eiaustralia
Contamination | Remediation | Geotechnical

CREATIVE VISION

Hydrogeological Report including Dewatering Management Plan and Groundwater Seepage Analysis

135 Badgerys Creek Road, Bradfield NSW

E26733.E16_Rev0
1 October 2025

DOCUMENT CONTROL

Report Title:	Hydrogeological Report including Dewatering Management Plan and Groundwater Seepage Analysis; 135 Badgerys Creek Road, Bradfield NSW
Report No:	E26733.E16_Rev0

Copies		Recipient
1	Soft Copy (PDF – Secured, issued by email)	Lateral Consulting Pty Ltd c/- Creative Vision Level 19, 9 Castlereagh Street, Sydney **NSW 2000**
2	Original (Saved to Digital Archives)	EI Australia Suite 6.01, 55 Miller Street, **Pyrmont NSW 2009**

Author	Technical Reviewer
Lance chen.	Sergio Raposeira
Lance Chen Environmental Engineer	**Sergio Raposeira** Senior Environmental Consultant CEnvP Cert. No: 1959

Revision	Details	Date	Amended By
0	Original	1 October 2025	-

TABLE OF CONTENTS

PAGE NUMBER

1. INTRODUCTION 1
1.1 Overview 1
1.2 Proposed Development 1
1.3 Report Objectives 2
1.4 Scope of Work 2
1.5 Regulatory Framework 3

2. SITE DESCRIPTION 5
2.1 Identification, Location and Zoning 5
2.2 Surrounding Land Use 5
2.3 Regional Setting 6
2.4 Local Groundwater Use 6
2.5 Potential Contamination Sources 6
2.6 Potential Environmental Receptors 7
2.7 Groundwater Dependent Ecosystems 7

3. GROUNDWATER CONDITIONS 8
3.1 Previous Investigations 8
3.2 Conceptual Hydrogeological Model 9
3.3 Pre-Dewatering Groundwater Depth and Hydraulic Gradient 9
3.4 Baseline Groundwater Quality Assessment 10
3.4.1 Monitoring Well Locations 10
3.4.2 Tested Parameters 10
3.4.3 Field Water Quality Testing and Observations 11
3.4.4 Laboratory Data Quality Assessment 12
3.4.5 Assessment Criteria 12
3.4.6 Laboratory Analytical Results 12
3.4.7 Water Treatment Requirements 12

4. DEWATERING METHODOLOGY 14
4.1 Excavation and Shoring 14
4.2 Estimated Groundwater Take Volume 14
4.3 Dewatering Level and Drawdown Monitoring 14
4.4 Dewatering Method 14
4.4.1 Construction Phase Dewatering 15
4.4.2 Operational Phase Dewatering 15

4.5 Discharge Flow and Volume Monitoring 15
4.6 Potential Drawdown-Induced Impacts 16

5. WATER QUALITY MANAGEMENT 17
5.1 Responsibility 17
5.2 Discharge Water Quality Guidelines 17

5.3 Additional Pre-dewatering Monitoring Event 20
5.4 Discharge Water Quality Monitoring 20
  5.4.1 Visual Monitoring 20
  5.4.2 Sample Collection and Analysis 20
  5.4.3 Reporting of Water Quality Results 21
5.5 Water Treatment 22
  5.5.1 Water Treatment Design Considerations 22
  5.5.2 Treatment System Maintenance 22
5.6 Reporting of Dewatering Information 23
  5.6.1 Interim Report - Construction Dewatering 23
  5.6.2 Annual Reporting for Operational Dewatering 23
  5.6.3 Dewatering Completion Report 23

6. SITE MANAGEMENT AND CONTROLS 24
6.1 Deviations from this Plan 24
6.2 Contact Details for Key Personnel 24
6.3 Summary of Specific Activities 24
6.4 Vibration, Noise and Odour Management 25
6.5 Dewatering Contingencies 25

7. MINIMAL HARM ASSESSMENT 28
7.1 Consideration of NSW Aquifer Interference Policy 28
  7.1.1 Hydrogeological Model Summary 28
  7.1.2 Groundwater Source Category 28
  7.1.3 Minimal Impact Considerations 28
  7.1.4 Minimal Impact Conclusions 29
7.2 Assessment Inputs 29
7.3 Operational (Occupational) Phase Dewatering Management 30
  7.3.1 Operational Phase Water Treatment 30
  7.3.2 Monitoring Frequency and Reporting 30
  7.3.3 Monitoring Well Replacement Protocol 31

8. DEWATERING MANAGEMENT SUMMARY 33

9. STATEMENT OF LIMITATIONS 35

REFERENCES 36

ABBREVIATIONS 38

SCHEDULE OF FIGURES (IN-TEXT)

Figure 4-1 Hypothetical layout of a *Sump and Pump* seepage collection system 15

SCHEDULE OF TABLES (IN-TEXT)

Table 1-1 Regulatory Framework 3
Table 2-1 Site Identification, Location and Zoning 5
Table 2-2 Surrounding Land Uses 5
Table 2-3 Regional Setting Information 6
Table 3-1 Summary of Groundwater Monitoring Results 9
Table 3-2 Groundwater Field Data (GME date: 14 August 2025) 11
Table 4-1 Assessment of Potential Dewatering Effects 16
Table 5-1 Discharge Water Criteria (DWC) 17
Table --1 Mitigation Measures for Potential Dewatering Issues 25
Table 7-1 Assessment inputs summary 29
Table 8-1 Dewatering Management Summary 33

APPENDICES

APPENDIX A – FIGURES

APPENDIX B – TABLES

APPENDIX C – DEVELOPMENT PLANS

APPENDIX D – GSA (EI, 2025E)

APPENDIX E – BOREHOLE LOGS

APPENDIX F – LABORATORY DOCUMENTATION

APPENDIX G – METHODOLOGY

APPENDIX H – COMPLETION REPORT FOR DEWATERING WORK

1. INTRODUCTION

1.1 Overview

Creative Vision ('the client') engaged EI Australia (EI) to prepare a Hydrogeological Report including Dewatering Management Plan and Groundwater Seepage Analysis (the 'report') for the property at 135 Badgerys Creek Road, Bradfield NSW ('the site').

The site is located approximately 45 kilometres (km) west of the Sydney central business district (CBD), within the local government area (LGA) of Liverpool City Council (Figure 1, **Appendix A**). The site comprised a rectangle-shaped section of land, covering an area of approximately 2.025 ha. At the time of the investigation, it was an occupied lot with no building structures.

The site is proposed for commercial and residential redevelopment, which will involve the construction of basements. This will require bulk excavation works that will intersect the shallow groundwater system, triggering the need for site dewatering. Groundwater drawn into the dewatering system will be treated to comply with relevant water quality criteria for subsequent discharge into the local municipal stormwater system, subject to Council approval.

This report is prepared for the purpose of complying with regulatory requirements in relation to the proposed site dewatering activities. With this aim in mind, the information is arranged as follows: the findings of relevant database searches including groundwater use, potential environmental receptors and groundwater dependent ecosystems (**Section 2)**; review of pre-dewatering groundwater conditions, including baseline groundwater elevations and groundwater quality (**Section 3** and **Appendix B**); dewatering management requirements with reference to field-based hydraulic conductivity tests and groundwater modelling results, as documented in the GSA report (**Section 4**), discharge water quality trigger levels, water treatment requirements, monitoring requirements for treated water quality and drawdown (**Section 5**), management controls and contingencies plan (**Section 6**).

Due to low hydraulic conductivity characteristics of the water-bearing lithology and the findings of an impact assessment confirming no more than minimal harm, a drained basement design is proposed for basement construction and for the occupational phase of the of the development.

Cumulative drawdown and water quality effects are assessed against the NSW Aquifer Interference Policy (AIP) in **Section 7**. Findings are reviewed with due regard for relevant factors including groundwater utility, ground settlement potential and water treatability to demonstrate that the proposed drained basement would meet the minimal impact considerations, as described in the AIP.

1.2 Proposed Development

Based on the supplied architectural drawings (**Appendix C**) the proposed development involves involves:

- Excavation is planned for three detached two-level basements, comprising:
    - Stage 1 basement underlying the hotel and childcare towards the eastern boundary;
    - Stage 2 basement underlying commercial and residential buildings towards the centre of the site; and
    - Stage 3 underlying further commercial and residential buildings towards the western boundary.
    - Stage 1 and Stage 2 basements are shown to have a shared wall with Stage 2 and Stage 3 separated by a riparian corridor with water course and a proposed local street.

- The lowest basement levels of each stage are proposed to have a Finished Floor Level (FFL) of between RL 68.8m and 70.0m Australian Height Datum (AHD).
- A Bulk Excavation Level (BEL) ranging between RL 69.7 m and 70.7 m is assumed, which includes allowance for the construction of the basement slab.
- To achieve the BEL, excavation depths from 5.5m to 11.5m Below Existing Ground Level (BEGL) have been estimated. Locally deeper excavations may be required for footings, lift overrun pits, crane pads, and service trenches.
- The basement extends up to the northern and eastern site boundaries for the Stage 1 and Stage 2 basements, and is set back from the southern boundary by about 3 m.
- The Stage 3 basement is set back also about 3 m from the southern site boundary, and about 10 m from the western boundary, and a minimum of 6 m from the northern site boundary.

A drained basement using sub-soil drainage and a sump-and-pump system is assumed as the dewatering method for the project. The dewatering method is described in more detail in **Section 4**.

1.3 Report Objectives

The objectives of this report are to:

- Describe the conceptual hydrogeological model for the site and summarise baseline groundwater conditions, including pre-dewatering groundwater depth and groundwater quality;
- Summarise relevant hydrogeological and groundwater modelling information, with reference to EI's groundwater seepage analysis (GSA) report; which is attached as **Appendix D**;
- Describe the dewatering methodology, groundwater treatment requirements, monitoring and reporting procedures to be employed;
- Provide effective management and contingency procedures, to ensure that the discharge of extracted groundwater does not pose unacceptable risks to the receiving environment, in compliance with the *Protection of the Environment Operations Act 1997*;
- Detail post-construction seepage control measures and dewatering management procedures; and
- Provide relevant information on anticipated groundwater impacts, with reference to the *NSW Aquifer Interference policy* to properly inform the regulatory approval process.

It is understood that this report will form the basis for a Council permit application for connection and discharge to the municipal stormwater system and a water supply works (dewatering licence) application to WaterNSW.

1.4 Scope of Work

The following works were undertaken:

- A desktop study including:
  - Review DA consent conditions and WaterNSW requirements to determine generic and site specific conditions placed on the development in relation to dewatering;
  - Review of the development proposal and proposed shoring/dewatering designs;
  - Review of hydrogeological, landscape and acid sulfate soil (ASS) risk maps for the area;
  - Review of previous investigation reports and plans, which included:

  - ➢ A search of registered bores located within a 500m radius of the site to review local groundwater usage;
  - ➢ Onsite drilling data, including sub-surface stratigraphic data and depth to water bearing zones; and
  - ➢ Potential onsite and offsite sources of contamination that may impact on dewatering discharge water quality.
- Groundwater monitoring event (GME), including sampling of four existing monitoring wells and laboratory analysis for relevant analytical parameters to characterise baseline groundwater quality.

This report also relies on information provided in a groundwater seepage analysis (GSA) report, which is attached as **Appendix D**. The GSA includes the findings from field-based hydraulic testing and computer-based groundwater modelling used to determine groundwater take volumes and provide estimates for associated water level drawdown effects. GSA details and findings are incorporated into various parts of this report.

1.5 Regulatory Framework

The following regulatory framework and guidelines were considered for this report:

Table 1-1 Regulatory Framework

NSW Legislation, Regulatory Instruments and Guidelines	Requirements
Contaminated Land Management Act 1997 (CLM Act)	Promotes the effective management of contaminated land in NSW by setting out the roles and responsibilities of the NSW EPA and its rules.
Environmental Planning and Assessment Act 1979 (EP&A Act)	The EP&A Act stipulates the regulations and gives rise to state environmental planning policy (SEPP) to assist regulators with the protection of human and environmental health.
Protection of the Environment Operations Act 1997 (POEO Act)	The objective of the *POEO Act* is to achieve the protection, restoration and enhancement of the quality of the environment.
NSW Water Management (General) Regulation 2018.	Details relating to Water Access License requirements, if relevant.
Water Management Act 2000 and *Water Act 1912* (WM Act)	Protects the health of rivers, streams and groundwater systems and gives rise to Water Sharing Plans and quality objectives for catchments within the state of NSW. Manages aquifer interference activities which involve: ▪ The penetration of an aquifer; ▪ The interference of water in an aquifer; ▪ The obstruction of water flow or taking of water from an aquifer when carrying out prescribed activities; and ▪ The disposal of water taken from an aquifer.
NSW Aquifer Interference Policy (2012)	Details the scope of aquifer interference activities, minimal impact assessment and provides specific guidance on the licensing and approval requirements for activities that interfere with aquifers.
Liverpool City Council Plans and Policies	Provides controls and guidelines for development in the area. ▪ *State Environmental Planning Policy (Precincts—Western Parkland City) 2021* Note: For projects involving site dewatering, Council typically requires details for the proposed water disposal connection to the stormwater system, preferably in the form of engineering drawings and plans.

NSW Legislation, Regulatory Instruments and Guidelines	**Requirements**
Guidelines	▪ ANZG (2018) *Guidelines for Fresh and Marine Water Quality;* ▪ ANZECC & ARMCANZ (2000) *Guidelines for Fresh and Marine Water Quality*, Vol. 1, Chapter 3, Aquatic Ecosystems; ▪ DPIE (2022) *Minimum requirements for building site groundwater investigations and reporting;* ▪ NHMRC (2008) *Guidelines for Managing Risks in Recreational Water.*

2. SITE DESCRIPTION

2.1 Identification, Location and Zoning

Site identification details and associated information are summarised in **Table 2-1**. Site location and the proposed development are shown in **Figures A1** and **A2**, in **Appendix A**.

Table 2-1 Site Identification, Location and Zoning

Information	Detail
Site Address	135 Badgerys Creek Road, Bradfield NSW
Location Description	The site is a vegetated vacant lot. It was surrounded by: ▪ North: Residential farmland; ▪ East: Sydney Metro and Bradfield City Centre construction site; ▪ South: Residential farmland; ▪ West: Badgerys Creek Road, followed by residential farmland and a depot/storage yard
Lots and DPs	Lot 7 in Deposited Plan 243457
Local Government Area	Liverpool City Council
Current Zoning	MU – Mixed Use State Environmental Planning Policy (Precincts—Western Parkland City) 2021
Current Site Use	At the time of fieldwork for preparation of this report, the site was an occupied lot with no building structures.
Location Coordinates	North-western corner of site (GDA2020-MGA56): ▪ Easting: 290105.126 ▪ Northing: 6244096.985
Site Area	Approximately 2.025 ha

2.2 Surrounding Land Use

Surrounding land uses and local, potential receptors within close proximity (within 250m) to the site are described in **Table 2-2**.

Table 2-2 Surrounding Land Uses

Direction	Land Use Description
North	Residential farmland
East	Construction site (Metro and Bradfield City Centre)
South	Residential farmland
West	Badgerys Creek Road, followed by residential farmland and commercial depot and storage yard

2.3 Regional Setting

Regional setting is briefly outlined in **Table 2-3**.

Table 2-3 Regional Setting Information

Attribute	Description
Topography	The site gently downslopes from the west and east boundary's to the centre of the site, with elevations ranging from 80 to 76 metre Australian Height Datum (m AHD) (Source: Mecone Mosaic).
Site Drainage	Surface water is expected to directly infiltrate on exposed surfaces. Any runoff is likely to drain into the municipal stormwater system.
Regional Geology	According to the *Geological Series Penrith Sheet 9030* (DMR, 1991), the site is underlain by *Rwb: Bringelly Shale*, characterised by shale, carbonaceous claystone, claystone, laminate, fine to medium grained lithic sandstone, rare coal and tuff.
Soil Landscape	The NSW Government Department of Planning, Industry and Environment *eSPADE v2.2* website indicates that the site overlies a Blacktown (*bt*) residual landscape, which consists of gently undulating rises on Wianamatta Group shales. Local relief to 30 m, slopes usually >5%. Broad rounded crests and ridges with gently inclined slopes
Acid Sulfate Soil (ASS) Risk	With reference to the *Atlas of Australian Acid Sulfate Soils* (Due Diligence Report; Land Insight, 2025), the site lies within the class description of '*Extremely low probability of occurrence*'. In such cases, ASSs are not known or expected to occur and "land management activities are not likely to be affected by ASS materials." Based on the map information, as well as the site's elevation 76-80m AHD, the potential for ASS to be present on-site was low and further related assessment was unwarranted.
Nearest Water Feature	Private: Dam located approximately 20 m north of the northern site boundary. Public: Moore Gully approximately 500 m south of the site.
Groundwater Flow Direction	Anticipated to be south easterly, towards Moore Gully.

2.4 Local Groundwater Use

An online search for groundwater bores registered with WaterNSW was conducted by EI on 11 July 2025 (Ref. https://realtimedata.waternsw.com.au/water.stm). The search revealed no registered bores within a 500m radius of the site, indicating that local groundwater is not utilised for water supply purposes in the vicinity of the site, particularly as a more reliable and convenient, reticulated potable water supply is readily available and preferred by domestic and commercial/industrial water users.

2.5 Potential Contamination Sources

Previous environmental investigations for the site (EI, 2025) have not identified any evidence or local land uses that would indicate the potential for off-site mobile sources of contamination. In addition the environmental investigation data did not identify any significant onsite mobile contamination that would potentially cause water quality deterioration as a result of site dewatering.

2.6 Potential Environmental Receptors

It is proposed that during construction, extracted groundwater will be pumped through a water treatment system (**Section 5.4**) and then discharged into the local municipal stormwater system, which is expected to drain into Moore Gully located approximately 500m south of the site.

Moore Gully is considered to be a slightly to moderately disturbed ecosystem. The creek is also deemed to be a freshwater ecosystem for discharge water quality considerations, as detailed in **Section 5.2**.

2.7 Groundwater Dependent Ecosystems

A search of the *NSW Water Sharing Plan for the Greater Metropolitan Region Groundwater Sources 2023 – Schedule 4* was conducted on 11 July 2025. Moore Gully was not listed as a high priority groundwater dependent ecosystem (GDE) on **Table D** of the plan and no other high priority GDE was listed within 40 m of the site. This information was used in the minimal harm assessment considerations under the NSW Aquifer Interference Policy, as described in **Section 7.1** of this report.

3. GROUNDWATER CONDITIONS

3.1 Previous Investigations

The following previous reports were used to gain an understanding of hydrogeological conditions at the site:

- EI (2025a) *Acid Sulfate Soil Assessment at* 135 Badgerys Creek Road NSW, Report No. E26733.E14_Rev1, 24 September 2025 – the ASSMP;
- EI (2025b) *Preliminary Site Investigation with Targeted Sampling* at 135 Badgerys Creek Road NSW, Report No. E26733.E01_Rev1, 25 September 2025 – the PSI;
- EI (2025c) *Geotechnical Investigation at* 135 Badgerys Creek Road NSW Report No. E26733.G03_Rev0, 25 September 2025;
- EI (2025d) *Salinity Management Plan at* 135 Badgerys Creek Road NSW Report No. E26733.G17_Rev0, 11 July 2025; and
- EI (2025e) *Groundwater Seepage Analysis* at 135 Badgerys Creek Road NSW Report No. E26733.G17_Rev0, 29 September 2025.
- A total of five groundwater monitoring wells (detailed borehole logs presented in **Appendix E**) were installed during the previous PSI (EI, 2025b).

The previous reports were reviewed and summarised as follows:

- ***EI (2025a) Acid Sulfate Soil Assessment -*** The objective of this report is to provide the framework for the on-going management and monitoring of the impacts of ASSs (if present at the site) throughout the construction and operation phases of the project in lieu of an Acid Sulfate Soil Assessment.
- ***EI (2025b) Preliminary Site Investigation with Targeted Sampling -*** The purpose of the investigation was to determine the environmental conditions (contamination status) of the site, by means of targeted sampling of soil and groundwater followed by laboratory analysis for relevant potential contaminants.

  The Preliminary Site Investigation conducted by EI (2025) was inclusive of an intrusive investigation with the advancement of boreholes located at accessible areas. The contaminants of concern were subject to testing and after screening the data it was reported that the human-health and ecological risks were found to be low and acceptable. As such there was no trigger for a Remedial Action Plan and/or Long Term Environmental Management Plan. Nevertheless, the recommendations detailed in the PSI should be addressed and be managed through the development approval process, as conditions of consent, in accordance with State Environmental Planning Policy (Resilience and Hazards) 2021.
- ***EI (2025c) Geotechnical Investigation -*** The purpose of the investigation was to provide information on subsurface conditions on the site by way of intrusive investigation.

  The depth of the test bores ranged between 10.91m and 21.97m.Five boreholes (were converted into groundwater monitoring wells to allow for groundwater monitoring.
- ***EI (2025d) Salinity Management Plan -*** The purpose of the investigation was to provide salinity information on the site by way of intrusive investigation and laboratory analysisat three test bores (BH01, BH03 and BH05).

  Based on the findings of the laboratory analysis, saline, sodic soils are likely to be encountered during construction. A slight to moderate salinity potential and the presence of very strongly sodic soils was identified, and mitigation measures will be required during construction to reduce the risks posed by these soils. In such case, these soils must be managed in accordance with the *Salinity Management Plan* (EI, 2025d) during construction.

- ***EI (2025e) Groundwater Seepage Analysis* -** The GSA report was prepared by EI's geotechnical engineering group and provided details of the proposed excavation and site-specific groundwater modelling findings, including predicted water level drawdowns, expected groundwater inflow and discharge volumes, and predicted, drawdown-induced ground settlement rates at varying distances from the basement excavation. The GSA report is included in **Appendix D** and GSA findings are incorporated into various parts of this report.

3.2 Conceptual Hydrogeological Model

Based on previous investigation findings and EI's experience from sites with similar sub-soil conditions, the Conceptual Hydrogeoxialogical Model for the site is summarised as follows:

- Subsurface soil profile:
  - ➢ Fill layer (silty clay), from 0.0-0.5m BGL;
  - ➢ Natural soil layer (clay), from 0.5 – 2.5 mBGL; and
  - ➢ Siltstone bedrock, beneath the fill / natural layer, from 2.5 to 21 mBGL.
- Groundwater under pressure with standing water levels (SWLs) ranging between 73.27 and 75.72 mAHD, as measured within monitoring wells located inside and close to the proposed basement excavation footprint area, shown in **Table 3-1**.
- Groundwater flow direction in the vicinity of the site is inferred (based on monitoring data, see **Section 3.3 and Groundwater contour presented in Figure 3, Appendix A**) to be easterly then ultimately towards Moore Gully.
- Local groundwater is not utilised for water supply purposes, as indicated by the absence of registered groundwater supply bores within 500m of the site (**Section 2.4**).

3.3 Pre-Dewatering Groundwater Depth and Hydraulic Gradient

EI measured groundwater levels during three inspections from groundwater monitoring wells BH1M, BH2M, BH3M, BH5M and BH6M. Groundwater levels recorded during each inspection are summarised in **Table 3-1**.

Table 3-1 Summary of Groundwater Monitoring Results

Monitoring Well ID	Groundwater Levels		
	Date of Observation	Approximate Depth to Groundwater Level (m BEGL)	Approximate RL of Groundwater Level (m AHD)
BH1M	6/05/2025 8/05/2025 23/09/2025	4.58 4.66 4.80	75.72 75.64 75.5
BH2M	6/05/2025 8/05/2025 23/09/2025	4.44 5.36 4.49	75.27 74.34 75.21
BH3M	6/05/2025 8/05/2025 23/09/2025	1.52 1.62 1.48	75.28 75.18 75.32
BH5M	6/05/2025 8/05/2025 23/09/2025	6.36 7.43 7.19	74.34 73.27 73.51

Monitoring Well ID	Groundwater Levels		
BH6M	6/05/2025	4.19	74.51
	8/05/2025	5.25	73.45
	23/09/2025	5.02	73.68

Groundwater level data from the latest groundwater monitoring event on 23 September 2025, were used to produce the groundwater contour maps presented in **Figure 3**, **Appendix A**. The analysis showed that:

- The highest recorded groundwater level on 23 September was identified at BH1M, with the standing water level of 75.5 mAHD.
- The lowest recorded groundwater level on 23 September was identified at BH5M, with the standing water level of 71.51 mAHD.

Based on groundwater levels observed on the site, the following design groundwater levels (GWL) for each section have been adopted for this analysis:

- **Section A-A'**: Design groundwater levels of RL 76.7 m AHD was adopted for the western side of the site, incorporating a 1 m increase above the observed levels to account for possible seasonal variation.
- **Section B-B'**: Design groundwater levels of RL 76.3 m AHD was adopted for the eastern side of the site, incorporating a 1 m increase above the observed levels to account for possible seasonal variation.

The estimated maximum extent of the cone of depression has been determined using Sichardt's Formula, as follows:

$$R = 3000\,(H - h)\sqrt{k}$$

where:

- R = Maximum extent of the cone of depression
- h = Estimated groundwater level at the BEL due to full duration of dewatering (m).
- k = Hydraulic conductivity of the aquifer (m/s).

The coefficient of 3000 is based on empirical observations, predominantly for sandy aquifers. The lowest coefficient outlined in Sichardt's formula is approximately 1000, which would result in a smaller radius of influence. Therefore, using a coefficient of 3000 in this case is considered conservative.

Based on the formula above, the maximum extent of the cone of depression is estimated to be approximately 50m from the basement outline. This extent has been adopted in the numerical modelling.

3.4 Baseline Groundwater Quality Assessment

3.4.1 Monitoring Well Locations

Analytical results for groundwater sampled from each of the monitoring wells BH1M, BH3M, BH5M and BH6M were used to characterise pre-dewatering groundwater quality. All well locations are illustrated on **Figure A2**, **Appendix A**.

3.4.2 Tested Parameters

The most recent GME was conducted on 6 May 2025 and incorporated the above-listed four monitoring wells. Collected samples were tested for the mandatory baseline analytical parameters listed in Appendix A of DPIE (2022), as follows:

- Physical parameters: Electrical Conductivity (EC), pH, redox potential (Eh), Total Dissolved Solids (TDS), Total Hardness, temperature, Dissolved Oxygen (DO) and Turbidity;
- Major Anions: sulfate (SO_4), chloride (Cl), carbonates (CO_3), bromide (Br), fluoride (F);
- Major Cations: calcium (Ca), magnesium (Mg), sodium (Na), potassium (K);
- Ionic balance: cation/anion balance (%);
- Dissolved metals: aluminium (Al), antimony (Sb), arsenic (As), barium (Ba), beryllium (Be), boron (B), cadmium (Cd), total chromium (Cr), cobalt (Co), copper (Cu), iron (Fe), lead (Pb), lithium (Li), manganese (Mn), mercury (Hg), molybdenum (Mo), nickel (Ni), selenium (Se), silica (dissolved SiO2), silver (Ag), strontium (Sr), uranium (U), vanadium (V) and zinc (Zn);
- Nutrients: ammonia (NH3), nitrate (NO_3), total nitrogen (N), oxidised nitrogen (N), total phosphorus (P) and reactive phosphorus (P);
- Microbiological organisms: Faecal coliforms, faecal streptococci and Escherichia Coli;
- Organics: Benzene, Toluene, Ethylbenzene and Xylenes (BTEX), Polycyclic Aromatic Hydrocarbons (PAHs), Total Recoverable Hydrocarbons (TRHs);

The following additional parameters were also analysed as part of the site characterisation process:

- Volatile Organic Compounds (VOCs), including Chlorinated Volatile Organic Compounds (CVOC);
- Total cyanide and total phenols; and
- Perfluoroalkyl and polyfluoroalkyl substances (PFAS).

3.4.3 Field Water Quality Testing and Observations

The field water quality parameters DO, pH, EC, temperature and Redox potential, were measured onsite using a flow cell and recorded as presented in **Table 3-2**. The groundwater samples were then evaluated on the basis of odour and visual signs of contamination, with the following observations noted:

- Groundwater samples were observed to be clear to light grey / brown in colour, with low turbidity;
- No odour or visual evidence of contamination were detected during well purging and groundwater sampling;
- No petrochemical films or oily sheen was observed on the surface of the purged / sampled groundwater; and
- A portable photo-ionisation detector (PID) was used to screen the top of each well for VOCs and PID readings were low (<5ppm, i.e. less than background levels) at all four wells.

Table 3-2 Groundwater Field Data (GME date: 14 August 2025)

Well ID	DO (mg/L)	pH	EC (μS/cm)	Temperature (°C)	Redox [1] (mV)
BH1M	0.0	6.64	20,990	16.29	177.8
BH2M	0.0	6.71	11,990	16.52	173.6
BH3M	0.0	7.24	5,562	16.05	175.7
BH5M	0.0	7.45	1,584	17.66	177.7
BH6M	0.0	7.59	2,533	18.03	175.7

Notes:

[1] Redox potential (mV) readings were adjusted to Standard Hydrogen Electrode (SHE) by adding field electrode potential (205mV).

Field observations indicated that he groundwater was fresh to saline (EC 1,584 to 20,990 μS/cm), slightly acidic to alkaline (pH 6.64 to 7.59), oxidising conditions (Redox 173.6 to 177.8 mV) and oxygen depleted (DO 0.0 mg/L).

3.4.4 Laboratory Data Quality Assessment

A data quality assessment in relation to the May 2025 groundwater data was undertaken, as documented in **Appendix G**. This included collection and testing of field quality control samples and review of field QC and internal laboratory QA/QC results. On the basis of the analytical data validation procedure employed, the overall quality of the groundwater analytical data were considered to be of an acceptable standard for interpretive use.

3.4.5 Assessment Criteria

The adopted discharge water criteria (the 'DWC') were based on the default guideline values (DGVs) for freshwater ecosystems as published under ANZG (2018) *95% Freshwater Default Guideline Values* (*DGVs)* and 99% *Freshwater DGVs* for bio-accumulative toxicants (cadmium and mercury). For parameters that are not currently addressed by the ANZG fresh water DGVs, relevant alternative criteria were adopted, as detailed in **Section 5.2**.

The criteria values are presented alongside the analytical results in the corresponding summary tables (**Table B1** and **Table B2** in **Appendix B**).

3.4.6 Laboratory Analytical Results

A summary of laboratory analytical results assessed against the adopted water quality criteria is presented in **Table B1** and **Table B2** (**Appendix B**). Laboratory documentation is attached in **Appendix F**.

Groundwater quality data were assessed against the water discharge criteria (the 'adopted criteria'), which are based on the default guideline values (DGVs) for fresh water, published under the ANZG (2018) *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*, or appropriate default criteria, as explained in **Section 5.2**.

In summary, the results of the May 2025 GME showed compliant concentrations with the water discharge criteria in most samples, with the following exceptions:

- TRH were deleted in all groundwater monitoring wells sampled;
- Electrical conductivity in all groundwater monitoring wells exceeded the adopted criteria; and
- Turbidity in wells BH2M, BH3M and BH6M exceeded the adopted criteria.

3.4.7 Water Treatment Requirements

<u>Construction Phase Dewatering</u>

The baseline groundwater quality data indicates water treatment is required in relation to:

- The physical parameters: Electrical Conductivity and turbidity;
- Metals: cobalt; and
- The nutrient parameters: total oxidised nitrogen, total nitrogen and total phosphorus.

Potential water treatment options include pumping the water through a sediment settlement tank, where the following could be implemented:

- Addition of flocculent/coagulant for settlement of suspended particles;
- pH correction implemented concurrently to higher water pH to the required range; and

- Adjustment of flow rates to allow sufficient residence time for flocculation/coagulation and settlement to take place.

A further GME is recommended before commencement of construction, including testing of DPIE (2022) water quality parameters (as listed in **Section 5.3**), to verify groundwater quality and to inform the water treatment requirements.

A water treatment specialist should be engaged to advise on appropriate technologies for water treatment.

Further details on water quality management are provided in **Section 5.4**.

Operational Phase Dewatering

Laboratory test results for the routine treated water sample collected at the end of basement construction will be used to verify discharge water quality at the end of the construction phase. The results will also inform any required adjustments to the water treatment system for the operational phase, to ensure that water quality is complaint with the discharge criteria (**Table 5-1**).

Water treatment requirements for the occupational phase will be determined at the completion of the construction dewatering phase, as described in **Section 7.3**.

4. DEWATERING METHODOLOGY

4.1 Excavation and Shoring

As stated in **Section 1.2**, the proposed development includes the construction of a multi-level basement. A BEL of RL 69.7 to 70.7 m AHD has been assumed. Locally deeper excavations may be required for footings, service trenches, crane pads and lift overrun pits.

With reference to the GSA report (attached in **Appendix D**), the basement excavation is assumed to be supported by a shoring system comprised of a fully drained soldier pile wall.

This assessment does not cover the overall stability and embedment depth of the shoring system. Once final designs are made available, the GSA (and this report) should be revised accordingly.

4.2 Estimated Groundwater Take Volume

As described in the GSA report, groundwater seepage analysis was undertaken using PLAXIS 2D Advanced (Version 2024.1.0.1060). PLAXIS 2D is a finite element software package, which estimates the seepage rate of water entering the excavation through and beneath the shoring wall. This model estimates the volume of water which will be required to be dewatered during basement construction, as well as the annual water take applicable for the occupational phase of the development.

As the basement will be designed as a draining structure for this project, groundwater mounding was not a consideration for modelling purposes.

Based on a specific set of assumptions and field test data, which included the design groundwater levels of 76.7 mAHD **across Section A-A' and** 76.3 mAHD across **Section B-B',** and calculated, layer-specific hydraulic conductivities for the various classes of bedrock encountered at the site (detailed in the GSA report), annual groundwater seepage flow draining through the shored walls into the excavation is predicted to be **14.2 ML/year** (38.8 m^3/day). This would apply for both the construction and the operational phases of the development.

It is noted that in accordance with the NSW *Water Management (General) Regulation 2018*, a Water Access Licence is required where the estimated groundwater take is above 3 ML/year.

4.3 Dewatering Level and Drawdown Monitoring

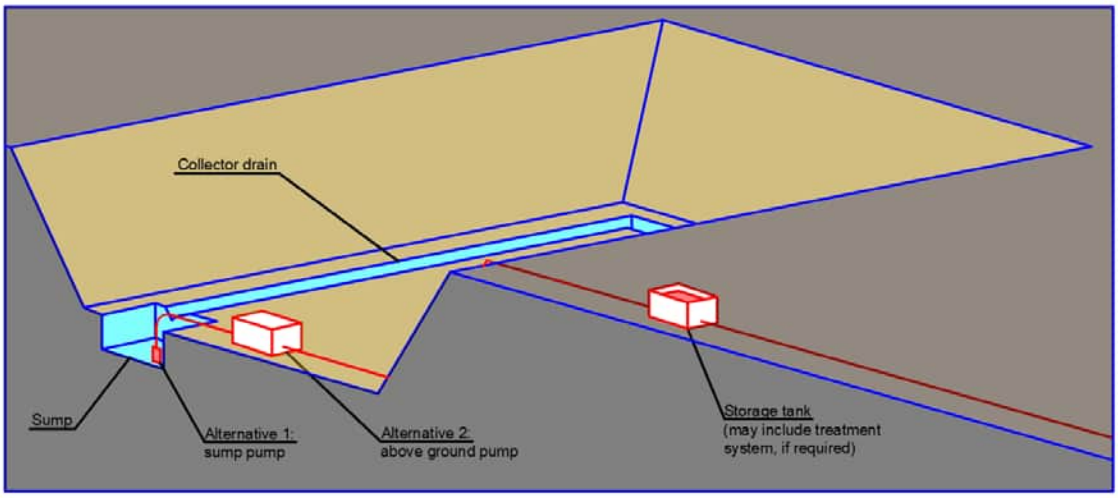
With reference to GSA (EI, 2025e) attached in **Appendix D,** the groundwater drawdown surrounding the basement boundary is predicted to be up to about 6 m.

The ground settlements due to the predicted groundwater drawdown behind the shoring wall, within the cone of depression, are estimated to be less than 3 mm. This level of settlement falls within the 'negligible' risk category for damage risk resulting from ground settlement due to dewatering, as per Cashman and Preene (2021). It would be prudent for potential risks to neighbouring structures to be assessed by a qualified and experienced structural engineer.

4.4 Dewatering Method

A sump and pump system will be used to control seepage into the excavation during basement construction and in the long-term, as illustrated in **Figure 4-1**.

Figure 4-1 Hypothetical layout of a *Sump and Pump* seepage collection system



4.4.1 Construction Phase Dewatering

During construction, it is recommended that groundwater is pumped-out from a collection sump located at the lowest part of the excavation and discharged initially into a vessel (or equivalent) for sediment settling. The preferred vessel type will require capacity to accommodate the rate of groundwater extraction, which is estimated to be approximately 38.8 m^3/day.

Groundwater treatment will be undertaken either in the vessel, or via a water treatment system installed close to the vessel prior to discharge. The treated water will then be discharged into the municipal storm water pit provided that prior approval for discharge has been obtained from the relevant consent authorities.

The pumping system may operate on a full time or intermittent basis (as required) for the approved construction dewatering period, to control seepage during basement construction.

The Site Manager, Dewatering Contractor and Water Treatment Specialist must agree on a dewatering strategy to confirm that dewatering treatment systems and water retention tanks can be positioned appropriately within approved areas of the site, prior to the commencement of the excavation works.

4.4.2 Operational Phase Dewatering

Dewatering for the operational (post-construction) phase of the development would involve collection of groundwater seepage via onsite detention storage (OSD tank, or equivalent), with water treatment followed by discharge to the municipal stormwater system for the operational life of the project, with consent authority approval.

It is understood that WaterNSW may consider an application for long-term, operational phase dewatering, where minimal impact considerations under the NSW Aquifer Interference Policy (AIP) are satisfied. An assessment against the AIP was undertaken, which found minimal impact requirements would be satisfied, as described in **Section 7**.

4.5 Discharge Flow and Volume Monitoring

The volume of water discharged must be monitored by a calibrated flow meter (or equivalent alternative means) that is integrated as part of the dewatering system for the complete duration of the temporary construction dewatering period. The flow meter will therefore display cumulative volume discharged at any stage during dewatering, which will be documented as part of the dewatering monitoring records.

In regards to the drainage and disposal of seepage waters entering the basement, the client must provide details for the proposed disposal connection to the stormwater system, preferably in the form of drawings, suitable for Council review purposes.

Flow monitoring data will be documented by a suitably trained site employee under the supervision of the Site Manager. Tabulated records should be maintained on site and made available to the Environmental Consultant for inclusion in the routine monitoring event reports.

These records will be used to calculate the actual groundwater volume taken from the site and will be included in the Construction Dewatering Completion Report (**Section 5.4.3**), to be issued to Council and WaterNSW after the completion of construction dewatering activities.

For the construction phase, water level and volume monitoring will be conducted during the same monitoring events described in **Section 5.4**. For the operation phase, these monitoring events will be conducted annually, as described in **Section 7.3**.

4.6 Potential Drawdown-Induced Impacts

A review of potential adverse effects of dewatering on neighbouring properties and groundwater dependent ecosystems was undertaken, as summarised in **Table 4-1**.

Table 4-1 Assessment of Potential Dewatering Effects

Attribute	Description
Proximity of Groundwater Dependent Ecosystems (GDEs)	A search of Schedule 4 in NSW Water Sharing Plan for the Greater Metropolitan Region Groundwater Sources 2023, found no listed groundwater dependent ecosystems within 40 m of the site.
Potential impacts on groundwater quality resulting from onsite migration of contamination	Previous investigations have not identified any evidence of potential onsite or offsite contamination sources that could potentially impact on groundwater quality. The risk of groundwater quality deterioration due to dewatering was therefore concluded to be low.
Water supply losses by neighbouring groundwater users	As described in Section 2.4 a review of registered bores within a 500 m radius of the site indicated no shallow water supply bores in the locality, it was concluded that local groundwater was not being utilised or relied on as a water supply source. The shallow nature of the proposed site dewatering and the low utilisation of groundwater indicated that water supply losses are unlikely to be experienced as there are no identified local groundwater users.
Potential subsidence of neighbouring structures	The groundwater drawdown surrounding the basement boundary is predicted to be up to about 6 m. The ground settlements due to the predicted groundwater drawdown behind the shoring wall, within the cone of depression, are estimated to be less than 3 mm. This level of settlement falls within the 'negligible' risk category for damage risk resulting from ground settlement due to dewatering, as per Cashman and Preene (2021). It would be prudent for potential risks to neighbouring structures to be assessed by a qualified and experienced structural engineer.
Mounding of water up gradient of structure	As the basement will be designed as a draining structure for this project, groundwater mounding is not a consideration.

5. WATER QUALITY MANAGEMENT

5.1 Responsibility

The Principal Contractor or Site Manager, appointed by the client for the construction works, will be responsible for implementing the management procedures for water quality as described in this report. Post-construction (i.e. occupational phase) water quality management, including water treatment and water quality monitoring will be overseen by strata management (see also **Section 7.3**).

5.2 Discharge Water Quality Guidelines

In accordance with statutory requirements for site dewatering operations, discharged waters must comply with the ANZG (2018) *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*, or relevant default criteria where the ANZG (2018) guidelines do not provide values. This requirement is in compliance with the *Protection of the Environment Operations Act 1997*.

The nearest, primary receiving water body is Moore Gully, which is an urban stream and is considered a slightly to moderately disturbed freshwater (**Section 2.6**). The ANZG (2018) *95% freshwater Default Guideline Values* (*DGVs)* and 99% freshwater *DGVs* for bio-accumulative toxicants were therefore adopted as the Discharge Water Criteria (DWC). These will be the trigger levels for contingent actions (see **Section 6.5**) to ensure that water of an appropriate quality is discharged to the environment.

For water quality parameters not currently addressed by the ANZG freshwater DGVs, relevant alternative criteria have been adopted as the default DWC, as summarised in **Table 5-1**. For parameters not addressed by the ANZG (2018) freshwater criteria, recreational water criteria were not used, as these were deemed not relevant to the receiving water body, with the exception of *oil and grease*, for aesthetic purposes. The adopted criteria are specified in the table footnotes.

The listed parameters and their respective criteria will apply for both the initial (pre-dewatering) and on-going assessment of the quality of water being discharged to the storm water system during the construction and occupational phases of the development. It is noted however, that specific analytical parameters are not mandatory after the baseline groundwater quality assessment, in accordance with the Routine water quality monitoring lists in Appendix A of DPIE (2022).

Table 5-1 Discharge Water Criteria (DWC)

Analyte	**DWC (µg/L)** [1]
Metals	
Aluminium (for waters with pH > 6.5) (Al)	55
Antimony (Sb)	9 [3]
Arsenic ^{III} (As III)	24
Arsenic ^{V} (As V)	13
Barium (Ba)	No Relevant Criteria
Beryllium (Be)	No Relevant Criteria
Boron (B)	940

Analyte	**DWC (µg/L) [1]**
Cadmium (Cd)	0.2
Chromium [III] (Cr III)	3.3 [3]
Chromium [VI] (Cr VI)	1
Cobalt (Co)	1.4 [3]
Copper (Cu)	14 [2]
Iron (Fe)	No Relevant Criteria
Lead (Pb)	3.4
Lithium (Li)	No Relevant Criteria
Manganese (Mn)	1900
Mercury (total) (Hg)	0.06
Molybdenum (Mo)	34 [3]
Nickel (Ni)	11
Selenium (Se)	11
Silica (dissolved SiO_2)	No Relevant Criteria
Silver (Ag)	0.05
Strontium (Sr)	No Relevant Criteria
Uranium (U)	0.5 [3]
Vanadium (V)	6 [3]
Zinc (Zn)	80 [2]
Petroleum Hydrocarbons / Total Recoverable Hydrocarbons (TRH)	
Oil and grease	*No visible sheens, surface films or oil and grease* [4]
Volatile TRH ($C_6 – C_9$)	No Relevant Criteria
Semi-volatile to heavy TRH ($C_{10} – C_{40}$)	No Relevant Criteria
Monocyclic Aromatic Hydrocarbons (BTEX)	
Benzene	950
Toluene	180
Ethylbenzene	80
o - xylene	350
p - xylene	200
m - xylene	75
Polycyclic Aromatic Hydrocarbons (PAH)	
Benzo(a)pyrene	0.1
Naphthalene	16
Microbiological Organisms	

Analyte	DWC (µg/L) [1]
Faecal coliforms, Faecal streptococci, Escherichia coli (E. coli)	No Relevant Criteria
Major Ions	
Anions: sulfate, chloride, carbonates, bromide, fluoride	No Relevant Criteria
Cations: calcium, magnesium, sodium, potassium	No Relevant Criteria
Ionic balance: cation / anion balance (as a percentage)	No Relevant Criteria
Nutrients	
Ammonia	900
Nitrate (NO_3)	700 [7]
Nitrite (NO_2)	No Relevant Criteria
Total Oxidised Nitrogen (NO_x)	40 [9]
Total Nitrogen	500 [9]
Total Phosphorus	50 [9]
Reactive Phosphorus	20 [9]
Other	
Total Cyanide	7
Phenol	320
PFOS	0.13 [8]
PFOA	220 [8]
Physiochemical Parameters	
EC (µS/cm)	2,200 [6]
pH (pH units)	6.5 to 8.0 [5]
Turbidity (NTU)	50 [6]

Note 1	Discharge water criteria are the ANZG (2018) *95% Default Guideline Values (DGVs)* for the protection of slightly to moderately disturbed freshwater ecosystems, with the *99% DGVs* applied for the bio-accumulative parameters *benzo(a)pyrene*, *cadmium* and *mercury*, unless otherwise indicated.
Note 2	For the metals copper and zinc, which are commonly present as regional background components in groundwater at concentrations above the ANZG 2018 95% Fresh DGVs, discharge water criteria are set at one order of magnitude higher than the ANZG 2018 DGV.
Note 3	The ANZG (2018) only provides freshwater criteria at an ‘unknown’ level (%) of species protection for *antimony, chromium III, cobalt, molybdenum, uranium* and *vanadium*; therefore, these DGVs are applied.
Note 4	NHMRC (2008) No Detectable Oil & Grease - OG test must find no visible film or sheen at the water surface and no detectable hydrocarbon odours, based on aesthetic aspects, as described in NHMRC (2008) *Guidelines for managing risks in recreational water*, Section 10.2.2.
Note 5	In the absence of ANZG (2018) criteria, alternative pH criteria from ANZECC / ARMCANZ (2000), Table 3.3.2 *Default trigger values for physical and chemical stressors for south-east Australia for slightly disturbed ecosystems* were used*.* The adopted pH range for *Lowland River* settings is applied.
Note 6	In the absence of ANZG (2018) criteria in relation to *Turbidity* and *water salinity* (as indicated by EC), the ANZECC & ARMCANZ (2000), Table 3.3.3 *upper default trigger values for Lowland River settings* are applied.
Note 7	In the absence of ANZG (2018) criteria in relation to *Nitrate*, the ANZECC & ARMCANZ 2000, *95% Freshwater Trigger value (Ref. Table 3.4.1 Trigger values for toxicants at alternative levels of protection)* is applied.
Note 8	DWC value is derived from the National Environmental Management Plan for PFAS (2020) - *95% species protection for slightly to moderately disturbed systems*.

Note 9 In the absence of ANZG (2018) criteria, alternative criteria from ANZECC / ARMCANZ (2000), Table 3.3.2, *Default trigger values for physical and chemical stressors for south-east Australia for slightly disturbed ecosystems, Lowland River* criteria were adopted for total oxidised nitrogen (NO_x), total phosphorus (TP), reactive phosphorus (FRP) and total nitrogen (TN).

5.3 Additional Pre-dewatering Monitoring Event

As described in **Section 3.4**, water quality conditions outside of the DWC have previously been detected in relation to cobalt, total oxidised nitrogen, total nitrogen, total phosphorus, electrical conductivity and turbidity. With the aim of preventing adverse impacts on receiving waters, extracted groundwater should be treated prior to stormwater discharge, while monitoring of all parameters should continue regularly, as described in **Section 5.4**.

An additional round of groundwater monitoring will be undertaken prior to commencement of construction dewatering to verify groundwater concentrations and water treatment requirements. The laboratory analytical suite must include the mandatory parameters listed **Section 3.4.2**. Field testing during groundwater sampling must include the water quality parameters indicated in **Section 3.4.3**.

5.4 Discharge Water Quality Monitoring

5.4.1 Visual Monitoring

Visual inspections of the dewatering measures and equipment should occur regularly (daily where possible) by the Site Manager and/or Dewatering Contractor, to ensure:

- The effective operation of all dewatering treatment equipment, including inspection that short-circuiting of water around baffles and filter media is not occurring within sediment retention tanks;
- No petrochemical sheens are visible on the water surface and no hydrocarbon odours are being generated by the treated groundwater or sediment; and
- No green, blue or extremely clear effluent, potentially indicating high levels of dissolved aluminium (if used in the treatment process).

The Site Manager must maintain a logbook record of all visual observations and operational measurements such as flow rates and water flow meter readings (if used), as detailed in **Section 5.6**.

5.4.2 Sample Collection and Analysis

On-going sample analysis must continue for the duration of construction dewatering activities, to establish that the treatment system (if required) is functioning as intended, and to confirm the quality of discharge water is acceptable for release into receiving water bodies (Moore Gully).

Sample collection should be completed by a suitably qualified environmental scientist or equivalent, with the subsequent analyses performed by a reputable environmental laboratory using NATA-registered analytical methods. The analytical program is to include the parameters listed in **Table 5-1** (**Section 5.2**), in accordance with *Appendix A – Routine water quality monitoring lists* (Ref. DPIE, 2022). Additional water quality parameters may be added to the analytical test suite, should daily monitoring indicate this is warranted.

The following activities are to be implemented for the on-going monitoring program:

Trial-Run Period

- Prior to the discharge of any extracted groundwater, a trial run will be completed as follows:
  - Groundwater will be pumped into the tank;
  - Samples of the (treated) groundwater will be collected and laboratory analysed for the water quality parameters of concern; and

  - The water testing results will be compared against the DWC, to confirm compliance and signify extracted groundwater can be directed to the municipal stormwater network (from the approved connection point).
- As a minimum, two samples of treated groundwater will be collected for each of two weeks during the designated trial-run period. The analytical results will be compared to DWC, to assess the performance of the water treatment system. The results of each sampling event will be recorded, to establish chemical concentration trends (if any).
- Sampling for trial run purposes will cease once the target parameters in treated water stabilise (i.e. consecutive tests are within ±10%) and test parameter concentrations are within the adopted discharge criteria for three consecutive sampling events. The trial-run period may be extended if stabilisation is not observed, or if the treated water does not satisfy the adopted criteria.
- The Dewatering Contractor / Water Treatment Specialist should seek advice from the Environmental Consultant regarding termination of the trial-run period.
- During the trial-run period, all collected (treated) groundwater (including treated water) should be retained on-site and stored in appropriate bulk containers. Alternatively, baffle tanked groundwater may be re-injected into the sub-surface of the site (away from the extraction / pumping point). No collected groundwater should be discharged until it is proven to meet the adopted DWC.

Construction Phase Discharge Monitoring (Weekly to Monthly)

- After the Trial-Run Period, and subject to consent authority approval, treated water may be discharged to the receiving water bodies. A weekly sampling frequency will be adopted for four weeks. The sampling program will involve the collection of one system discharge (i.e. treated) sample (as a minimum), to be analysed for the target parameters of concern, to confirm the system is functioning as intended.
- After four weeks, the weekly sampling frequency may be extended to fortnightly monitoring for one month and then monthly for the remaining duration of construction phase dewatering, provided the analytical monitoring results indicate the treated water quality consistently meets the adopted criteria. If this is not achieved, contingency measures must be implemented, with monitoring frequency going back to weekly until consistency in the discharged water results is re-established.

Operational Phase Discharge Monitoring (Annual)

- Provided that Construction Phase Discharge Monitoring shows consistent and compliant results, the monitoring frequency can be extended to annually during the operational period, until the end of year 3, as described in **Section 7.3**.
- As per the construction phase monitoring, contingency measures detailed in **Section 6.5** should be implemented if groundwater results exceed or are predicted to exceed the adopted criteria for any one monitoring event based on statistically trending water quality results.
- Any changes to the sampling frequency are to be determined by the appointed environmental consultant, and justification must be documented in the monitoring records.

5.4.3 Reporting of Water Quality Results

Dewatering management procedures and monitoring results will be reviewed by the appointed Environmental Consultant to ensure that the treatment procedures are effective, and that the discharge waters are in compliance with the adopted criteria (**Section 5.2**). Discharge water quality reporting will be required as follows:

- **Interim Monitoring Reports** will be prepared upon receipt of laboratory data for each round of water quality monitoring for the discharged waters. The interim reports will detail the sampling methods and procedures, provide a comparison between historical and current results, assess the results against the adopted criteria and provide recommendations on corrective actions, when required.

- Following completion of construction dewatering activities, a **Dewatering Completion Report** will be prepared by the appointed Environmental Consultant, and must include copies of all analytical results and interim monitoring reports issued during the construction phase dewatering period. A clear statement will be made regarding the overall quality of groundwater discharged in comparison to the acceptable quality standards. The final report will be submitted to Council and Water NSW.
- **Annual Dewatering Monitoring Reports** will be prepared upon receipt of laboratory data for each annual round of water quality monitoring during the operational phase of the development, as described in **Section 7.3**.

5.5 Water Treatment

This section provides only general guidance on the treatment of groundwater that is dewatered from the site. Specific details on the water treatment system and associated treatment technologies/methods will be finalised after engagement of a contract water treatment specialist and may be submitted to Council and WaterNSW at that stage.

5.5.1 Water Treatment Design Considerations

Baseline groundwater quality data to date (**Section 3.4.5**) indicates that treatment of seeped groundwater will be necessary prior to discharge to the storm water system. It is recommended that the selection and design of the preferred treatment system are managed by a Dewatering Contractor / Water Treatment Specialist, in collaboration with the appointed Environmental Consultant. Alternative and/or additional water treatment options may be required, depending on which parameters are found to exceed the DWC after the additional, pre-dewatering monitoring event described in **Section 5.3**.

The design and installation of the preferred system should consider:

- A treatment tank with minimum capacity capable of containing the expected inflow for the basement (as described in **Sections 4.2** and **4.4**);
- Water filtration to reduce coarse and fine suspended solids;
- If applicable, automated in-line chemical dosing systems for the addition of coagulants for the adjustment of turbidity and other parameters, which may be required as described in **Section 6.5** *Dewatering Contingencies*;
- Groundwater treatment to reduce concentrations of contaminants exceeding the DWC to below the values presented in **Section 5.2**;
- Spare retention tank(s) to provide additional residence time and sedimentation, in the case that non-compliant water quality is identified during routine monitoring, triggering temporary redirection and storage while adjustments to the water treatment system are being implemented; and
- A means of monitoring flow rate to enable the accurate determination of total discharge volume.

The water treatment system should be installed, tested and made operational prior to the commencement of dewatering, to ensure that only treated water that meets the adopted quality criteria is discharged.

5.5.2 Treatment System Maintenance

The water treatment system(s) must be regularly maintained by the Dewatering Contractor / Water Treatment Specialist. Maintenance must include (if applicable):

- Regular cleaning and or replacement of the geo-fabric/particle filters within the retention tanks;
- Media changeover (e.g. granular activated carbon – GAC) whenever breakthrough conditions are met; and
- Regular removal of sediment from the retention tanks by an appropriately-licensed waste contractor.

5.6 Reporting of Dewatering Information

5.6.1 Interim Report - Construction Dewatering

In accordance with WaterNSW requirements (Ref. WaterNSW Fact Sheet 260923, Link: https://www.waternsw.com.au/__data/assets/pdf_file/0005/155417/Fact-sheet-Completion-report-Construction-dewatering.pdf), a *completion report* will be prepared and submitted to WaterNSW, at the completion of site dewatering. The completion report must accompany an application to WaterNSW to surrender the *water supply work approval*, at the time that site dewatering is ended.

As the proposed dewatering will involve operational dewatering, the first report to be submitted to WaterNSW for this site will be titled "*Interim Report – Construction Dewatering*" and will document all records collected from the beginning to the end of the construction dewatering period. A blank *Interim Report* form may be downloaded from the WaterNSW website using the internet link: https://www.waternsw.com.au/__data/assets/pdf_file/0004/167278/Completion-report-for-dewatering-work.pdf, and is to be used to record all of the required information, as listed on the form itself (see **Appendix H**).

The routine logging of flow meter readings at the start and finish of each dewatering event is to be completed by a responsible representative of the construction team (e.g. the Site Manager). Each flow meter entry will record a volume of water take associated with it, to enable the calculation of cumulative water take volume at any time during the site dewatering period.

Other records including water quality results, laboratory analytical reports and groundwater level monitoring records may be supplied by the appointed specialist contractors/consultants to the responsible person, who will compile and attach the relevant information to the *Interim Report* form. The Site Manager may authorise a qualified contractor/consultant to maintain the *Interim Report* on the Site Manager's behalf.

At the completion of the construction phase, the Interim Report will be submitted to WaterNSW for review.

5.6.2 Annual Reporting for Operational Dewatering

As site dewatering will continue during the occupational phase of the development, monitoring will continue under the responsibility of Strata Management through the occupational phase. This will require the same information as required for the *Interim Report* (described in **Section 5.6.1**), to be logged and submitted to WaterNSW on an annual basis under the report title "*Annual Report – Occupational Dewatering*".

Monitoring frequencies for the occupational phase are detailed in **Section 7.3**.

All laboratory analytical results, flow meter logs and groundwater level monitoring records must be maintained by strata management, and should be made available upon request by Council and/or WaterNSW.

5.6.3 Dewatering Completion Report

A final *"Dewatering Completion Report"* will be submitted to WaterNSW at the termination of site dewatering, together with an application to surrender the water supply works approval.

6. SITE MANAGEMENT AND CONTROLS

6.1 Deviations from this Plan

The Site Manager should seek advice from the Environmental Consultant whenever deviation from the agreed monitoring program is considered. One of the objectives of the dewatering monitoring program is to provide early warning to prevent adverse impacts from non-compliant discharge water quality, excessive groundwater extraction and excessive drawdown in groundwater levels.

Should any variation to this plan be considered to be warranted, written notification (with technical justification) must be submitted to the relevant consent authority (Council / WaterNSW) for consideration.

Variations to the discharge water criteria (specified in **Table 5-2** of this plan), require approval from the consent authority for the stormwater system before alternative discharge criteria are applied.

6.2 Contact Details for Key Personnel

Once the relevant personnel have been appointed, their names and contact information must be clearly displayed on-site, within the site office. An example format is as follows:

Site Manager	Name: To be confirmed Company: To be confirmed	Mobile phone: To be confirmed Email: To be confirmed
Dewatering Contractor	Name: To be confirmed Company: To be confirmed	Mobile phone: To be confirmed Email: To be confirmed
Water Treatment Specialist	Name: To be confirmed Company: To be confirmed	Mobile phone: To be confirmed Email: To be confirmed
Environmental Consultant (Water Quality Expert)	Name: To be confirmed Company: To be confirmed	Mobile phone: To be confirmed Email: To be confirmed

6.3 Summary of Specific Activities

The appointed contractors and/or Site Manager will be responsible for ensuring that the following activities (requirements) are undertaken during the dewatering program:

- Maintain erosion and sediment control measures in a functioning condition, until all earthwork activities are completed.
- Perform daily visual inspection of stormwater diversions and sediment / erosion control devices, ensuring they are operating effectively and at full capacity.
- Implement appropriate remedial measures where any controls or devices are not functioning effectively or are inappropriate.
- Collate records and comments on the condition of existing erosion and run-off controls (drains, silt fences, catch drains etc.), dewatering procedures and test results, and any site instructions issued to sub-contractors to undertake remedial works.
- Maintain rainfall data (to be filed on site).
- Confirm water quality parameters meet the relevant discharge limits, by disclosing supporting documentation upon request.

- Reporting any incidents of poor drainage or uncontrolled discharge.
- Recording all daily inspection reports, environmental incidents and controlled discharge volumes, which may be reviewed during any environmental audit performed on the site.

6.4 Vibration, Noise and Odour Management

The following vibration, noise and odour risks must not occur during dewatering:

- Excessive vibration and noise levels associated with site plant / dewatering equipment; and
- Odours released from collected groundwater, which may pose a risk to human health and/or the aesthetic condition of the environment.

It is the responsibility of the Site Manager to ensure appropriate management of vibration, noise and odour during dewatering operations. Appropriate management methodologies include:

- Undertaking dilapidation surveys of neighbouring buildings, in accordance with potential for impacts in final design type.
- All sub-contractors to work only within defined hours set by the DA conditions.
- All reasonable steps shall be taken to muffle and acoustically baffle all plant and equipment. Noise and vibration levels generated by site works must be within the limits set by the DA conditions, the site-specific environmental management plan and the *Protection of Environmental Operation Act 1997*.
- Give consideration to the noise emission of plant/equipment prior to its selection/mobilisation to site.
- Schedule the use of noisy equipment at the least-sensitive time of day.
- Situate noisy equipment at the greatest distance from the noise-sensitive area, or orient the equipment so that noise emissions are directed away from sensitive areas, to achieve the maximum attenuation of noise.
- Where there are several noisy pieces of equipment, schedule operations to minimise cumulative impacts.
- Keep equipment well maintained.
- Ensure engine shrouds (acoustic linings) are installed (where feasible).

6.5 Dewatering Contingencies

Dewatering contingency measures should be implemented where groundwater results exceed or are predicted to exceed the adopted criteria for any one monitoring event. Contingent actions for this and other scenarios that may arise during dewatering are detailed in **Table 6-1**.

Table --1 Mitigation Measures for Potential Dewatering Issues

Anticipated Problem	Preventive/Corrective Actions
Water Quality Criteria Non-Compliance	
Water Quality Criteria Exceedance Laboratory analytical report for any monitoring event reveals that the quality of treated discharge water does not satisfy the adopted criteria detailed in **Table 5-1**.	Immediate action must be taken to halt the release of water into receiving water bodies, where water quality is found not to meet the adopted criteria detailed in **Table 5-1**. Discharge of water must be suspended to enable the following procedure to be implemented: 1) Water will be redirected to storage retention basin/tanks; 2) A water sample will then be collected and sent to the laboratory for confirmation analysis for the non-compliant parameter(s) on an express (24hr) results turn-around basis; 3) Should the analytical result for the confirmation sample show

Anticipated Problem	Preventive/Corrective Actions
	that the previously non-compliant parameter(s) is/are now meet the adopted criteria, the treated water outlet may be redirected to receiving water bodies; however 4) Should the analytical result for the confirmation sample show that the discharge water quality does not comply with the adopted criteria, the environmental consultant / water treatment specialist will be required to modify the water treatment system, in order to achieve compliant discharge water quality. Collection of further treated water samples will be required to confirm the effectiveness of the modifications; 5) After laboratory confirmation that the revised treated water quality complies with criteria, extracted groundwater may be redirected to receiving water bodies; and 6) Weekly monitoring of treated discharge water quality monitoring will be required, until such time that contaminant concentrations are within the adopted criteria values for three consecutive sampling events. Once this is achieved, fortnightly monitoring may be reinstated. **Note: Wastewater Removal** - It may be necessary to have collected waters removed by a licensed wastewater contractor, should quantities exceed the on-site capacity for temporary storage. In this case, records must be maintained to document quantities of wastewater disposed in this way, with provision of wastewater disposal dockets issued by the contractor to be retained for audit and reporting purposes.
Visible and Olfactory Impacts Visual and/or olfactory anomalies (e.g. change in water colour, turbidity, odour, presence of oil / grease) are observed in extracted groundwater.	Similar to the above procedure (Steps 1 to 6) treated water will be redirected to an alternative retention vessel, while the treatment system is adjusted. It may be necessary to have collected waters removed by a licensed wastewater contractor, should retained quantities exceed the on-site capacity for temporary storage. The contractor is to seek advice from a suitably experienced environmental consultant in regard to the additional assessment and treatment that may be required for any observed changes to water appearance or detectable odours.
Repeated Criteria Exceedances After three non-compliances for discharge water quality.	Retain extracted water onsite in appropriate bulk containers for subsequent removal by a licensed wastewater contractor. Determine an alternative discharge method, if necessary, updating this report accordingly.
Groundwater Take Non-Compliance	
Excessive Extraction The predicted daily inflow rate (specified in **Section 4.2**) is exceeded.	Retain tail water onsite in appropriate bulk containers. Remove water by a licensed wastewater contractor, or seek Council approval for temporary increase in discharge rate to the stormwater system.
System Performance Issues	
Dewatering system failures	Ensure that spare equipment parts (where practical) are on hand. Ensure that the failed equipment can be serviced by site personnel or an appointed contractor who can rapidly report to site when needed.
Power outages	Ensure that a backup generator is readily available. In this event, an assessment across the site and surrounding sites should also be completed in order to identify whether any other lights and electrical equipment are working so to identify if the issue is site specific or if it is across a whole area. In addition to having the back-up generator running, the contractor should also seek advice from an electrician in regard to the additional assessment and repairs that may be required.

Anticipated Problem	Preventive/Corrective Actions
Unexpected contaminants found during monitoring	Contact the appointed environmental consultant / water quality expert and collect samples for analysis, to assess the identified concentrations against relevant criteria. If the contaminant is found to exceed the adopted criteria, follow the corrective actions corresponding to *Water Quality Criteria Exceedance* above. Expand the adopted criteria accordingly.
Chemical/fuel spill and leaks from machinery	Stop earthworks, notify site manager. Use accessible soil or appropriate absorbent material to absorb the spill (if practicable). Stockpile the impacted material in a secure location, on builder's plastic to avoid cross contamination. Inspect groundwater and note any visual and/or changes. The contractor should seek advice from environmental consultant in regard to assessment and treatment requirements.
Excessive rainfall	Ensure sediment and surface water controls are in place and functioning as intended, as per the designs provided in the site-specific Soil and Water Management Plan. Any non-conformance is to be documented and rectified. The capacity of the dewatering system to dispose larger volumes of water should be evaluated and if required, a temporary system should be utilised following correspondence with Council / WaterNSW and the environmental consultant.
Excessive noise	Identify the source and isolate if possible. Modify the actions of the source or erect temporary noise barriers if required.
Impacts on the stability of adjacent structures	Contractor to seek advice from qualified professional (such as a geotechnical engineer and/or structural consultant) in regards to the additional assessment and monitoring that may be required.
Excessive organic odours / vapours	In accordance with Council's Contaminated Land Policy, no nuisance odours are to be detected at any site boundary during the dewatering stage. Should odour emissions be detected at a site boundary, the following measures will be implemented: 1) Stop work, to allow odour to subside. 2) Monitor ambient air across the site and boundaries with a portable photo-ionisation detector (PID). 3) Implement control measures, including respirators for on-site workers, use of odour suppressants and wetting down of excavated material. 4) Notify the occupants of adjoining premises regarding odour issues. Notification should be in writing, providing the contact details of the responsible site personnel. 5) Record logs for odours and volatile emissions using photo-ionisation detectors (PID), if applicable.
Complaint management	Notify client, site manager and environmental consultant (if required) logging and following up complaint. Reporting should follow management procedures. Implement control measures to address reason of complaint (if possible) and notify complainant of outcome.

7. MINIMAL HARM ASSESSMENT

7.1 Consideration of NSW Aquifer Interference Policy

In accordance with the NSW Water Management Act 2000 the taking of water from an aquifer and/or the disposal of water taken from an aquifer is defined as an aquifer interference activity. The NSW 2012 Aquifer Interference Policy (the 'NSW AIP') provides guidance for the assessment of potential impacts of dewatering on water users and groundwater dependent ecosystems. The NSW AIP assessment process was performed with due regard for all hydrogeological information collected for the site and is presented below.

7.1.1 Hydrogeological Model Summary

The site-specific hydrogeological conceptual model (**Section 3.2**) indicates that groundwater seepage would enter the excavation flowing through joints, faults and bedding plane fractures within the bedrock. Lower seepage flow volumes may be expected during depressed groundwater levels in dry periods, with higher seepage flow after high rainfall events, which would be expected to cause temporary, elevated groundwater levels.

7.1.2 Groundwater Source Category

Under the NSW 2012 Aquifer Interference Policy (the 'NSW AIP') *highly productive groundwater* is defined as a groundwater source that:

a) *has total dissolved solids of less than 1,500 mg/L; and*

b) *contains water supply works that can yield water at a rate greater than 5 L/sec.*

The site will be dewatered by allowing groundwater to drain from the sandstone bedrock, which has been characterised with groundwater salinity ranging between 1,500 and 14,000 mg/L TDS (see **Table B2**). Modelled inflow to the basement will be 38.8 m^3/day (**Section 4.2**) i.e. 0.449 L/sec, for both the construction and operational phases of the development.

The aquifer at the site therefore meets the description of a *"less productive groundwater source"*, as defined under Section 3.2.1 *Aquifer impact assessment* of the NSW AIP.

7.1.3 Minimal Impact Considerations

In accordance with the NSW AIP Table 1 *"If the predicted impacts are less than the Level 1 minimal impact considerations, then these impacts will be considered as acceptable."*

Table 1 *Minimal Impact Considerations for Aquifer Interference Activities* of the NSW AIP shows that for *Less Productive Groundwater Sources* in low yielding porous and fractured rock water sources that are under groundwater pressure conditions, the following minimal impact considerations are applicable:

Drawdown

- *Level 1 – A cumulative pressure head decline of not more than 2m, at any water supply work.*
- *Level 2 – If the predicted pressure head decline is greater than the Level 1 requirement (above), then appropriate studies are required to demonstrate to the Minister's satisfaction that the decline will not prevent the long-term viability of the affected water supply works unless make good provisions apply.*

Water Quality

- *Level 1 - Any change in groundwater quality should not lower the beneficial use category of the groundwater source beyond 40m from the activity.*

- *Level 2 - If the Level 1 condition (above) is not met, then appropriate studies will need to demonstrate to the Minister's satisfaction that the change in groundwater quality will not prevent the long-term viability of the dependent ecosystem, significant site or affected water supply works.*

7.1.4 Minimal Impact Conclusions

The proposed dewatering for the construction and operational phases of the project are considered to be compliant with the NSW AIP minimal impact criteria for the following reasons:

- Although the estimated maximum cumulative pressure head decline (6 m) has been modelled to be greater than *Level 1 minimal impact considerations* with respect to drawdown, the drawdown will occur in competent bedrock, which is characterised as a low hydraulic conductivity (9.0 x 10^{-8} m/sec) material. In addition, less than 3 mm of ground settlement is predicted immediately outside of the shored wall. Drawdown-induced ground settlement would therefore have negligible impact on neighbouring properties.
- The lack of registered water supply bores within 500m of the site indicates that groundwater is not relied on as a water supply source in surrounding areas. This indicates there are no beneficial users of the groundwater resource within the zone of drawdown influence that would be adversely affected by the drop in groundwater levels.
- No evidence of potential onsite or offsite contamination sources has been identified to suggest that groundwater quality may be adversely impacted due to site dewatering. And since groundwater is not being utilised within 500m of the site, any water quality impacts are unlikely to adversely impact the beneficial use category of the groundwater source. The AIP *Level 1 Water Quality* conditions would therefore be maintained.
- In addition to the above, the routine monitoring of treated water quality, cumulative drawdown and water take and the dewatering contingencies tabulated in **Section 6.5** are designed to ensure that potential adverse impacts are minimised.
- There are no documented high priority, groundwater dependant ecosystems within 40m of the site.

7.2 Assessment Inputs

The inputs for assessing the potential impacts of dewatering on the groundwater system are summarised in **Table 7-1**.

Table 7-1 Assessment inputs summary

Assessment Items	Comments
1. Estimated water take volume	As detailed in **Section 4.2**, the water take volume is estimated to be **14.2 ML** per year, for both the construction phase and the operational phase of the development.
2. Suitability of volume estimation	Use of PLAXIS 2D (a finite element computer model), implemented by experienced Geotechnical Engineer and reviewed by Senior Geotechnical Engineer (see also the GSA report in **Appendix D**).
3. Ground elevation across the site	As detailed in **Section 2.3**, The site gently downslopes from the west and east boundary's to the centre of the site, with elevations ranging from 80 to 76 metre Australian Height Datum (m AHD).
4. Geotechnical ground characterisation	Refer to GSA report in **Appendix D**.
5. Water level measurements	Periodic groundwater level gauging will be conducted on an annual basis (i.e. 1 monitoring event per year) at monitoring wells during the operational phase, as described in **Section 5.3.2**.
6. Required water level draw down and	The GSA (EI, 2025e) assumed that the groundwater drawdown

Assessment Items	Comments
potential impacts	level was estimated to be 6 m. Considering that the groundwater drawdown occurs within the sandstone bedrock, EI summarised that the drawdown settlement resulting from dewatering of the site will have a negligible effect and will not pose any adverse impact on the neighbouring properties, as described in **Section 4.6**.
7. Works proposed for dewatering	A drained basement using drainage of sub-soil seepage waters and a sump-and-pump system, as described in **Section 4.4**.
8. The base level of the aquifer	Siltstone bedrock extends below the proposed BEL, see **Section 3.2**.
9. Excavation footprint dimensions	Not available at the time of this report.
10. Hydraulic conductivity of lithological units	Detailed in Table 1 of the GSA report (EI, 2025e) in **Appendix D**.
11. Anticipated duration of dewatering	Dewatering will be ongoing for the approved construction dewatering period, while operational dewatering will be ongoing for the life time of the project.
12. Depth of piling embedment beneath bulk excavation	Refer to **Section 4.1** – embedment depth will be provided with final design and detailed shoring plans.

7.3 Operational (Occupational) Phase Dewatering Management

7.3.1 Operational Phase Water Treatment

The need for water treatment during the operational phase will be dependent on water quality, as it was during construction phase dewatering. A pre-treatment water sample will be collected and laboratory analysed for the dewatering parameters listed in **Table 5-1**. Any exceedances of the DWC, will indicate the need for water treatment for the con-compliant water quality parameter. An appropriate water treatment system will be established to ensure that discharge water quality (i.e. treated water) is appropriate for stormwater discharge.

It will be the responsibility of Strata Management to ensure that the water treatment is appropriately maintained to ensure that only compliant water quality is discharged from the site.

7.3.2 Monitoring Frequency and Reporting

Strata Management is also responsible for the engagement of a suitably qualified and appropriately experienced environmental consultant, to perform dewatering monitoring and annual reporting for the occupational phase of the project.

The following procedure will be adhered to ensure that the long-term dewatering system is managed appropriately:

- **Groundwater level monitoring**: Scheduled groundwater level monitoring is required for the first 36 months of the sump and pump operational phase in order to characterise seasonal groundwater level fluctuations for the operational (post-construction) phase of the development.

  A quarterly groundwater level monitoring frequency (i.e. once every 3 months) will be adopted for the first twelve months of occupation. This will be followed by semi-annual water level monitoring (i.e. once every 6 months) for the second year; then annual monitoring (i.e. a monitoring event at the end of the third year). Groundwater levels will be measured at each of the onsite monitoring wells and data will be recorded on a data form which also documents date of monitoring, well identification number, reference point from where all water level measurements are consistently taken (e.g. top of well casing, or ground level), the depth to water in metres relative to Australian Height Datum and the name and company of the person conducting the monitoring.

Should the environmental consultant discover that the monitoring wells are no longer functional, Strata Management must be immediately notified to implement the Well Replacement Protocol described in **Section 7.3.3**.

- **Discharge volume monitoring**: The volume of water discharged to stormwater must be monitored by a calibrated flow meter (or equivalent alternative means) that is integrated as part of the long-term pumping system. The flow meter (or flow monitoring device) will display cumulative volume discharged, which will be recorded onto the same data form used to document groundwater level, at the time of each water level monitoring event. Discharge volume monitoring frequency will therefore be the same as for groundwater level monitoring, i.e. quarterly for the first year, every 6 months for year two, and a single monitoring event at the end of year three.
- **Water quality monitoring**: A single, post-treatment water sample will be collected on an annual basis during the final monitoring event in each year (i.e. at 12 months, 24 months and 36 months of operation). Treated water samples will be laboratory analysed for the water quality parameters listed in **Table 5-1**, to confirm compliance with the DWC. Laboratory analytical reports and associated results summary tables must be returned to Strata Management for record archiving. The data will also be attached to the annual monitoring report.
- **Annual dewatering monitoring report**: A factual, 12-monthly *Interim Report – Operational Dewatering* will be prepared using the WaterNSW Completion Report form template (described in **Section 5.6.1**), after each 12 months of monitoring. Each report will document the groundwater level gauging results, groundwater quality results and the cumulative volume of water discharge from the seepage collection sump to the storm water system. Each annual monitoring report will also include a trend analysis of the monitoring data and provide a discussion to characterise discernible/statistical trends in groundwater quality, and/or groundwater levels as measured in the monitoring well(s) and water discharge volumes over time.
- **Cessation of monitoring**: Should the annual dewatering monitoring report after the 36th month of occupation confirm that groundwater quality, groundwater level fluctuations at the monitoring well(s) and annual groundwater discharge volumes are stable (i.e. not statistically trending up or down), then it will be determined that equilibrium has been reached and termination of the monitoring program would be justified. Should this not be the case, then ongoing monitoring for occupational phase dewatering will be reviewed accordingly.

  The appointed environmental consultant will provide notification to Council to document the termination or continuation of monitoring, if warranted. Should monitoring be continued, a review of monitoring frequency will be undertaken and appropriate notification to Council and WaterNSW will be issued by the appointed environmental consultant, through Strata Management.

7.3.3 Monitoring Well Replacement Protocol

EI notes that the existing groundwater monitoring wells BH3M, BH11M and BH12M are located outside the basement footprint (the ‘external wells’), and BH6M is located inside of the basement footprint. At least one of three wells (and if practical, all external wells) should be preserved to enable groundwater level monitoring close to the basement.

Should all existing wells be damaged during the construction works, installation of a new, long-term, groundwater monitoring well must be installed as follows:

a) The replacement monitoring well must be appropriately located so as to avoid any damage or destruction during construction works;

b) Well design should be in accordance with the design for water monitoring bores for water level monitoring as specified under the *Minimum Construction Requirements for Water Bores in Australia* (Ref. NUDLC, 2020);

c) The well should be appropriately screened, with the water intake interval set across the lowermost basement level to monitor groundwater levels at the bulk excavation level, assuming uniform ground conditions; and

d) All reasonable steps must be taken to have the replacement bore installed within one week of the damage having occurred, subject to licensed driller availability.

8. DEWATERING MANAGEMENT SUMMARY

The requirements of this report are summarised in **Table 8-1**.

Table 8-1 Dewatering Management Summary

Item	Requirement / Procedure
Objective	Ensure that the proposed dewatering operations do not impact on the quality of the receiving surface waters (i.e. at the point of groundwater discharge). Where necessary, groundwater will be treated to achieve an acceptable water quality prior to discharge: ▪ *See **Section 3** for groundwater conditions.* ▪ *See **Section 5.2** for groundwater quality discharge requirements.* ▪ *See **Section 5.5** for groundwater treatment options.* Provide comment on groundwater level changes that occur during dewatering: ▪ *See **Section 4** for summary of groundwater seepage analysis and dewatering drawdown impacts.* ▪ *Refer to **Appendix D** for groundwater seepage analysis model.* Provide relevant information demonstrating that post-construction, operational dewatering would pose minimal harm to the groundwater source: *See **Section 7** for operational phase dewatering management.*
Person Responsible for Implementation of this Report	During basement excavation and construction, the Site Manager / Water Treatment Specialist will be responsible for ensuring the implementation of appropriate treatment of extracted groundwater, as outlined in this document. Occupation phase responsibility will rest with Strata Management.
Operation Dewatering Policy	To ensure that all extracted groundwater from dewatering is effectively treated prior to discharge to the receiving water bodies, as will be confirmed by the Operational Dewatering Management Procedure detailed in **Section 7.3**.
Pre-Dewatering Groundwater Assessment	As set out in **Section 3**, representative samples were collected prior to dewatering and tested for the identified potential contaminants, to provide baseline groundwater quality data and review the proposed discharge water quality requirements.
Discharge Water Quality Criteria	All groundwater to be discharge into the local stormwater network is to meet (at the very least) the criteria outlined in **Table 5-1**, **Section 5.2**.
Implementation Strategy	All extracted groundwater will be monitored and treated (where necessary). On-going testing to be performed to confirm water quality meets the adopted Discharge Water Criteria (DWC) prior to release into the storm water network, which discharges to receiving water bodies. Additional treatment / wastewater disposal to be undertaken if the DWC values are not met.

Item	Requirement / Procedure
Monitoring Requirements for Construction Phase Dewatering	As specified in **Section 5.4**: ▪ 1. Initial Assessment = Prior to dewatering ▪ 2. Trial-Run Period = Twice per week* ▪ 3. Discharge Monitoring Period = Weekly for a month to fortnightly for a month then monthly* **provided the analytical results indicate treated water quality meets the adopted criteria, or risks are considered to be significantly low. Should analytical results exceed the adopted discharge criteria, contingencies listed in **Section 6.5** must be followed.*
Monitoring Requirements for Operational Phase Dewatering	As specified in **Section 7.3**: Quarterly for the first year, every 6 months for year two, and a single monitoring event at the end of year three.
Auditing	The appointed environmental consultant (water quality expert) will undertake weekly audits during the Trial-Run Period (if required), and monthly audits during the Monitoring Period, to ensure that all discharges comply with the criteria specified in **Section 5.2**.
Reporting	The contractor responsible for dewatering will keep records of all monitoring and laboratory test results, as well as quantities of treatment agents applied during the dewatering process. All records should be made available for inspection onsite during the construction phase.
Corrective Actions	As specified in the contingency measures, outlined in **Section 6.5**.

9. STATEMENT OF LIMITATIONS

This plan has been prepared for the exclusive use of Creative Vision, which is the only intended beneficiary of EI’s work. The scope of work completed for the purpose of this plan is limited to that agreed with the client.

No other party should rely on the document without the prior written consent of EI, and EI undertakes no duty, or accepts any responsibility or liability, to any third party who purports to rely upon this document without EI's approval.

EI has used a degree of care and skill ordinarily exercised in drafting similar plans by reputable members of the environmental industry in Australia, as at the date of this document. No other warranty, expressed or implied, is made or intended. Each section must be read in conjunction with the whole of this plan, including its appendices.

EI's professional opinions are reasonable and based on its judgment, experience, training and results from analytical data. EI may also have relied upon information provided by the client and other third parties to prepare this document, some of which may not have been verified by EI.

EI's professional opinions contained in this document are subject to modification if additional information is obtained through further investigation or observations. In some cases, further testing and analysis may be required, which may result in a further report with different conclusions.

Should you have any queries regarding this plan, please do not hesitate to contact EI.

REFERENCES

ANZECC/ARMCANZ (2000) *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*, Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand, October 2000.

ANZG (2018) *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*, Australian and New Zealand Governments and Australian State and Territory Governments, Canberra ACT, Australia, August 2018.

Bannerman SM and Hazelton PA (1990) *Soil Landscapes of the Penrith 1:100,000 Sheet*, Soil Conservation Service of NSW, Sydney.

Cashman and Preene (2001) *Groundwater Lowering in Construction*, *A Practical Guide* (Edition 1), New York: Spon Press.

DMR (1991) *Penrith 1:100,000 Geological Series Sheet 9030* (Edition 1), Geological Survey of New South Wales, Department of Mineral Resources.

DEC (2007) *Guidelines for the Assessment and Management of Groundwater Contamination*, NSW Department of Environment and Conservation, DEC 2007/144, June 2007.

DCCEEW (2023) *eSPADE v2.0 Portal*. NSW Department of Planning, Industry and Environment (retrieved from www.espade.environment.nsw.gov.au).

DPIE (2022) *Minimum requirements for building site groundwater investigations and reporting*, NSW Dept. of Planning and Environment, Doc. PUB20/940, Rev. V02.2210, October 2022.

EI (2025a) Acid Sulfate Soil Assessment at 135 Badgerys Creek Road NSW, Report No. E26733.E14_Rev1, 24 September 2025 – the ASSMP;

EI (2025b) Preliminary Site Investigation with Targeted Sampling at 135 Badgerys Creek Road NSW, Report No. E26733.E01_Rev1, 25 September 2025 – the PSI;

EI (2025c) Geotechnical Investigation at 135 Badgerys Creek Road NSW Report No. E26733.G03_Rev0, 25 September 2025;

EI (2025d) Salinity Management Plan at 135 Badgerys Creek Road NSW Report No. E26733.G17_Rev0, 11 July 2025; and

EI (2025e) Groundwater Seepage Analysis at 135 Badgerys Creek Road NSW Report No. E26733.G17_Rev0, 29 September 2025.

Murphy CL (1997) *Acid Sulfate Soil Risk*, Department of Land and Water Conservation, Sydney, Second Edition, supplied by the Sydney South Coast, Geographical Information Systems Unit.

NEPC (2013) *National Environmental Protection (Assessment of Site Contamination) Amendment Measure*, National Environmental Protection Council, April, 2013.

NHMRC (2008) *Guidelines for Managing Risks in Recreational Water*, National Health and Medical Research Council, Australian Government, 2008.

NHMRC (2022) *Australian Drinking Water Guidelines, Paper 6 National Water Quality Management Strategy*, National Health and Medical Research Council, Commonwealth of Australia, Canberra, Version 3.8, September 2022.

NUDLC (2020) *Minimum Construction Requirements for Water Bores in Australia* (4th Edition), National Uniform Drillers Licensing Committee.

NSW EPA (2013) *Licencing Fact Sheet – Using Environment Protection Licensing to Control Water* Pollution, EPA 2013/0119, May 2013.

NSW Government (2018) *Water Management (General) Regulation*.

NSW Government (2021) *Minimum Requirements for Building Site Groundwater Investigations and Reporting, Information for Developers and Consultants*, Department of Planning, Industry and Environment, January 2021.

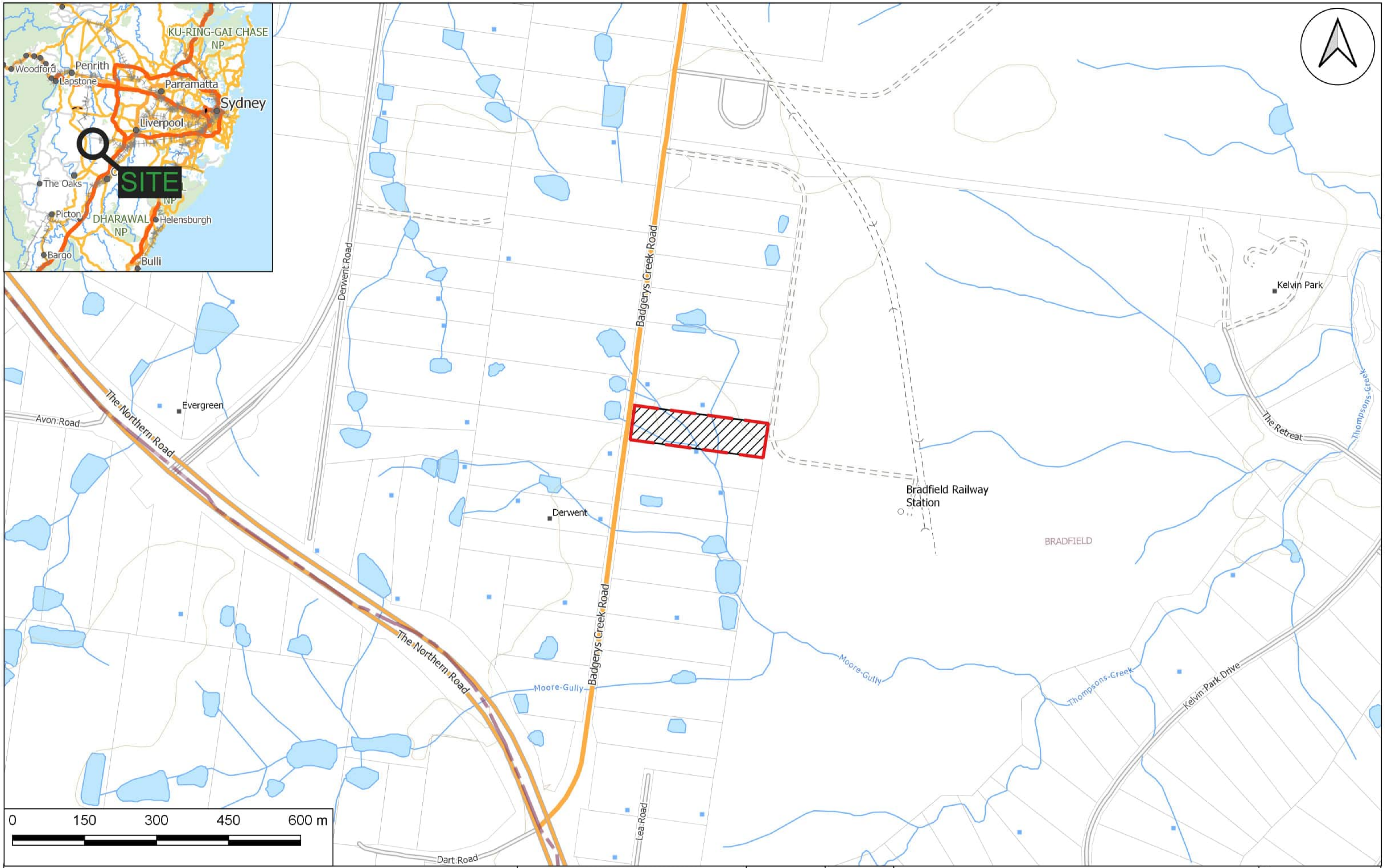
NSW Government (2023) *Water Sharing Plans for the Greater Metropolitan Region Groundwater Sources 2023 under the Water Management Act 2000*, 27 June 2023.

State Environmental Planning Policy (Precincts—Western Parkland City) 2021

ABBREVIATIONS

AIP	Aquifer Interference Policy
ANZECC	Australian and New Zealand Environment Conservation Council
ANZG	Australian and New Zealand Governments
ASS	Acid Sulfate Soil
BEL	Bulk Excavation Level
BTEX	Benzene, Toluene, Ethyl benzene, Xylene
CVOC	Chlorinated Volatile Organic Compounds
DGV	Default Guideline Values
DO	Dissolved Oxygen
DP	Deposited Plan
DWC	Discharge Water Criteria
EC	Electrical Conductivity
EI	EI Australia
FFL	Finished Floor Level
GME	Groundwater Monitoring Event
GSA	Groundwater Seepage Analysis
LGA	Local Government Area
LOR	Limit of Reporting (limit of laboratory reporting for analytical method; see PQL)
m	metres
mAHD	metres Australian Height Datum
mBGL	metres Below Ground Level
ML	Megalitres
mg/L	Milligrams per Litre
µg/L	Micrograms per Litre
µS/cm	Microsiemens per Centimetre
N/A	No Available Criterion
NATA	National Association of Testing Authorities
NTU	Nepholemetric Turbidity Units
PAHs	Polycyclic Aromatic Hydrocarbons
PFAS	Perfluoroalkyl and Polyfluoroalkyl Substances
pH	Potential Hydrogen (a measure of the acidity or basicity of an aqueous solution)
PID	Photo-ionisation Detector
PQL	Practical Quantitation Limit (limit of reporting for analytical method; see LOR)
RL	Reduced Level
TDS	Total Dissolved Solids
TRH	Total Recoverable Hydrocarbons (non-specific analysis of organic compounds)
VOCs	Volatile Organic Compounds

Appendix A – Figures



LEGEND **Note: All locations are approximate**

▨ Figure 1

eiaustralia
Practical Solutions for Built Environments
Suite 6.01, 55 Miller Street, PYRMONT 2009
Ph (02) 9516 0722 Fax (02) 9518 5088

Drawn:	A.L.
Approved:	-
Date:	29/09/2025

Creative Vision

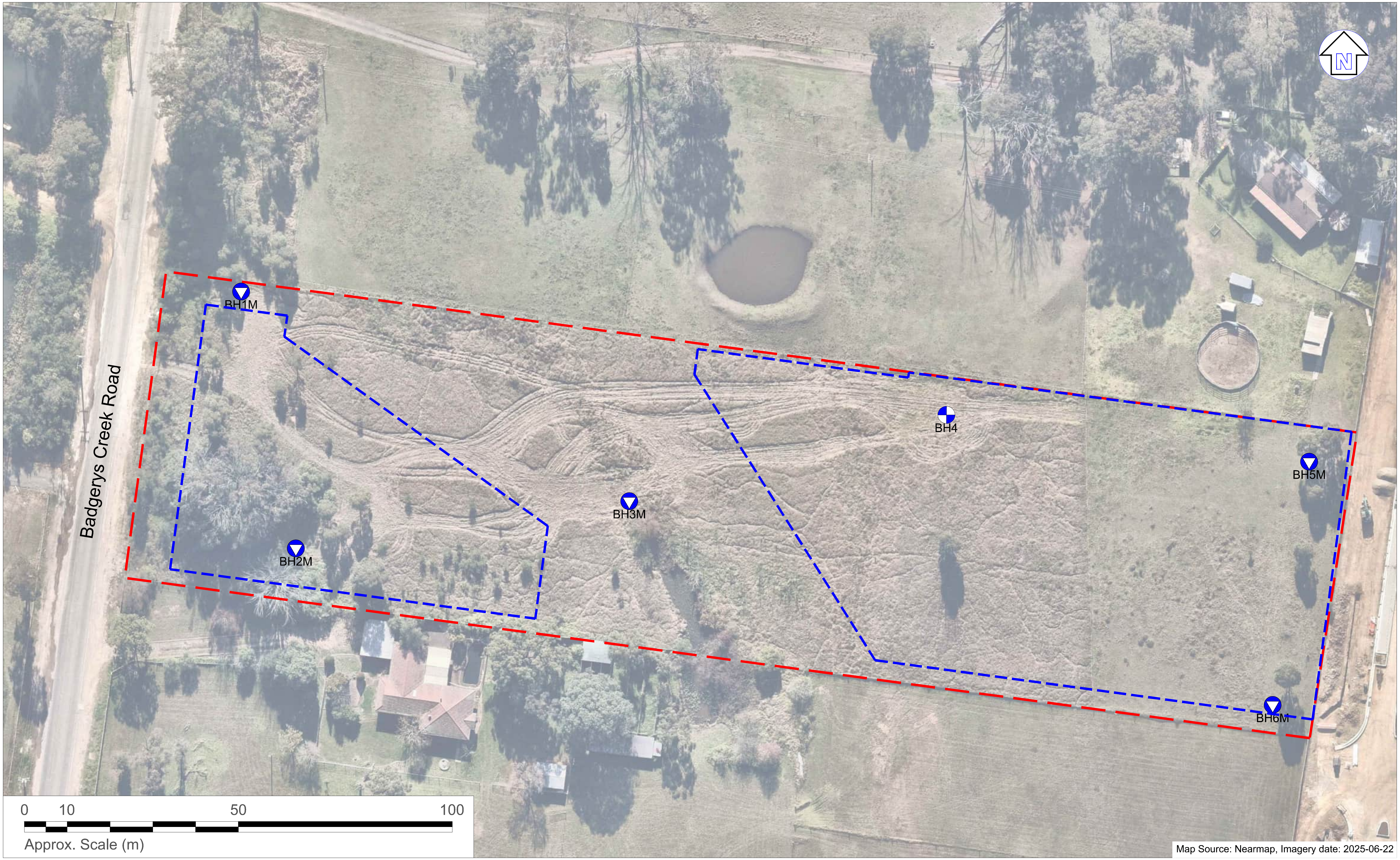
Dewatering Management Plan

135 Badgerys Creek road, Bradfield, NSW

Site Locality Plan

Figure:
1

Project: E26733.E16



Map Source: Nearmap, Imagery date: 2025-06-22

LEGEND (All Locations are Approximate)

- - - Site boundary
- - - Proposed basement boundary
◐ Borehole location
▼ Borehole / monitoring well location

eiaustralia
Practical Solutions for Built Environments
Suite 6.01, 55 Miller Street, PYRMONT 2009
Ph (02) 9516 0722 Fax (02) 9518 5088

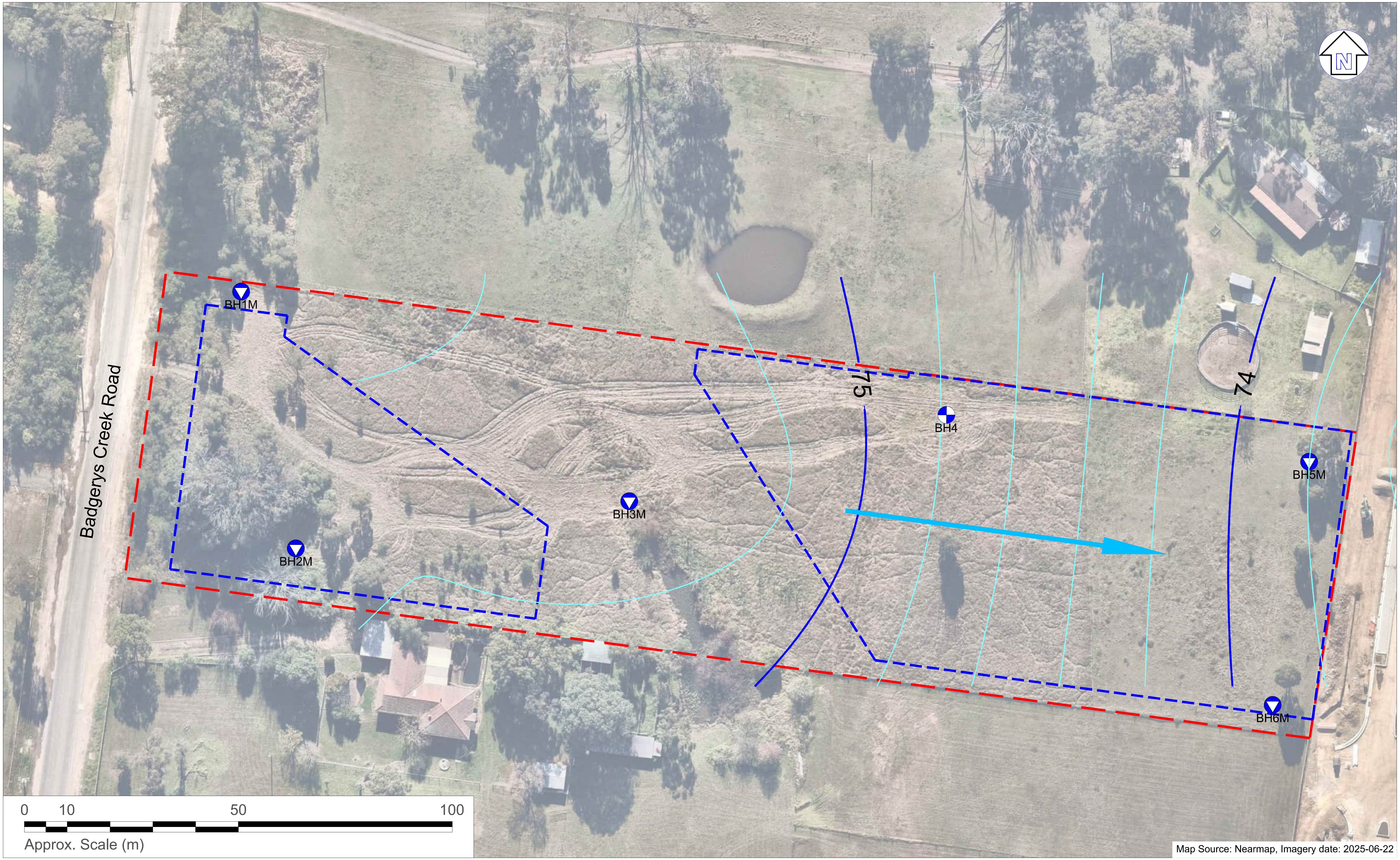
Drawn:	L.C.
Approved:	S.R.
Date:	29-09-25

Creative Vision
Dewatering Management Plan
135 Badgerys Creek Road, Bradfield, NSW

Sampling Location Plan

Figure:
A2

Project: E26733.E16



Map Source: Nearmap, Imagery date: 2025-06-22

LEGEND (All Locations are Approximate)

– – –	Site boundary
– – –	Proposed basement boundary
◒	Borehole location
▽	Borehole / monitoring well location

eiaustralia
Practical Solutions for Built Environments
Suite 6.01, 55 Miller Street, PYRMONT 2009
Ph (02) 9516 0722 Fax (02) 9518 5088

Drawn:	L.C.
Approved:	S.R.
Date:	29-09-25

Creative Vision
Dewatering Management Plan
135 Badgerys Creek Road, Bradfield, NSW

Groundwater Contour Plan

Figure:
A3

Project: E26733.E16

Appendix B – Tables

Table B1 - Summary of Baseline Groundwater Quality - Analytical Results

Sample ID	Sampling Date	Metals																								PAHs			BTEX					VOCs	Pesticides		Total PCB
		Total As	Cd	[1] Total Cr	Cu	Pb	Hg	Ni	Zn	Al (pH>6.5)	Sb	Ba	Be	B	Co	Fe	Li (mg/L)	Mn	Mo	Se	SiO$_2$ (mg/L)	Ag	Sr	U	V	Total PAHs	Benzo(α)pyrene	Naphthalene	Benzene	Toluene	Ethylbenzene	o-xylene	m/p-xylene	Total VOCs	Total OCP	Total OPP	
BH1M	7/5/2025	<1	<0.1	<1	<1	<1	<0.1	4	7	9	<1	71	<1	86	4	110	0.19	960	1	<1	15	<1	9200	<1	<1	N.A.	<0.1	<0.1	<0.5	<0.5	<0.5	<0.5	<1	<10	<1	<PQL	<5
BH2M		1	0.1	<1	<1	<1	<0.1	4	8	6	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	<1	<0.1	<0.1	<0.5	<0.5	<0.5	<0.5	<1	N.A.	N.A.	<PQL	N.A.
BH3M		1	<0.1	<1	<1	<1	<0.1	4	6	6	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	<1	<0.1	0.2	<0.5	<0.5	<0.5	<0.5	<1	N.A.	N.A.	<PQL	N.A.
BH6M		3	<0.1	<1	<1	<1	<0.1	1	<5	11	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	<1	<0.1	<0.1	<0.5	2	<0.5	0.9	<1	N.A.	N.A.	<PQL	N.A.
Guidelines																																					
Discharge Water Quality Criteria		24 (As III) 13 (As V)	0.2	3.3 (Cr III) 1 (Cr VI)	14	3.4	0.06	11	80	55	9				1.4			1900	34	11		0.05		0.5	6		0.1	16	950	180	80	350	275				

Sample ID	Sampling Date	Petroleum Hydrocarbons							Microbiological Organisms			Total Phenols	Total Cyanide	PFAS			Other																								
		Oil & Grease	F1	F2	F3	F4	TRH C6 - C9	TRH C10 - C40	Faecal coliforms (MPN/100mL)	Faecal streptococci	Escherichia coli (E. coli)			PFOS	PFOS + PFHxs	PFOA	Fluoride (mg/L)	Chloride (mg/L)	Sulfate (mg/L)	Bromide (mg/L)	Ammonia Nitrogen $_3$ NH as N	Nitrate Nitrogen NO3-N	Nitrite Nitrogen NO2 as N	Total Oxidised Nitrogen, NOx-N	Total Kjeldahl Nitrogen	Total Nitrogen (calc)	Total Phosphorus (Kjeldahl) as P	Filterable Reactive Phosphorus as P	Bicarbonate Alkalinity as CaCO3	Carbonate Alkalinity as CaCO3	Hydroxide Alkalinity as CaCO3	Total Alkalinity as CaCO3	Hydroxide Alkalinity as OH (meq/L)	Bicarbonate Alkalinity as HCO3 (meq/L)	Carbonate Alkalinity as CO3 (meq/L)	Ca (mg/L)	Mg (mg/L)	Na (mg/L)	K (mg/L)
BH1M	7/5/2025	No	<50	290	920	790	<40	2000	770	10	<1	<50	N.A.	<0.01	<0.01	<0.01	0.21	6600	1100	2.6	740	490	18	510	1000	1.5	0.02	<0.005	1200	<5000	<5000	1200000	<5000	1400000	<5000	220	860	2900	33
BH2M		No	<50	120	<500	<500	<40	<320	N.A.	N.A.	N.A.	<50	<0.4	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	130	490	N.A.	N.A.
BH3M		No	<50	63	<500	<500	<40	<320	N.A.	N.A.	N.A.	<50	<0.4	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	46	98	N.A.	N.A.
BH6M		No	54	71	<500	<500	50	<320	N.A.	N.A.	N.A.	<50	<0.4	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	18	38	N.A.	N.A.
Guidelines																																							
Discharge Water Quality Criteria			If TPH is detected analysis for BTEX and PAH is required									320	7	0.13		220					900	700		40		500	50	20											

Notes:

All values are µg/L unless stated otherwise

NA = Not Analysed

Water quality criteria are based on the ANZG, 2018 (Rev. Jan 2024) 95% fresh water DGVs, or relevant default guidelines where ANZG fresh water DGVs are not currently available, as explained in the footnotes to **Table 5-1**, in **Section 5** of the DMP.

1	This result was for *Total Chromium* . Chromium speciation testing was not undertaken, but should be included in future monitoring.
2	TRH result was obtained using silica gel clean-up method, to allow quantification of non-natural organic sources only.
*	Confirmatory speciation testing for CrVI was not undertaken to confirm if this result represented an actual exceedance of the DWC.
🟨	Highlighted value does not meet the adopted criteria
▨	No relevant criteria are currently available

Table B2 – Summary of Baseline Groundwater Quality Results: Physicochemical Characteristics

Sample ID	Date sampled	Physiochemical Characteristics									Aesthetic Properties
		Electrical Conductivity (Lab EC) (µs/cm)	pH (field)	Total Dissolved Solids (mg/L)	Total Suspended Solids (mg/L)	Turbidity (NTU)	Field Redox (mV)	Hardness (mg $CaCO_3$/L)	Dissolved Oxygen (Lab DO) (mg/L)	Total Organic Carbon as NPOC (mg/L)	Oil & Grease (present/absent)
BH1M	7/5/2025	16000	6.6	14000	8	4.6	-27.2	4100	3.6	1.5	No visible sheens, surface films or oil and grease
BH2M		10000	7	8300	N.A.	1900	-31.4	2400	N.A.	N.A.	No visible sheens, surface films or oil and grease
BH3M		5200	7.4	3300	N.A.	330	-29.3	520	N.A.	N.A.	No visible sheens, surface films or oil and grease
BH6M		2700	7.7	1500	N.A.	16000	-29.3	200	N.A.	N.A.	No visible sheens, surface films or oil and grease
Guidelines											
Discharge Water Quality Criteria		2000	6.5 - 8.0	▒	▒	50	▒	▒	▒	▒	No visible sheens, surface films or oil and grease

Notes:

All values are in units as shown.

NA = Not Analysed

Water quality criteria are based on the ANZG, 2018 (Rev. Jan 2024) 95% fresh water DGVs, or relevant default guidelines where ANZG Fresh DGVs are not currently available, as explained in the footnotes to **Table 5-1**, in **Section 5** of the DMP.

🟨	Highlighted value does not meet the adopted criteria
▒	No relevant criteria are currently available

eiaustralia
Contamination | Remediation | Geotechnical

Table B3- Soil and Groundwater RPD values

Sample identification	Description	Date	TRH				BTEX				Metals							
			F1	F2	F3	F4	Benzene	Toluene	Ethylbenzene	O-Xylene	Arsenic	Cadmium	Chromium (Total)	Copper	Lead	Nickel	Zinc	Mercury
Groundwater Investigation																		
Intra-laboratory Duplicate																		
BH1M	Priminary sample	5/07/2025	<50	290	920	790	2000	<0.5	<0.5	<1.5	<1	<0.1	<1	<1	<1	4	7	<0.1
QD1	Duplicate of BH1M		<50	<60	<500	<500	<320	<0.5	<0.5	<1.5	<1	<0.1	<1	<1	<1	3	6	<0.1
	RPD	-	*0.00*	**131.43**	**59.15**	*44.96*	**144.83**	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*28.57*	*15.38*	*0.00*
Inter-laboratory Duplicate																		
BH1M	Priminary sample	5/07/2025	<50	290	920	790	2000	<0.5	<0.5	<1.5	<1	<0.1	<1	<1	<1	4	7	<0.1
QT1	Duplicate of BH1M		<10	<50	<100	<100	<1	<1	<1	<3	<1	<0.1	<1	<1	<1	4	6	<0.05
	RPD	-	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*15.38*	*0.00*
Rinsate																		
QR1	Equipment Rinsate	5/07/2025	<50	<60	<500	<500	<0.5	<0.5	<0.5	<0.5	<1	<0.1	<1	<1	<1	<1	<5	<0.1
Trip Blank and Trip Spike																		
TB	Soil Trip Blank	5/07/2025	-	-	-	-	<0.5	<0.5	<0.5	<1	-	-	-	-	-			-
TS	Soil Trip Spike	5/07/2025	-	-	-	-	[102%]	[102%]	[102%]	-	-	-	-	-	-			-

NOTE: All results are reported in mg/kg (soil) or µg/L (water)

44.55	RPD calculated by halving detection limit exceeds 30-50% range referenced from AS4482.1 (2005)
52.87	RPD exceeds 30-50% range referenced from AS4482.1 (2005)

BOLD = Composite value of primary sample

F1 = TRH C6-C10 less the sum of BTEX

F2 = TRH >C10-C16 less naphthalene

F3 = TRH >C16-C34

F4 = TRH >C34-C40

[1] Value shown is the lowest recovery value reported for xylenes

Appendix C – Development Plans

GROUPGSA

North Point

SCALE	DRAWING	NUMBER	REVISION	DATE
1 : 500 @ A1	OPTION D2.4_SITE PLAN	MP3085		12/02/24

GROUP GSA

North Point

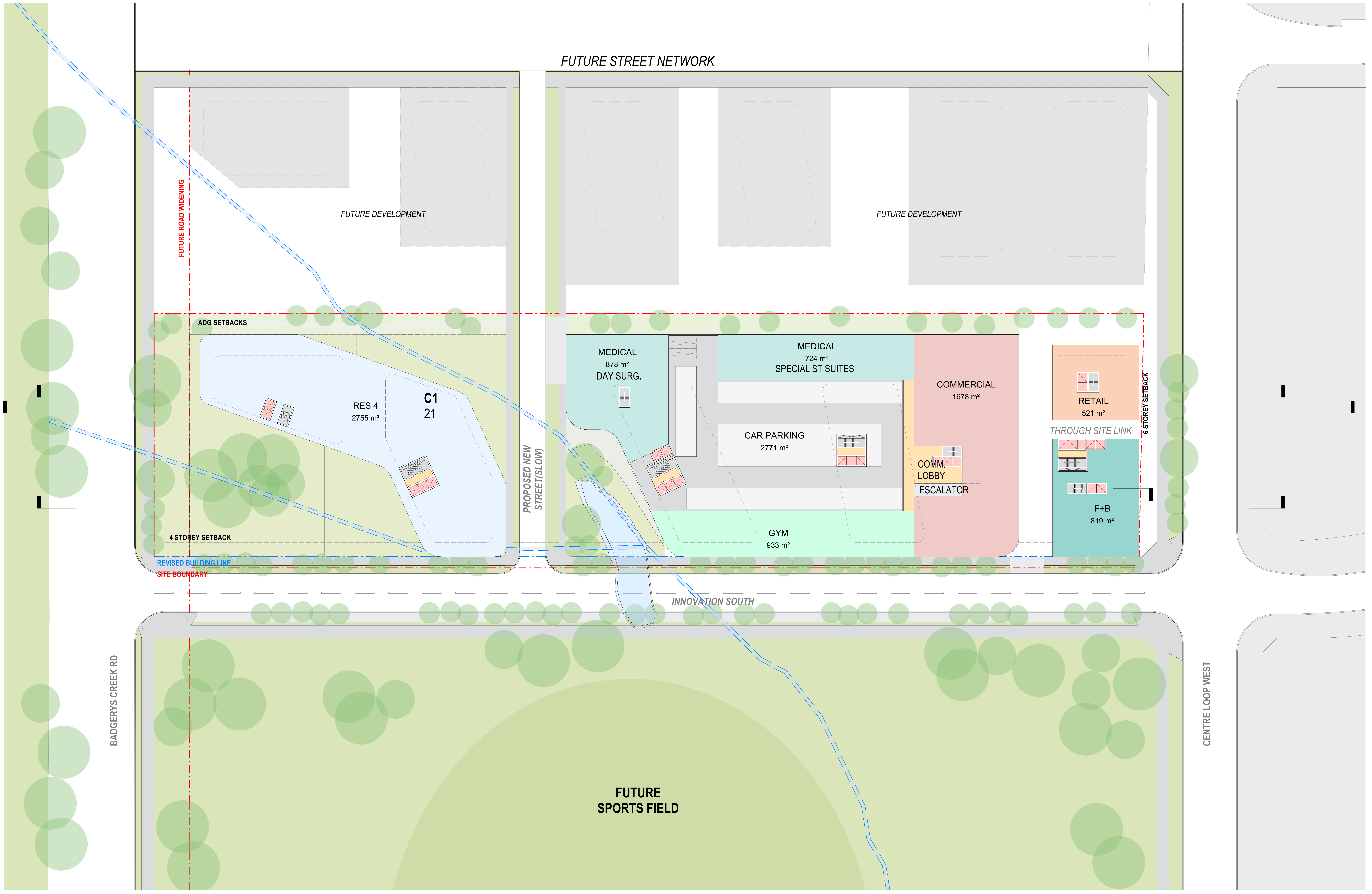
SCALE
1 : 500 @ A1

DRAWING
OPTION D2.4_GROUND PLANE

NUMBER
MP3086

REVISION

DATE
12/02/24



North Point

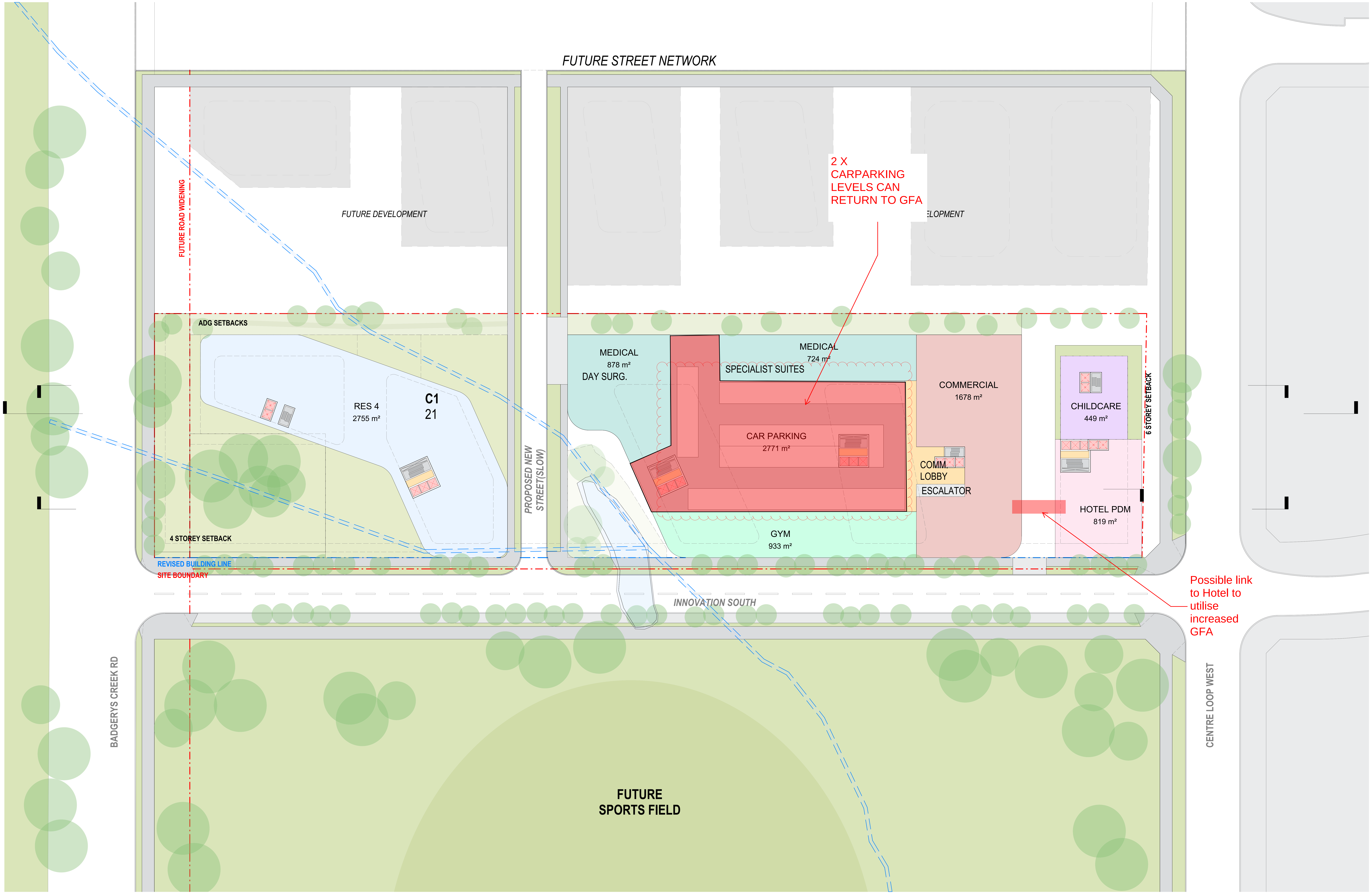
SCALE
1 : 500 @ A1

DRAWING
OPTION D2.4_PODIUM LEVEL 1

NUMBER
MP3087

REVISION

DATE
12/02/24



2 X
CARPARKING
LEVELS CAN
RETURN TO GFA

Possible link
to Hotel to
utilise
increased
GFA

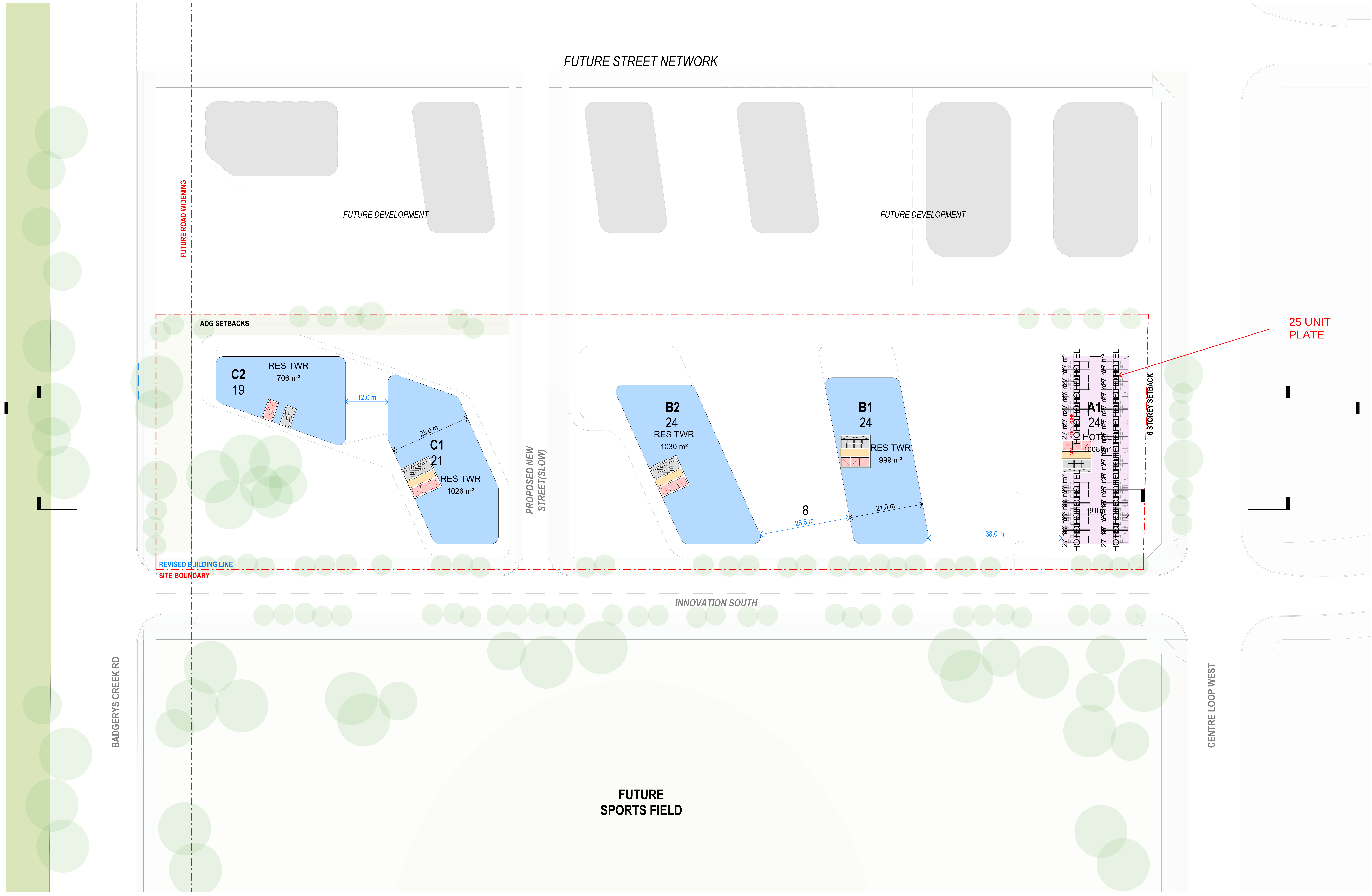
North Point

SCALE	DRAWING	NUMBER	REVISION	DATE
1 : 500 @ A1	OPTION D2.4_PODIUM LEVEL 2-3	MP3088		12/02/24

GROUPGSA

North Point

SCALE	DRAWING	NUMBER	REVISION	DATE
1 : 500 @ A1	OPTION D2.4_PODIUM UPPER	MP3089		12/02/24



GROUP GSA

SCALE	DRAWING	NUMBER	REVISION	DATE
1 : 500 @ A1	OPTION D2.4_TOWER	MP3090		12/02/24

1 SECTION NORTH OPTION D2.4

1 : 500

2 SECTION SOUTH OPTION D2.4

1 : 500

SCALE	DRAWING	NUMBER	REVISION	DATE
1 : 500 @ A1	OPTION D2.4_SECTIONS	MP3301		12/02/24

A241737 135 Badgerys Creek Rd, Bradfield

Site 2

Children	120	138	122	**Open Space**	4139	2341	**6480 32%**
				After land dedication	3449		**5790 29%**

Area Schedule OPT_D2.4 (Organic)

2 x levels of car park to commercial

Building No.					*A1*					*B 1*			*B 2*			*B 3*			*C 1*			*C 2*	
Typology					*Hotel, F+B* *Residential*					*Mixed Use*			*Mixed Use*			*Mixed Use*			*Residential*			*Residential*	
No. of Storeys					**14**			**0**		**13**			**4**			**13**			**13**			**13**	
Temporary Crane Zone (m)				*15.0 m*				*15.0 m*										*15.0 m*					
Max. Bld Height (AHD AHD)			**AHD**	**164.8 m**				**80.7 m**	**161.0 m**			**94.0 m**			**155.8 m**			**150.8 m**			**145.3 m**		
Presumed PANS-OPS																							
			164.8																				
30% Bonus Height 80.6m	**Roof**		159.8	5.0 m					2.6 m						2.6 m								
	Level 23		156.2	3.6 m					3.4 m						0.4 m								
	Level 22		153.0	3.2 m					3.2 m						1.4 m								
	Level 21	25	149.8	3.2 m					3.2 m						2.4 m			2.6 m					
	Level 20	25	146.6	3.2 m					3.2 m						3.4 m			3.2 m					
	Level 19	25	143.4	3.2 m					3.2 m						3.2 m			3.2 m					
LEP Height Limit 62m	**Level 18**	25	140.2	3.2 m					3.2 m						3.4 m			3.2 m			2.6 m		
	Level 17	25	137.0	3.2 m					3.2 m						3.2 m			3.2 m			3.2 m		
	Level 16	25	133.8	3.2 m					3.2 m						3.2 m			3.2 m			3.2 m		
	Level 15	25	130.6	3.2 m					3.2 m						3.2 m			3.2 m			3.2 m		
	Level 14	25	127.4	3.2 m					3.2 m						3.2 m			3.2 m			3.2 m		
OLS AHD 126 m	**Level 13**	25	124.2	3.2 m	1,008				3.2 m						3.2 m			3.2 m			3.2 m		
	Level 12	25	121.0	3.2 m	1,008				3.2 m	999					3.2 m	1,030		3.2 m	1,026		3.2 m	706	
	Level 11	25	117.8	3.2 m	1,008				3.2 m	999					3.2 m	1,030		3.2 m	1,026		3.2 m	706	
	Level 10	25	114.6	3.2 m	1,008				3.2 m	999					3.2 m	1,030		3.2 m	1,026		3.2 m	706	
	Level 9	25	111.4	3.2 m	1,008				3.2 m	999					3.2 m	1,030		3.2 m	1,026		3.2 m	706	
Podium Form [8 storeys]	**Level 8**	25	107.8	3.6 m	1,008				3.2 m	999					3.2 m	1,030		3.2 m	1,026		3.2 m	706	
	Level 7	0	104.6	3.2 m	331		Lounge		3.4 m	2,009					3.4 m	1,471		3.2 m	1,028		3.4 m	960	
Podium Form [6 storeys]	**Level 6**	0	101.4	3.2 m	331		Pool		3.2 m	2,009					3.2 m	1,471		3.2 m	1,028		3.2 m	960	
	Level 5	17	96.9	4.5 m	819		449	120 Children	3.2 m	2,009					3.2 m	1,471		3.2 m	1,028		3.2 m	960	
Podium Form [4 storeys]	**Level 4**	31	93.7	3.2 m	1,471				3.2 m	2,009					3.2 m	1,471		3.2 m	1,028		3.2 m	960	
	Level 3	31	90.5	3.2 m	1,471				3.6 m	4,705		3.6 m	724	973	3.6 m	878		3.4 m	2,755		3.4 m	0	
	Level 2	31	87.3	3.2 m	1,471				3.6 m	4,705		3.6 m	724	973	3.6 m	878		3.2 m	2,755		3.2 m	0	
	Level 1		83.3	4.0 m	0	819	521		3.6 m	1,934		3.6 m	724	973	3.6 m	878		3.2 m	2,755		3.2 m	0	
	Ground Level		78.3	5.0 m	207	514	476		5.0 m	342	1,344	5.0 m	205	4,042	5.0 m	90	194	4.0 m	2,009	205	4.0 m	136	
	Basement 1		76.7	4.0 m																			
	Basement 2		73.7	3.0 m																			
	Basement 3																						
Natural Ground Level [AHD]		460	AHD	78.3 m			AHD	80.7 m	78.2 m		AHD	78.2 m		AHD	78.2 m		AHD	80.0 m		AHD	80.7 m		

Baseme	**14500**	382
	14500	382
Podiun	**6216**	164
Spaces		**927**

Total Area

	A1		B 1	B 2	B 3	C 1	C 2		
Gross Building Area	**14,928**	**-**	**26,061**	**9,338**	**13,952**	**19,721**	**7,506**	**97,722**	**sqm**

Gross Floor Area by Efficiency

		A1				B 1		B 2		B 3		C 1		C 2			
Residential GFA	74.5%	0	74.5%	0	74.5%	9,708	74.5%	153	74.5%	8,287	74.5%	14,539	74.5%	5,592	**38,280**	**sqm**	**54%**
Non-Resi GFA (Retail)	95.0%	947	95.0%	0	95.0%	1,277	90.0%	3,638	90.0%		95.0%	195	95.0%		**6,057**	**sqm**	**9%**
Non-Resi GFA (F+B)	60.0%	800													**800**	**sqm**	**1%**
Hotel GFA	75.0%	9,112													**9,112**	**sqm**	**13%**
Childcare, Gym, Med GFA	75.0%	337					75.0%	3,818	75.0%	2,121					**6,276**	**sqm**	**9%**
Commercial GFA	85.0%				85.0%	9,933									**9,933**	**sqm**	**14%**
Total		**11195**		**0**		**20918**		**7609**		**10408**		**14734**		**5592**	**GFA 70,457**	**sqm**	
															FSR 3.48	**: 1**	

DEVELOPMENT YIELD

	Size	Mix		A1				B 1		B 2		B 3		C 1		C 2		
GFA for Residential				**0**		**0**		**9,708**		**153**		**8,287**		**14,539**		**5,592**		**38280**
Assumed GFA to NSA Efficiency				85%		85%		85%		85%		85%		85%		85%		
NLA for Residential				**-**		**-**		**8,252**		**130**		**7,044**		**12,359**		**4753**		**32538**
Target NLA for Affordable Dwellings			**0%**	**0**	**10%**	**0**	**10%**	**825**	**10%**	**13**	**10%**	**704**	**10%**	**1236**	**10%**	**475**	**10%**	**3254**
	Size	**Mix**																
1 Bed	50	35%		0		0		4		0		4		6		2		16
2 Bed	75	50%		0		0		6		0		5		9		3		23
3 Bed	95	15%		0		0		2		0		2		3		1		7
Target AH Dwellings		**100%**		**0**		**0**		**12**		**0**		**10**		**18**		**7**		**47**
Target NLA for Market Dwellings			**100%**	**0**	**90%**	**0**	**90%**	**7427**	**90%**	**117**	**90%**	**6340**	**90%**	**11123**	**90%**	**4278**	**90%**	**29284**
	Size	**Mix**																
1 Bed	55	25%		0		0		25		0		21		37		14		98
2 Bed	75	50%		0		0		50		1		42		74		29		195
3 Bed	95	25%		0		0		25		0		21		37		14		98
Target Market Dwellings		**100%**		**0**		**0**		**99**		**2**		**85**		**148**		**57**		**390**
Total Dwellings			100%	**0**	100%	**0**	100%	**111**	100%	**2**	100%	**95**	100%	**166**	100%	**64**	100%	**437**

PARKING ANALYSIS

*** Link formulas to correct tab, using replace (ctrl+h)

Non-Residential Parking Requirements

	Rate		Spaces	Total
Office/business permises	1 : 100	sqm	99	99
Shop, restaurant/café	1 : 90	sqm	27	27
Gym	5 : /100	sqm	97	97
Hotel	1 : 5	room	49	49
Hotel Staff	1 : 5	staff	15	15
Supermarket	1 : 200	sqm	18	18
F + B	1 : 90	sqm	67	67
Childcare			3	3
Medical	1 : 200	sqm	24	24
Subtotal			**400**	**400**
Car Share (Non-Res)	1 : 40	space	10	10
Total Non-Residential Parking			**410**	**410**

Residential Parking Requirements

		Rate		Apts	Cars	Total	Area (1:38)	# of Basements
Market	**1 bed**	0.5 :	unit	98	49	49		
	2 bed	1 :	unit	195	195	195		
	3+ bed	1 :	unit	98	98	98		
AHA	**1 bed**	0.4 :	unit	16	7	7		
	2 bed	0.5 :	unit	23	12	12		
	3+ bed	1 :	unit	7	7	7		
Subtotal				**437**	**367**	**367**		
	Visitor	1 : 10	space		44	44		
	Car Share (Residential)	1 : 60	space		6	6		
Total Residential Parking						**417**		
Total Parking						**827**	**31437**	**2.2**
							Basement Footprint ~14500m²	

Bicycle Parking Requirements

	Rate		Bikes	Total
Supermarket Staff	1 : 200	sqm	18	18
Supermarket Customers	1 : 300	sqm	12	12
Shop, restaurant/café staff	1 : 25	sqm	97	97
Shop, restaurant/café customers	2 + 1 100	sqm	26	26
F + B staff	1 : 100	sqm	8	8
F + B customer	1 : 100	sqm	8	8
Hotel Staff	1 : 4	staff	56	56
Hotel customers	1 : 20	room	23	23
Office	1 : 150	sqm	66	66
Gym	1 : 10	staff	TBA	
Childcare	1 : 10	staff	TBA	
Childcare Visitors	2 per centre		2	2
Medical Centres/ health consulting	1 : 5	practitioners	TBA	
Medical Centres customers	1 : 200	sqm	24	24
Subtotal Non-Residential			**340**	**340**
Residential	1 : 1	dwelling	437	437
Residential visitors	1 : 10	dwelling	44	44
Subtotal Residential			**481**	**481**
Total Bicycle Parking				**821**

Motorcycle Parking Requirements

Residential	1 : 10	Cars	42	42
Non-Residential	1 : 10	Cars	41	41
Total Motorcycle Parking			**83**	**83**

Appendix D – GSA (EI, 2025e)

EI Australia
Suite 6.01, 55 Miller Street
PYRMONT, NSW 2009

ABN 42 909 129 957

E service@eiaustralia.com.au
W www.eiaustralia.com.au
T 02 9516 0722

29 September 2025
E26733.G12

Boomika Madaiah
Bradfield Corporation Pty Ltd
c/- Creative Vision
Level 2, 14 Railway Parade,
BURWOOD NSW 2134

Groundwater Seepage Analysis
Proposed Development
135 Badgerys Creek Road, Bradfield NSW

1 INTRODUCTION

At the request of Creative Vision on behalf of Bradfield Corporation Pty Ltd (the Client), EI Australia (EI) has prepared this Groundwater Seepage Analysis (GSA) for the proposed development at 135 Badgerys Creek Road, Bradfield NSW.

The following documents provided by the Client were used to assist in the preparation of this analysis:

- Architectural plans prepared by Plus Architecture – Job No. 20799, Drawing Nos. DA-10B1 to 10B3, and DA-1000 to 1012, 110, 120, 200 to 204, dated on 11 September 2025; and
- Site survey plan prepared by SDG – Referenced 9165, revision B 94, dated on 8 August 2024.

EI has previously prepared the following relevant reports for this site:

- Geotechnical Investigation (GI) Draft Report, Reference E26733.G03, dated 11 July 2025.

Based on the provided documents, EI understands that the proposed development involves the construction of a mixed use residential and commercial development comprising four, mixed commercial (retail) and residential (apartment) buildings, and one hotel building with associated childcare. Excavation is planned for three detached two-level basements, comprising Stage 1 basement underlying the hotel and childcare towards the eastern boundary, Stage 2 basement underlying commercial and residential buildings towards the centre of the site, and Stage 3 underlying further commercial and residential buildings towards the western boundary. Stage 1 and 2 basements are shown to have a shared wall with Stage 2 and 3 separated by a riparian corridor with water course and a proposed local street.

The lowest basement level is proposed to have a Finished Floor Level (FFL) of between RL 69.2m and 69.0m Australian Height Datum (AHD). A Bulk Excavation Level (BEL) ranging between RL 68.9m and 68.7m is assumed, which includes allowance for the construction of the basement slab. To achieve the BEL, excavation depths from 6.0m to 11.0m Below Existing Ground Level (BEGL) have been estimated. Locally deeper excavations may be required for footings, lift overrun pits, crane pads, and service trenches.

The basement extends up to the northern and eastern site boundaries for the Stage 1 and 2 basements, and is set back from the southern boundary by about 3m. The Stage 3 basement is set back also about 3m from the southern site boundary, and about 10m from the western boundary, and a minimum of 6m from the northern site boundary.

1.1 ASSESSMENT OBJECTIVES

The objective of this GSA is to provide an estimation of the groundwater take volumes that require pumping out during the construction and operational stages of the development with estimation of the groundwater drawdown and drawdown settlement as a result of the excavation dewatering.

2 SITE MODEL

2.1 MODELLED SECTIONS

For the purpose of GSA, a half section has been modelled for each basement, utilising the most conservative subsurface conditions for each basement, the locations of these sections is shown in the attached **Figure 1:**

- Section A-A’: Western Basement
- Section B-B’: Eastern Basement

2.2 SUBSURFACE CONDITIONS

The subsurface conditions outlined in our GI report were utilised in this analysis to model the geological subsurface conditions for the section.

A summary of the permeability values which were adopted for the assessment of groundwater take volumes is presented in **Table 1**.

Table 1 Summary of Subsurface Conditions and Adopted Design Parameters

Material [1]	Adopted RL of Top of Unit; Section A-A’ (m AHD) [2]	Adopted RL of Top of Unit; Section B-B’ (m AHD) [2]	Adopted Permeability (m/s)	$k_{vertical}/k_{horizontal}$
Topsoil/Residual Soil[3]	78.9	78.8	1.0×10^{-7}	1.0
XW Siltstone[3]	77.3	77.3	1.0×10^{-9}	1
DW Siltstone[4]	76.1	75.4	6.0×10^{-8}	1
SW-FR Siltstone[5]	72.4	72.8	1.8×10^{-7}	0.2

Notes:

1 For more detailed descriptions of subsurface conditions reference should be made to our GI report.
2 Minor idealisations have been made to the adopted ground profile based on borehole logs.
3 Permeability value has been correlated using Pells (2019).
4 Permeability value was adopted based on the average value of rising head tests carried out by EI encountered in BH2M and BH3M discussed in Section 2.2.1.
5 Permeability value was adopted based on the average value of rising head tests carried out by EI encountered in BH1M, BH5M and BH6M discussed in Section 2.2.1.

2.2.1 GROUNDWATER PERMEABILITY TESTS

Rising Head tests were undertaken by EI in five monitoring wells to estimate the permeability of the soil. The test involves removing the water from the well and measuring the rise in water level within the well at regular time intervals. The data was then used to calculate the hydraulic conductivity of the material screened by each well using the Hvorslev method (results are presented graphically in **Appendix B**).

A summary of the rising head test results for each monitoring well are presented in below.

Table 2 Summary of Monitoring Well Details and Rising Head Test Results

Monitoring Well ID	Total Well Depth (m BEGL)	Screen Length (m)	Screened Section	Latest Date of Test	Approximate RL of Groundwater Level (m AHD)	Calculated Permeability (m/s)
BH1M	10.9	3.00	SW-FR Siltstone	8/05/2025	75.64	5.56×10^{-7}
BH1M	10.9		SW-FR Siltstone	23/09/2025	75.5	4.76×10^{-7}
BH2M	6.6	3.00	DW Siltstone	8/05/2025	74.34	2.70×10^{-8}
BH2M	6.6		DW Siltstone	23/09/2025	75.21	1.20×10^{-8}
BH3M	6.2	3.00	DW Siltstone	23/09/2025	75.32	1.41×10^{-7}
BH5M [1]	12.1	3.00	SW-FR Siltstone	8/05/2025	73.27	1.0×10^{-9}
BH5M [1]	12.1		SW-FR Siltstone	23/09/2025	73.51	1.0×10^{-9}
BH6M [1]	9.1	3.00	SW-FR Siltstone	8/05/2025	73.45	1.0×10^{-9}

BH6M	9.1		SW-FR Siltstone	23/09/2025	73.67	4.7×10^{-8}

Notes:

1 Due to very low water inflow during the test resulting in no rising head, EI have assumed the lowest estimated mass hydraulic conductivity of Class II Shale as per Pells (2019)

2.3 GROUNDWATER LEVEL OBSERVATIONS

The groundwater levels observed within all monitoring wells during various site visits are summarised in **Table 3**.

Table 3 Summary of Groundwater Levels

Monitoring Well ID	Groundwater Levels		
	Date of Observation	Approximate Depth to Groundwater Level (m BEGL)	Approximate RL of Groundwater Level (m AHD)
BH1M	6/05/2025	4.58	75.72
	8/05/2025	4.66	75.64
	23/09/2025	4.80	75.5
BH2M	6/05/2025	4.44	75.27
	8/05/2025	5.36	74.34
	23/09/2025	4.49	75.21
BH3M	6/05/2025	1.52	75.28
	8/05/2025	1.62	75.18
	23/09/2025	1.48	75.32
BH5M	6/05/2025	6.36	74.34
	8/05/2025	7.43	73.27
	23/09/2025	7.19	73.51
BH6M	6/05/2025	4.19	74.51
	8/05/2025	5.25	73.45
	23/09/2025	5.02	73.68

Based on groundwater levels observed on the site, the following design groundwater levels (GWL) for each section have been adopted for this analysis:

- **Section A-A'**: Design groundwater levels of RL 76.7 m AHD was adopted for the western side of the site, incorporating a 1 m increase above the observed levels to account for possible seasonal variation.
- **Section B-B'**: Design groundwater levels of RL 76.3 m AHD was adopted for the eastern side of the site, incorporating a 1 m increase above the observed levels to account for possible seasonal variation.

The estimated maximum extent of the cone of depression has been determined using Sichardt's Formula, as follows:

$$R = 3000\,(H - h)\sqrt{k}$$

where:

- R = Maximum extent of the cone of depression
- h = Estimated groundwater level at the BEL due to full duration of dewatering (m).
- k = Hydraulic conductivity of the aquifer (m/s).

The coefficient of 3000 is based on empirical observations, predominantly for sandy aquifers. The lowest coefficient outlined in Sichardt's formula is approximately 1000, which would result in a smaller radius of influence. Therefore, using a coefficient of 3000 in this case is considered conservative.

Based on the formula above, the maximum extent of the cone of depression is estimated to be approximately 50m from the basement outline. This extent has been adopted in the numerical modelling.

2.4 SHORING SYSTEM

At the time of this analysis, no detailed structural design was available. However, the system was conservatively assumed to be soldier pile wall socketed below BEL based on the recommendations of the GI. During excavation and operation, any seepage will be freely allowed to enter the basement.

This analysis does not assess the overall stability of the shoring system. Once the designs relating to the adopted shoring system are updated, this analysis should be revised accordingly.

3 GROUNDWATER TAKE ASSESSMENT

3.1 GROUNDWATER SEEPAGE VOLUMES DURING CONSTRUCTION PHASE

Groundwater seepage analysis for flow through and beneath the excavation face during construction has been undertaken using two sections of PLAXIS 2D (Version 2024.1.0.1060). PLAXIS 2D is a commercially available finite element package intended for the two dimensional analysis in geotechnical engineering. It is equipped with features to deal with various aspects of geotechnical structures and construction processes using robust and theoretically sound computational procedures. PLAXIS 2D estimates the seepage rate of water entering the excavation through and beneath excavation face. This model estimates the volume of water which will be required to be dewatered during the construction of the basement and until the dewatering is turned off.

For the purpose of this modelling, it has been assumed that:

- The subsurface conditions from **Table 1** were modelled to horizontally beyond the basement boundary.
- The permeability values presented in **Table 1** above were adopted for each unit.
- Design groundwater level for Section A-A’ at RL 76.7m and Section B-B’ at RL 76.3m.
- The excavation face is assumed to be permeable and free to drain as per Section 2.4 of this report.
- The base of the basement excavation is assumed to be permeable and free to drain.
- Temporary dewatering will be undertaken to the proposed bulk excavation level, about RL 68.9m AHD for western basement and RL 68.7m AHD for eastern basement.
- A total footprint length of approximately 257m and 408m was measured for the western (Section A-A’) and eastern (Section B-B’) excavation respectively.
- The external design groundwater levels were assumed to be constant at 50m from the excavation faces as discussed in **Section 2.4** of this report.

The PLAXIS 2D models are presented in **Appendix A**. **Table 5** provides the estimated groundwater inflow rate into the proposed excavation and maximum drawdown depths.

Table 1 Summary of Analysis Results

Basement	Inflow into excavation (m^3/day/m)	Inflow into excavation (m^3/day)	Inflow into excavation (ML/year)
Western Basement (Section A-A’)	0.12	30.4	11.1
Eastern Basement (Section B-B’)	0.095	38.8	14.2

3.2 ASSESSMENT OF GROUNDWATER TAKE DURING OPERATIONAL PHASE

Based on our geotechnical and ground water investigation and utilising PLAXIS 2D, it is estimated that the western basement will encounter an inflow of approximately 11.1ML/year. Whilst, the eastern basement will encounter an inflow of approximately 14.2 ML/year.

3.3 GROUNDWATER DRAWDOWN INDUCED SETTLEMENT

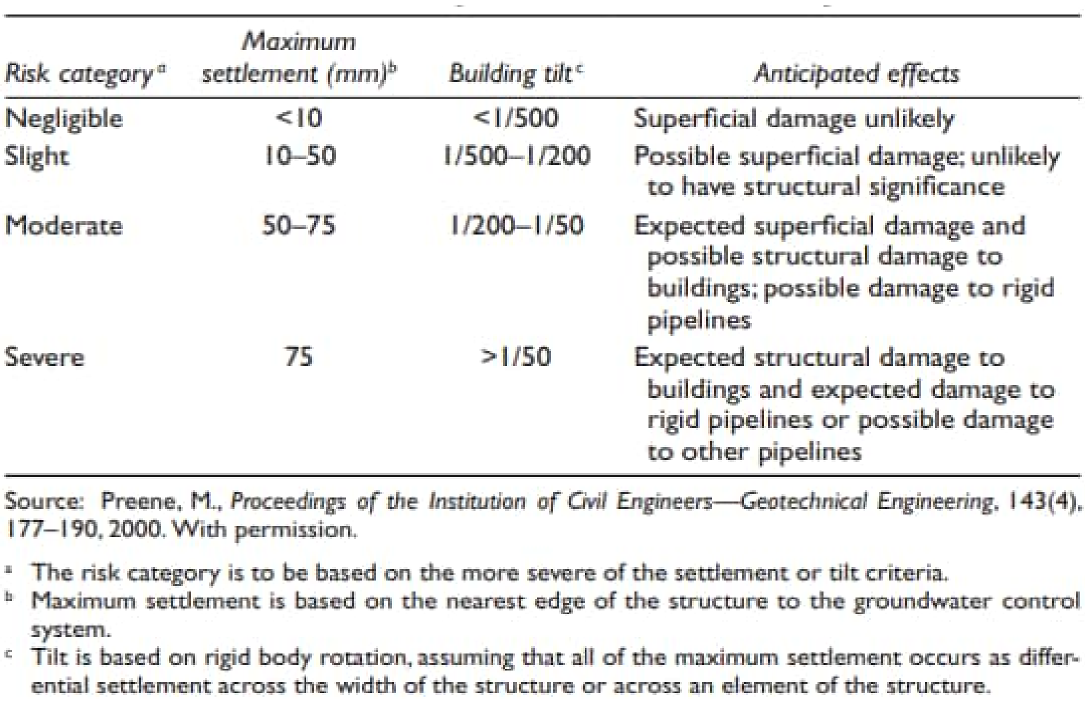
EI utilised PLAXIS 2D to estimate the potential drawdown-induced settlements as a result of dewatering. The maximum predicted groundwater drawdown and its associated maximum ground settlement surrounding the basement boundary is summarised in **Table 6**. It should be noted that these predicted settlements accounts **only for water drawdown** and does not consider other factors, such as shoring wall deflection, surcharge loading, relaxation of the bedrock/soil or other construction-related influences. Figures illustrating the estimated drawdown-induced settlement are provided in **Appendix A**.

Table 2 Summary of Maximum Groundwater Drawdown and Associated Maximum Ground Settlement

Section	Maximum Drawdown (m)	Maximum Ground Settlement (mm)
Western Basement (Section A'A')	5.7	1
Eastern Basement (Section B-B')	6.2	2

As tabulated above, the maximum predicted ground settlements occur immediately outside of the excavation is negligible (<3.0mm). The maximum predicted ground settlements are much less than 10mm and are considered to be a 'negligible' risk in regards to category of damage risk due to dewatering, as defined in Cashman and Preene (2021), as shown in the excerpt in **Plate 1**.

Although the PLAXIS modelling provides predicted drawdown-induced ground settlement values, it would be prudent for a thorough assessment of potential risks posed on neighbouring structures to be completed by a qualified and experienced structural engineer.



Risk category[a]	*Maximum settlement (mm)*[b]	*Building tilt*[c]	*Anticipated effects*
Negligible	<10	<1/500	Superficial damage unlikely
Slight	10–50	1/500–1/200	Possible superficial damage; unlikely to have structural significance
Moderate	50–75	1/200–1/50	Expected superficial damage and possible structural damage to buildings; possible damage to rigid pipelines
Severe	75	>1/50	Expected structural damage to buildings and expected damage to rigid pipelines or possible damage to other pipelines

Source: Preene, M., *Proceedings of the Institution of Civil Engineers—Geotechnical Engineering*, 143(4), 177–190, 2000. With permission.

[a] The risk category is to be based on the more severe of the settlement or tilt criteria.
[b] Maximum settlement is based on the nearest edge of the structure to the groundwater control system.
[c] Tilt is based on rigid body rotation, assuming that all of the maximum settlement occurs as differential settlement across the width of the structure or across an element of the structure.

Plate 1 **Excerpt from Cashman and Preene (2021)**

4 CONCLUSIONS AND COMMENTS

Based on the findings of this report and within the limitations of available data, EI concludes that:

- Construction and operational phase groundwater take will be approximately 11.1 ML per year for the western basement and 14.2 ML per year for the eastern basement..
- The above estimate is based on the following assumptions:
  - The shoring wall system is a permeable system as per **Section 2.4** of this report;
  - Continuous dewatering in order to maintain the groundwater at BEL during construction; and
  - The basement walls and slab will be designed as drained for the developments lifetime.
  - This assessment does not take into consideration any excavation that may be required for footings, service trenches, lift pits, or crane pads. This additional excavation, if required, is not expected to affect the retention or the dewatering system.
- The groundwater drawdown surrounding the basement boundary is predicted to be up to about 6 m.
- The ground settlements due to the predicted groundwater drawdown behind the shoring wall, within the cone of depression, are estimated to be less than 3 mm. This level of settlement falls within the ‘negligible’ risk category for damage risk resulting from ground settlement due to dewatering, as per Cashman and Preene (2021). It would be prudent for potential risks to neighbouring structures to be assessed by a qualified and experienced structural engineer.
- Alternatively, if the basement is designed as ‘tanked’ then the operational phase dewatering volumes will be negligible.
- Should any design or construction conditions differ from that adopted in this report; this GSA should be reviewed and updated as required.

5 LIMITATIONS

This report has been prepared for the exclusive use of Bradfield Corporation Pty Ltd who is the only intended beneficiary of EI's work. The scope of the inspections carried out for the purpose of this report is limited to those agreed with Bradfield Corporation Pty Ltd.

No other party should rely on the document without the prior written consent of EI, and EI undertakes no duty, or accepts any responsibility or liability, to any third party who purports to rely upon this document without EI's approval.

EI has used a degree of care and skill ordinarily exercised in similar tasks by reputable members of the geotechnical industry in Australia as at the date of this document. No other warranty, expressed or implied, is made or intended. Each section of this report must be read in conjunction with the whole of this report, including its appendices and attachments.

The conclusions presented in this report are based on a limited assessment of conditions, with specific locations chosen to be as representative as possible under the given circumstances.

EI's professional opinions are reasonable and based on its professional judgment, experience, training and results from analytical data. EI may also have relied upon information provided by the Client and other third parties to prepare this document, some of which may not have been verified by EI.

EI's professional opinions contained in this document are subject to modification if additional information is obtained through further investigation, observations, or validation testing and analysis during remedial activities. In some cases, further testing and analysis may be required, which may result in a further report with different conclusions.

6 CLOSURE

Please do not hesitate to contact the undersigned should you have any questions.

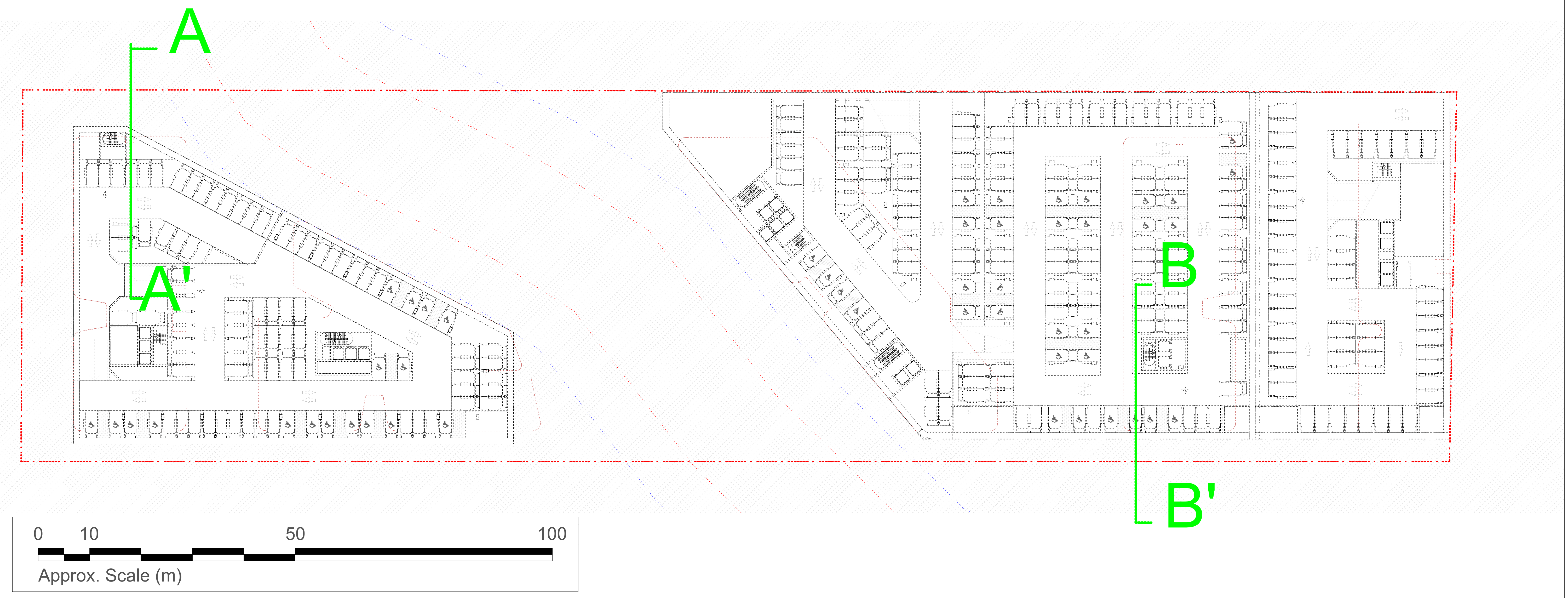
For and on behalf of
EI Australia

Author	Technical Reviewer
Prince Shrestha Geotechnical Engineer	Stephen Kim Associate Geotechnical Engineer

APPENDICES:
Figure 1 – Site Plan
Appendix A – PLAXIS 2D Model and Results (Section A-A')
PLAXIS 2D Model and Results (Section B-B')
Appendix B – Rising Head Permeability Test Results
Appendix D – Important Information

Figures

Figure 1 Analysed Sections Plan



Map Source: Plus Architecture, Job Number: 20799, date: 6/2/2025

LEGEND (All Locations are Approximate)

🟥 Site Boundary

eiaustralia
Practical Solutions for Built Environments

Suite 6.01, 55 Miller Street, PYRMONT 2009
Ph (02) 9516 0722 Fax (02) 9518 5088

Drawn:	P.S
Approved:	
Date:	6/08/2025

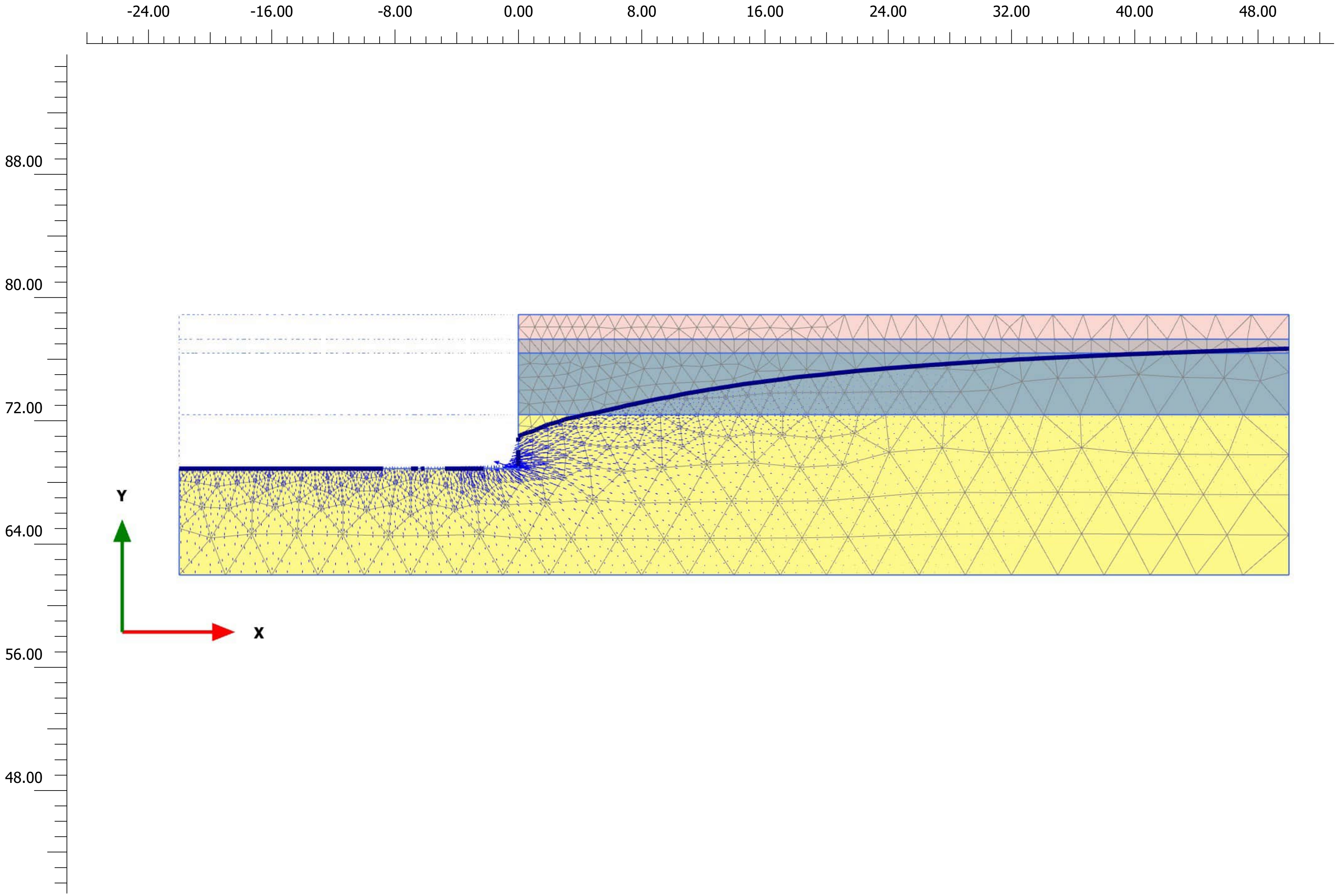
Bradfield Corporation Pty Ltd
Cross Secition for Plaxis Modelling
135 Badgerys Creek Roas, Bradfield NSW

Figure:
1

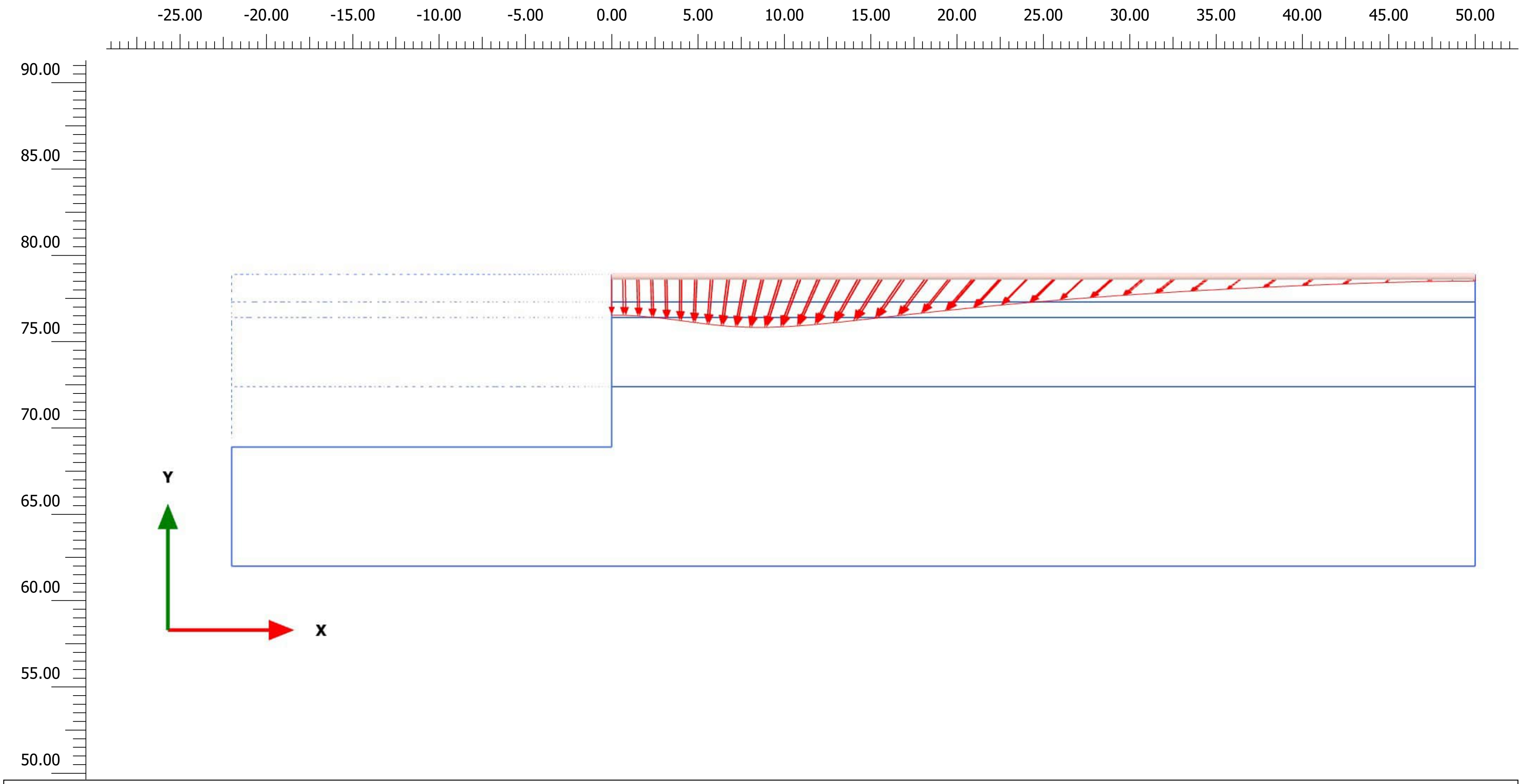
Project: E26326.G05

Appendix A – PLAXIS 2D Model and Results

(Section A-A’ and Section B-B’)



PLAXIS® 2D	*Project description* Groundwater Flow and Drawdown Curve for Section A-A'		*Date* 29/09/2025
	Project filename E26733.G12.01_Bradfield ...	*Step* 3	*Company* EI Australia

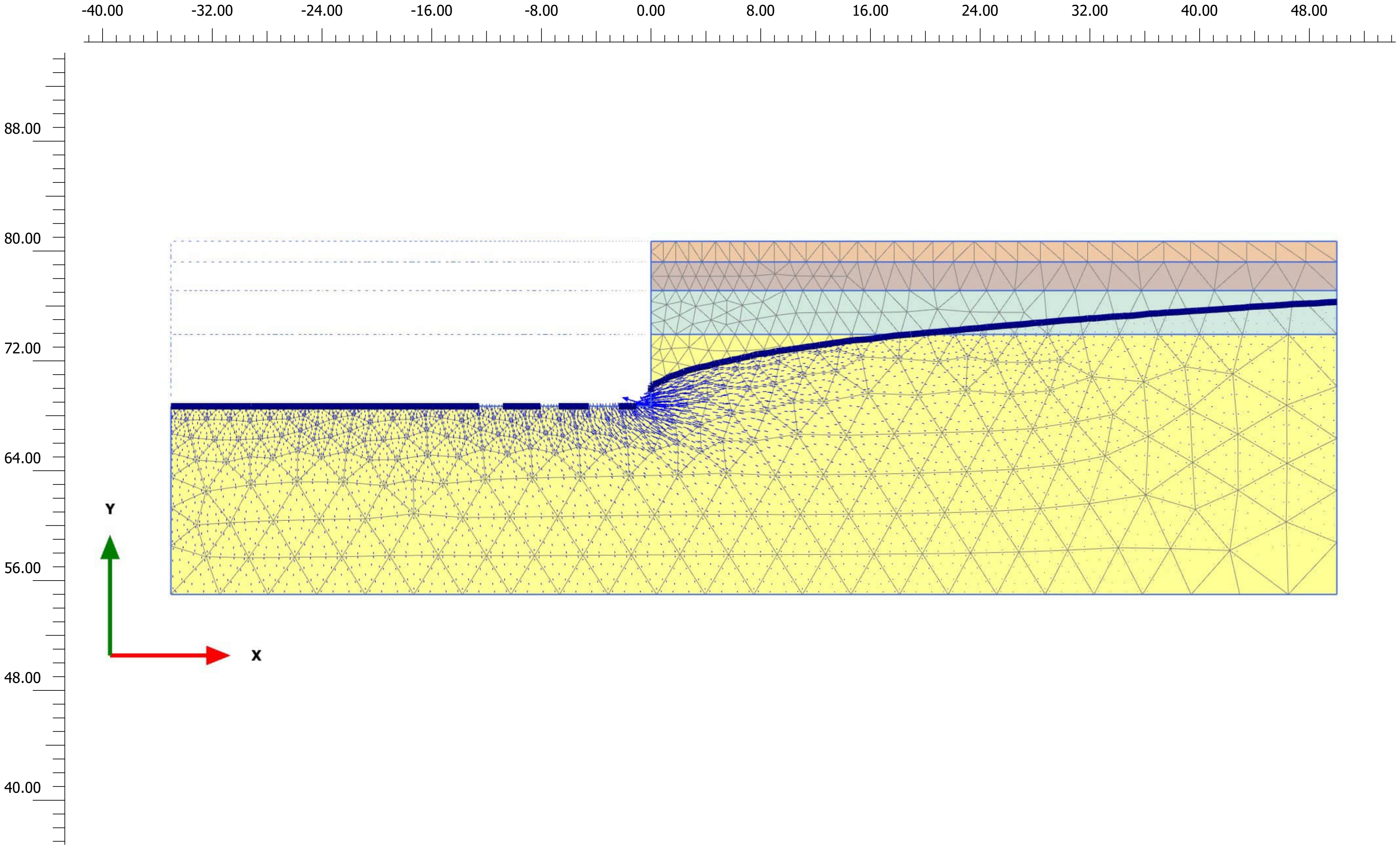


Total displacements |u| (scaled up 2.00*10³ times)

Maximum value = 1.569×10^{-3} m

PLAXIS® 2D	*Project description* Drawdown-Induced Settlements Beyond Northen Elevation		*Date* 29/09/2025
	Project filename E26733.G12.01_Bradfield_ ...	*Step* 3	*Company* EI Australia

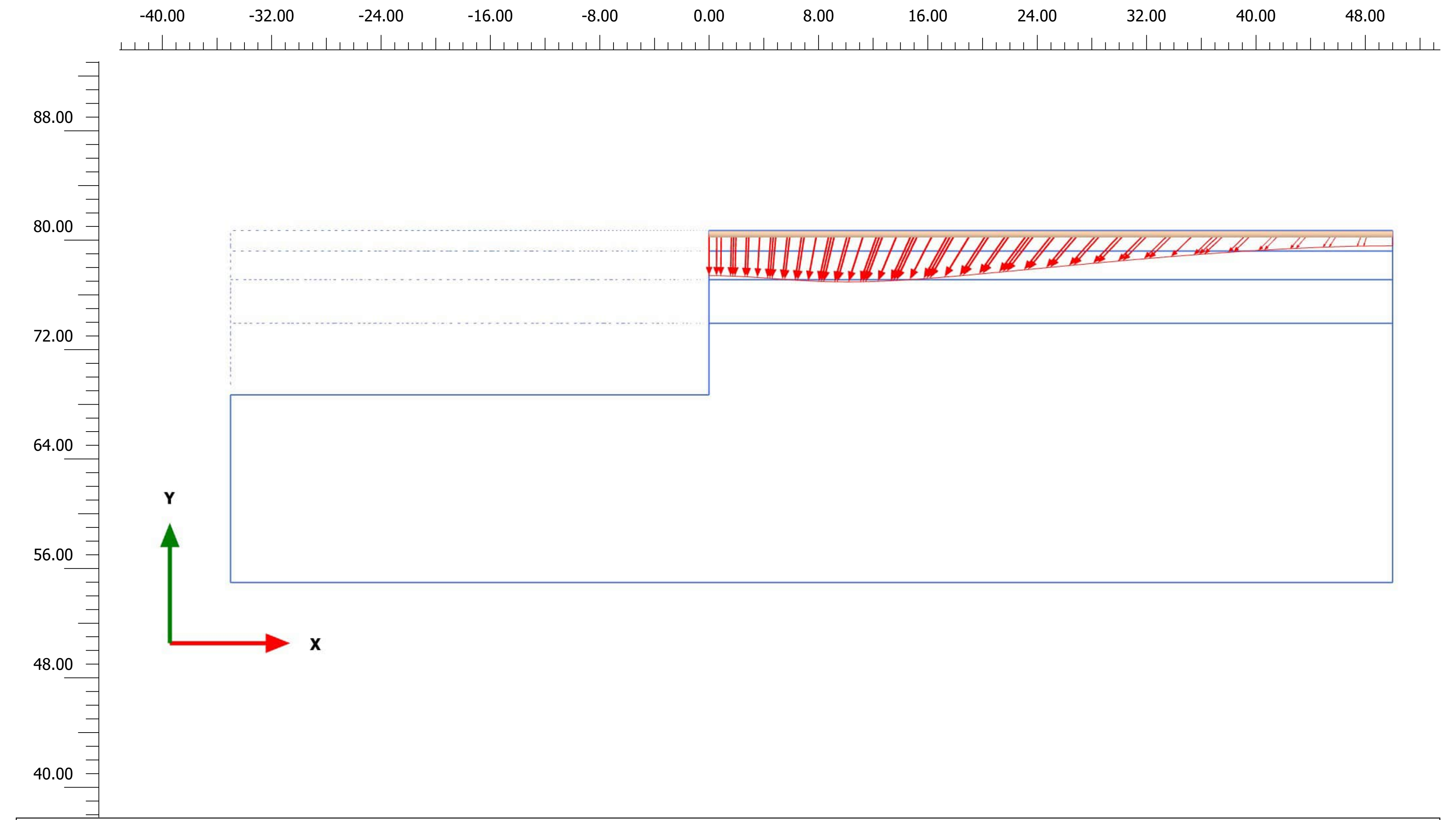
Output Version 2024.2.0.1144



PLAXIS® 2D

Project description Groundwater Flow and Drawdown Curve for Section B-B'			*Date* 29/09/2025
Project filename E26733.G12.01_Bradfield	*Step* 6	*Company* EI Australia	

Z:\07 - Projects\E26733_Creative Vision_Bradfield_GI_ASSMP_SMP_GME_GSA_DMP_PSI_\04_Working Docs\Data Analysis\G12.01\E26733.G12.01_Bradfield.p2dxdat\



Total displacements |u| (scaled up 2.00*10^3 times)

Maximum value = 1.865*10^{-3} m

PLAXIS® 2D	*Project description* Drawdown-induced Settlements Beyond Southern El ...		*Date* 29/09/2025
	Project filename E26733.G12.01_Bradfield	*Step* 6	*Company* EI Australia

Appendix B – Rising Head Permeability Tests

Rising Head Permeability Test

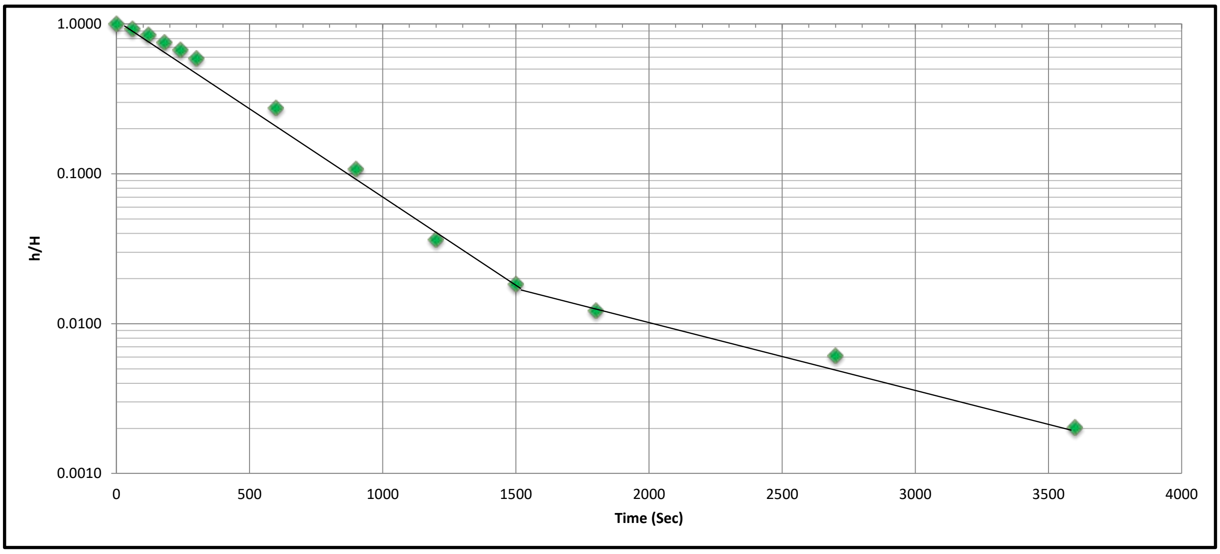
EI Job No.	E26733.G12		Test Date	23/09/2025
By	MS		Location	135 Badgerys Creek Road, Bradfield NSW

Borehole Detail

BH No.	BH1M			Based on Hvorslev Method
Casing Stick-up (m)	0.86			
Effective Piezo Screen Length (m)	3.00			
Piezo Radius r (m)	0.025			
Bore radium (drillhole radius) (m)	0.038			
Depth of the piezometer (m BGL)	10.90			
Static Water Level (m BToC)	5.68		t1	1500
Lag time T0 (sec)			t2	3600
			h1	0.0183
Calculated Permeability k	**4.76E-07**	m/sec	h2	0.0020

$$K = \frac{r^2}{2L}\ln\left(\frac{L}{R}\right)\left[\frac{\ln(h_1/h_2)}{t_2 - t_1}\right]$$

Time (mins)	Time (sec)	Depth to water (ft BToC)	Depth to water (m BToC)	Change in Level (m)	h/H
Static			5.68		
0	0		10.61	4.93	1.0000
1	60		10.23	4.55	0.9229
2	120		9.83	4.15	0.8418
3	180		9.38	3.70	0.7505
4	240		8.99	3.31	0.6714
5	300		8.58	2.90	0.5882
10	600		7.03	1.35	0.2738
15	900		6.21	0.53	0.1075
20	1200		5.86	0.18	0.0365
25	1500		5.77	0.09	0.0183
30	1800		5.74	0.06	0.0122
45	2700		5.71	0.03	0.0061
60	3600		5.69	0.01	0.0020



Rising Head Permeability Test

EI Job No.	E26733.G12		Test Date	23/09/2025
By	MS		Location	135 Badgerys Creek Road, Bradfield NSW

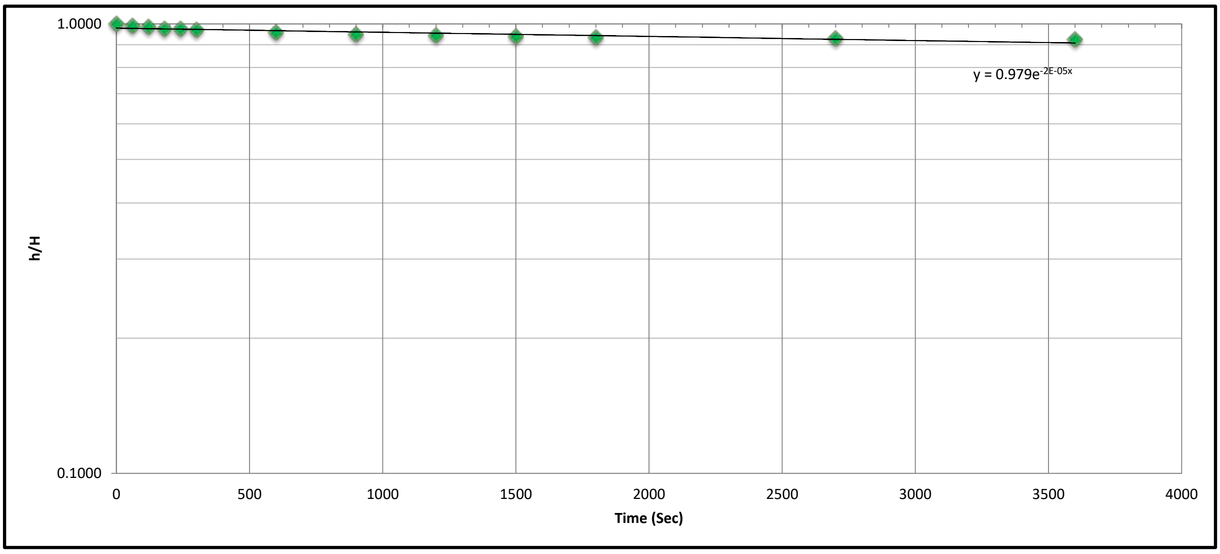
Borehole Detail

BH No.	BH2M
Casing Stick-up (m)	0.95
Effective Piezo Screen Length (m)	2.06
Piezo Radius r (m)	0.025
Bore radium (drillhole radius) (m)	0.038
Depth of the piezometer (m BGL)	6.55
Static Water Level (m BToC)	5.44
Lag time T0 (sec)	48601.09
Calculated Permeability k	**1.20E-08** m/sec

Based on Hvorslev Method

$$\mathbf{K} = \frac{\mathbf{r^2 \ln(L/R)}}{\mathbf{2LT_0}}$$

Time (mins)	Time (sec)	Depth to water (ft BToC)	Depth to water (m BToC)	Change in Level (m)	h/H
Static			5.44		
0	0		7.37	1.93	1.0000
1	60		7.35	1.91	0.9896
2	120		7.34	1.90	0.9845
3	180		7.32	1.88	0.9741
4	240		7.32	1.88	0.9741
5	300		7.31	1.87	0.9689
10	600		7.29	1.85	0.9585
15	900		7.27	1.83	0.9482
20	1200		7.26	1.82	0.9430
25	1500		7.25	1.81	0.9378
30	1800		7.24	1.80	0.9326
45	2700		7.23	1.79	0.9275
60	3600		7.22	1.78	0.9223



Rising Head Permeability Test

eiaustralia
Contamination | Remediation | Geotechnical

EI Job No.	E26733.G12		Test Date	23/09/2025
By	MS		Location	135 Badgerys Creek Road, Bradfield NSW

Borehole Detail

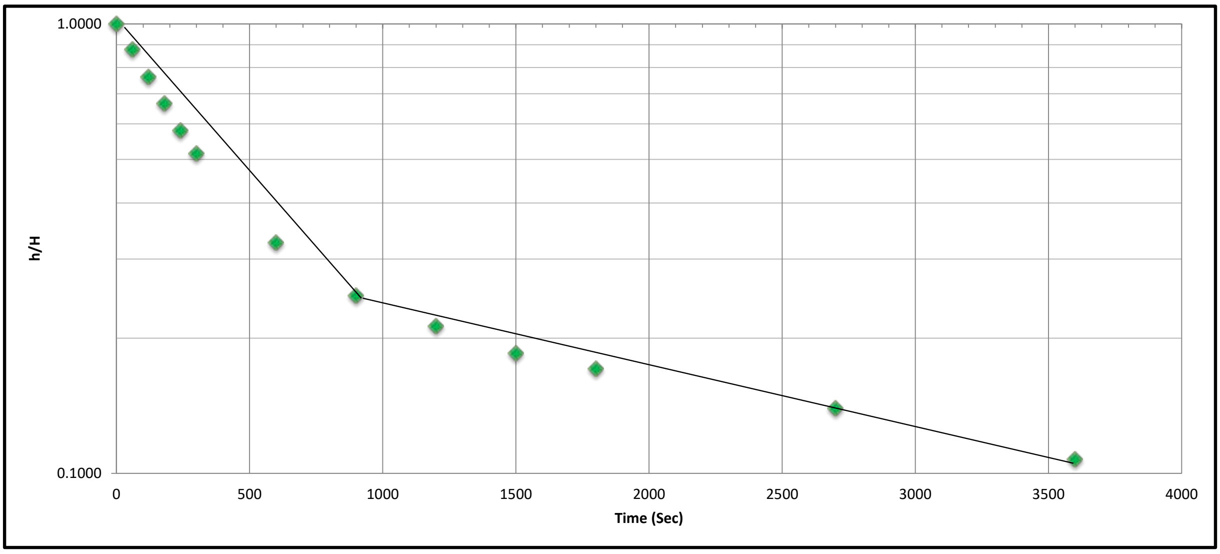
BH No.	BH3M
Casing Stick-up (m)	0.61
Effective Piezo Screen Length (m)	3.00
Piezo Radius r (m)	0.025
Bore radium (drillhole radius) (m)	0.038
Depth of the piezometer (m BGL)	22.30
Static Water Level (m BToC)	2.08
Calculated Permeability k	**1.41E-07** m/sec

Based on Hvorslev Method

$$K = \frac{r^2}{2L} \ln\left(\frac{L}{R}\right)\left[\frac{\ln(h_1/h_2)}{t_2 - t_1}\right]$$

t1	900
t2	3600
h1	0.2483
h2	0.1075

Time (mins)	Time (sec)	Depth to water (ft BToC)	Depth to water (m BToC)	Change in Level (m)	h/H
Static			2.08		
0	0		11.10	9.02	1.0000
1	60		10.00	7.92	0.8780
2	120		8.95	6.87	0.7616
3	180		8.08	6.00	0.6652
4	240		7.30	5.22	0.5787
5	300		6.72	4.64	0.5144
10	600		5.02	2.94	0.3259
15	900		4.32	2.24	0.2483
20	1200		4.00	1.92	0.2129
25	1500		3.75	1.67	0.1851
30	1800		3.62	1.54	0.1707
45	2700		3.34	1.26	0.1397
60	3600		3.05	0.97	0.1075



Rising Head Permeability Test

EI Job No.	E26733.G12		Test Date	23/09/2025
By	MS		Location	135 Badgerys Creek Road, Bradfield NSW

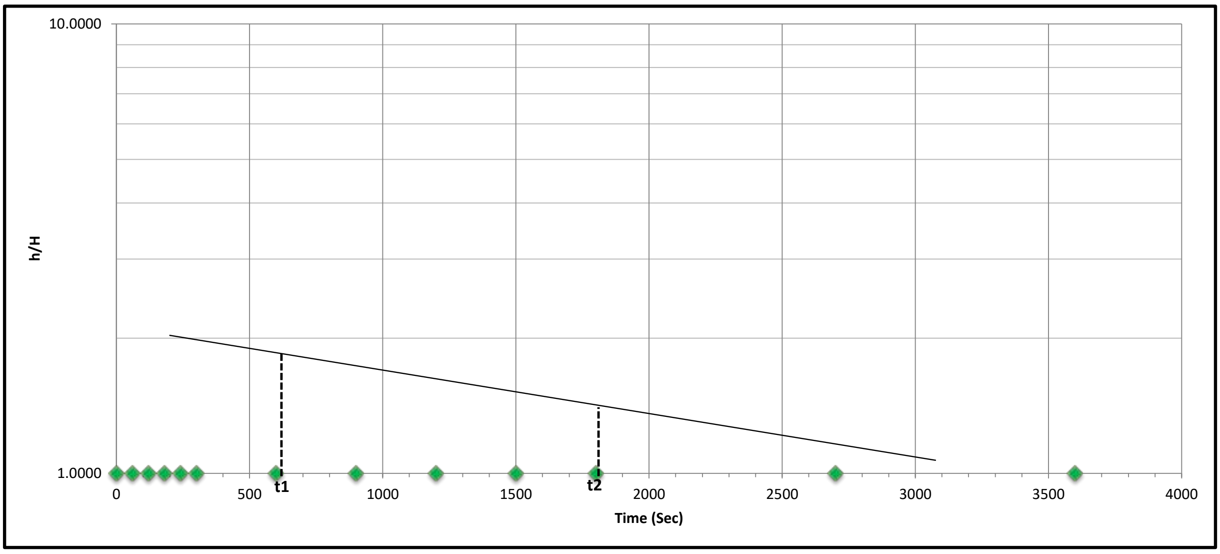
Borehole Detail

BH No.	BH5M
Casing Stick-up (m)	0.99
Effective Piezo Screen Length (m)	4.90
Piezo Radius r (m)	0.025
Bore radium (drillhole radius) (m)	0.038
Depth of the piezometer (m BGL)	12.10
Static Water Level (m BToC)	8.19
Calculated Permeability k	**N/A** m/sec

Based on Hvorslev Method

UNABLE TO TEST DUE TO SILT BUILDUP IN WELL

Time (mins)	Time (sec)	Depth to water (ft BToC)	Depth to water (m BToC)	Change in Level (m)	h/H
Static			8.19		
0	0			-8.19	1.0000
1	60			-8.19	1.0000
2	120			-8.19	1.0000
3	180			-8.19	1.0000
4	240			-8.19	1.0000
5	300			-8.19	1.0000
10	600			-8.19	1.0000
15	900			-8.19	1.0000
20	1200			-8.19	1.0000
25	1500			-8.19	1.0000
30	1800			-8.19	1.0000
45	2700			-8.19	1.0000
60	3600			-8.19	1.0000



Rising Head Permeability Test

EI Job No.	E26733.G12		Test Date	23/09/2025
By	MS		Location	135 Badgerys Creek Road, Bradfield NSW

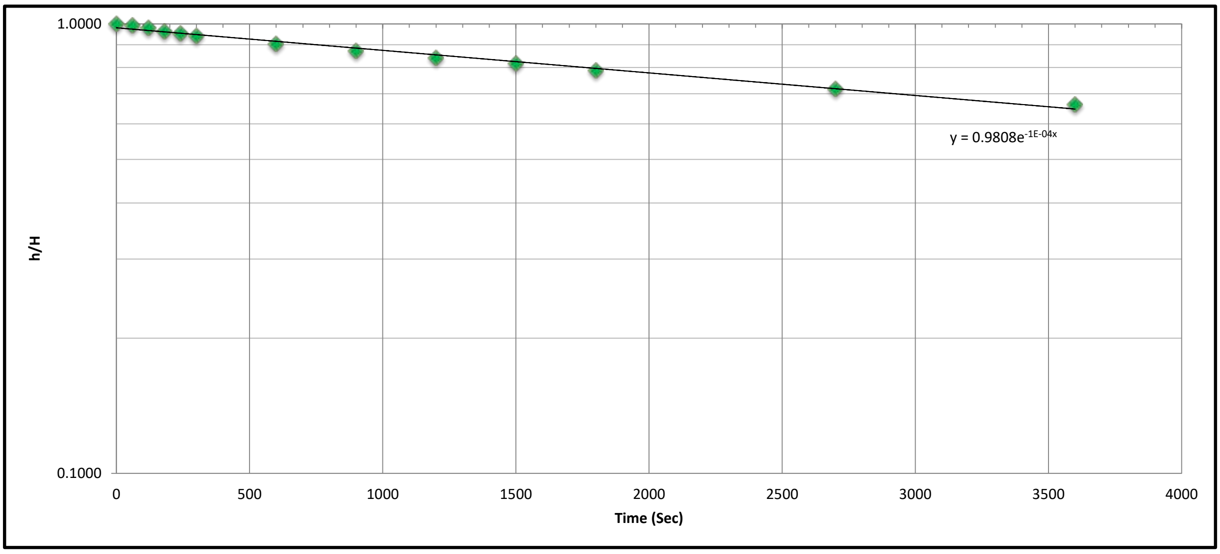
Borehole Detail

BH No.	BH6M
Casing Stick-up (m)	0.90
Effective Piezo Screen Length (m)	3.00
Piezo Radius r (m)	0.025
Bore radium (drillhole radius) (m)	0.038
Depth of the piezometer (m BGL)	9.10
Static Water Level (m BToC)	5.95
Lag time T0 (sec)	9737.66
Calculated Permeability k	**4.70E-08** m/sec

Based on Hvorslev Method

$$\mathbf{K} = \frac{\mathbf{r^2 \ln(L/R)}}{\mathbf{2LT_0}}$$

Time (mins)	Time (sec)	Depth to water (ft BToC)	Depth to water (m BToC)	Change in Level (m)	h/H
Static			5.95		
0	0		9.20	3.25	1.0000
1	60		9.18	3.23	0.9938
2	120		9.13	3.18	0.9785
3	180		9.08	3.13	0.9631
4	240		9.05	3.10	0.9538
5	300		9.01	3.06	0.9415
10	600		8.88	2.93	0.9015
15	900		8.78	2.83	0.8708
20	1200		8.68	2.73	0.8400
25	1500		8.60	2.65	0.8154
30	1800		8.51	2.56	0.7877
45	2700		8.28	2.33	0.7169
60	3600		8.10	2.15	0.6615



Appendix D – Important Information

Important Information

SCOPE OF SERVICES

The geotechnical report ("the report") has been prepared in accordance with the scope of services as set out in the contract, or as otherwise agreed, between the Client And EI Australia ("EI"). The scope of work may have been limited by a range of factors such as time, budget, access and/or site disturbance constraints.

RELIANCE ON DATA

EI has relied on data provided by the Client and other individuals and organizations, to prepare the report. Such data may include surveys, analyses, designs, maps and plans. EI has not verified the accuracy or completeness of the data except as stated in the report. To the extent that the statements, opinions, facts, information, conclusions and/or recommendations ("conclusions") are based in whole or part on the data, EI will not be liable in relation to incorrect conclusions should any data, information or condition be incorrect or have been concealed, withheld, misrepresented or otherwise not fully disclosed to EI.

GEOTECHNICAL ENGINEERING

Geotechnical engineering is based extensively on judgment and opinion. It is far less exact than other engineering disciplines. Geotechnical engineering reports are prepared for a specific client, for a specific project and to meet specific needs, and may not be adequate for other clients or other purposes (e.g. a report prepared for a consulting civil engineer may not be adequate for a construction contractor). The report should not be used for other than its intended purpose without seeking additional geotechnical advice. Also, unless further geotechnical advice is obtained, the report cannot be used where the nature and/or details of the proposed development are changed.

LIMITATIONS OF SITE INVESTIGATION

The investigation programme undertaken is a professional estimate of the scope of investigation required to provide a general profile of subsurface conditions. The data derived from the site investigation programme and subsequent laboratory testing are extrapolated across the site to form an inferred geological model, and an engineering opinion is rendered about overall subsurface conditions and their likely behaviour with regard to the proposed development. Despite investigation, the actual conditions at the site might differ from those inferred to exist, since no subsurface exploration program, no matter how comprehensive, can reveal all subsurface details and anomalies. The engineering logs are the subjective interpretation of subsurface conditions at a particular location and time, made by trained personnel. The actual interface between materials may be more gradual or abrupt than a report indicates.

SUBSURFACE CONDITIONS ARE TIME DEPENDENT

Subsurface conditions can be modified by changing natural forces or man-made influences. The report is based on conditions that existed at the time of subsurface exploration. Construction operations adjacent to the site, and natural events such as floods, or ground water fluctuations, may also affect subsurface conditions, and thus the continuing adequacy of a geotechnical report. EI should be kept appraised of any such events, and should be consulted to determine if any additional tests are necessary.

VERIFICATION OF SITE CONDITIONS

Where ground conditions encountered at the site differ significantly from those anticipated in the report, either due to natural variability of subsurface conditions or construction activities, it is a condition of the report that EI be notified of any variations and be provided with an opportunity to review the recommendations of this report. Recognition of change of soil and rock conditions requires experience and it is recommended that a suitably experienced geotechnical engineer be engaged to visit the site with sufficient frequency to detect if conditions have changed significantly.

REPRODUCTION OF REPORTS

This report is the subject of copyright and shall not be reproduced either totally or in part without the express permission of this Company. Where information from the accompanying report is to be included in contract documents or engineering specification for the project, the entire report should be included in order to minimize the likelihood of misinterpretation from logs.

REPORT FOR BENEFIT OF CLIENT

The report has been prepared for the benefit of the Client and no other party. EI assumes no responsibility and will not be liable to any other person or organisation for or in relation to any matter dealt with or conclusions expressed in the report, or for any loss or damage suffered by any other person or organisation arising from matters dealt with or conclusions expressed in the report (including without limitation matters arising from any negligent act or omission of EI or for any loss or damage suffered by any other party relying upon the matters dealt with or conclusions expressed in the report). Other parties should not rely upon the report or the accuracy or completeness of any conclusions and should make their own inquiries and obtain independent advice in relation to such matters.

OTHER LIMITATIONS

EI will not be liable to update or revise the report to take into account any events or emergent circumstances or fact occurring or becoming apparent after the date of the report.

Appendix E – Borehole Logs

eiaustralia

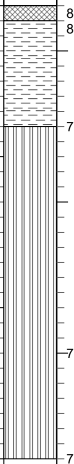
BOREHOLE LOG

BH ID: BH1M

Location	135 Badgerys Creek Road, Bradfield NSW	**Started**	23 April 2025
Client	Creative Vision	**Completed**	23 April 2025
Job No.	E26733.G03	**Logged By**	GB **Date** 23 April 2025
Sheets	1 of 3	**Review By**	JB **Date** 23 June 2025

Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈80.30 m (AHD)	**Northing**	6244091.0000 (MGA 2020 Zone 56)
Plant	Comacchio Geo 205	**Inclination**	90°	**Easting**	290122.0000 (MGA 2020 Zone 56)

METHOD	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	SAMPLE RECOVERY	DEPTH (m)	RL (m AHD)	MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY / REL. DENSITY	MATERIAL ORIGIN & OBSERVATIONS
AD/T	GWNE			0.00	80.30	TOPSOIL: Silty CLAY: medium plasticity, dark brown, with rootlets, no odour odour	M ≈ PL	-	TOPSOIL
		BH1M_0.5-0.95 SPT 0.50-0.95 7,9,15 N=24	■	0.10	80.20	CLAY: low plasticity, dark red, no odour odour	M < PL	VSt	RESIDUAL SOIL
		BH1M_1.50-1.94 SPT 1.50-1.79 2,16/140 mm N=R	■	0.80	79.50	SILTSTONE: pale brown-grey, extremely weathered, soil to very low strength, with pale grey clay seams			BEDROCK
				2.30	78.00	From 2.30m, very low to low strength			
				3.00	77.30	*Log continued on next page.*			



BOREHOLE CORE LOG

BH ID: BH1M

Location	135 Badgerys Creek Road, Bradfield NSW	**Started**	23 April 2025
Client	Creative Vision	**Completed**	23 April 2025
Job No.	E26733.G03	**Logged By**	GB **Date** 23 April 2025
Sheets	2 of 3	**Review By**	JB **Date** 23 June 2025

Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈80.30 m (AHD)	**Northing**	6244091.0000 (MGA 2020 Zone 56)
Plant	Comacchio Geo 205	**Inclination**	90°	**Easting**	290122.0000 (MGA 2020 Zone 56)

METHOD	Flush Return	TCR %	RQD %	DEPTH (m)	RL (m AHD)	MATERIAL DESCRIPTION	WEATHERING
				0		*Log continued from previous page.*	
NMLC	90%	100	16	3		SILTSTONE: brown to dark grey, thinly to medium bedded, iron stained	DW
				5.31	74.99	From 5.31m, with bands of sand/gravel, medium sand to fine gravel size, sub-rounded, bands up to 60mm thick, iron indurated	
				5.81	74.49	SILTSTONE: dark grey, indistinctly thinly bedded, trace mudstone/carbonaceous inclusions or laminations, up to 20mm in size	FR
	70%	100	89	6.98	73.32	From 6.98m to 7.14m, bioturbation burrow	
				7.20	73.10	SANDSTONE: pale grey to grey, fine to medium grained, very thinly to thinly bedded, occasional bioturbation or disturbed bedding	
	40%	100	90	8.26	72.04	SILTSTONE: dark grey, laminated to very thinly bedded, occasional bioturbation or disturbed bedding	
				10			

ESTIMATED STRENGTH Is(50) ▼ - Axial ▽ - Diametral: VL 0-1, L 0-3, M 1, H 3, VH 10, EH

FRACTURE SPACING: 30, 100, 300, 1000, 3000

DISCONTINUITIES & ADDITIONAL DATA

3.01: JT 20° PR SM CL
3.06: BP 0-10° PR SM CL VN
3.09-3.11: JT 10-20° PR SM CL X3
3.17: BP 0° PR SM CL VN
3.21: JT 0-10° UN SM CL
3.23: BP 0° PR SM CL VN
3.25-3.47: JT 10-50° PR SM CL Infilled
3.35: XWS 0° PR SM CL Infilled
3.45: XWS 0° PR SM CL Infilled
3.49-3.56: BP 0-10° PR SM FE VN
3.61-3.63: XWS 10° PR SM CL Infilled
3.69: XWS 10° PR SM CL Infilled
3.74: BP 10° PR SM FE VN
3.82: BP 0° PR SM FE VN
3.91: BP 10° PR SM CL VN
3.97: BP 10° PR SM CL VN
4.12-4.15: XWS 0° PR SM CL Infilled
4.19: BP 0-15° UN SM FE VN
4.29: BP 0-10° UN SM CL
4.36: BP 10° PR SM CL
4.37-4.41: XWS 10° PR SM CL Infilled
4.46-4.47: XWS 10° PR SM CL Infilled
4.50: JT 70° PR SM FE VN
4.65: BP 0° PR CM CL VN
4.68: JT 30° PR SM CL
4.74-4.75: XWS 0° PR SM CL Infilled
4.77-4.78: XWS 10° PL SM CL Infilled
4.89: JT 80° PR SM FE SN X2
4.97: HB
5.03: JT 80° PR SM FE SN
5.11: BP 10° PR SM FE VN
5.32-5.56: BP 0-10° UN RO GC Infilled
5.66: BP 10° PR RO GC Infilled
5.87: JT 20° PR RO FE/CL Infilled
5.98: BP 0° PR SM FE VN
6.07: DB
6.08-6.97: DB scarring from above gravels
6.81: BP 10° PR SM CL Infilled
6.87-6.91: CS 0-20° PR RO GC Infilled
7.20: BP 10° UN RO FE VN
7.22: BP 10° UN RO FE VN
7.65: BP 10° PR RO FE VN
7.95: BP 10° PR RO FE VN
7.98: HB
8.09: BP 0° PR RO FE VN
8.25: JT 80° PR RO FE/QZ Infilled
8.26: BP 20° PR RO FE VN
8.38: JT 80° ST RO CL
8.54-8.74: JT 30-90° ST RO CL
8.73: DB
9.01: HB
9.03-9.04: XWS 0° PR SM CL Infilled
9.09: BP 0° PR SM CL VN
9.16-9.19: XWS 0° PR SM CL Infilled
9.27: BP 0° PR CM CN
9.93: BP 10° PR SM CN

BOREHOLE CORE LOG

BH ID: BH1M

Location	135 Badgerys Creek Road, Bradfield NSW	**Started**	23 April 2025
Client	Creative Vision	**Completed**	23 April 2025
Job No.	E26733.G03	**Logged By**	GB **Date** 23 April 2025
Sheets	3 of 3	**Review By**	JB **Date** 23 June 2025

Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈80.30 m (AHD)	**Northing**	6244091.0000 (MGA 2020 Zone 56)
Plant	Comacchio Geo 205	**Inclination**	90°	**Easting**	290122.0000 (MGA 2020 Zone 56)

METHOD	Flush Return	TCR %	RQD %	DEPTH (m)	GRAPHIC LOG	RL (m AHD)	MATERIAL DESCRIPTION	WEATHERING	ESTIMATED STRENGTH Is(50) ▼ - Axial ▽ - Diametral (VL 0-1, L 0-3, M 1, H 3, VH 10, EH)	DISCONTINUITIES & ADDITIONAL DATA	FRACTURE SPACING (30, 100, 300, 1000, 3000)
	40%					69.39	SILTSTONE: dark grey, laminated to very thinly bedded, occasional bioturbation or disturbed bedding		M	9.94: BP 0° PR SM CN 10.08: HB 10.22: BP 0° PR SM CN 10.26: BP 0° PR SM CN 10.33: BP 0° PR SM CN 10.51-10.58: CS 0-30° SM VN QZ	30–100
				11 12 13 14 15 16 17 18 19 20			Terminated at 10.91m. Target depth reached.				

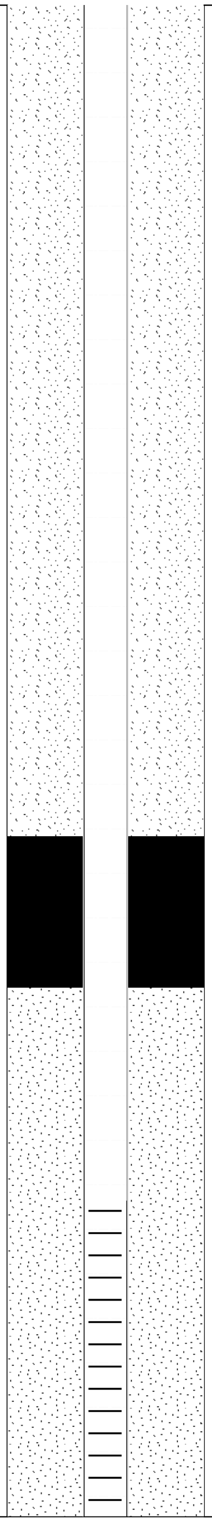
This log should be read in conjunction with EI Australia's accompanying explanatory notes.

MONITORING WELL LOG

BH ID: BH1M

Location	135 Badgerys Creek Road, Bradfield NSW	**Started**	23 April 2025
Client	Creative Vision	**Completed**	23 April 2025
Job No.	E26733.G03	**Logged By**	GB **Date** 23 April 2025
Sheets	1 of 2	**Review By**	JB **Date** 23 June 2025
Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈80.30 m (AHD)
Plant	Comacchio Geo 205	**Inclination**	90°
Northing	6244091.0000 (MGA 2020 Zone 56)	**Easting**	290122.0000 (MGA 2020 Zone 56)

WATER	SAMPLES & FIELD TESTS	DEPTH (m)	RL (m AHD)	MATERIAL DESCRIPTION	MOISTURE CONDITION
GWNE		0.00	80.30	TOPSOIL: Silty CLAY: medium plasticity, dark brown, with rootlets, no odour odour	M ≈ PL
	BH1M_0.5-0.95 SPT 0.50-0.95 7,9,15 N=24	0.10	80.20	CLAY: low plasticity, dark red, no odour odour	M < PL
	BH1M_1.50-1.94 SPT 1.50-1.79 2,16/140 mm N=R	0.80	79.50	SILTSTONE: pale brown-grey, extremely weathered, soil to very low strength, with pale grey clay seams	
		2.30	78.00	From 2.30m, very low to low strength	
90%		3.00	77.30	SILTSTONE: brown to dark grey, thinly to medium bedded, iron stained	
		5.31	74.99	From 5.31m, with bands of sand/gravel, medium sand to fine gravel size, sub-rounded, bands up to 60mm thick, iron indurated	
		5.81	74.49	SILTSTONE: dark grey, indistinctly thinly bedded, trace mudstone/carbonaceous inclusions or laminations, up to 20mm in size	
70%		6.98	73.32	From 6.98m to 7.14m, bioturbation burrow	
		7.20	73.10	SANDSTONE: pale grey to grey, fine to medium grained, very thinly to thinly bedded, occasional bioturbation or disturbed bedding	
40%		8.26	72.04	SILTSTONE: dark grey, laminated to very thinly bedded, occasional bioturbation or disturbed bedding	



BACKFILL DETAILS

Grout
0.00m - 5.50m

Bentonite
5.50m - 6.50m

Sand
6.50m - 10.91m

STANDPIPE DETAILS

Well Stickup =0.86m
(RL 81.16m)

-0.86m - 7.91m
PVC casing (50mm Ø)

7.91m - 10.91m
PVC screen (50mm Ø)

This log should be read in conjunction with EI Australia's accompanying explanatory notes.

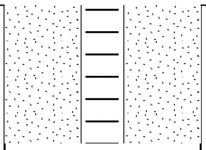
MONITORING WELL LOG

BH ID: BH1M

Location	135 Badgerys Creek Road, Bradfield NSW	**Started**	23 April 2025		
Client	Creative Vision	**Completed**	23 April 2025		
Job No.	E26733.G03	**Logged By**	GB	**Date**	23 April 2025
Sheets	2 of 2	**Review By**	JB	**Date**	23 June 2025

Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈80.30 m (AHD)	**Northing**	6244091.0000 (MGA 2020 Zone 56)
Plant	Comacchio Geo 205	**Inclination**	90°	**Easting**	290122.0000 (MGA 2020 Zone 56)

WATER	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG	RL (m AHD)	MATERIAL DESCRIPTION	MOISTURE CONDITION	BACKFILL DETAILS	STANDPIPE DETAILS
40%					SILTSTONE: dark grey, laminated to very thinly bedded, occasional bioturbation or disturbed bedding			
		11		69.39	Terminated at 10.91m. Target depth reached.			
		12						
		13						
		14						
		15						
		16						
		17						
		18						
		19						
		20						



This log should be read in conjunction with EI Australia's accompanying explanatory notes.

CORE PHOTOGRAPH OF BOREHOLE: BH1M

Project	Proposed Mixed-use Development	**East**	290122	**Depth Range**	3.00m to 10.91m BEGL		
Location	135 Badgerys Creek Road, Bradfield NSW	**North**	6244091	**Contractor**	Geosense Drilling Engineers Pty Ltd		
Position	See Figure 2	**Surface RL**	≈ 80.3m	**Drill Rig**	Comacchio GEO 205		
Job No.	E26733.G03	**Inclination**	-90°	**Logged**	GB	**Date**	23 / 04 / 2025
Client	Creative Vision	**Box**	1-2 of 2	**Checked**	JB	**Date**	23 / 06 / 2025

BOREHOLE LOG

BH ID: BH2M

Location	135 Badgerys Creek Road, Bradfield NSW	**Started**	23 April 2025		
Client	Creative Vision	**Completed**	24 April 2025		
Job No.	E26733.G03	**Logged By**	GB	**Date**	24 April 2025
Sheets	1 of 3	**Review By**	JB	**Date**	23 June 2025

Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈79.70 m (AHD)	**Northing**	6244031.0000 (MGA 2020 Zone 56)
Plant	Comacchio Geo 205	**Inclination**	90°	**Easting**	290135.0000 (MGA 2020 Zone 56)

METHOD	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	SAMPLE RECOVERY	DEPTH (m)	GRAPHIC LOG	RL (m AHD)	MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY / REL. DENSITY	MATERIAL ORIGIN & OBSERVATIONS
AD/T	GWNE			0.00		79.70	TOPSOIL: Silty CLAY: medium plasticity, dark brown, with rootlets, no odour odour	M ≈ PL	-	TOPSOIL
				0.15		79.55	CLAY: low plasticity, dark red, trace rootlets, no odour odour	M < PL	VSt	RESIDUAL SOIL
		BH2M_0.50-0.95 SPT 0.50-0.95 5,7,12 N=19	■							
				0.60		79.10	From 0.60m, pale grey mottled dark red			
		BH2M_1.50-1.86 SPT 1.50-1.86 8,16,10/60 mm N=R	■							
				1.70		78.00	SILTSTONE: brown-grey to dark grey and dark red, extremely weathered, soil to very low strength			BEDROCK
				2.50		77.20	*Log continued on next page.*			

This log should be read in conjunction with EI Australia's accompanying explanatory notes.

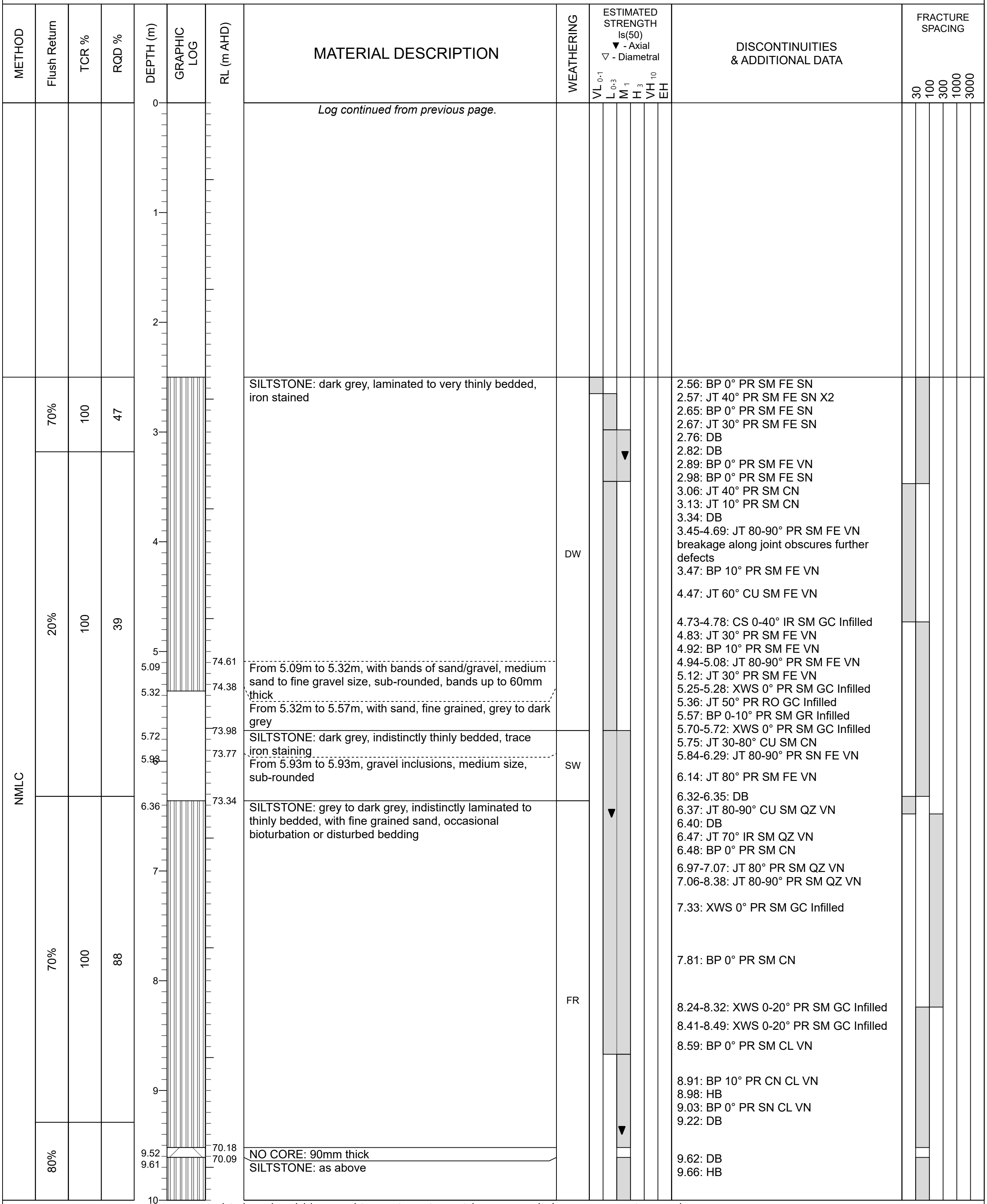
eiaustralia

BOREHOLE CORE LOG

BH ID: BH2M

Location	135 Badgerys Creek Road, Bradfield NSW	**Started**	23 April 2025		
Client	Creative Vision	**Completed**	24 April 2025		
Job No.	E26733.G03	**Logged By**	GB	**Date**	24 April 2025
Sheets	2 of 3	**Review By**	JB	**Date**	23 June 2025

Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈79.70 m (AHD)	**Northing**	6244031.0000 (MGA 2020 Zone 56)
Plant	Comacchio Geo 205	**Inclination**	90°	**Easting**	290135.0000 (MGA 2020 Zone 56)



Log continued from previous page.

SILTSTONE: dark grey, laminated to very thinly bedded, iron stained

From 5.09m to 5.32m, with bands of sand/gravel, medium sand to fine gravel size, sub-rounded, bands up to 60mm thick

From 5.32m to 5.57m, with sand, fine grained, grey to dark grey

SILTSTONE: dark grey, indistinctly thinly bedded, trace iron staining

From 5.93m to 5.93m, gravel inclusions, medium size, sub-rounded

SILTSTONE: grey to dark grey, indistinctly laminated to thinly bedded, with fine grained sand, occasional bioturbation or disturbed bedding

NO CORE: 90mm thick

SILTSTONE: as above

2.56: BP 0° PR SM FE SN
2.57: JT 40° PR SM FE SN X2
2.65: BP 0° PR SM FE SN
2.67: JT 30° PR SM FE SN
2.76: DB
2.82: DB
2.89: BP 0° PR SM FE VN
2.98: BP 0° PR SM FE SN
3.06: JT 40° PR SM CN
3.13: JT 10° PR SM CN
3.34: DB
3.45-4.69: JT 80-90° PR SM FE VN
breakage along joint obscures further defects
3.47: BP 10° PR SM FE VN
4.47: JT 60° CU SM FE VN
4.73-4.78: CS 0-40° IR SM GC Infilled
4.83: JT 30° PR SM FE VN
4.92: BP 10° PR SM FE VN
4.94-5.08: JT 80-90° PR SM FE VN
5.12: JT 30° PR SM FE VN
5.25-5.28: XWS 0° PR SM GC Infilled
5.36: JT 50° PR RO GC Infilled
5.57: BP 0-10° PR SM GR Infilled
5.70-5.72: XWS 0° PR SM GC Infilled
5.75: JT 30-80° CU SM CN
5.84-6.29: JT 80-90° PR SN FE VN
6.14: JT 80° PR SM FE VN
6.32-6.35: DB
6.37: JT 80-90° CU SM QZ VN
6.40: DB
6.47: JT 70° IR SM QZ VN
6.48: BP 0° PR SM CN
6.97-7.07: JT 80° PR SM QZ VN
7.06-8.38: JT 80-90° PR SM QZ VN
7.33: XWS 0° PR SM GC Infilled
7.81: BP 0° PR SM CN
8.24-8.32: XWS 0-20° PR SM GC Infilled
8.41-8.49: XWS 0-20° PR SM GC Infilled
8.59: BP 0° PR SM CL VN
8.91: BP 10° PR CN CL VN
8.98: HB
9.03: BP 0° PR SN CL VN
9.22: DB
9.62: DB
9.66: HB

BOREHOLE CORE LOG

BH ID: BH2M

Location	135 Badgerys Creek Road, Bradfield NSW	**Started**	23 April 2025
Client	Creative Vision	**Completed**	24 April 2025
Job No.	E26733.G03	**Logged By**	GB **Date** 24 April 2025
Sheets	3 of 3	**Review By**	JB **Date** 23 June 2025

Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈79.70 m (AHD)	**Northing**	6244031.0000 (MGA 2020 Zone 56)
Plant	Comacchio Geo 205	**Inclination**	90°	**Easting**	290135.0000 (MGA 2020 Zone 56)

METHOD	Flush Return	TCR %	RQD %	DEPTH (m)	GRAPHIC LOG	RL (m AHD)	MATERIAL DESCRIPTION	WEATHERING	ESTIMATED STRENGTH Is(50) ▼ - Axial ▽ - Diametral (VL 0-1, L 0-3, M 1, H 3, VH 10, EH)	DISCONTINUITIES & ADDITIONAL DATA	FRACTURE SPACING (30, 100, 300, 1000, 3000)
	80%	97	92				SILTSTONE: as above			10.05: HB 10.37: BP 0° PR SM CN 10.68: BP 10° PR SM CN 10.72: BP 0° PR SM CL VN 10.78: BP 0° PR SM CL VN 10.91: JT 30° PR SM CL VN 10.97: HB	
				11.07		68.63	From 11.07m to 11.07m, gravel inclusions, medium size, rounded		▼	11.07: DB	
				11.78		67.92	From 11.78m to 11.83m, gravel inclusions, medium size, rounded			11.79: DB	
						67.51	Terminated at 12.19m. Target depth reached.				

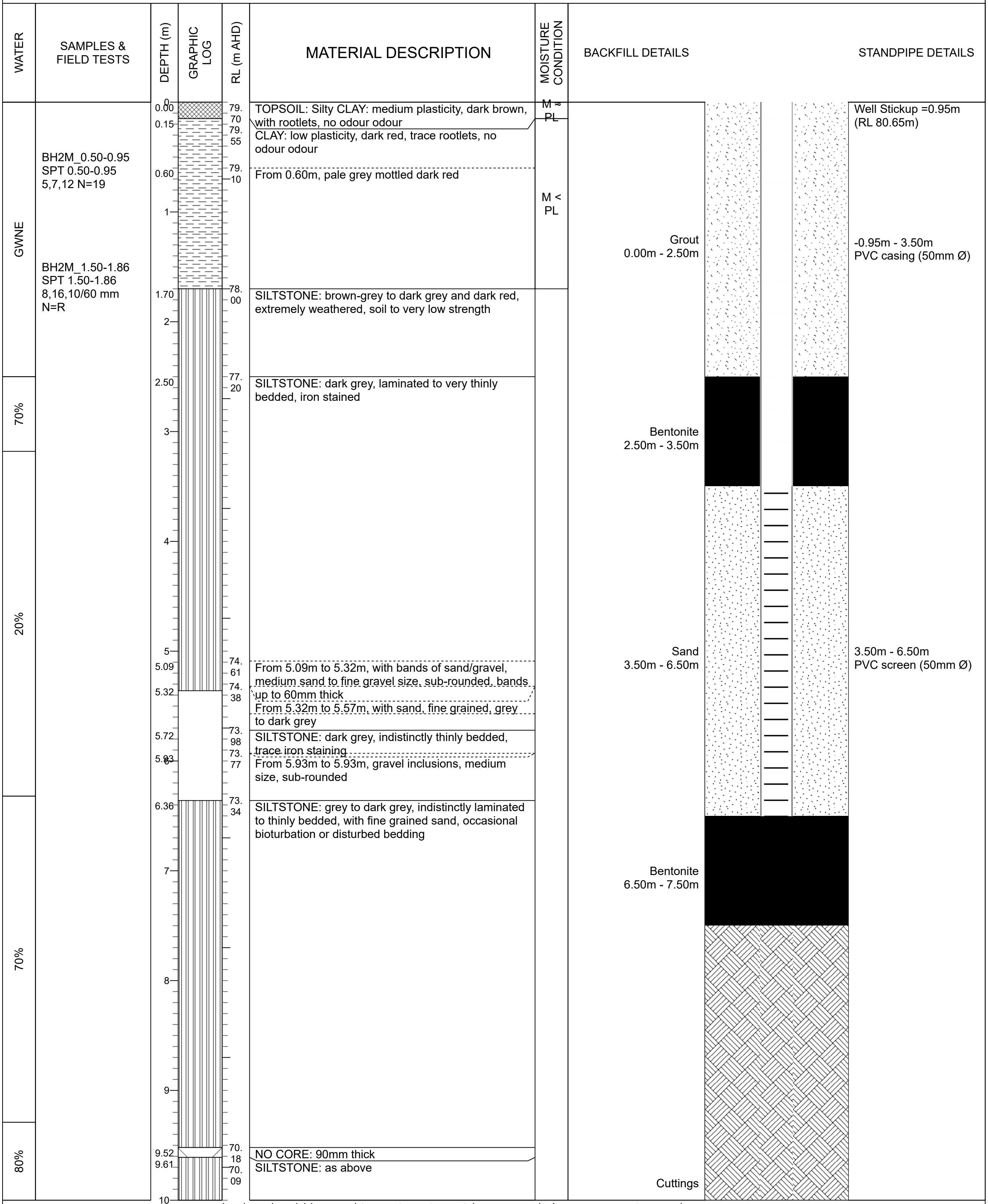
This log should be read in conjunction with EI Australia's accompanying explanatory notes.

MONITORING WELL LOG

BH ID: BH2M

Location	135 Badgerys Creek Road, Bradfield NSW	**Started**	23 April 2025		
Client	Creative Vision	**Completed**	24 April 2025		
Job No.	E26733.G03	**Logged By**	GB	**Date**	24 April 2025
Sheets	1 of 2	**Review By**	JB	**Date**	23 June 2025

Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈79.70 m (AHD)	**Northing**	6244031.0000 (MGA 2020 Zone 56)
Plant	Comacchio Geo 205	**Inclination**	90°	**Easting**	290135.0000 (MGA 2020 Zone 56)



WATER
GWNE
70%
20%
70%
80%

SAMPLES & FIELD TESTS
BH2M_0.50-0.95 SPT 0.50-0.95 5,7,12 N=19
BH2M_1.50-1.86 SPT 1.50-1.86 8,16,10/60 mm N=R

DEPTH (m)	RL (m AHD)	MATERIAL DESCRIPTION	MOISTURE CONDITION
0.00	79.70	TOPSOIL: Silty CLAY: medium plasticity, dark brown, with rootlets, no odour odour	M ≈ PL
0.15	79.55	CLAY: low plasticity, dark red, trace rootlets, no odour odour	M < PL
0.60	79.10	From 0.60m, pale grey mottled dark red	
1.70	78.00	SILTSTONE: brown-grey to dark grey and dark red, extremely weathered, soil to very low strength	
2.50	77.20	SILTSTONE: dark grey, laminated to very thinly bedded, iron stained	
5.09	74.61	From 5.09m to 5.32m, with bands of sand/gravel, medium sand to fine gravel size, sub-rounded, bands up to 60mm thick	
5.32	74.38	From 5.32m to 5.57m, with sand, fine grained, grey to dark grey	
5.72	73.98	SILTSTONE: dark grey, indistinctly thinly bedded, trace iron staining	
5.93	73.77	From 5.93m to 5.93m, gravel inclusions, medium size, sub-rounded	
6.36	73.34	SILTSTONE: grey to dark grey, indistinctly laminated to thinly bedded, with fine grained sand, occasional bioturbation or disturbed bedding	
9.52	70.18	NO CORE: 90mm thick	
9.61	70.09	SILTSTONE: as above	

BACKFILL DETAILS	STANDPIPE DETAILS
	Well Stickup =0.95m (RL 80.65m)
Grout 0.00m - 2.50m	-0.95m - 3.50m PVC casing (50mm Ø)
Bentonite 2.50m - 3.50m	
Sand 3.50m - 6.50m	3.50m - 6.50m PVC screen (50mm Ø)
Bentonite 6.50m - 7.50m	
Cuttings	

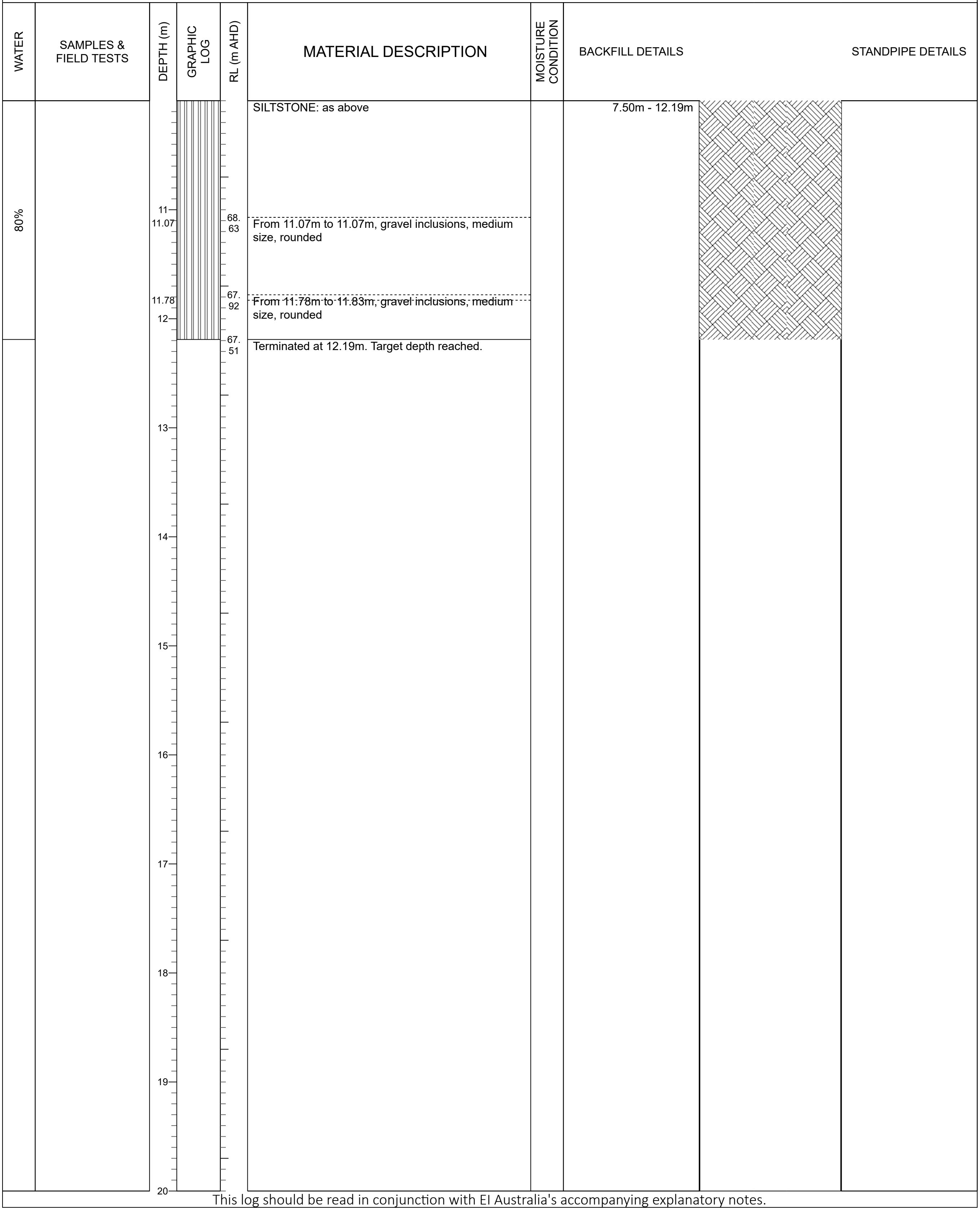
This log should be read in conjunction with EI Australia's accompanying explanatory notes.

MONITORING WELL LOG

BH ID: BH2M

Location	135 Badgerys Creek Road, Bradfield NSW	**Started**	23 April 2025		
Client	Creative Vision	**Completed**	24 April 2025		
Job No.	E26733.G03	**Logged By**	GB	**Date**	24 April 2025
Sheets	2 of 2	**Review By**	JB	**Date**	23 June 2025

Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈79.70 m (AHD)	**Northing**	6244031.0000 (MGA 2020 Zone 56)
Plant	Comacchio Geo 205	**Inclination**	90°	**Easting**	290135.0000 (MGA 2020 Zone 56)



SILTSTONE: as above

From 11.07m to 11.07m, gravel inclusions, medium size, rounded

From 11.78m to 11.83m, gravel inclusions, medium size, rounded

Terminated at 12.19m. Target depth reached.

This log should be read in conjunction with EI Australia's accompanying explanatory notes.

CORE PHOTOGRAPH OF BOREHOLE: BH2M

Project	Proposed Mixed-use Development	**East**	290135	**Depth Range**	2.5m to 12.19m BEGL		
Location	135 Badgerys Creek Road, Bradfield NSW	**North**	6244031	**Contractor**	Geosense Drilling Engineers Pty Ltd		
Position	See Figure 2	**Surface RL**	≈ 79.7m	**Drill Rig**	Comacchio GEO 205		
Job No.	E26733.G03	**Inclination**	-90°	**Logged**	GB	**Date**	24 / 04 / 2025
Client	Creative Vision	**Box**	1-3 of 3	**Checked**	JB	**Date**	23 / 06 / 2025

BOREHOLE LOG

BH ID: BH3M

Location 135 Badgerys Creek Road, Bradfield NSW
Client Creative Vision
Job No. E26733.G03
Sheets 1 of 4

Started 24 April 2025
Completed 28 April 2025
Logged By GB **Date** 28 April 2025
Review By JB **Date** 23 June 2025

Drilling Contractor Geosense Drilling Engineers
Plant Comacchio Geo 205
Surface RL ≈76.80 m (AHD)
Inclination 90°
Northing 6244042.0000 (MGA 2020 Zone 56)
Easting 290213.0000 (MGA 2020 Zone 56)

METHOD	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	DEPTH (m)	RL (m AHD)	MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY / REL. DENSITY	MATERIAL ORIGIN & OBSERVATIONS
AD/T	GWNE	BH3M_0.50-0.95 SPT 0.50-0.95 3,3,6 N=9	0.00	76.80	TOPSOIL: Silty CLAY: low to medium plasticity, dark brown, with rootlets, no odour odour	M ≈ PL	-	TOPSOIL
			0.70	76.10	CLAY: low to medium plasticity, dark red mottled grey, trace rootlets, no odour odour	M < PL	F - St	
		BH3M_1.50-1.95 SPT 1.50-1.95 2,3,4 N=7	1.20	75.60	CLAY: low plasticity, red-brown, trace sand/gravel, medium sand to fine gravel size, rounded, trace rootlets, occasional charcoal pieces, fine to medium size, no odour odour			
			1.85	74.95	CLAY: low plasticity, pale grey mottled pale yellow-brown, trace iron indurated nodules, fine to medium gravel size, dark red, no odour odour		VSt	RESIDUAL SOIL
			2.50	74.30	SILTSTONE: grey to pale brown, extremely weathered, soil to very low strength			BEDROCK
		BH3M_3.00-3.05 SPT 3.00-3.05 10/50 mm N=R	3.02	73.78	*Log continued on next page.*			

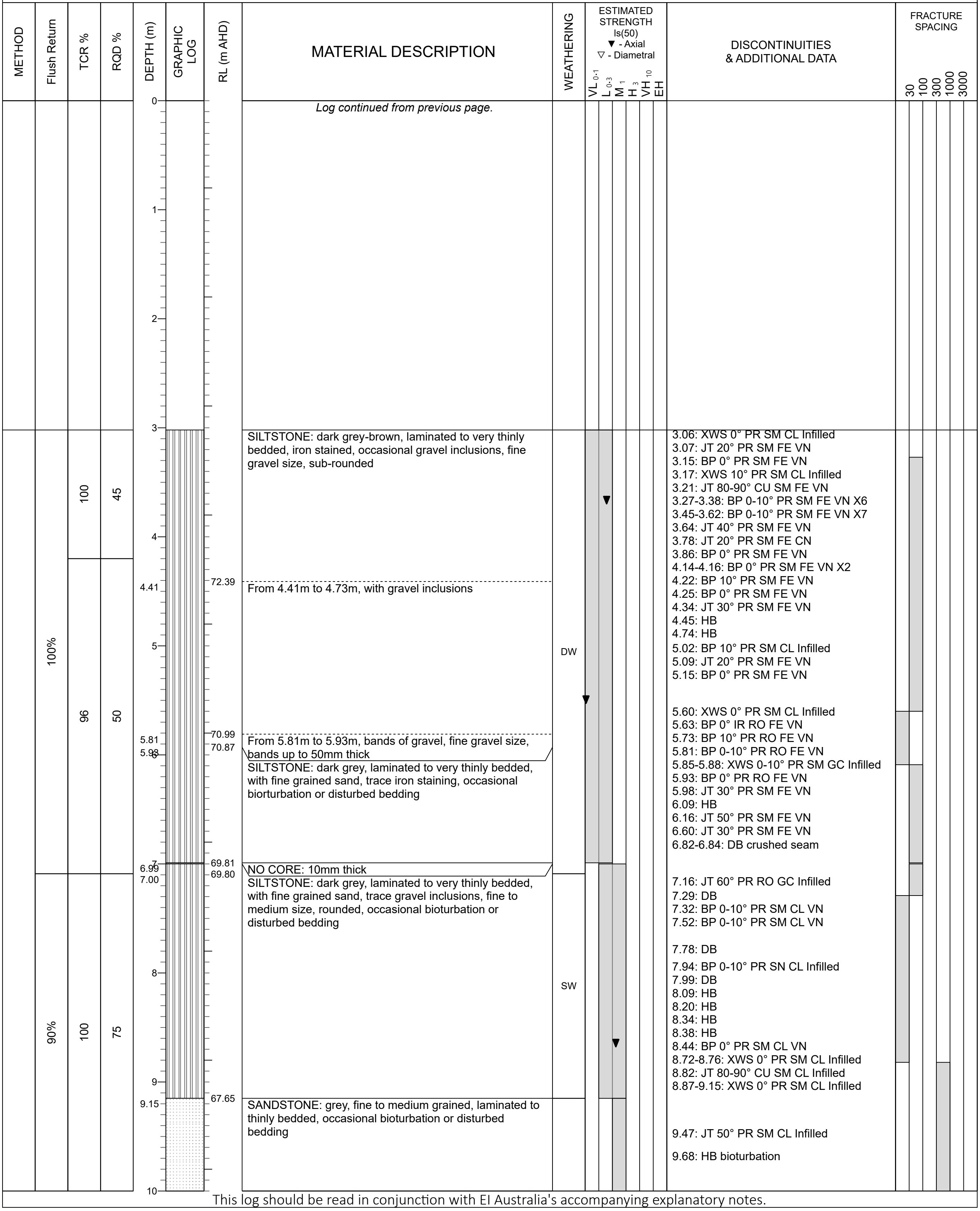
eiaustralia

BOREHOLE CORE LOG

BH ID: BH3M

Location	135 Badgerys Creek Road, Bradfield NSW	**Started**	24 April 2025
Client	Creative Vision	**Completed**	28 April 2025
Job No.	E26733.G03	**Logged By**	GB **Date** 28 April 2025
Sheets	2 of 4	**Review By**	JB **Date** 23 June 2025

Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈76.80 m (AHD)	**Northing**	6244042.0000 (MGA 2020 Zone 56)
Plant	Comacchio Geo 205	**Inclination**	90°	**Easting**	290213.0000 (MGA 2020 Zone 56)



DEPTH (m)	RL (m AHD)	MATERIAL DESCRIPTION
0		*Log continued from previous page.*
3		SILTSTONE: dark grey-brown, laminated to very thinly bedded, iron stained, occasional gravel inclusions, fine gravel size, sub-rounded
4.41	72.39	From 4.41m to 4.73m, with gravel inclusions
5.81	70.99	From 5.81m to 5.93m, bands of gravel, fine gravel size, bands up to 50mm thick
5.93	70.87	SILTSTONE: dark grey, laminated to very thinly bedded, with fine grained sand, trace iron staining, occasional biorturbation or disturbed bedding
6.99	69.81	NO CORE: 10mm thick
7.00	69.80	SILTSTONE: dark grey, laminated to very thinly bedded, with fine grained sand, trace gravel inclusions, fine to medium size, rounded, occasional bioturbation or disturbed bedding
9.15	67.65	SANDSTONE: grey, fine to medium grained, laminated to thinly bedded, occasional bioturbation or disturbed bedding

Flush Return	TCR %	RQD %
100%	100	45
	96	50
90%	100	75

WEATHERING
DW
SW

DISCONTINUITIES & ADDITIONAL DATA

3.06: XWS 0° PR SM CL Infilled
3.07: JT 20° PR SM FE VN
3.15: BP 0° PR SM FE VN
3.17: XWS 10° PR SM CL Infilled
3.21: JT 80-90° CU SM FE VN
3.27-3.38: BP 0-10° PR SM FE VN X6
3.45-3.62: BP 0-10° PR SM FE VN X7
3.64: JT 40° PR SM FE VN
3.78: JT 20° PR SM FE CN
3.86: BP 0° PR SM FE VN
4.14-4.16: BP 0° PR SM FE VN X2
4.22: BP 10° PR SM FE VN
4.25: BP 0° PR SM FE VN
4.34: JT 30° PR SM FE VN
4.45: HB
4.74: HB
5.02: BP 10° PR SM CL Infilled
5.09: JT 20° PR SM FE VN
5.15: BP 0° PR SM FE VN

5.60: XWS 0° PR SM CL Infilled
5.63: BP 0° IR RO FE VN
5.73: BP 10° PR RO FE VN
5.81: BP 0-10° PR RO FE VN
5.85-5.88: XWS 0-10° PR SM GC Infilled
5.93: BP 0° PR RO FE VN
5.98: JT 30° PR SM FE VN
6.09: HB
6.16: JT 50° PR SM FE VN
6.60: JT 30° PR SM FE VN
6.82-6.84: DB crushed seam

7.16: JT 60° PR RO GC Infilled
7.29: DB
7.32: BP 0-10° PR SM CL VN
7.52: BP 0-10° PR SM CL VN

7.78: DB
7.94: BP 0-10° PR SN CL Infilled
7.99: DB
8.09: HB
8.20: HB
8.34: HB
8.38: HB
8.44: BP 0° PR SM CL VN
8.72-8.76: XWS 0° PR SM CL Infilled
8.82: JT 80-90° CU SM CL Infilled
8.87-9.15: XWS 0° PR SM CL Infilled

9.47: JT 50° PR SM CL Infilled

9.68: HB bioturbation

This log should be read in conjunction with EI Australia's accompanying explanatory notes.

eiaustralia

BOREHOLE CORE LOG

BH ID: BH3M

Location	135 Badgerys Creek Road, Bradfield NSW	**Started**	24 April 2025		
Client	Creative Vision	**Completed**	28 April 2025		
Job No.	E26733.G03	**Logged By**	GB	**Date**	28 April 2025
Sheets	3 of 4	**Review By**	JB	**Date**	23 June 2025

Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈76.80 m (AHD)	**Northing**	6244042.0000 (MGA 2020 Zone 56)
Plant	Comacchio Geo 205	**Inclination**	90°	**Easting**	290213.0000 (MGA 2020 Zone 56)

METHOD: NMLC

Flush Return	TCR %	RQD %
90%	95	92
80%	100	88
30%	100	89
10%	100	80

DEPTH (m)	RL (m AHD)	MATERIAL DESCRIPTION
		SANDSTONE: grey, fine to medium grained, laminated to thinly bedded, occasional bioturbation or disturbed bedding
11.00	65.80	SILTSTONE: dark grey, laminated to very thinly bedded, with fine grained sand, trace gravel inclusions, fine to medium size, rounded
11.76	65.04	From 11.76m, with bands of increased sand content, up to 220mm thick, and occasional bioturbation or disturbed bedding
12.97	63.83	NO CORE: 130mm thick
13.10	63.70	SILTSTONE: grey to dark grey, laminated to thickly bedded with fine grained sandy SILTSTONE beds, beds up to 300mm thick, occasional bioturbation or disturbed bedding

WEATHERING: FR

ESTIMATED STRENGTH Is(50) ▼ - Axial ▽ - Diametral: VL 0-1, L 0-3, M 1, H 3, VH 10, EH

DISCONTINUITIES & ADDITIONAL DATA

10.19: DB
10.52: BP 0° PR RO CL VN
10.53: JT 70-90° CU RO CL
10.59: BP 0° PR RO CL VN
10.61: BP 0-10° UN RO CL VN
11.07: DB
11.19: BP 0-10° CU RO CL
11.35: BP 0-10° UN RO CL VN
11.67: DB
11.91: HB
12.15: HB
12.28: BP 0° PR RO CL VN
12.81: BP 0-10° UN RO CL VN
12.95: DB
13.19: BP 10° PR SM GC VN
13.25: DB
13.39: JT 60-90° IR SM GC Infilled
13.71: HB
13.96: HB
14.10: HB
14.28: HB
14.35: BP 0° PR SM CL VN
14.46: HB
14.57: BP 0-10° PR RO COAL VN
14.73-14.75: XWS 0° PR SM CL Infilled
15.08: JT 40° PR RO GC Infilled
15.62: HB
15.85: DB
15.88: DB
16.02: HB
16.08-16.15: JT 60-80° IR SM GC Infilled
16.26: DB
16.86: HB
16.95: HB
16.98: HB
17.07-17.34: JT 80-90° PR RO CL
17.63: DB
17.97-18.08: JT 80-90° PR RO CL
18.08: BP 0° PR RO CL VN
18.19: HB
18.28: HB
18.86: HB
18.95: HB
19.01: HB
19.10: DB
19.29: DB
19.51: BP 0-10° PR SM CL VN
19.53: DB

FRACTURE SPACING: 30, 100, 300, 1000, 3000

This log should be read in conjunction with EI Australia's accompanying explanatory notes.

BOREHOLE CORE LOG

BH ID: BH3M

Location	135 Badgerys Creek Road, Bradfield NSW	**Started**	24 April 2025		
Client	Creative Vision	**Completed**	28 April 2025		
Job No.	E26733.G03	**Logged By**	GB	**Date**	28 April 2025
Sheets	4 of 4	**Review By**	JB	**Date**	23 June 2025

Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈76.80 m (AHD)	**Northing**	6244042.0000 (MGA 2020 Zone 56)
Plant	Comacchio Geo 205	**Inclination**	90°	**Easting**	290213.0000 (MGA 2020 Zone 56)

METHOD	Flush Return	TCR %	RQD %	DEPTH (m)	GRAPHIC LOG	RL (m AHD)	MATERIAL DESCRIPTION	WEATHERING	ESTIMATED STRENGTH Is(50) ▼ - Axial ▽ - Diametral VL 0-1, L 0-3, M 1, H 3, VH 10, EH	DISCONTINUITIES & ADDITIONAL DATA	FRACTURE SPACING 30, 100, 300, 1000, 3000
	10%	100	100	21	▥		SILTSTONE: grey to dark grey, laminated to thickly bedded with fine grained sandy SILSTONE beds, beds up to 300mm thick, occasional bioturbation or disturbed bedding		M ▼	20.23: HB 20.71-20.89: BP 0° PR SM CL VN X3 21.02: HB 21.14-21.22: BP 0-10° PR SM CL VN X3 21.75: HB	▨
				22 23 24 25 26 27 28 29 30		54.83	Terminated at 21.97m. Target depth reached.				

MONITORING WELL LOG

BH ID: BH3M

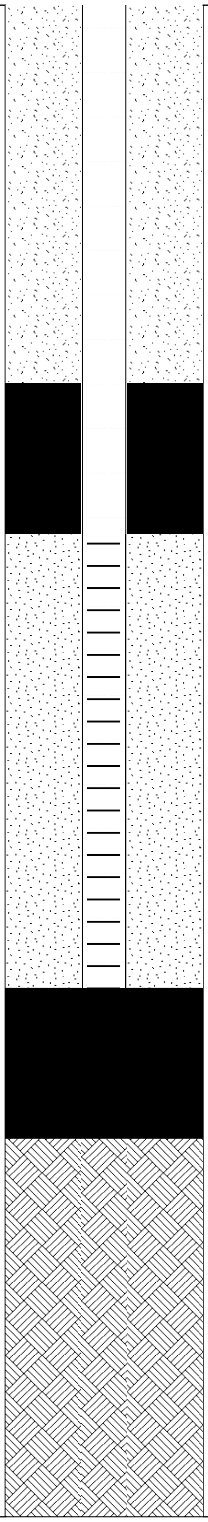
Location	135 Badgerys Creek Road, Bradfield NSW	**Started**	24 April 2025
Client	Creative Vision	**Completed**	28 April 2025
Job No.	E26733.G03	**Logged By**	GB **Date** 28 April 2025
Sheets	1 of 3	**Review By**	JB **Date** 23 June 2025

Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈76.80 m (AHD)	**Northing**	6244042.0000 (MGA 2020 Zone 56)
Plant	Comacchio Geo 205	**Inclination**	90°	**Easting**	290213.0000 (MGA 2020 Zone 56)

DEPTH (m)	RL (m AHD)	MATERIAL DESCRIPTION	MOISTURE CONDITION
0.00	76.80	TOPSOIL: Silty CLAY: low to medium plasticity, dark brown, with rootlets, no odour odour	M ≈ PL
0.70	76.10	CLAY: low to medium plasticity, dark red mottled grey, trace rootlets, no odour odour	M < PL
1.20	75.60	CLAY: low plasticity, red-brown, trace sand/gravel, medium sand to fine gravel size, rounded, trace rootlets, occasional charcoal pieces, fine to medium size, no odour odour	
1.85	74.95	CLAY: low plasticity, pale grey mottled pale yellow-brown, trace iron indurated nodules, fine to medium gravel size, dark red, no odour odour	
2.50	74.30	SILTSTONE: grey to pale brown, extremely weathered, soil to very low strength	
3.02	73.78	SILTSTONE: dark grey-brown, laminated to very thinly bedded, iron stained, occasional gravel inclusions, fine gravel size, sub-rounded	
4.41	72.39	From 4.41m to 4.73m, with gravel inclusions	
5.81	70.99	From 5.81m to 5.93m, bands of gravel, fine gravel size, bands up to 50mm thick	
5.93	70.87	SILTSTONE: dark grey, laminated to very thinly bedded, with fine grained sand, trace iron staining, occasional biorturbation or disturbed bedding	
6.99	69.81	NO CORE: 10mm thick	
7.00	69.80	SILTSTONE: dark grey, laminated to very thinly bedded, with fine grained sand, trace gravel inclusions, fine to medium size, rounded, occasional bioturbation or disturbed bedding	
9.15	67.65	SANDSTONE: grey, fine to medium grained, laminated to thinly bedded, occasional bioturbation or disturbed bedding	

WATER	SAMPLES & FIELD TESTS
GWNE	BH3M_0.50-0.95 SPT 0.50-0.95 3,3,6 N=9
	BH3M_1.50-1.95 SPT 1.50-1.95 2,3,4 N=7
100%	BH3M_3.00-3.05 SPT 3.00-3.05 10/50 mm N=R
90%	

BACKFILL DETAILS	STANDPIPE DETAILS
Grout 0.00m - 2.50m	Well Stickup =0.61m (RL 77.41m)
Bentonite 2.50m - 3.50m	-0.61m - 3.50m PVC casing (50mm Ø)
Sand 3.50m - 6.50m	3.50m - 6.50m PVC screen (50mm Ø)
Bentonite 6.50m - 7.50m	



This log should be read in conjunction with EI Australia's accompanying explanatory notes.

MONITORING WELL LOG

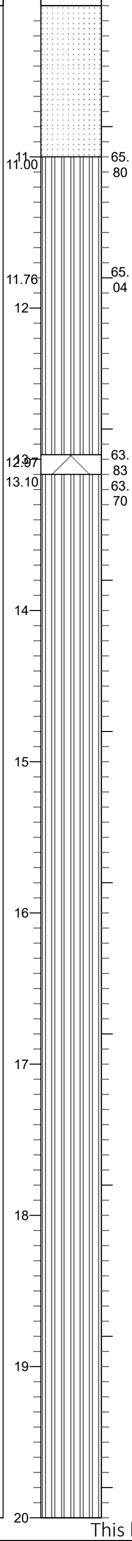
BH ID: BH3M

Location	135 Badgerys Creek Road, Bradfield NSW	**Started**	24 April 2025		
Client	Creative Vision	**Completed**	28 April 2025		
Job No.	E26733.G03	**Logged By**	GB	**Date**	28 April 2025
Sheets	2 of 3	**Review By**	JB	**Date**	23 June 2025

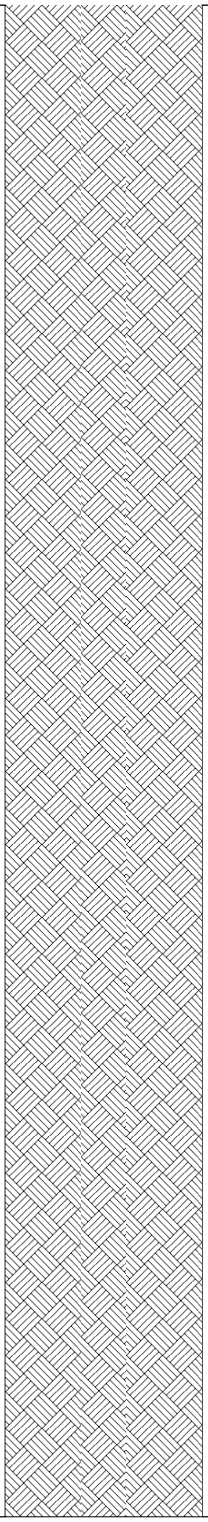
Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈76.80 m (AHD)	**Northing**	6244042.0000 (MGA 2020 Zone 56)
Plant	Comacchio Geo 205	**Inclination**	90°	**Easting**	290213.0000 (MGA 2020 Zone 56)

WATER	SAMPLES & FIELD TESTS	DEPTH (m)	RL (m AHD)	MATERIAL DESCRIPTION	MOISTURE CONDITION
90%				SANDSTONE: grey, fine to medium grained, laminated to thinly bedded, occasional bioturbation or disturbed bedding	
		11.00	65.80	SILTSTONE: dark grey, laminated to very thinly bedded, with fine grained sand, trace gravel inclusions, fine to medium size, rounded	
		11.76	65.04	From 11.76m, with bands of increased sand content, up to 220mm thick, and occasional bioturbation or disturbed bedding	
		12.97	63.83	NO CORE: 130mm thick	
80%		13.10	63.70	SILTSTONE: grey to dark grey, laminated to thickly bedded with fine grained sandy SILSTONE beds, beds up to 300mm thick, occasional bioturbation or disturbed bedding	
30%					
10%					

GRAPHIC LOG



BACKFILL DETAILS | STANDPIPE DETAILS



Cuttings
7.50m - 21.97m

This log should be read in conjunction with EI Australia's accompanying explanatory notes.

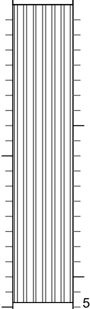
MONITORING WELL LOG

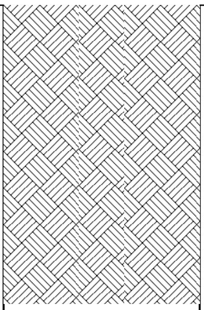
BH ID: BH3M

Location	135 Badgerys Creek Road, Bradfield NSW	**Started**	24 April 2025		
Client	Creative Vision	**Completed**	28 April 2025		
Job No.	E26733.G03	**Logged By**	GB	**Date**	28 April 2025
Sheets	3 of 3	**Review By**	JB	**Date**	23 June 2025

Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈76.80 m (AHD)	**Northing**	6244042.0000 (MGA 2020 Zone 56)
Plant	Comacchio Geo 205	**Inclination**	90°	**Easting**	290213.0000 (MGA 2020 Zone 56)

WATER	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG	RL (m AHD)	MATERIAL DESCRIPTION	MOISTURE CONDITION	BACKFILL DETAILS	STANDPIPE DETAILS
10%		21			SILTSTONE: grey to dark grey, laminated to thickly bedded with fine grained sandy SILSTONE beds, beds up to 300mm thick, occasional bioturbation or disturbed bedding			
		22		54.83	Terminated at 21.97m. Target depth reached.			
		23						
		24						
		25						
		26						
		27						
		28						
		29						
		30						





This log should be read in conjunction with EI Australia's accompanying explanatory notes.

eiaustralia

CORE PHOTOGRAPH OF BOREHOLE: BH3M

Project	Proposed Mixed-use Development	**East**	290213	**Depth Range**	3.02m to 12.00m BEGL		
Location	135 Badgerys Creek Road, Bradfield NSW	**North**	6244042	**Contractor**	Geosense Drilling Engineers Pty Ltd		
Position	See Figure 2	**Surface RL**	≈ 76.8m	**Drill Rig**	Comacchio GEO 205		
Job No.	E26733.G03	**Inclination**	-90°	**Logged**	GB	**Date**	28 / 04 / 2025
Client	Creative Vision	**Box**	1-2 of 4	**Checked**	JB	**Date**	23 / 06 / 2025

CORE PHOTOGRAPH OF BOREHOLE: BH3M

Project	Proposed Mixed-use Development	**East**	290213	**Depth Range**	12.00m to 21.97m BEGL		
Location	135 Badgerys Creek Road, Bradfield NSW	**North**	6244042	**Contractor**	Geosense Drilling Engineers Pty Ltd		
Position	See Figure 2	**Surface RL**	≈ 76.8m	**Drill Rig**	Comacchio GEO 205		
Job No.	E26733.G03	**Inclination**	-90°	**Logged**	GB	**Date**	28 / 04 / 2025
Client	Creative Vision	**Box**	3-4 of 4	**Checked**	JB	**Date**	23 / 06 / 2025

BOREHOLE LOG

BH ID: BH4

Location	135 Badgerys Creek Road, Bradfield NSW			**Started**	29 April 2025		
Client	Creative Vision			**Completed**	29 April 2025		
Job No.	E26733.G03			**Logged By**	JO	**Date**	29 April 2025
Sheets	1 of 3			**Review By**	JB	**Date**	23 June 2025
Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈77.10 m (AHD)	**Northing**	6244062.0000 (MGA 2020 Zone 56)		
Plant	Comacchio Geo 205	**Inclination**	90°	**Easting**	290287.0000 (MGA 2020 Zone 56)		

METHOD	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	DEPTH (m)	RL (m AHD)	MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY / REL. DENSITY	MATERIAL ORIGIN & OBSERVATIONS
AD/T	GWNE		0.00	77.10	TOPSOIL: SAND: fine to medium grained, dark brown, trace sub-angular to sub-rounded gravels with rootlets	M	-	TOPSOIL
		BH4_0.50-0.95 SPT 0.50-0.95 3,9,14 N=23						
			0.65	76.45	CLAY: low plasticity, dark red	M < PL	VSt	RESIDUAL SOIL
		BH4_1.50-1.95 SPT 1.50-1.95 4,7,10 N=17						
		BH4_3.00-3.01 SPT 3.00-3.01 4/10 mm N=R						
			3.50	73.60	*Log continued on next page.*			

This log should be read in conjunction with EI Australia's accompanying explanatory notes.

BOREHOLE CORE LOG

BH ID: BH4

Location	135 Badgerys Creek Road, Bradfield NSW	**Started**	29 April 2025		
Client	Creative Vision	**Completed**	29 April 2025		
Job No.	E26733.G03	**Logged By**	JO	**Date**	29 April 2025
Sheets	2 of 3	**Review By**	JB	**Date**	23 June 2025

Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈77.10 m (AHD)	**Northing**	6244062.0000 (MGA 2020 Zone 56)
Plant	Comacchio Geo 205	**Inclination**	90°	**Easting**	290287.0000 (MGA 2020 Zone 56)

METHOD	Flush Return	TCR %	RQD %	DEPTH (m)	GRAPHIC LOG	RL (m AHD)	MATERIAL DESCRIPTION	WEATHERING	ESTIMATED STRENGTH Is(50) ▼ - Axial ▽ - Diametral VL 0-1 L 0-3 M 1 H 3 VH 10 EH	DISCONTINUITIES & ADDITIONAL DATA	FRACTURE SPACING 30 100 300 1000 3000
				0			*Log continued from previous page.*				
NMLC	90%	100	83				SILTSTONE: dark grey-brown, very thinly to thinly bedded, iron stained	MW	▼	4.16: BP PR SM CN 4.24: BP PR SM CN 4.36: PR SM CN 4.38: PR SM CN 4.70: BP PR SM CN 4.78: BP PR SM CN	
				4.81		72.29	SILTSTONE: grey to dark grey, thinly to medium bedded	SW	▼	5.28: BP PR SM CN 5.96: PR SM CN	
		100	95						▼ ▼	7.13: BP PR SM CN 7.14: BP PR SM CN 7.69: BP PR SM CN 7.73: PR SM CN 7.82: BP PR SM CN 8.08: BP PR SM CN 8.19: BP PR SM CN 8.48: BP PR SM CN 8.82: BP PR SM CN 9.17: PR SM CN	
				9.34		67.76	From 9.34m, trace pebble or mudstone inclusions, up to 20mm in size			9.35: BP PR SM CN	
				10							

BOREHOLE CORE LOG

BH ID: BH4

Location	135 Badgerys Creek Road, Bradfield NSW	**Started**	29 April 2025		
Client	Creative Vision	**Completed**	29 April 2025		
Job No.	E26733.G03	**Logged By**	JO	**Date**	29 April 2025
Sheets	3 of 3	**Review By**	JB	**Date**	23 June 2025

Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈77.10 m (AHD)	**Northing**	6244062.0000 (MGA 2020 Zone 56)
Plant	Comacchio Geo 205	**Inclination**	90°	**Easting**	290287.0000 (MGA 2020 Zone 56)

METHOD	Flush Return	TCR %	RQD %	DEPTH (m)	GRAPHIC LOG	RL (m AHD)	MATERIAL DESCRIPTION	WEATHERING	ESTIMATED STRENGTH Is(50) ▼ - Axial ▽ - Diametral VL 0-1, L 0-3, M 1, H 3, VH 10, EH	DISCONTINUITIES & ADDITIONAL DATA	FRACTURE SPACING 30, 100, 300, 1000, 3000
	90%	100	100	11 12		64.99	From 9.34m, trace pebble or mudstone inclusions, up to 20mm in size	SW	M ▼	10.14: BP PR SM CN 10.40: BP PR SM CN 10.69: BP PR SM CN 11.51: BP PR SM Infilled	
				13 14 15 16 17 18 19 20			Terminated at 12.11m. Target Depth Reached.				

CORE PHOTOGRAPH OF BOREHOLE: BH4

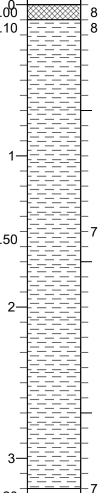
Project	Proposed Mixed-use Development	**East**	290287	**Depth Range**	3.5m to 12.11m BEGL		
Location	135 Badgerys Creek Road, Bradfield NSW	**North**	6244062	**Contractor**	Geosense Drilling Engineers Pty Ltd		
Position	See Figure 2	**Surface RL**	≈ 77.1m	**Drill Rig**	Comacchio GEO 205		
Job No.	E26733.G03	**Inclination**	-90°	**Logged**	JO	**Date**	29 / 04 / 2025
Client	Creative Vision	**Box**	1-3 of 3	**Checked**	JB	**Date**	23 / 06 / 2025

BOREHOLE LOG

BH ID: BH5M

Location	135 Badgerys Creek Road, Bradfield NSW	**Started**	29 April 2025		
Client	Creative Vision	**Completed**	30 April 2025		
Job No.	E26733.G03	**Logged By**	JO	**Date**	30 April 2025
Sheets	1 of 3	**Review By**	JB	**Date**	23 June 2025

Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈80.70 m (AHD)	**Northing**	6244051.0000 (MGA 2020 Zone 56)
Plant	Comacchio Geo 205	**Inclination**	90°	**Easting**	290372.0000 (MGA 2020 Zone 56)



METHOD	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	DEPTH (m)	RL (m AHD)	MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY / REL. DENSITY	MATERIAL ORIGIN & OBSERVATIONS
AD/T	GWNE		0.00	80.70	TOPSOIL: Silty CLAY: medium plasticity, dark brown with rootlets	M > PL	-	TOPSOIL
		BH5M_0.50-0.95 SPT 0.50-0.95 5,5,7 N=12	0.10	80.60	Silty CLAY: medium plasticity, orange-brown	M ≈ PL	St	RESIDUAL SOIL
		BH5M_1.50-1.95 SPT 1.50-1.95 3,7,12 N=19 BH5M_3.00-3.18 SPT 3.00-3.18 14,6/30 mm HB N=R	1.50	79.20	From 1.50m, pale grey-orange		VSt	
			3.20	77.50	*Log continued on next page.*			

This log should be read in conjunction with EI Australia's accompanying explanatory notes.

BOREHOLE CORE LOG

BH ID: BH5M

Location	135 Badgerys Creek Road, Bradfield NSW	**Started**	29 April 2025
Client	Creative Vision	**Completed**	30 April 2025
Job No.	E26733.G03	**Logged By**	JO **Date** 30 April 2025
Sheets	2 of 3	**Review By**	JB **Date** 23 June 2025

Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈80.70 m (AHD)	**Northing**	6244051.0000 (MGA 2020 Zone 56)
Plant	Comacchio Geo 205	**Inclination**	90°	**Easting**	290372.0000 (MGA 2020 Zone 56)

METHOD	Flush Return	TCR %	RQD %	DEPTH (m)	RL (m AHD)	MATERIAL DESCRIPTION	WEATHERING
				0		*Log continued from previous page.*	
NMLC	90%	100	71			SILTSTONE: grey-brown, thinly to medium bedded, iron stained	MW
				6.27	74.43	From 6.27m, with fine grained sand	
		100	92	6.72	73.98	SILTSTONE: grey to dark grey, thinly to medium bedded	SW
				9.49	71.21	From 9.49m, trace pebble or mudstone inclusions, up to 20mm in size, and occasional bioturbation or disturbed bedding	
				10			

ESTIMATED STRENGTH Is(50) ▼ - Axial ▽ - Diametral: VL 0-1, L 0-3, M 1, H 3, VH 10, EH

FRACTURE SPACING: 30, 100, 300, 1000, 3000

DISCONTINUITIES & ADDITIONAL DATA

3.43: JT 90° PR SM CN
3.57: BP PR SM CN
3.59: BP PR SM CN
3.69: BP PR SM CN
3.81: BP PR SM CN
4.14: JT 30° PR SM CN
4.23: BP PR SM CN
4.32: BP PR SM CN
4.62: BP PR SM CN
5.08: BP PR SM CN
5.26: JT 90° PR SM CN
5.38: JT 40° PR SM CN
5.60: BP PR SM CN
6.08: BP PR SM CN
6.12: BP PR SM CN
6.61: JT 45° PR SM CN
6.91: BP PR SM CN
7.09: JT 10° CU SM CN
7.25: BP PR SM CN
7.30: BP PR SM
7.34: BP PR SM CN
7.35: BP PR SM CN
7.58: BP PR SM CN
7.64: JT 45° PR SM CN
8.19: BP PR SM CN
8.38: BP PR SM CN
8.40: BP PR SM CN
8.49: BP PR SM CN
8.77: BP PR SM CN
9.27: BP PR SM CN
9.90: BP PR SM CN

BOREHOLE CORE LOG

BH ID: BH5M

Location	135 Badgerys Creek Road, Bradfield NSW	**Started**	29 April 2025		
Client	Creative Vision	**Completed**	30 April 2025		
Job No.	E26733.G03	**Logged By**	JO	**Date**	30 April 2025
Sheets	3 of 3	**Review By**	JB	**Date**	23 June 2025

Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈80.70 m (AHD)	**Northing**	6244051.0000 (MGA 2020 Zone 56)
Plant	Comacchio Geo 205	**Inclination**	90°	**Easting**	290372.0000 (MGA 2020 Zone 56)

METHOD	Flush Return	TCR %	RQD %	DEPTH (m)	GRAPHIC LOG	RL (m AHD)	MATERIAL DESCRIPTION	WEATHERING	ESTIMATED STRENGTH Is(50) ▼ - Axial ▽ - Diametral VL 0-1 L 0-3 M 1 H 3 VH 10 EH	DISCONTINUITIES & ADDITIONAL DATA	FRACTURE SPACING 30 100 300 1000 3000
	90%	100	89	11 12			From 9.49m, trace pebble or mudstone inclusions, up to 20mm in size, and occasional bioturbation or disturbed bedding			9.95: BP PR SM CN 10.19: BP PR SM CN 10.48: BP PR SM CN 10.76: BP PR SM CN 11.16: BP PR SM CN 11.36: BP PR SM CN 11.59: BP PR SM CN 11.62: BP PR SM CN 11.66: BP PR SM CN 11.75: BP PR SM CN 11.92: BP PR SM CN 11.96: BP PR SM CN 12.06: BP PR SM CN	
				13 14 15 16 17 18 19 20		68.54	Terminated at 12.16m. Target Depth Reached.				

This log should be read in conjunction with EI Australia's accompanying explanatory notes.

eiaustralia

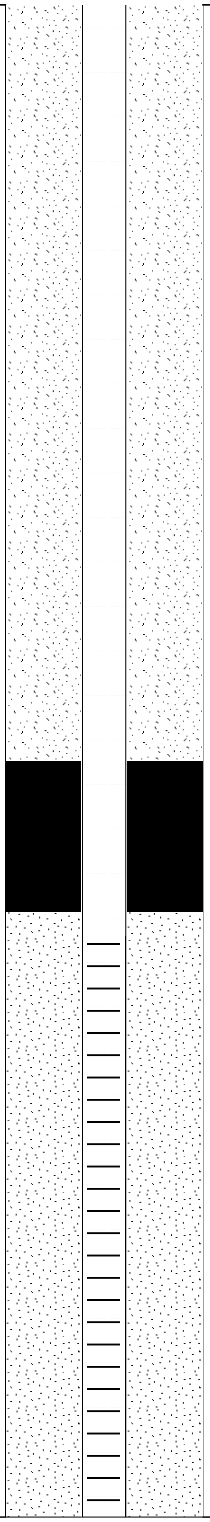
MONITORING WELL LOG

BH ID: BH5M

Location	135 Badgerys Creek Road, Bradfield NSW	**Started**	29 April 2025
Client	Creative Vision	**Completed**	30 April 2025
Job No.	E26733.G03	**Logged By**	JO **Date** 30 April 2025
Sheets	1 of 2	**Review By**	JB **Date** 23 June 2025

Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈80.70 m (AHD)	**Northing**	6244051.0000 (MGA 2020 Zone 56)
Plant	Comacchio Geo 205	**Inclination**	90°	**Easting**	290372.0000 (MGA 2020 Zone 56)

WATER	SAMPLES & FIELD TESTS	DEPTH (m)	RL (m AHD)	MATERIAL DESCRIPTION	MOISTURE CONDITION
GWNE		0.00	80.70	TOPSOIL: Silty CLAY: medium plasticity, dark brown with rootlets	M > PL
		0.10	80.60	Silty CLAY: medium plasticity, orange-brown	
	BH5M_0.50-0.95 SPT 0.50-0.95 5,5,7 N=12				
	BH5M_1.50-1.95 SPT 1.50-1.95 3,7,12 N=19	1.50	79.20	From 1.50m, pale grey-orange	M ≈ PL
	BH5M_3.00-3.18 SPT 3.00-3.18 14,6/30 mm HB N=R				
90%		3.20	77.50	SILTSTONE: grey-brown, thinly to medium bedded, iron stained	
		6.27	74.43	From 6.27m, with fine grained sand	
		6.72	73.98	SILTSTONE: grey to dark grey, thinly to medium bedded	
		9.49	71.21	From 9.49m, trace pebble or mudstone inclusions, up to 20mm in size, and occasional bioturbation or disturbed bedding	



BACKFILL DETAILS	STANDPIPE DETAILS
	Well Stickup =0.99m (RL 81.69m)
Grout 0.00m - 5.00m	-0.99m - 6.16m PVC casing (50mm Ø)
Bentonite 5.00m - 6.00m	
Sand 6.00m - 12.16m	6.16m - 12.16m PVC screen (50mm Ø)

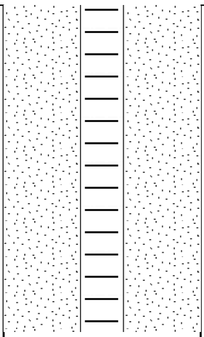
MONITORING WELL LOG

BH ID: BH5M

Location	135 Badgerys Creek Road, Bradfield NSW	**Started**	29 April 2025		
Client	Creative Vision	**Completed**	30 April 2025		
Job No.	E26733.G03	**Logged By**	JO	**Date**	30 April 2025
Sheets	2 of 2	**Review By**	JB	**Date**	23 June 2025

Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈80.70 m (AHD)	**Northing**	6244051.0000 (MGA 2020 Zone 56)
Plant	Comacchio Geo 205	**Inclination**	90°	**Easting**	290372.0000 (MGA 2020 Zone 56)

WATER	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG	RL (m AHD)	MATERIAL DESCRIPTION	MOISTURE CONDITION	BACKFILL DETAILS	STANDPIPE DETAILS
90%		11 12			From 9.49m, trace pebble or mudstone inclusions, up to 20mm in size, and occasional bioturbation or disturbed bedding			
		13 14 15 16 17 18 19 20		68.54	Terminated at 12.16m. Target Depth Reached.			



This log should be read in conjunction with EI Australia's accompanying explanatory notes.

CORE PHOTOGRAPH OF BOREHOLE: BH5M

Project	Proposed Mixed-use Development	**East**	290372	**Depth Range**	3.2m to 12.16m BEGL		
Location	135 Badgerys Creek Road, Bradfield NSW	**North**	6244051	**Contractor**	Geosense Drilling Engineers Pty Ltd		
Position	See Figure 2	**Surface RL**	≈ 80.7m	**Drill Rig**	Comacchio GEO 205		
Job No.	E26733.G03	**Inclination**	-90°	**Logged**	JO	**Date**	30 / 04 / 2025
Client	Creative Vision	**Box**	1-3 of 3	**Checked**	JB	**Date**	23 / 06 / 2025

eiaustralia

BOREHOLE LOG

BH ID: BH6M

Location	135 Badgerys Creek Road, Bradfield NSW	**Started**	30 April 2025
Client	Creative Vision	**Completed**	30 April 2025
Job No.	E26733.G03	**Logged By**	JO **Date** 30 April 2025
Sheets	1 of 3	**Review By**	JB **Date** 23 June 2025

Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈78.70 m (AHD)	**Northing**	6243994.0000 (MGA 2020 Zone 56)
Plant	Comacchio Geo 205	**Inclination**	90°	**Easting**	290363.0000 (MGA 2020 Zone 56)

METHOD	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	SAMPLE RECOVERY	DEPTH (m)	GRAPHIC LOG	RL (m AHD)	MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY / REL. DENSITY	MATERIAL ORIGIN & OBSERVATIONS
AD/T				0.00		78.70	TOPSOIL: CLAY: low plasticity, dark brown trace rootlets	M > PL	-	TOPSOIL
				0.10		78.60	CLAY: low to medium plasticity, orange-brown			RESIDUAL SOIL
		BH6M_0.50-0.95 SPT 0.50-0.95 3,6,9 N=15								
		BH6M_1.50-1.95 SPT 1.50-1.95 5,9,24 HB N=33						M < PL	VSt	
		BH6M_3.00-3.10 SPT 3.00-3.10 13/100 mm HB N=R		3.00		75.70	*Log continued on next page.*			

eiaustralia

BOREHOLE CORE LOG

BH ID: BH6M

Location	135 Badgerys Creek Road, Bradfield NSW	**Started**	30 April 2025		
Client	Creative Vision	**Completed**	30 April 2025		
Job No.	E26733.G03	**Logged By**	JO	**Date**	30 April 2025
Sheets	2 of 3	**Review By**	JB	**Date**	23 June 2025

Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈78.70 m (AHD)	**Northing**	6243994.0000 (MGA 2020 Zone 56)
Plant	Comacchio Geo 205	**Inclination**	90°	**Easting**	290363.0000 (MGA 2020 Zone 56)

METHOD	Flush Return	TCR %	RQD %	DEPTH (m)	RL (m AHD)	MATERIAL DESCRIPTION	WEATHERING	DISCONTINUITIES & ADDITIONAL DATA
				0		*Log continued from previous page.*		
NMLC	90%	100	91	3		SILTSTONE: dark grey-brown, laminated to very thinly bedded	HW	3.03: BP PR SM CN 3.06: BP PR SM CN 3.14: JT 30° PR SM CN 3.22: JT 20° PR SM CN 3.50: BP PR SM CN 3.60: JT 30° PR SM CN 3.63: BP PR SM CN 3.68: BP PR SM CN 3.73: BP PR SM CN 3.89: BP PR SM CN 4.22: BP PR SM CN 4.30: BP PR SM CN
				4.46	74.24	From 4.46m, with fine grained sand		4.68: BP PR SM CN 4.90: JT 20° PR SM CN 5.06: BP PR SM CN 5.28: BP PR SM CN
		100	92	5.55	73.15	SANDSTONE: grey, laminated to thinly bedded, trace iron staining, occasional bioturbation or disturbed bedding	MW	5.66: BP PR SM CN 5.74: BP PR SM CN 5.89: BP PR SM CN 5.93: BP PR SM CN 6.05: BP PR SM CN 6.27: BP PR SM CN 6.58: BP PR SM 6.68: BP PR SM CN 6.75: BP PR SM CN 6.89: BP PR SM 7.03: BP PR SM CN 7.14: BP PR SM CN 7.24: BP PR SM CN 7.38: BP PR SM CN 7.74: BP PR SM CN
				7.83	70.87	From 7.83m, thinly to medium bedded, bioturbation and disturbed bedding absent		7.83: BP PR SM CN 8.28: BP PR SM CN
				8.67	70.03	SILTSTONE: dark grey-brown, laminated to thinly bedded, trace iron staining		8.67: BP PR SM CN 9.12: BP PR SM CN 9.30: JT 20° PR SM CN 9.59: JT 10° PR SM CN 9.78: BP PR SM CN
				9.88	68.82	From 9.88m, iron staining absent, occasional bioturbation or disturbed bedding		

This log should be read in conjunction with EI Australia's accompanying explanatory notes.

BOREHOLE CORE LOG

BH ID: BH6M

Location	135 Badgerys Creek Road, Bradfield NSW	**Started**	30 April 2025
Client	Creative Vision	**Completed**	30 April 2025
Job No.	E26733.G03	**Logged By**	JO — **Date** 30 April 2025
Sheets	3 of 3	**Review By**	JB — **Date** 23 June 2025

Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈78.70 m (AHD)	**Northing**	6243994.0000 (MGA 2020 Zone 56)
Plant	Comacchio Geo 205	**Inclination**	90°	**Easting**	290363.0000 (MGA 2020 Zone 56)

METHOD	Flush Return	TCR %	RQD %	DEPTH (m)	GRAPHIC LOG	RL (m AHD)	MATERIAL DESCRIPTION	WEATHERING	ESTIMATED STRENGTH Is(50) ▼ - Axial ▽ - Diametral: VL 0-1	L 0-3	M 1	H 3	VH 10	EH	DISCONTINUITIES & ADDITIONAL DATA	FRACTURE SPACING: 30	100	300	1000	3000
	90%	100	100	11			From 9.88m, iron staining absent, occasional bioturbation or disturbed bedding	FR			▼ ▨				10.20: BP PR SM CN			▨		
		100	70	12		66.70	Terminated at 12.00m. Target Depth Reached.													
				13																
				14																
				15																
				16																
				17																
				18																
				19																
				20																

This log should be read in conjunction with EI Australia's accompanying explanatory notes.

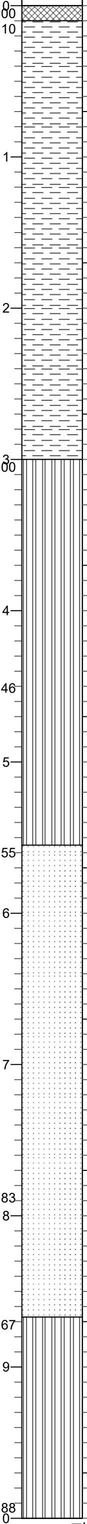
MONITORING WELL LOG

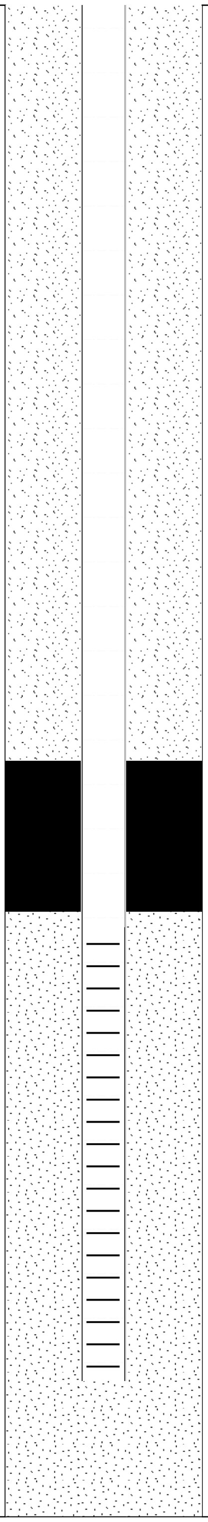
BH ID: BH6M

Location	135 Badgerys Creek Road, Bradfield NSW	**Started**	30 April 2025		
Client	Creative Vision	**Completed**	30 April 2025		
Job No.	E26733.G03	**Logged By**	JO	**Date**	30 April 2025
Sheets	1 of 2	**Review By**	JB	**Date**	23 June 2025

Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈78.70 m (AHD)	**Northing**	6243994.0000 (MGA 2020 Zone 56)
Plant	Comacchio Geo 205	**Inclination**	90°	**Easting**	290363.0000 (MGA 2020 Zone 56)

WATER	SAMPLES & FIELD TESTS	DEPTH (m)	RL (m AHD)	MATERIAL DESCRIPTION	MOISTURE CONDITION
		0.00	78.70	TOPSOIL: CLAY: low plasticity, dark brown trace rootlets	M > PL
	BH6M_0.50-0.95 SPT 0.50-0.95 3,6,9 N=15 BH6M_1.50-1.95 SPT 1.50-1.95 5,9,24 HB N=33	0.10	78.60	CLAY: low to medium plasticity, orange-brown	M < PL
	BH6M_3.00-3.10 SPT 3.00-3.10 13/100 mm HB N=R	3.00	75.70	SILTSTONE: dark grey-brown, laminated to very thinly bedded	
		4.46	74.24	From 4.46m, with fine grained sand	
90%		5.55	73.15	SANDSTONE: grey, laminated to thinly bedded, trace iron staining, occasional bioturbation or disturbed bedding	
		7.83	70.87	From 7.83m, thinly to medium bedded, bioturbation and disturbed bedding absent	
		8.67	70.03	SILTSTONE: dark grey-brown, laminated to thinly bedded, trace iron staining	
		9.88		From 9.88m, iron staining absent, occasional bioturbation or disturbed bedding	





BACKFILL DETAILS	STANDPIPE DETAILS
Grout 0.00m - 5.00m	Well Stickup =0.90m (RL 79.60m) -0.90m - 6.10m PVC casing (50mm Ø)
Bentonite 5.00m - 6.00m	
Sand 6.00m - 12.00m	6.10m - 9.10m PVC screen (50mm Ø)

This log should be read in conjunction with EI Australia's accompanying explanatory notes.

MONITORING WELL LOG

BH ID: BH6M

Location	135 Badgerys Creek Road, Bradfield NSW	**Started**	30 April 2025		
Client	Creative Vision	**Completed**	30 April 2025		
Job No.	E26733.G03	**Logged By**	JO	**Date**	30 April 2025
Sheets	2 of 2	**Review By**	JB	**Date**	23 June 2025

Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈78.70 m (AHD)	**Northing**	6243994.0000 (MGA 2020 Zone 56)
Plant	Comacchio Geo 205	**Inclination**	90°	**Easting**	290363.0000 (MGA 2020 Zone 56)

WATER	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG	RL (m AHD)	MATERIAL DESCRIPTION	MOISTURE CONDITION	BACKFILL DETAILS	STANDPIPE DETAILS
90%		11	▥	68.82	From 9.88m, iron staining absent, occasional bioturbation or disturbed bedding		░	
		12 13 14 15 16 17 18 19 20		66.70	Terminated at 12.00m. Target Depth Reached.			

This log should be read in conjunction with EI Australia's accompanying explanatory notes.

CORE PHOTOGRAPH OF BOREHOLE: BH6M

Project	Proposed Mixed-use Development	**East**	290363	**Depth Range**	3.0m to 12.0m BEGL		
Location	135 Badgerys Creek Road, Bradfield NSW	**North**	6243994	**Contractor**	Geosense Drilling Engineers Pty Ltd		
Position	See Figure 2	**Surface RL**	≈ 78.7m	**Drill Rig**	Comacchio GEO 205		
Job No.	E26733.G03	**Inclination**	-90°	**Logged**	JO	**Date**	30 / 04 / 2025
Client	Creative Vision	**Box**	1-2 of 2	**Checked**	JB	**Date**	23 / 06 / 2025

Appendix F – Laboratory Documentation

Sheet _1_ of _1_

Site: 135 Badgerys creek road, Bradfield, NSW

Project No: E26733

Laboratory:
SGS Australia
Unit 16, 33 Maddox Street,
ALEXANDRIA NSW 2015
P: 02 8594 0400 F: 02 8594 0499

Sample ID	Laboratory ID	Container Type	Sampling		Sample Matrix				Analysis																				
			Date	Time	SOIL	WATER	0.45 µm field filtered	OTHER	HM ^{A} /TRH (including F1, F2, F3, F4)/BTEX/ PAHs/ OCP/OP/PCB/Asbestos	HM ^{A} /TRH (including F1, F2, F3, F4)/ BTEX/PAHs	HM ^{A} /TRH (including F1, F2, F3, F4)/BTEX	BTEX	Appendix A table A2 NSW PFAS	Asbestos	Asbestos Quantification (500ml)	Asbestos 10L field screening	Excavated Natural Material (ENM) Suite	ENM Suite - Stockpile discrete (TRH/BTEX/PAHs)	ENM Suite - Stockpile composite (HM ^{A} /pH / EC / Foreign Materials)	Dewatering Suite	pH / pH peroxide	sPOCAS	Chromium Reducible Sulfur (CrS)	Hold	pH / CEC (cation exchange)	pH / EC (electrical conductivity)	Sulphate / Chloride	Lead	TCLP HM ^{B} / PAH
BH1M	1	SPVC	7/5/25	AM		X							X																
BH2M	2	SP	↓	PM		↓														X									
BH3M	3	SPVC		PM																X									
BH6M	4	SPVC		PM																X									
QD1	5	SPVC		AM							X																		
TS	6	VC		AM								X																	
TB	7	VC		AM								X																	
QR1	8	SPVC		PM							X																		
QRB1		SPVC		PM																				X					

Comments

HM ^{A}
Arsenic
Cadmium
Chromium
Copper
Lead
Mercury
Nickel
Zinc

HM ^{B}
Arsenic
Cadmium
Chromium
Lead
Mercury
Nickel

Dewatering Suite
pH & EC
TDS / TDU
Hardness
Total Cyanide
Metals (Al, As, Cd, Cr, Cu, Pb, Hg, Ni, Zn)
TRH (F1, F2, F3, F4)
BTEX
PAH
Total Phenol

LABORATORY TURNAROUND

☒ Standard
☐ 24 Hours
☐ 48 Hours
☐ 72 Hours
☐ Other_____

Container Type:
J = solvent washed, acid rinsed, Tefton sealed glass jar
S = solvent washed, acid rinsed glass bottle
P = natural HDPE plastic bottle
VC = glass vial, Tefton Septum
ZLB = Zip-Lock Bag BB = Bulk Bag

Investigator: I attest that these samples were collected in accordance with standard EI field sampling procedures.

Report with EI Waste Classification Table ☐

Sampler's Name (EI):
Print Jordan Goehner-Drewe
Signature
Date 8/05/25

Received by (SGS):
Print Joel K
Signature
Date 8/5 @ 4:30

Sampler's Comments:
CC Sergio in results please. Please forward QT1 to envirolab.

Suite 6.01, 55 Miller Street,
PYRMONT NSW 2009
Ph: 9516 0722
ustralia.com.au

IMPORTANT:
Please e-mail laboratory results to: lab@eiaustralia.com.au

2021 FORM v.5 - SGS

SGS EHS Sydney COC
SE282562

SAMPLE RECEIPT ADVICE

SE282562

CLIENT DETAILS

Contact	Jordan Goehner Drewe
Client	EI AUSTRALIA
Address	SUITE 6.01 55 MILLER STREET PYRMONT NSW 2009
Telephone	61 2 95160722
Facsimile	(Not specified)
Email	jordan.goehner-drewe@eiaustralia.com.au
Project	**E26733 135 Badgerys Creek road Bradfield**
Order Number	**E26733**
Samples	8

LABORATORY DETAILS

Manager	Shane McDermott
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
Samples Received	Thu 8/5/2025
Report Due	Thu 15/5/2025
SGS Reference	**SE282562**

SUBMISSION DETAILS

This is to confirm that 8 samples were received on Thursday 8/5/2025. Results are expected to be ready by COB Thursday 15/5/2025. Please quote SGS reference SE282562 when making enquiries. Refer below for details relating to sample integrity upon receipt.

Type of documentation received	COC	Date documentation received	8/5/2025
Samples received in good order	Yes	Samples received without headspace	Yes
Sample temperature upon receipt	12.1°C	Sample container provider	SGS
Turnaround time requested	Standard	Samples received in correct containers	Yes
Sufficient sample for analysis	Yes	Sample cooling method	Ice Bricks
Samples clearly labelled	Yes	Complete documentation received	Yes

Unless otherwise instructed, water and bulk samples will be held for one month from date of report, and soil samples will be held for two months.

COMMENTS

QRB1 on Hold.
QT1 Forwarded to Envirolab.

SAMPLE RECEIPT ADVICE

SE282562

CLIENT DETAILS

Client EI AUSTRALIA

Project E26733 135 Badgerys Creek road Bradfield

SUMMARY OF ANALYSIS

No.	Sample ID	Full 8270 SVOC in Water	OC Pesticides in Water	OP Pesticides in Water	PAH (Polynuclear Aromatic Hydrocarbons) in Water	PCBs in Water	TRH (Total Recoverable Hydrocarbons) in Water	VOCs in Water	Volatile Petroleum Hydrocarbons in Water
001	BH1M	167	26	13	22	9	9	84	6
002	BH2M	-	-	-	23	-	9	11	7
003	BH3M	-	-	-	23	-	9	11	7
004	BH6M	-	-	-	23	-	9	11	7
005	QD1	-	-	-	-	-	9	11	7
006	TS	-	-	-	-	-	-	11	-
007	TB	-	-	-	-	-	-	11	-
008	QR1	-	-	-	-	-	9	11	7

CONTINUED OVERLEAF

The above table represents SGS' interpretation of the client-supplied Chain Of Custody document.
The numbers shown in the table indicate the number of results requested in each package.
Please indicate as soon as possible should your request differ from these details .
Testing as per this table shall commence immediately unless the client intervenes with a correction .

SAMPLE RECEIPT ADVICE

SE282562

CLIENT DETAILS

Client EI AUSTRALIA

Project E26733 135 Badgerys Creek road Bradfield

SUMMARY OF ANALYSIS

No.	Sample ID	Conductivity and TDS by Calculation - Water	Mercury (dissolved) in Water	Metals in Water (Dissolved) by ICPOES	pH in water	Total Cyanide in water by Discrete Analyser	Total Dissolved Solids (TDS) in water	Total Phenolics in Water	Trace Metals (Dissolved) in Water by ICPMS	Turbidity
001	BH1M	1	1	9	1	-	1	1	21	1
002	BH2M	1	1	3	1	1	1	1	8	1
003	BH3M	1	1	3	1	1	1	1	8	1
004	BH6M	1	1	3	1	1	1	1	8	1
005	QD1	-	1	-	-	-	-	-	7	-
008	QR1	-	1	-	-	-	-	-	7	-

CONTINUED OVERLEAF

The above table represents SGS' interpretation of the client-supplied Chain Of Custody document.
The numbers shown in the table indicate the number of results requested in each package.
Please indicate as soon as possible should your request differ from these details .
Testing as per this table shall commence immediately unless the client intervenes with a correction .

SAMPLE RECEIPT ADVICE

SE282562

CLIENT DETAILS

Client	EI AUSTRALIA	Project	E26733 135 Badgerys Creek road Bradfield

SUMMARY OF ANALYSIS

No.	Sample ID	Alkalinity	Ammonia Nitrogen by Discrete Analyser	Anions by Ion Chromatography in Water	Calculation of Anion-Cation Balance	Dissolved Oxygen by Membrane Electrode	Forms of Carbon	Nitrite in Water	TKN Kjeldahl Digestion by Discrete Analyser	Total and Volatile Suspended Solids (TSS /	Total Phosphorus by Kjeldahl Digestion DA in
001	BH1M	10	1	5	4	3	1	2	2	1	1

CONTINUED OVERLEAF

The above table represents SGS' interpretation of the client-supplied Chain Of Custody document.
The numbers shown in the table indicate the number of results requested in each package.
Please indicate as soon as possible should your request differ from these details .
Testing as per this table shall commence immediately unless the client intervenes with a correction .

SAMPLE RECEIPT ADVICE

CLIENT DETAILS

Client	EI AUSTRALIA	Project	E26733 135 Badgerys Creek road Bradfield

SUMMARY OF ANALYSIS

No.	Sample ID	E. coli and Thermotolerant coliforms in Water (CFU)	Enterococci in Water	Filterable Reactive Phosphorus (FRP)	Per- and Polyfluoroalkyl Substances (PFAS) in	Redox Potential (Eh) in water
001	BH1M	3	3	1	60	2

The above table represents SGS' interpretation of the client-supplied Chain Of Custody document.
The numbers shown in the table indicate the number of results requested in each package.
Please indicate as soon as possible should your request differ from these details .
Testing as per this table shall commence immediately unless the client intervenes with a correction .

ANALYTICAL REPORT

Accreditation No. 2562

CLIENT DETAILS

Contact	Jordan Goehner Drewe
Client	EI AUSTRALIA
Address	SUITE 6.01 55 MILLER STREET PYRMONT NSW 2009
Telephone	61 2 95160722
Facsimile	(Not specified)
Email	jordan.goehner-drewe@eiaustralia.com.au
Project	**E26733 135 Badgerys Creek road Bradfield**
Order Number	**E26733**
Samples	8

LABORATORY DETAILS

Manager	Shane McDermott
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
SGS Reference	**SE282562 R0**
Date Received	8/5/2025
Date Reported	15/5/2025

COMMENTS

Accredited for compliance with ISO/IEC 17025 - Testing. NATA accredited laboratory 2562(4354).

SIGNATORIES

Akheeqar BENIAMEEN
Chemist

Dong LIANG
Metals/Inorganics Team Leader

Kamrul AHSAN
Senior Chemist

Ly Kim HA
Organic Section Head

Tim MEEYAN
Lab Tech

VOCs in Water [AN433] Tested: 13/5/2025

PARAMETER	UOM	LOR	BH1M WATER - 7/5/2025 SE282562.001	BH2M WATER - 7/5/2025 SE282562.002	BH3M WATER - 7/5/2025 SE282562.003	BH6M WATER - 7/5/2025 SE282562.004	QD1 WATER - 7/5/2025 SE282562.005
Benzene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	µg/L	0.5	<0.5	<0.5	<0.5	**2.0**	<0.5
Ethylbenzene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
m/p-xylene	µg/L	1	<1	<1	<1	<1	<1
o-xylene	µg/L	0.5	<0.5	<0.5	<0.5	**0.9**	<0.5
Total Xylenes	µg/L	1.5	<1.5	<1.5	<1.5	<1.5	<1.5
Total BTEX	µg/L	3	<3	<3	<3	<3	<3
Naphthalene (VOC)*	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichlorodifluoromethane (CFC-12)	µg/L	5	<5	-	-	-	-
Chloromethane	µg/L	5	<5	-	-	-	-
Vinyl chloride (Chloroethene)	µg/L	0.3	<0.3	-	-	-	-
Bromomethane	µg/L	10	<10	-	-	-	-
Chloroethane	µg/L	5	<5	-	-	-	-
Trichlorofluoromethane	µg/L	1	<1	-	-	-	-
Acetone (2-propanone)	µg/L	10	<10	-	-	-	-
Iodomethane	µg/L	5	<5	-	-	-	-
1,1-dichloroethene	µg/L	0.5	<0.5	-	-	-	-
Acrylonitrile	µg/L	0.5	<0.5	-	-	-	-
Dichloromethane (Methylene chloride)	µg/L	5	<5	-	-	-	-
Allyl chloride	µg/L	2	<2.0	-	-	-	-
Carbon disulfide	µg/L	2	<2.0	-	-	-	-
trans-1,2-dichloroethene	µg/L	0.5	<0.5	-	-	-	-
MtBE (Methyl-tert-butyl ether)	µg/L	0.5	<0.5	-	-	-	-
1,1-dichloroethane	µg/L	0.5	<0.5	-	-	-	-
Vinyl acetate*	µg/L	10	<10	-	-	-	-
MEK (2-butanone)	µg/L	10	<10	-	-	-	-
cis-1,2-dichloroethene	µg/L	0.5	<0.5	-	-	-	-
Bromochloromethane	µg/L	0.5	<0.5	-	-	-	-
Chloroform (THM)	µg/L	0.5	**2.9**	-	-	-	-
2,2-dichloropropane	µg/L	0.5	<0.5	-	-	-	-
1,2-dichloroethane	µg/L	0.5	<0.5	-	-	-	-
1,1,1-trichloroethane	µg/L	0.5	<0.5	-	-	-	-
1,1-dichloropropene	µg/L	0.5	<0.5	-	-	-	-
Carbon tetrachloride	µg/L	0.5	<0.5	-	-	-	-
Dibromomethane	µg/L	0.5	<0.5	-	-	-	-
1,2-dichloropropane	µg/L	0.5	<0.5	-	-	-	-
Trichloroethene (Trichloroethylene,TCE)	µg/L	0.5	<0.5	-	-	-	-
2-nitropropane	µg/L	100	<100	-	-	-	-
Bromodichloromethane (THM)	µg/L	0.5	<0.5	-	-	-	-
MIBK (4-methyl-2-pentanone)	µg/L	5	<5	-	-	-	-
cis-1,3-dichloropropene	µg/L	0.5	<0.5	-	-	-	-
trans-1,3-dichloropropene	µg/L	0.5	<0.5	-	-	-	-
1,1,2-trichloroethane	µg/L	0.5	<0.5	-	-	-	-
1,3-dichloropropane	µg/L	0.5	<0.5	-	-	-	-
Dibromochloromethane (THM)	µg/L	0.5	<0.5	-	-	-	-
2-hexanone (MBK)	µg/L	5	<5	-	-	-	-
1,2-dibromoethane (EDB)	µg/L	0.5	<0.5	-	-	-	-
Tetrachloroethene (Perchloroethylene,PCE)	µg/L	0.5	<0.5	-	-	-	-
1,1,1,2-tetrachloroethane	µg/L	0.5	<0.5	-	-	-	-
Chlorobenzene	µg/L	0.5	<0.5	-	-	-	-
Bromoform (THM)	µg/L	0.5	<0.5	-	-	-	-
Styrene (Vinyl benzene)	µg/L	0.5	<0.5	-	-	-	-
1,1,2,2-tetrachloroethane	µg/L	0.5	<0.5	-	-	-	-
1,2,3-trichloropropane	µg/L	0.5	<0.5	-	-	-	-
trans-1,4-dichloro-2-butene	µg/L	1	<1	-	-	-	-
Isopropylbenzene (Cumene)	µg/L	0.5	<0.5	-	-	-	-

VOCs in Water [AN433] Tested: 13/5/2025 (continued)

			BH1M	BH2M	BH3M	BH6M	QD1
			WATER	WATER	WATER	WATER	WATER
			-	-	-	-	-
			7/5/2025	7/5/2025	7/5/2025	7/5/2025	7/5/2025
PARAMETER	**UOM**	**LOR**	**SE282562.001**	**SE282562.002**	**SE282562.003**	**SE282562.004**	**SE282562.005**
Bromobenzene	µg/L	0.5	<0.5	-	-	-	-
n-propylbenzene	µg/L	0.5	<0.5	-	-	-	-
2-chlorotoluene	µg/L	0.5	<0.5	-	-	-	-
4-chlorotoluene	µg/L	0.5	<0.5	-	-	-	-
1,3,5-trimethylbenzene	µg/L	0.5	<0.5	-	-	-	-
tert-butylbenzene	µg/L	0.5	<0.5	-	-	-	-
1,2,4-trimethylbenzene	µg/L	0.5	<0.5	-	-	-	-
sec-butylbenzene	µg/L	0.5	<0.5	-	-	-	-
1,3-dichlorobenzene	µg/L	0.5	<0.5	-	-	-	-
1,4-dichlorobenzene	µg/L	0.3	<0.3	-	-	-	-
p-isopropyltoluene	µg/L	0.5	<0.5	-	-	-	-
1,2-dichlorobenzene	µg/L	0.5	<0.5	-	-	-	-
n-butylbenzene	µg/L	0.5	<0.5	-	-	-	-
1,2-dibromo-3-chloropropane	µg/L	0.5	<0.5	-	-	-	-
1,2,4-trichlorobenzene	µg/L	0.5	<0.5	-	-	-	-
Hexachlorobutadiene	µg/L	0.5	<0.5	-	-	-	-
1,2,3-trichlorobenzene	µg/L	0.5	<0.5	-	-	-	-
Total VOC	µg/L	10	<10	-	-	-	-
Total Halogenated Hydrocarbons	µg/L	10	<10	-	-	-	-
Total Chlorinated Hydrocarbons VIC EPA	µg/L	0.5	3.3	-	-	-	-
Total MAH	µg/L	0.5	<0.5	-	-	-	-
Total Chlorinated Hydrocarbons	µg/L	10	<10	-	-	-	-
Total Other Chlorinated Hydrocarbons VIC EPA	µg/L	0.5	3.3	-	-	-	-
Total THM	µg/L	2	3	-	-	-	-
Total MAH VIC EPA (BTEX+Styrene)	µg/L	0.5	<0.5	-	-	-	-

VOCs in Water [AN433] Tested: 13/5/2025 (continued)

PARAMETER	UOM	LOR	TS WATER - 7/5/2025 SE282562.006	TB WATER - 7/5/2025 SE282562.007	QR1 WATER - 7/5/2025 SE282562.008
Benzene	µg/L	0.5	[102%]	<0.5	<0.5
Toluene	µg/L	0.5	[102%]	<0.5	<0.5
Ethylbenzene	µg/L	0.5	[102%]	<0.5	<0.5
m/p-xylene	µg/L	1	[101%]	<1	<1
o-xylene	µg/L	0.5	[101%]	<0.5	<0.5
Total Xylenes	µg/L	1.5	-	<1.5	<1.5
Total BTEX	µg/L	3	-	<3	<3
Naphthalene (VOC)*	µg/L	0.5	[94%]	<0.5	<0.5
Dichlorodifluoromethane (CFC-12)	µg/L	5	-	-	-
Chloromethane	µg/L	5	-	-	-
Vinyl chloride (Chloroethene)	µg/L	0.3	-	-	-
Bromomethane	µg/L	10	-	-	-
Chloroethane	µg/L	5	-	-	-
Trichlorofluoromethane	µg/L	1	-	-	-
Acetone (2-propanone)	µg/L	10	-	-	-
Iodomethane	µg/L	5	-	-	-
1,1-dichloroethene	µg/L	0.5	-	-	-
Acrylonitrile	µg/L	0.5	-	-	-
Dichloromethane (Methylene chloride)	µg/L	5	-	-	-
Allyl chloride	µg/L	2	-	-	-
Carbon disulfide	µg/L	2	-	-	-
trans-1,2-dichloroethene	µg/L	0.5	-	-	-
MtBE (Methyl-tert-butyl ether)	µg/L	0.5	-	-	-
1,1-dichloroethane	µg/L	0.5	-	-	-
Vinyl acetate*	µg/L	10	-	-	-
MEK (2-butanone)	µg/L	10	-	-	-
cis-1,2-dichloroethene	µg/L	0.5	-	-	-
Bromochloromethane	µg/L	0.5	-	-	-
Chloroform (THM)	µg/L	0.5	-	-	-
2,2-dichloropropane	µg/L	0.5	-	-	-
1,2-dichloroethane	µg/L	0.5	-	-	-
1,1,1-trichloroethane	µg/L	0.5	-	-	-
1,1-dichloropropene	µg/L	0.5	-	-	-
Carbon tetrachloride	µg/L	0.5	-	-	-
Dibromomethane	µg/L	0.5	-	-	-
1,2-dichloropropane	µg/L	0.5	-	-	-
Trichloroethene (Trichloroethylene,TCE)	µg/L	0.5	-	-	-
2-nitropropane	µg/L	100	-	-	-
Bromodichloromethane (THM)	µg/L	0.5	-	-	-
MIBK (4-methyl-2-pentanone)	µg/L	5	-	-	-
cis-1,3-dichloropropene	µg/L	0.5	-	-	-
trans-1,3-dichloropropene	µg/L	0.5	-	-	-
1,1,2-trichloroethane	µg/L	0.5	-	-	-
1,3-dichloropropane	µg/L	0.5	-	-	-
Dibromochloromethane (THM)	µg/L	0.5	-	-	-
2-hexanone (MBK)	µg/L	5	-	-	-
1,2-dibromoethane (EDB)	µg/L	0.5	-	-	-
Tetrachloroethene (Perchloroethylene,PCE)	µg/L	0.5	-	-	-
1,1,1,2-tetrachloroethane	µg/L	0.5	-	-	-
Chlorobenzene	µg/L	0.5	-	-	-
Bromoform (THM)	µg/L	0.5	-	-	-
Styrene (Vinyl benzene)	µg/L	0.5	-	-	-
1,1,2,2-tetrachloroethane	µg/L	0.5	-	-	-
1,2,3-trichloropropane	µg/L	0.5	-	-	-
trans-1,4-dichloro-2-butene	µg/L	1	-	-	-
Isopropylbenzene (Cumene)	µg/L	0.5	-	-	-

VOCs in Water [AN433] Tested: 13/5/2025 (continued)

PARAMETER	UOM	LOR	TS WATER - 7/5/2025 SE282562.006	TB WATER - 7/5/2025 SE282562.007	QR1 WATER - 7/5/2025 SE282562.008
Bromobenzene	µg/L	0.5	-	-	-
n-propylbenzene	µg/L	0.5	-	-	-
2-chlorotoluene	µg/L	0.5	-	-	-
4-chlorotoluene	µg/L	0.5	-	-	-
1,3,5-trimethylbenzene	µg/L	0.5	-	-	-
tert-butylbenzene	µg/L	0.5	-	-	-
1,2,4-trimethylbenzene	µg/L	0.5	-	-	-
sec-butylbenzene	µg/L	0.5	-	-	-
1,3-dichlorobenzene	µg/L	0.5	-	-	-
1,4-dichlorobenzene	µg/L	0.3	-	-	-
p-isopropyltoluene	µg/L	0.5	-	-	-
1,2-dichlorobenzene	µg/L	0.5	-	-	-
n-butylbenzene	µg/L	0.5	-	-	-
1,2-dibromo-3-chloropropane	µg/L	0.5	-	-	-
1,2,4-trichlorobenzene	µg/L	0.5	-	-	-
Hexachlorobutadiene	µg/L	0.5	-	-	-
1,2,3-trichlorobenzene	µg/L	0.5	-	-	-
Total VOC	µg/L	10	-	-	-
Total Halogenated Hydrocarbons	µg/L	10	-	-	-
Total Chlorinated Hydrocarbons VIC EPA	µg/L	0.5	-	-	-
Total MAH	µg/L	0.5	-	-	-
Total Chlorinated Hydrocarbons	µg/L	10	-	-	-
Total Other Chlorinated Hydrocarbons VIC EPA	µg/L	0.5	-	-	-
Total THM	µg/L	2	-	-	-
Total MAH VIC EPA (BTEX+Styrene)	µg/L	0.5	-	-	-

Volatile Petroleum Hydrocarbons in Water [AN433] Tested: 13/5/2025

PARAMETER	UOM	LOR	BH1M WATER - 7/5/2025 SE282562.001	BH2M WATER - 7/5/2025 SE282562.002	BH3M WATER - 7/5/2025 SE282562.003	BH6M WATER - 7/5/2025 SE282562.004	QD1 WATER - 7/5/2025 SE282562.005
TRH C6-C9	µg/L	40	<40	<40	<40	**50**	<40
Benzene (F0)	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TRH C6-C10	µg/L	50	<50	<50	<50	**57**	<50
TRH C6-C10 minus BTEX (F1)	µg/L	50	<50	<50	<50	**54**	<50

PARAMETER	UOM	LOR	QR1 WATER - 7/5/2025 SE282562.008
TRH C6-C9	µg/L	40	<40
Benzene (F0)	µg/L	0.5	<0.5
TRH C6-C10	µg/L	50	<50
TRH C6-C10 minus BTEX (F1)	µg/L	50	<50

TRH (Total Recoverable Hydrocarbons) in Water [AN403] Tested: 12/5/2025

PARAMETER	UOM	LOR	BH1M WATER - 7/5/2025 SE282562.001	BH2M WATER - 7/5/2025 SE282562.002	BH3M WATER - 7/5/2025 SE282562.003	BH6M WATER - 7/5/2025 SE282562.004	QD1 WATER - 7/5/2025 SE282562.005
TRH C10-C14	μg/L	50	**290**	**110**	**56**	**63**	<50
TRH C15-C28	μg/L	200	**210**	<200	<200	<200	<200
TRH C29-C36	μg/L	200	**970**	<200	<200	<200	<200
TRH C37-C40	μg/L	200	**550**	<200	<200	<200	<200
TRH >C10-C16	μg/L	60	**290**	**120**	**63**	**71**	<60
TRH >C10-C16 - Naphthalene (F2)	μg/L	60	**290**	**120**	**63**	**71**	<60
TRH >C16-C34 (F3)	μg/L	500	**920**	<500	<500	<500	<500
TRH >C34-C40 (F4)	μg/L	500	**790**	<500	<500	<500	<500
TRH C10-C40	μg/L	320	**2000**	<320	<320	<320	<320

PARAMETER	UOM	LOR	QR1 WATER - 7/5/2025 SE282562.008
TRH C10-C14	μg/L	50	<50
TRH C15-C28	μg/L	200	<200
TRH C29-C36	μg/L	200	<200
TRH C37-C40	μg/L	200	<200
TRH >C10-C16	μg/L	60	<60
TRH >C10-C16 - Naphthalene (F2)	μg/L	60	<60
TRH >C16-C34 (F3)	μg/L	500	<500
TRH >C34-C40 (F4)	μg/L	500	<500
TRH C10-C40	μg/L	320	<320

PAH (Polynuclear Aromatic Hydrocarbons) in Water [AN420] Tested: 12/5/2025

			BH1M	BH2M	BH3M	BH6M
			WATER	WATER	WATER	WATER
			-	-	-	-
			7/5/2025	7/5/2025	7/5/2025	7/5/2025
PARAMETER	**UOM**	**LOR**	**SE282562.001**	**SE282562.002**	**SE282562.003**	**SE282562.004**
Naphthalene	µg/L	0.1	<0.1	<0.1	0.2	<0.1
2-methylnaphthalene	µg/L	0.1	<0.1	<0.1	0.3	<0.1
1-methylnaphthalene	µg/L	0.1	<0.1	<0.1	0.3	<0.1
Acenaphthylene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b&j)fluoranthene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b&j&k)fluoranthene	µg/L	0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-cd)pyrene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(ah)anthracene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Total PAH (18)	µg/L	1	-	<1	<1	<1

OC Pesticides in Water [AN420] Tested: 12/5/2025

PARAMETER	UOM	LOR	BH1M WATER - 7/5/2025 SE282562.001
Alpha BHC	µg/L	0.1	<0.1
Hexachlorobenzene (HCB)	µg/L	0.1	<0.1
Beta BHC	µg/L	0.1	<0.1
Lindane (gamma BHC)	µg/L	0.1	<0.1
Delta BHC	µg/L	0.1	<0.1
Heptachlor	µg/L	0.1	<0.1
Aldrin	µg/L	0.1	<0.1
Heptachlor epoxide	µg/L	0.1	<0.1
Gamma Chlordane	µg/L	0.1	<0.1
Alpha Chlordane	µg/L	0.1	<0.1
Alpha Endosulfan	µg/L	0.1	<0.1
p,p'-DDE	µg/L	0.1	<0.1
Dieldrin	µg/L	0.1	<0.1
Endrin	µg/L	0.1	<0.1
Beta Endosulfan	µg/L	0.1	<0.1
p,p'-DDD	µg/L	0.1	<0.1
Endrin aldehyde	µg/L	0.1	<0.1
Endosulfan sulphate	µg/L	0.1	<0.1
p,p'-DDT	µg/L	0.1	<0.1
Endrin ketone	µg/L	0.1	<0.1
Methoxychlor	µg/L	0.1	<0.1
Mirex	µg/L	0.1	<0.1
Total OC	µg/L	1	<1
Total OC	µg/L	1	<1
Total Other OC VIC EPA	µg/L	1	<1

OP Pesticides in Water [AN420] Tested: 12/5/2025

PARAMETER	UOM	LOR	BH1M WATER - 7/5/2025 SE282562.001	BH2M WATER - 7/5/2025 SE282562.002	BH3M WATER - 7/5/2025 SE282562.003	BH6M WATER - 7/5/2025 SE282562.004
Azinphos-methyl	µg/L	0.2	<0.2	<0.2	<0.2	<0.2
Bromophos Ethyl	µg/L	0.2	<0.2	<0.2	<0.2	<0.2
Chlorpyrifos (Chlorpyrifos Ethyl)	µg/L	0.2	<0.2	<0.2	<0.2	<0.2
Diazinon (Dimpylate)	µg/L	0.5	<0.5	<0.5	<0.5	<0.5
Dichlorvos	µg/L	0.5	<0.5	<0.5	<0.5	<0.5
Dimethoate	µg/L	0.5	<0.5	<0.5	<0.5	<0.5
Ethion	µg/L	0.2	<0.2	<0.2	<0.2	<0.2
Fenitrothion	µg/L	0.2	<0.2	<0.2	<0.2	<0.2
Malathion	µg/L	0.2	<0.2	<0.2	<0.2	<0.2
Methidathion	µg/L	0.5	<0.5	<0.5	<0.5	<0.5
Parathion-ethyl (Parathion)	µg/L	0.2	<0.2	<0.2	<0.2	<0.2

PCBs in Water [AN420] Tested: 12/5/2025

PARAMETER	UOM	LOR	BH1M WATER - 7/5/2025 SE282562.001
Arochlor 1016	μg/L	1	<1
Arochlor 1221	μg/L	1	<1
Arochlor 1232	μg/L	1	<1
Arochlor 1242	μg/L	1	<1
Arochlor 1248	μg/L	1	<1
Arochlor 1254	μg/L	1	<1
Arochlor 1260	μg/L	1	<1
Total Arochlors*	μg/L	5	<5

Full 8270 SVOC in Water [AN420] Tested: 12/5/2025

PARAMETER	UOM	LOR	BH1M WATER - 7/5/2025 SE282562.001
Acenaphthene	µg/L	0.1	<0.1
Acenaphthylene	µg/L	0.1	<0.1
Anthracene	µg/L	0.1	<0.1
Benzo(a)anthracene	µg/L	0.1	<0.1
Benzo(b&j)fluoranthene	µg/L	0.1	<0.1
Benzo(b&j&k)fluoranthene	µg/L	0.2	<0.2
Benzo(k)fluoranthene	µg/L	0.1	<0.1
Benzo(ghi)perylene	µg/L	0.1	<0.1
Benzo(a)pyrene	µg/L	0.1	<0.1
Chrysene	µg/L	0.1	<0.1
Dibenzo(ah)anthracene	µg/L	0.1	<0.1
Fluoranthene	µg/L	0.1	<0.1
Fluorene	µg/L	0.1	<0.1
Indeno(1,2,3-cd)pyrene	µg/L	0.1	<0.1
1-methylnaphthalene	µg/L	0.1	<0.1
2-methylnaphthalene	µg/L	0.1	<0.1
Naphthalene	µg/L	0.1	<0.1
Phenanthrene	µg/L	0.1	<0.1
Pyrene	µg/L	0.1	<0.1
2-acetylaminofluorene	µg/L	0.5	<0.5
7,12-dimethyl-benz(a)anthracene	µg/L	0.5	<0.5
3-methylcholanthrene	µg/L	0.5	<0.5
Aldrin	µg/L	0.1	<0.1
Alpha-BHC	µg/L	0.1	<0.1
Beta-BHC	µg/L	0.1	<0.1
Delta-BHC	µg/L	0.1	<0.1
Gamma-BHC (Lindane)	µg/L	0.1	<0.1
p,p-DDD	µg/L	0.1	<0.1
p,p-DDE	µg/L	0.1	<0.1
p,p-DDT	µg/L	0.1	<0.1
Dieldrin	µg/L	0.1	<0.1
Alpha-endosulfan	µg/L	0.1	<0.1
Beta-endosulfan	µg/L	0.1	<0.1
Endosulfan sulphate	µg/L	0.1	<0.1
Endrin	µg/L	0.1	<0.1
Heptachlor	µg/L	0.1	<0.1
Heptachlor epoxide	µg/L	0.1	<0.1
Methoxychlor	µg/L	0.1	<0.1
Mirex	µg/L	0.1	<0.1
Alpha-chlordane	µg/L	0.1	<0.1
Gamma-chlordane	µg/L	0.1	<0.1
Endrin ketone	µg/L	0.1	<0.1
Azinphos-methyl (Guthion)	µg/L	0.2	<0.2
Bromophos ethyl	µg/L	0.2	<0.2
Carbophenothion	µg/L	0.5	<0.5
Chlorfenvinphos-cis	µg/L	5	<5
Chlorfenvinphos-trans	µg/L	0.5	<0.5
Chlorpyrifos (Chlorpyrifos Ethyl)	µg/L	0.2	<0.2
Chlorpyrifos-methyl	µg/L	0.5	<0.5
Co-Ral (Coumaphos)	µg/L	0.5	<0.5
Diazinon (Dimpylate)	µg/L	0.5	<0.5
Dichlorvos	µg/L	0.5	<0.5
Demeton-S-methyl	µg/L	0.5	<0.5
Dimethoate	µg/L	0.5	<0.5
Disulfoton (Di-syston)	µg/L	0.5	<0.5
EPN*	µg/L	0.5	<0.5

Full 8270 SVOC in Water [AN420] Tested: 12/5/2025 (continued)

PARAMETER	UOM	LOR	BH1M WATER - 7/5/2025 SE282562.001
Ethion	µg/L	0.2	<0.2
Ethoprophos (ethoprop or prophos)	µg/L	0.5	<0.5
Famphur (Famophos)	µg/L	0.5	<0.5
Fenamiphos (Phenamiphos)	µg/L	0.5	<0.5
Fenchlorophos (Ronnel)	µg/L	0.5	<0.5
Fenitrothion	µg/L	0.2	<0.2
Fenthion	µg/L	0.5	<0.5
Malathion (Maldison)	µg/L	0.2	<0.2
Methidathion	µg/L	0.5	<0.5
Mevinphos-cis/trans	µg/L	1	<1
o,o,o-triethyl phosphorothioate	µg/L	0.5	<0.5
Parathion ethyl (Parathion)	µg/L	0.2	<0.2
Parathion methyl	µg/L	0.5	<0.5
Phorate	µg/L	0.5	<0.5
Pirimiphos-ethyl	µg/L	0.5	<0.5
Pirimiphos-methyl	µg/L	0.5	<0.5
Profenofos	µg/L	0.5	<0.5
Prothiophos (Tokuthion)*	µg/L	0.5	<0.5
Sulfotepp	µg/L	0.5	<0.5
Tetrachlorvinphos (Stirophos)*	µg/L	0.5	<0.5
PCB Congener C28	µg/L	0.1	<0.1
PCB Congener C52	µg/L	0.1	<0.1
PCB Congener C101	µg/L	0.1	<0.1
PCB Congener C118	µg/L	0.1	<0.1
PCB Congener C138	µg/L	0.1	<0.1
PCB Congener C153	µg/L	0.1	<0.1
PCB Congener C180	µg/L	0.1	<0.1
Hexachlorobenzene (HCB)	µg/L	0.1	<0.1
1,2-dichlorobenzene	µg/L	0.5	<0.5
1,3-dichlorobenzene	µg/L	0.5	<0.5
1,4-dichlorobenzene	µg/L	0.5	<0.5
Hexachlorobutadiene	µg/L	0.5	<0.5
Hexachlorocyclopentadiene	µg/L	2	<2
Hexachloroethane	µg/L	0.5	<0.5
Hexachloroproprene	µg/L	0.5	<0.5
Pentachlorobenzene	µg/L	0.5	<0.5
Pentachloroethane	µg/L	0.5	<0.5
1,2,3,5 and 1,2,4,5 -tetrachlorobenzene	µg/L	1	<1
1,2,3,4-tetrachlorobenzene	µg/L	0.5	<0.5
1/2-Chloronaphthalene	µg/L	1	<1
1,2,4-trichlorobenzene	µg/L	0.5	<0.5
Bis(2-ethylhexyl)phthalate	µg/L	10	<10
Bis(2-ethylhexyl)adipate	µg/L	1	<1
Butyl benzyl phthalate	µg/L	1	<1
Di-n-butyl phthalate	µg/L	10	<10
Diethyl phthalate	µg/L	5	<5
Dimethyl phthalate	µg/L	1	<1
Di-n-octyl phthalate	µg/L	1	<1
Carbofuran	µg/L	0.5	<0.5
Carbaryl	µg/L	0.5	<0.5
Trifluralin	µg/L	0.5	<0.5
N-nitroso-di-n-butylamine (NDBA)	µg/L	1	<1
N-nitroso-diethylamine (NDEA)	µg/L	1	<1
N-nitroso-di-n-propylamine (NDPA)	µg/L	1	<1
N-nitroso-morpholine (NMOR)	µg/L	1	<1
N-nitroso-piperidine (NPIP)	µg/L	1	<1

Full 8270 SVOC in Water [AN420] Tested: 12/5/2025 (continued)

PARAMETER	UOM	LOR	BH1M WATER - 7/5/2025 SE282562.001
N-nitroso-pyrrolidine (NPYR)	µg/L	1	<1
4-amino biphenyl	µg/L	1	<1
Acetophenone	µg/L	1	<1
1,3-dinitrobenzene	µg/L	1	<1
2,4-dinitrotoluene	µg/L	1	<1
2,6-dinitrotoluene	µg/L	1	<1
Isophorone	µg/L	1	<1
Nitrobenzene	µg/L	1	<1
p-(dimethylamino) azobenzene	µg/L	1	<1
Phenacetin	µg/L	1	<1
Pentachloronitrobenzene (quintozene)	µg/L	1	<1
Aniline	µg/L	5	<5
4-chloroaniline	µg/L	1	<1
2-nitroaniline	µg/L	1	<1
3-nitroaniline	µg/L	1	<1
4-nitroaniline	µg/L	1	<1
Diphenylamine	µg/L	1	<1
o-toluidine	µg/L	1	<1
5-nitro-o-toluidine	µg/L	1	<1
1-naphthylamine	µg/L	2	<2
2-naphthylamine	µg/L	2	<2
Bis(2-chloroethoxy) methane	µg/L	1	<1
Bis(2-chloroethyl) ether	µg/L	1	<1
Bis(2-chloroisopropyl) ether	µg/L	1	<1
4-chlorophenyl phenyl ether	µg/L	1	<1
4-bromophenyl phenyl ether	µg/L	1	<1
Methyl methanesulfonate	µg/L	1	<1
Ethyl methanesulfonate	µg/L	1	<1
Dibenzofuran	µg/L	1	<1
Benzyl alcohol	µg/L	1	<1
Safrole	µg/L	1	<1
Isosafrole Isomer 1	µg/L	1	<1
Isosafrole Isomer 2	µg/L	1	<1
1,4-naphthoquinone	µg/L	1	<1
Thionazin	µg/L	1	<1
3/4-methyl phenol (m/p-cresol)	µg/L	1	<1
2-methyl phenol (o-cresol)	µg/L	0.5	<0.5
2,6-dichlorophenol	µg/L	0.5	<0.5
2,3,4,6-tetrachlorophenol	µg/L	0.5	<0.5
2,4,5-trichlorophenol	µg/L	0.5	<0.5
4-chloro-3-methylphenol	µg/L	2	<2
2-chlorophenol	µg/L	0.5	<0.5
2,4-dichlorophenol	µg/L	0.5	<0.5
2,4-dimethylphenol	µg/L	0.5	<0.5
2-nitrophenol	µg/L	0.5	<0.5
Phenol	µg/L	0.5	<0.5
2,4,6-trichlorophenol	µg/L	0.5	<0.5
Pentachlorophenol	µg/L	0.5	<0.5
4-nitrophenol	µg/L	1	<1
Total Endosulfan (alpha+beta+sulfate)	µg/L	0.2	<0.2

Total Phenolics in Water [AN295] Tested: 12/5/2025

PARAMETER	UOM	LOR	BH1M WATER - 7/5/2025 SE282562.001	BH2M WATER - 7/5/2025 SE282562.002	BH3M WATER - 7/5/2025 SE282562.003	BH6M WATER - 7/5/2025 SE282562.004
Total Phenols	mg/L	0.05	<0.05	<0.05	<0.05	<0.05

pH in water [AN101] Tested: 9/5/2025

PARAMETER	UOM	LOR	BH1M WATER - 7/5/2025 SE282562.001	BH2M WATER - 7/5/2025 SE282562.002	BH3M WATER - 7/5/2025 SE282562.003	BH6M WATER - 7/5/2025 SE282562.004
pH**	pH Units	0.1	6.6	7.0	7.4	7.7

Conductivity and TDS by Calculation - Water [AN106] Tested: 9/5/2025

PARAMETER	UOM	LOR	BH1M WATER - 7/5/2025 SE282562.001	BH2M WATER - 7/5/2025 SE282562.002	BH3M WATER - 7/5/2025 SE282562.003	BH6M WATER - 7/5/2025 SE282562.004
Conductivity @ 25 C	µS/cm	2	16000	10000	5200	2700

Total Dissolved Solids (TDS) in water [AN113] Tested: 12/5/2025

			BH1M WATER - 7/5/2025	BH2M WATER - 7/5/2025	BH3M WATER - 7/5/2025	BH6M WATER - 7/5/2025
PARAMETER	**UOM**	**LOR**	**SE282562.001**	**SE282562.002**	**SE282562.003**	**SE282562.004**
Total Dissolved Solids Dried at 175-185°C	mg/L	10	14000	8300	3300	1500

Turbidity [AN119] Tested: 9/5/2025

			BH1M WATER - 7/5/2025 SE282562.001	BH2M WATER - 7/5/2025 SE282562.002	BH3M WATER - 7/5/2025 SE282562.003	BH6M WATER - 7/5/2025 SE282562.004
PARAMETER	UOM	LOR				
Turbidity	NTU	0.5	4.6	1900	330	16000

Total Cyanide in water by Discrete Analyser [AN077/AN287] Tested: 9/5/2025

PARAMETER	UOM	LOR	BH2M WATER - 7/5/2025 SE282562.002	BH3M WATER - 7/5/2025 SE282562.003	BH6M WATER - 7/5/2025 SE282562.004
Total Cyanide	mg/L	0.004	<0.004	<0.004	<0.004

Metals in Water (Dissolved) by ICPOES [AN320] Tested: 9/5/2025

PARAMETER	UOM	LOR	BH1M WATER - 7/5/2025 SE282562.001	BH2M WATER - 7/5/2025 SE282562.002	BH3M WATER - 7/5/2025 SE282562.003	BH6M WATER - 7/5/2025 SE282562.004
Calcium, Ca	mg/L	0.2	220	130	46	18
Magnesium, Mg	mg/L	0.1	860	490	98	38
Total Hardness by Calculation	mg CaCO3/L	1	4100	2400	520	200
Sodium Adsorption Ratio	No unit	0.2	20	-	-	-
Sodium, Na	mg/L	0.5	2900	-	-	-
Potassium, K	mg/L	0.1	33	-	-	-
Lithium, Li	mg/L	0.005	0.19	-	-	-
Silicon, Si*	mg/L	0.05	7.1	-	-	-
Soluble Silicon as Silica, SiO2*	mg/L	0.1	15	-	-	-

Trace Metals (Dissolved) in Water by ICPMS [AN318] Tested: 9/5/2025

PARAMETER	UOM	LOR	BH1M WATER - 7/5/2025 SE282562.001	BH2M WATER - 7/5/2025 SE282562.002	BH3M WATER - 7/5/2025 SE282562.003	BH6M WATER - 7/5/2025 SE282562.004	QD1 WATER - 7/5/2025 SE282562.005
Aluminium	µg/L	5	9	6	6	11	-
Arsenic	µg/L	1	<1	1	1	3	<1
Cadmium	µg/L	0.1	<0.1	0.1	<0.1	<0.1	<0.1
Chromium	µg/L	1	<1	<1	<1	<1	<1
Copper	µg/L	1	<1	<1	<1	<1	<1
Lead	µg/L	1	<1	<1	<1	<1	<1
Nickel	µg/L	1	4	4	4	1	3
Zinc	µg/L	5	7	8	6	<5	6
Silver	µg/L	1	<1	-	-	-	-
Antimony	µg/L	1	<1	-	-	-	-
Barium	µg/L	1	71	-	-	-	-
Beryllium	µg/L	1	<1	-	-	-	-
Boron	µg/L	5	86	-	-	-	-
Cobalt	µg/L	1	4	-	-	-	-
Iron	µg/L	5	110	-	-	-	-
Manganese	µg/L	1	960	-	-	-	-
Molybdenum	µg/L	1	1	-	-	-	-
Selenium	µg/L	1	<1	-	-	-	-
Strontium	µg/L	1	9200	-	-	-	-
Uranium	µg/L	1	<1	-	-	-	-
Vanadium	µg/L	1	<1	-	-	-	-

PARAMETER	UOM	LOR	QR1 WATER - 7/5/2025 SE282562.008
Aluminium	µg/L	5	-
Arsenic	µg/L	1	<1
Cadmium	µg/L	0.1	<0.1
Chromium	µg/L	1	<1
Copper	µg/L	1	<1
Lead	µg/L	1	<1
Nickel	µg/L	1	<1
Zinc	µg/L	5	<5
Silver	µg/L	1	-
Antimony	µg/L	1	-
Barium	µg/L	1	-
Beryllium	µg/L	1	-
Boron	µg/L	5	-
Cobalt	µg/L	1	-
Iron	µg/L	5	-
Manganese	µg/L	1	-
Molybdenum	µg/L	1	-
Selenium	µg/L	1	-
Strontium	µg/L	1	-
Uranium	µg/L	1	-
Vanadium	µg/L	1	-

Mercury (dissolved) in Water [AN311(Perth)/AN312] Tested: 12/5/2025

			BH1M WATER - 7/5/2025	BH2M WATER - 7/5/2025	BH3M WATER - 7/5/2025	BH6M WATER - 7/5/2025	QD1 WATER - 7/5/2025
PARAMETER	**UOM**	**LOR**	**SE282562.001**	**SE282562.002**	**SE282562.003**	**SE282562.004**	**SE282562.005**
Mercury	mg/L	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001

			QR1 WATER - 7/5/2025
PARAMETER	**UOM**	**LOR**	**SE282562.008**
Mercury	mg/L	0.0001	<0.0001

Anions by Ion Chromatography in Water [AN245] Tested: 12/5/2025

PARAMETER	UOM	LOR	BH1M WATER - 7/5/2025 SE282562.001
Chloride	mg/L	0.05	6600
Bromide	mg/L	0.05	2.6
Fluoride	mg/L	0.1	0.21
Sulfate, SO4	mg/L	1	1100
Nitrate Nitrogen, NO3-N	mg/L	0.005	0.49

Alkalinity [AN135] Tested: 14/5/2025

PARAMETER	UOM	LOR	BH1M WATER - 7/5/2025 SE282562.001
Bicarbonate Alkalinity as CaCO3	mg/L	5	1200
Bicarbonate Alkalinity as HCO3	mg/L	5	1400
Carbonate Alkalinity as CaCO3	mg/L	5	<5
Carbonate Alkalinity as CO3	mg/L	5	<5
Hydroxide Alkalinity as CaCO3	mg/L	5	<5
Hydroxide Alkalinity as OH	mg/L	5	<5
Total Alkalinity as CaCO3	mg/L	5	1200
Carbonate Hardness as CaCO3*	mg CaCO3/L	2	1152.50833333333
Non-Carbonate Hardness as CaCO3*	mg CaCO3/L	2	2953.41916666667
Negative Hardness as CaCO3*	mg CaCO3/L	-100	-

Dissolved Oxygen by Membrane Electrode [AN176] Tested: 9/5/2025

PARAMETER	UOM	LOR	BH1M WATER - 7/5/2025 SE282562.001
Temperature*	°C	-	18.4
Dissolved Oxygen**	mg/L	0.5	3.6
Dissolved Oxygen (percent saturation)**	%	1	38.1

Forms of Carbon [AN190] Tested: 14/5/2025

PARAMETER	UOM	LOR	BH1M WATER - 7/5/2025 SE282562.001
Total Organic Carbon as NPOC	mg/L	0.2	**1.5**

Total and Volatile Suspended Solids (TSS / VSS) [AN114] Tested: 12/5/2025

PARAMETER	UOM	LOR	BH1M WATER - 7/5/2025 SE282562.001
Total Suspended Solids Dried at 103-105°C	mg/L	5	8

Ammonia Nitrogen by Discrete Analyser [AN291] Tested: 9/5/2025

PARAMETER	UOM	LOR	BH1M WATER - 7/5/2025 SE282562.001
Ammonia Nitrogen, NH_3 as N	mg/L	0.01	**0.74**

Calculation of Anion-Cation Balance (SAR Calc) [AN121] Tested: 15/5/2025

PARAMETER	UOM	LOR	BH1M WATER - 7/5/2025 SE282562.001
Sum of Ions*	mg/L	10	12900
Anion-Cation Balance	%	-100	-5.38
TFSS*	mg/L	10	12900
Sodium Adsorption Ratio*	No unit	0.1	19.7

Nitrite in Water [AN277] Tested: 9/5/2025

			BH1M WATER - 7/5/2025
PARAMETER	UOM	LOR	SE282562.001
Nitrite Nitrogen, NO2 as N	mg/L	0.005	0.018
Total Oxidised Nitrogen, NOx-N	mg/L	0.005	0.51

TKN Kjeldahl Digestion by Discrete Analyser [AN292] Tested: 13/5/2025

PARAMETER	UOM	LOR	BH1M WATER - 7/5/2025 SE282562.001
Total Kjeldahl Nitrogen	mg/L	0.05	1.0
Total Nitrogen (calc)	mg/L	0.05	1.5

Total Phosphorus by Kjeldahl Digestion DA in Water [AN279/AN293(Sydney only)] Tested: 13/5/2025

			BH1M WATER - 7/5/2025
PARAMETER	**UOM**	**LOR**	**SE282562.001**
Total Phosphorus (Kjeldahl Digestion) as P	mg/L	0.02	0.02

Filterable Reactive Phosphorus (FRP) [AN278] Tested: 9/5/2025

PARAMETER	UOM	LOR	BH1M WATER - 7/5/2025 SE282562.001
Filterable Reactive Phosphorus as P	mg/L	0.005	<0.005

Redox Potential (Eh) in water [AN240] Tested: 9/5/2025

PARAMETER	UOM	LOR	BH1M WATER - 7/5/2025 SE282562.001
Eh of Sample Relative to Standard H+ Electrode***	mV	-500	389
Temperature of Sample*	°C	0.1	19.9

Per- and Polyfluoroalkyl Substances (PFAS) in Aqueous Samples [AN404] Tested: 12/5/2025

PARAMETER	UOM	LOR	BH1M WATER - 7/5/2025 SE282562.001
Perfluorobutanoic acid (PFBA)	µg/L	0.05	<0.05
Perfluoropentanoic acid (PFPeA)	µg/L	0.01	<0.01
Perfluorohexanoic acid (PFHxA)	µg/L	0.01	<0.01
Perfluoroheptanoic acid (PFHpA)	µg/L	0.01	<0.01
Perfluorooctanoic acid (PFOA)	µg/L	0.01	<0.01
Perfluorononanoic acid (PFNA)	µg/L	0.01	<0.01
Perfluorodecanoic acid (PFDA)	µg/L	0.01	<0.01
Perfluoroundecanoic acid (PFUnDA)	µg/L	0.01	<0.01
Perfluorododecanoic acid (PFDoDA)	µg/L	0.01	<0.01
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.01	<0.01
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.01	<0.01
Perfluoropropane sulfonic acid (PFPrS)	µg/L	0.01	<0.01
Perfluorobutane sulfonic acid (PFBS)	µg/L	0.01	<0.01
Perfluoropentane sulfonic acid (PFPeS)	µg/L	0.01	<0.01
Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.01	<0.01
Perfluoroheptane sulfonic acid (PFHpS)	µg/L	0.01	<0.01
Perfluorooctane sulfonic acid (PFOS)	µg/L	0.01	<0.01
Perfluorononane sulfonic acid (PFNS)	µg/L	0.01	<0.01
Perfluorodecane sulfonic acid (PFDS)	µg/L	0.01	<0.01
1H,1H,2H,2H-Perfluorohexane sulfonic acid (4:2 FTS)	µg/L	0.01	<0.01
1H,1H,2H,2H-Perfluorooctane sulfonic acid (6:2 FTS)	µg/L	0.01	<0.01
1H,1H,2H,2H-Perfluorodecane sulfonic acid (8:2 FTS)	µg/L	0.01	<0.01
1H,1H,2H,2H-Perfluorododecane sulfonic acid (10:2	µg/L	0.01	<0.01
Perfluorooctane sulfonamide (FOSA)	µg/L	0.01	<0.01
N-Methylperfluoroctane sulfonamide (N-MeFOSA)	µg/L	0.01	<0.01
N-Ethylperfluoroctane sulfonamide (N-EtFOSA)	µg/L	0.01	<0.01
N-Methylperfluorooctanesulfonamidoacetic acid	µg/L	0.05	<0.05
N-Ethylperfluorooctanesulfonamidoacetic acid	µg/L	0.05	<0.05
2-(N-Ethylperfluorooctane sulfonamido)-ethanol	µg/L	0.05	<0.05
2-(N-Methylperfluorooctane sulfonamido)-ethanol	µg/L	0.05	<0.05
Sum of PFOS and PFHxS	µg/L	0.01	<0.01
Sum of enHealth PFAS (PFHxS+PFOS+PFOA)	µg/L	0.01	<0.01
Sum of US EPA PFAS (PFOS+PFOA)	µg/L	0.01	<0.01
Sum of PFAS A	µg/L	0.01	<0.01
Sum of PFAS B	µg/L	0.01	<0.01
Sum of PFAS C	µg/L	0.01	<0.01
Sum of Positive PFAS	µg/L	0.01	<0.01

Enterococci in Water [AN705] Tested: 9/5/2025

PARAMETER	UOM	LOR	BH1M WATER - 7/5/2025 SE282562.001
Date & Time Processed*	No unit	-	2025-05-08 18:04
Intestinal Enterococci*	CFU/100mL	1	10
Notes*	No unit	-	-

E. coli, Total and Faecal (Thermotolerant) coliforms in Water (MPN) [AN735] Tested: 9/5/2025

PARAMETER	UOM	LOR	BH1M WATER - 7/5/2025 SE282562.001
Date & Time Processed*	No unit	-	2025-05-08 17:53
E. coli	MPN/100mL	1	<1
Faecal Coliforms	MPN/100mL	1	770

METHOD	METHODOLOGY SUMMARY
AN020	Unpreserved water sample is filtered through a 0.45µm membrane filter and acidified with nitric acid similar to APHA3030B.
AN077	Hydrogen cyanide is liberated from an acidified sample by distillation and purging with air. The hydrogen cyanide gas is then collected by passing it through a sodium hydroxide scrubbing solution. The scrubbing solution will then be analysed for cyanide by the appropriate method.
AN101	pH in Soil Sludge Sediment and Water: pH is measured electrometrically using a combination electrode (glass plus reference electrode) and is calibrated against 3 buffers purchased commercially. For soils, an extract with water is made at a ratio of 1:5 and the pH determined and reported on the extract. Reference APHA 4500-H+.
AN106	Conductivity and TDS by Calculation: Conductivity is measured by meter with temperature compensation and is calibrated against a standard solution of potassium chloride. Conductivity is generally reported as µmhos/cm or µS/cm @ 25°C. For soils, an extract with water is made at a ratio of 1:5 and the EC determined and reported on the extract, or calculated back to the as-received sample. Total Dissolved Salts can be estimated from conductivity using a conversion factor, which for natural waters, is in the range 0.55 to 0.75. SGS use 0.6. Reference APHA 2510 B.
AN106	Salinity may be calculated in terms of NaCl from the sample conductivity. This assumes all soluble salts present, measured by the conductivity, are present as NaCl.
AN113	Total Dissolved Solids: A well-mixed filtered sample of known volume is evaporated to dryness at 180°C and the residue weighed. Approximate methods for correlating chemical analysis with dissolved solids are available. Reference APHA 2540 C.
AN113	The Total Dissolved Solids residue may also be ignited at 550 C and volatile TDS (Organic TDS) and non-volatile TDS (Inorganic) can be determined.
AN114	Total Suspended and Volatile Suspended Solids: The sample is homogenised by shaking and a known volume is filtered through a pre-weighed GF/C filter paper and washed well with deionised water. The filter paper is dried and reweighed. The TSS is the residue retained by the filter per unit volume of sample. Reference APHA 2540 D. Internal Reference AN114
AN119	Turbidity by Nephelometry: Small particles in a light beam scatter light at a range of angles. A turbidimeter measures this scatter and reports results compared to turbidity standards, in NTU. This procedure is not suitable for very dark coloured liquids or samples with high solids because light absorption causes artificially low light scatter and low turbidity. Reference APHA 2130B.
AN121	This method is used to calculation the balance of major Anions and Cations in water samples and converts major ion concentration to milliequivalents and then summed. Anions sum and Cation sum is calculated as a difference and expressed as a percentage.
AN135	Alkalinity (and forms of) by Titration: The sample is titrated with standard acid to pH 8.3 (P titre) and pH 4.5 (T titre) and permanent and/or total alkalinity calculated. The results are expressed as equivalents of calcium carbonate or recalculated as bicarbonate, carbonate and hydroxide. Reference APHA 2320. Internal Reference AN135
AN176	Dissolved Oxygen: DO can also be measured directly using an oxygen permeable membrane electrode and meter. Under steady state conditions the current is directly proportional to the DO conc. DO can also be measured via Luminescent dissolved oxygen probes (LDO) which also operates using an oxygen permeable membrane with an oxygen sensitive luminescent dye making up the second probe layer. The presence of oxygen causes changes in the lifetime and intensity of luminescence, which are then quantified. Zero headspace is required for sample analysis, if headspace is observed report comment will be recorded. Reference APHA 4500-C, G & O.
AN190	TOC and DOC in Water: A homogenised micro portion of sample is injected into a heated reaction chamber packed with an oxidative catalyst that converts organic carbon to carbon dioxide. The CO2 is measured using a non-dispersive infrared detector. The process is fully automated in a commercially available analyser. If required a sugar value can be calculated from the TOC result. Reference APHA 5310 B.
AN190	Chemical oxygen demand can be calculated/estimated based on the O2/C relation as 2.67*NPOC (TOC). This is an estimate only and the factor will vary with sample matrix so results should be interpreted with caution.
AN240	Oxidation-Reduction Potential (Eh): Electrometric measurements are made by potentiometric determination of electron activity (or intensity) with an inert indicator electrode and a suitable reference electrode. At redox equilibrium, the potential difference between the two electrodes equals the redox potential of the system. This measurement is then corrected for the difference between the potential of the reference electrode and that of the standard hydrogen electrode.
AN245	Anions by Ion Chromatography: A water sample is injected into an eluent stream that passes through the ion chromatographic system where the anions of interest ie Br, Cl, NO2, NO3 and SO4 are separated on their relative affinities for the active sites on the column packing material. Changes to the conductivity and the UV-visible absorbance of the eluent enable identification and quantitation of the anions based on their retention time and peak height or area. APHA 4110 B
AN277	Nitrite ions, when reacted with a reagent containing sulphanilamide and N-(1-naphthyl)-ethylenediamine dihydrochloride produce a highly coloured azo dye that is measured photometrically at 540nm.

AN278	Filterable Reactive Phosphorus by DA (determined on filtered sample): Orthophosphate reacts with ammonium molybdate (Mo VI) and potassium antimonyl tartrate (Sb III) in acid medium to form an antimony-phosphomolybdate complex. This complex is subsequently reduced with ascorbic acid to form a blue colour and the absorbance is read at 880 nm. The sensitivity of the automated method is 10-20 times that of the macro method. Reference APHA 4500-P F
AN279/AN293(Sydney)	The sample is digested with Sulphuric acid, K2SO4 and CuSO4. All forms of phosphorus are converted into orthophosphate. The digest is cooled and placed on the discrete analyser for colorimetric analysis.
AN281	An unfiltered water or soil sample is first digested in a block digestor with sulfuric acid, K2SO4 and CuSO4. The ammonia produced following digestion is then measured colourimetrically using the Discrete Analyser. A portion of the digested sample is buffered to an alkaline pH, and interfering cations are complexed. The ammonia then reacts with salicylate and hypochlorite to give a blue colour whose absorbance is measured at 660nm and compared with calibration standards. This is proportional to the concentration of Total Kjeldahl Nitrogen in the original sample.
AN287	A buffered distillate or water sample is treated with chloramine/barbituric acid reagents and the intensity of the colour developed is proportional to the cyanide concentration by DA.
AN291	Ammonia in solution reacts with hypochlorite ions from Sodium Dichloroisocyanuate, and salicylate in the presence of Sodium Nitroprusside to form indophenol blue and measured at 660 nm by Discrete Analyser.
AN295	The water sample or extract of sample is distilled in a phosphoric acid stream. Phenolic compounds in the distillate react with a reagent stream of potassium hexacyanoferrate(III) and 4-Amino-2,3-dimethyl-3-pryazolin-5-one in an alkaline medium to form a coloured complex which is analysed spectrophotometrically onboard a continuous flow analyser.
AN311(Perth)/AN312	Mercury by Cold Vapour AAS in Waters: Mercury ions are reduced by stannous chloride reagent in acidic solution to elemental mercury. This mercury vapour is purged by nitrogen into a cold cell in an atomic absorption spectrometer or mercury analyser. Quantification is made by comparing absorbances to those of the calibration standards. Reference APHA 3112/3500.
AN318	Determination of elements at trace level in waters by ICP-MS technique,, referenced to USEPA 6020B and USEPA 200.8 (5.4).
AN320	Metals by ICP-OES: Samples are preserved with 10% nitric acid for a wide range of metals and some non-metals. This solution is measured by Inductively Coupled Plasma. Solutions are aspirated into an argon plasma at 8000-10000K and emit characteristic energy or light as a result of electron transitions through unique energy levels. The emitted light is focused onto a diffraction grating where it is separated into components .
AN320	Photomultipliers or CCDs are used to measure the light intensity at specific wavelengths. This intensity is directly proportional to concentration. Corrections are required to compensate for spectral overlap between elements . Reference APHA 3120 B.
AN403	Total Recoverable Hydrocarbons: Determination of Hydrocarbons by gas chromatography after a solvent extraction. Detection is by flame ionisation detector (FID) that produces an electronic signal in proportion to the combustible matter passing through it. Total Recoverable Hydrocarbons (TRH) are routinely reported as four alkane groupings based on the carbon chain length of the compounds: C6-C9, C10-C14, C15-C28 and C29-C36 and in recognition of the NEPM 1999 (2013), >C10-C16 (F2), >C16-C34 (F3) and >C34-C40 (F4). Where F2 is corrected for Naphthalene, the VOC data for Naphthalene is used.
AN403	Additionally, the volatile C6-C9/C6-C10 fractions may be determined by a purge and trap technique and GC/MS because of the potential for volatiles loss. Total Recoveerable Hydrocarbons - Silica (TRH-Silica) follows the same method of analysis after silica gel cleanup of the solvent extract. Aliphatic/Aromatic Speciation follows the same method of analysis after fractionation of the solvent extract over silica with differential polarity of the eluent solvents.
AN403	The GC/FID method is not well suited to the analysis of refined high boiling point materials (ie lubricating oils or greases) but is particularly suited for measuring diesel, kerosene and petrol if care to control volatility is taken. This method will detect naturally occurring hydrocarbons, lipids, animal fats, phenols and PAHs if they are present at sufficient levels, dependent on the use of specific cleanup/fractionation techniques. Reference USEPA 3510B, 8015B.
AN404	This method covers the analysis of per- and polyfluoroalkyl substances (PFAS) in aqueous, solid and biosolid samples and solvent extracts. After spiking with isotopically labelled quantification surrogates and sample extracts are analysed by liquid chromatography/mass spectrometry (LC-MS/MS). PFAS concentrations are determined by isotope dilution quantification. PFOS and PFHXS are determined as the total of linear and branched isomers.
AN420	(SVOCs) including OC, OP, PCB, Herbicides, PAH, Phthalates and Speciated Phenols (etc) in soils, sediments and waters are determined by GCMS/ECD technique following appropriate solvent extraction process (Based on USEPA 3500C and 8270D). Total PAH calculated from individual analyte detections at or above the limit of reporting .
AN420	SVOC Compounds: Semi-Volatile Organic Compounds (SVOCs) including OC, OP, PCB, Herbicides, PAH, Phthalates and Speciated Phenols in soils, sediments and waters are determined by GCMS/ECD technique following appropriate solvent extraction process (Based on USEPA 3500C and 8270D).
AN433	VOCs and C6-C9 Hydrocarbons by GC-MS P&T: VOC`s are volatile organic compounds. The sample is presented to a gas chromatograph via a purge and trap (P&T) concentrator and autosampler and is detected with a Mass Spectrometer (MSD). Solid samples are initially extracted with methanol whilst liquid samples are processed directly. References: USEPA 5030B, 8020A, 8260.

AN705	A known volume of water is passed through a membrane of known pore size. The membrane is placed on a selective agar plate and incubated. The volume of sample filtered depends upon the expected count. Referenced to AS/NZS4276.9 (ISO 7899-2:2000 MOD).
AN735	The Colilert matrix contains two nutrient indicators, ONPG (ortho-nitro-phenyl B-d- galactopyranoside) and MUG (4-methyl-umbelliferyl B-d-glucruonide). As coliforms grow, they use B-galactosidase to metabolise ONPG which causes yellow colouration of the matrix via the nitro-phenyl. E.coli possesses an additional enzyme, B-glucuronidase, which it uses to metabolise MUG and display florescence (caused by the 4 methyl-umbelliferyl). Incubation at 37°C.
AN735	Non target organisms are suppressed by a combination of high salts, detergents etc. present within the matrix. Faecal coliforms are thermotolerant, thus they can be enumerated by testing at 44.5°C.
Calculation	Free and Total Carbon Dioxide may be calculated using alkalinity forms only when the samples TDS is <500mg/L. If TDS is >500mg/L free or total carbon dioxide cannot be reported. APHA4500CO2 D.

FOOTNOTES

*	NATA accreditation does not cover the performance of this service.	-	Not analysed.	UOM	Unit of Measure.
		NVL	Not validated.	LOR	Limit of Reporting.
**	Indicative data, theoretical holding time exceeded.	IS	Insufficient sample for analysis.	↑↓	Raised/lowered Limit of Reporting.
		LNR	Sample listed, but not received.		
***	Indicates that both * and ** apply.				

Unless it is reported that sampling has been performed by SGS, the samples have been analysed as received.
Solid samples expressed on a dry weight basis.

Where "Total" analyte groups are reported (for example, Total PAHs, Total OC Pesticides) the total will be calculated as the sum of the individual analytes, with those analytes that are reported as <LOR being assumed to be zero. The summed (Total) limit of reporting is calculated by summing the individual analyte LORs and dividing by two. For example, where 16 individual analytes are being summed and each has an LOR of 0.1 mg/kg, the "Totals" LOR will be 1.6 / 2 (0.8 mg/kg). Where only 2 analytes are being summed, the " Total" LOR will be the sum of those two LORs.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

If reported, measurement uncertainty follow the ± sign after the analytical result and is expressed as the expanded uncertainty calculated using a coverage factor of 2, providing a level of confidence of approximately 95%, unless stated otherwise in the comments section of this report.

Results reported for samples tested under test methods with codes starting with ARS-SOP, radionuclide or gross radioactivity concentrations are expressed in becquerel (Bq) per unit of mass or volume or per wipe as stated on the report. Becquerel is the SI unit for activity and equals one nuclear transformation per second.
Note that in terms of units of radioactivity:

a. 1 Bq is equivalent to 27 pCi
b. 37 MBq is equivalent to 1 mCi

For results reported for samples tested under test methods with codes starting with ARS-SOP, less than (<) values indicate the detection limit for each radionuclide or parameter for the measurement system used. The respective detection limits have been calculated in accordance with ISO 11929.

The QC and MU criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here: www.sgs.com.au/en-gb/environment-health-and-safety.

STATEMENT OF QA/QC PERFORMANCE

SE282562 R0

CLIENT DETAILS

Contact	Jordan Goehner Drewe	Manager	Shane McDermott
Client	EI AUSTRALIA	Laboratory	SGS Alexandria Environmental
Address	SUITE 6.01 55 MILLER STREET PYRMONT NSW 2009	Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	61 2 95160722	Telephone	+61 2 8594 0400
Facsimile	(Not specified)	Facsimile	+61 2 8594 0499
Email	jordan.goehner-drewe@eiaustralia.com.au	Email	au.environmental.sydney@sgs.com
Project	**E26733 135 Badgerys Creek road Bradfield**	SGS Reference	**SE282562 R0**
Order Number	**E26733**	Date Received	08 May 2025
Samples	8	Date Reported	15 May 2025

LABORATORY DETAILS

COMMENTS

All the laboratory data for each environmental matrix was compared to SGS' stated Data Quality Objectives (DQO). Comments arising from the comparison were made and are reported below.

The data relating to sampling was taken from the Chain of Custody document.
This QA/QC Statement must be read in conjunction with the referenced Analytical Report.
The Statement and the Analytical Report must not be reproduced except in full.

All Data Quality Objectives were met with the exception of the following:

Extraction Date	Dissolved Oxygen by Membrane Electrode	1 item
	E. coli, Total and Faecal (Thermotolerant) coliforms in Water (MPN)	1 item
	Enterococci in Water	1 item
	pH in water	4 items
	Redox Potential (Eh) in water	1 item
	Turbidity	4 items
Analysis Date	Dissolved Oxygen by Membrane Electrode	1 item
	Forms of Carbon	1 item
	Nitrite in Water	1 item
	pH in water	4 items
	Redox Potential (Eh) in water	1 item
	Turbidity	4 items

SAMPLE SUMMARY

Type of documentation received	COC	Date documentation received	8/5/2025
Samples received in good order	Yes	Samples received without headspace	Yes
Sample temperature upon receipt	12.1°C	Sample container provider	SGS
Turnaround time requested	Standard	Samples received in correct containers	Yes
Sufficient sample for analysis	Yes	Sample cooling method	Ice Bricks
Samples clearly labelled	Yes	Complete documentation received	Yes

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS "Field Sampling Guide for Containers and Holding Time" (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the

Alkalinity

Method: ME-(AU)-[ENV]AN135

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1M	SE282562.001	LB347104	07 May 2025	08 May 2025	21 May 2025	14 May 2025	21 May 2025	15 May 2025

Ammonia Nitrogen by Discrete Analyser

Method: ME-(AU)-[ENV]AN291

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1M	SE282562.001	LB346718	07 May 2025	08 May 2025	04 Jun 2025	09 May 2025	04 Jun 2025	09 May 2025

Anions by Ion Chromatography in Water

Method: ME-(AU)-[ENV]AN245

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1M	SE282562.001	LB346792	07 May 2025	08 May 2025	04 Jun 2025	12 May 2025	04 Jun 2025	14 May 2025

Conductivity and TDS by Calculation - Water

Method: ME-(AU)-[ENV]AN106

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1M	SE282562.001	LB346668	07 May 2025	08 May 2025	04 Jun 2025	09 May 2025	04 Jun 2025	09 May 2025
BH2M	SE282562.002	LB346668	07 May 2025	08 May 2025	04 Jun 2025	09 May 2025	04 Jun 2025	09 May 2025
BH3M	SE282562.003	LB346668	07 May 2025	08 May 2025	04 Jun 2025	09 May 2025	04 Jun 2025	09 May 2025
BH6M	SE282562.004	LB346668	07 May 2025	08 May 2025	04 Jun 2025	09 May 2025	04 Jun 2025	09 May 2025

Dissolved Oxygen by Membrane Electrode

Method: ME-(AU)-[ENV]AN176

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1M	SE282562.001	LB346750	07 May 2025	08 May 2025	08 May 2025	09 May 2025†	08 May 2025	09 May 2025†

E. coli, Total and Faecal (Thermotolerant) coliforms in Water (MPN)

Method: ME-(AU)-[ENV]AN735

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1M	SE282562.001	LB346636	07 May 2025	08 May 2025	08 May 2025	09 May 2025†	12 May 2025	08 May 2025

Enterococci in Water

Method: ME-(AU)-[ENV]AN705

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1M	SE282562.001	LB346636	07 May 2025	08 May 2025	08 May 2025	09 May 2025†	12 May 2025	13 May 2025†

Filterable Reactive Phosphorus (FRP)

Method: ME-(AU)-[ENV]AN278

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1M	SE282562.001	LB346718	07 May 2025	08 May 2025	04 Jun 2025	09 May 2025	04 Jun 2025	09 May 2025

Forms of Carbon

Method: ME-(AU)-[ENV]AN190

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1M	SE282562.001	LB347072	07 May 2025	08 May 2025	14 May 2025	14 May 2025	14 May 2025	15 May 2025†

Full 8270 SVOC in Water

Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1M	SE282562.001	LB346778	07 May 2025	08 May 2025	14 May 2025	12 May 2025	21 Jun 2025	15 May 2025
BH2M	SE282562.002	LB346778	07 May 2025	08 May 2025	14 May 2025	12 May 2025	21 Jun 2025	15 May 2025
BH3M	SE282562.003	LB346778	07 May 2025	08 May 2025	14 May 2025	12 May 2025	21 Jun 2025	15 May 2025
BH6M	SE282562.004	LB346778	07 May 2025	08 May 2025	14 May 2025	12 May 2025	21 Jun 2025	15 May 2025
QD1	SE282562.005	LB346778	07 May 2025	08 May 2025	14 May 2025	12 May 2025	21 Jun 2025	15 May 2025
QR1	SE282562.008	LB346778	07 May 2025	08 May 2025	14 May 2025	12 May 2025	21 Jun 2025	15 May 2025

Mercury (dissolved) in Water

Method: ME-(AU)-[ENV]AN311(Perth)/AN312

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1M	SE282562.001	LB346779	07 May 2025	08 May 2025	04 Jun 2025	12 May 2025	04 Jun 2025	14 May 2025
BH2M	SE282562.002	LB346779	07 May 2025	08 May 2025	04 Jun 2025	12 May 2025	04 Jun 2025	14 May 2025
BH3M	SE282562.003	LB346779	07 May 2025	08 May 2025	04 Jun 2025	12 May 2025	04 Jun 2025	14 May 2025
BH6M	SE282562.004	LB346779	07 May 2025	08 May 2025	04 Jun 2025	12 May 2025	04 Jun 2025	14 May 2025
QD1	SE282562.005	LB346779	07 May 2025	08 May 2025	04 Jun 2025	12 May 2025	04 Jun 2025	14 May 2025
QR1	SE282562.008	LB346779	07 May 2025	08 May 2025	04 Jun 2025	12 May 2025	04 Jun 2025	14 May 2025

Metals in Water (Dissolved) by ICPOES

Method: ME-(AU)-[ENV]AN320

Sample Name	Sample No.	QC Ref

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS "Field Sampling Guide for Containers and Holding Time" (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the

Metals in Water (Dissolved) by ICPOES (continued)

Method: ME-(AU)-[ENV]AN320

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1M	SE282562.001	LB346630	07 May 2025	08 May 2025	03 Nov 2025	09 May 2025	03 Nov 2025	12 May 2025
BH2M	SE282562.002	LB346630	07 May 2025	08 May 2025	03 Nov 2025	09 May 2025	03 Nov 2025	12 May 2025
BH3M	SE282562.003	LB346630	07 May 2025	08 May 2025	03 Nov 2025	09 May 2025	03 Nov 2025	12 May 2025
BH6M	SE282562.004	LB346630	07 May 2025	08 May 2025	03 Nov 2025	09 May 2025	03 Nov 2025	12 May 2025

Nitrite in Water

Method: ME-(AU)-[ENV]AN277

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1M	SE282562.001	LB346718	07 May 2025	08 May 2025	11 May 2025	09 May 2025	11 May 2025	15 May 2025†

OC Pesticides in Water

Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1M	SE282562.001	LB346778	07 May 2025	08 May 2025	14 May 2025	12 May 2025	21 Jun 2025	15 May 2025
BH2M	SE282562.002	LB346778	07 May 2025	08 May 2025	14 May 2025	12 May 2025	21 Jun 2025	15 May 2025
BH3M	SE282562.003	LB346778	07 May 2025	08 May 2025	14 May 2025	12 May 2025	21 Jun 2025	15 May 2025
BH6M	SE282562.004	LB346778	07 May 2025	08 May 2025	14 May 2025	12 May 2025	21 Jun 2025	15 May 2025
QD1	SE282562.005	LB346778	07 May 2025	08 May 2025	14 May 2025	12 May 2025	21 Jun 2025	15 May 2025
QR1	SE282562.008	LB346778	07 May 2025	08 May 2025	14 May 2025	12 May 2025	21 Jun 2025	15 May 2025

OP Pesticides in Water

Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1M	SE282562.001	LB346778	07 May 2025	08 May 2025	14 May 2025	12 May 2025	21 Jun 2025	15 May 2025
BH2M	SE282562.002	LB346778	07 May 2025	08 May 2025	14 May 2025	12 May 2025	21 Jun 2025	15 May 2025
BH3M	SE282562.003	LB346778	07 May 2025	08 May 2025	14 May 2025	12 May 2025	21 Jun 2025	15 May 2025
BH6M	SE282562.004	LB346778	07 May 2025	08 May 2025	14 May 2025	12 May 2025	21 Jun 2025	15 May 2025
QD1	SE282562.005	LB346778	07 May 2025	08 May 2025	14 May 2025	12 May 2025	21 Jun 2025	15 May 2025
QR1	SE282562.008	LB346778	07 May 2025	08 May 2025	14 May 2025	12 May 2025	21 Jun 2025	15 May 2025

PAH (Polynuclear Aromatic Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1M	SE282562.001	LB346778	07 May 2025	08 May 2025	14 May 2025	12 May 2025	21 Jun 2025	15 May 2025
BH2M	SE282562.002	LB346778	07 May 2025	08 May 2025	14 May 2025	12 May 2025	21 Jun 2025	15 May 2025
BH3M	SE282562.003	LB346778	07 May 2025	08 May 2025	14 May 2025	12 May 2025	21 Jun 2025	15 May 2025
BH6M	SE282562.004	LB346778	07 May 2025	08 May 2025	14 May 2025	12 May 2025	21 Jun 2025	15 May 2025
QD1	SE282562.005	LB346778	07 May 2025	08 May 2025	14 May 2025	12 May 2025	21 Jun 2025	15 May 2025
QR1	SE282562.008	LB346778	07 May 2025	08 May 2025	14 May 2025	12 May 2025	21 Jun 2025	15 May 2025

PCBs in Water

Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1M	SE282562.001	LB346778	07 May 2025	08 May 2025	14 May 2025	12 May 2025	21 Jun 2025	15 May 2025
BH2M	SE282562.002	LB346778	07 May 2025	08 May 2025	14 May 2025	12 May 2025	21 Jun 2025	15 May 2025
BH3M	SE282562.003	LB346778	07 May 2025	08 May 2025	14 May 2025	12 May 2025	21 Jun 2025	15 May 2025
BH6M	SE282562.004	LB346778	07 May 2025	08 May 2025	14 May 2025	12 May 2025	21 Jun 2025	15 May 2025
QD1	SE282562.005	LB346778	07 May 2025	08 May 2025	14 May 2025	12 May 2025	21 Jun 2025	15 May 2025
QR1	SE282562.008	LB346778	07 May 2025	08 May 2025	14 May 2025	12 May 2025	21 Jun 2025	15 May 2025

Per- and Polyfluoroalkyl Substances (PFAS) in Aqueous Samples

Method: ME-(AU)-[ENV]AN404

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1M	SE282562.001	LB346853	07 May 2025	08 May 2025	04 Jun 2025	12 May 2025	09 Jun 2025	13 May 2025

pH in water

Method: ME-(AU)-[ENV]AN101

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1M	SE282562.001	LB346668	07 May 2025	08 May 2025	08 May 2025	09 May 2025†	08 May 2025	09 May 2025†
BH2M	SE282562.002	LB346668	07 May 2025	08 May 2025	08 May 2025	09 May 2025†	08 May 2025	09 May 2025†
BH3M	SE282562.003	LB346668	07 May 2025	08 May 2025	08 May 2025	09 May 2025†	08 May 2025	09 May 2025†
BH6M	SE282562.004	LB346668	07 May 2025	08 May 2025	08 May 2025	09 May 2025†	08 May 2025	09 May 2025†

Redox Potential (Eh) in water

Method: ME-(AU)-[ENV]AN240

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1M	SE282562.001	LB346719	07 May 2025	08 May 2025	08 May 2025	09 May 2025†	08 May 2025	09 May 2025†

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS "Field Sampling Guide for Containers and Holding Time" (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the

TKN Kjeldahl Digestion by Discrete Analyser

Method: ME-(AU)-[ENV]AN292

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1M	SE282562.001	LB347058	07 May 2025	08 May 2025	04 Jun 2025	13 May 2025	04 Jun 2025	14 May 2025

Total and Volatile Suspended Solids (TSS / VSS)

Method: ME-(AU)-[ENV]AN114

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1M	SE282562.001	LB346815	07 May 2025	08 May 2025	14 May 2025	12 May 2025	19 May 2025	13 May 2025

Total Cyanide in water by Discrete Analyser

Method: ME-(AU)-[ENV]AN077/AN287

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH2M	SE282562.002	LB346677	07 May 2025	08 May 2025	21 May 2025	09 May 2025	21 May 2025	12 May 2025
BH3M	SE282562.003	LB346677	07 May 2025	08 May 2025	21 May 2025	09 May 2025	21 May 2025	12 May 2025
BH6M	SE282562.004	LB346677	07 May 2025	08 May 2025	21 May 2025	09 May 2025	21 May 2025	12 May 2025

Total Dissolved Solids (TDS) in water

Method: ME-(AU)-[ENV]AN113

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1M	SE282562.001	LB346814	07 May 2025	08 May 2025	14 May 2025	12 May 2025	14 May 2025	13 May 2025
BH2M	SE282562.002	LB346814	07 May 2025	08 May 2025	14 May 2025	12 May 2025	14 May 2025	13 May 2025
BH3M	SE282562.003	LB346814	07 May 2025	08 May 2025	14 May 2025	12 May 2025	14 May 2025	13 May 2025
BH6M	SE282562.004	LB346814	07 May 2025	08 May 2025	14 May 2025	12 May 2025	14 May 2025	13 May 2025

Total Phenolics in Water

Method: ME-(AU)-[ENV]AN295

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1M	SE282562.001	LB346809	07 May 2025	08 May 2025	21 May 2025	12 May 2025	21 May 2025	12 May 2025
BH2M	SE282562.002	LB346809	07 May 2025	08 May 2025	21 May 2025	12 May 2025	21 May 2025	12 May 2025
BH3M	SE282562.003	LB346809	07 May 2025	08 May 2025	21 May 2025	12 May 2025	21 May 2025	12 May 2025
BH6M	SE282562.004	LB346809	07 May 2025	08 May 2025	21 May 2025	12 May 2025	21 May 2025	12 May 2025

Total Phosphorus by Kjeldahl Digestion DA in Water

Method: ME-(AU)-[ENV]AN279/AN293(Sydney only)

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1M	SE282562.001	LB347058	07 May 2025	08 May 2025	04 Jun 2025	13 May 2025	04 Jun 2025	14 May 2025

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1M	SE282562.001	LB346671	07 May 2025	08 May 2025	03 Nov 2025	09 May 2025	03 Nov 2025	15 May 2025
BH2M	SE282562.002	LB346671	07 May 2025	08 May 2025	03 Nov 2025	09 May 2025	03 Nov 2025	15 May 2025
BH3M	SE282562.003	LB346671	07 May 2025	08 May 2025	03 Nov 2025	09 May 2025	03 Nov 2025	15 May 2025
BH6M	SE282562.004	LB346671	07 May 2025	08 May 2025	03 Nov 2025	09 May 2025	03 Nov 2025	15 May 2025
QD1	SE282562.005	LB346671	07 May 2025	08 May 2025	03 Nov 2025	09 May 2025	03 Nov 2025	15 May 2025
QR1	SE282562.008	LB346671	07 May 2025	08 May 2025	03 Nov 2025	09 May 2025	03 Nov 2025	15 May 2025

TRH (Total Recoverable Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN403

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1M	SE282562.001	LB346778	07 May 2025	08 May 2025	14 May 2025	12 May 2025	21 Jun 2025	15 May 2025
BH2M	SE282562.002	LB346778	07 May 2025	08 May 2025	14 May 2025	12 May 2025	21 Jun 2025	15 May 2025
BH3M	SE282562.003	LB346778	07 May 2025	08 May 2025	14 May 2025	12 May 2025	21 Jun 2025	15 May 2025
BH6M	SE282562.004	LB346778	07 May 2025	08 May 2025	14 May 2025	12 May 2025	21 Jun 2025	15 May 2025
QD1	SE282562.005	LB346778	07 May 2025	08 May 2025	14 May 2025	12 May 2025	21 Jun 2025	15 May 2025
QR1	SE282562.008	LB346778	07 May 2025	08 May 2025	14 May 2025	12 May 2025	21 Jun 2025	15 May 2025

Turbidity

Method: ME-(AU)-[ENV]AN119

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1M	SE282562.001	LB346669	07 May 2025	08 May 2025	08 May 2025	09 May 2025†	08 May 2025	09 May 2025†
BH2M	SE282562.002	LB346669	07 May 2025	08 May 2025	08 May 2025	09 May 2025†	08 May 2025	09 May 2025†
BH3M	SE282562.003	LB346669	07 May 2025	08 May 2025	08 May 2025	09 May 2025†	08 May 2025	09 May 2025†
BH6M	SE282562.004	LB346669	07 May 2025	08 May 2025	08 May 2025	09 May 2025†	08 May 2025	09 May 2025†

VOCs in Water

Method: ME-(AU)-[ENV]AN433

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1M	SE282562.001	LB346931	07 May 2025	08 May 2025	21 May 2025	13 May 2025	21 May 2025	14 May 2025
BH2M	SE282562.002	LB346931	07 May 2025	08 May 2025	21 May 2025	13 May 2025	21 May 2025	14 May 2025
BH3M	SE282562.003	LB346931	07 May 2025	08 May 2025	21 May 2025	13 May 2025	21 May 2025	14 May 2025
BH6M	SE282562.004	LB346931	07 May 2025	08 May 2025	21 May 2025	13 May 2025	21 May 2025	14 May 2025

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS "Field Sampling Guide for Containers and Holding Time" (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the

VOCs in Water (continued)

Method: ME-(AU)-[ENV]AN433

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
QD1	SE282562.005	LB346931	07 May 2025	08 May 2025	21 May 2025	13 May 2025	21 May 2025	14 May 2025
TS	SE282562.006	LB346931	07 May 2025	08 May 2025	21 May 2025	13 May 2025	21 May 2025	14 May 2025
TB	SE282562.007	LB346931	07 May 2025	08 May 2025	21 May 2025	13 May 2025	21 May 2025	14 May 2025
QR1	SE282562.008	LB346931	07 May 2025	08 May 2025	21 May 2025	13 May 2025	21 May 2025	14 May 2025

Volatile Petroleum Hydrocarbons in Water

Method: ME-(AU)-[ENV]AN433

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1M	SE282562.001	LB346931	07 May 2025	08 May 2025	21 May 2025	13 May 2025	21 May 2025	15 May 2025
BH2M	SE282562.002	LB346931	07 May 2025	08 May 2025	21 May 2025	13 May 2025	21 May 2025	14 May 2025
BH3M	SE282562.003	LB346931	07 May 2025	08 May 2025	21 May 2025	13 May 2025	21 May 2025	14 May 2025
BH6M	SE282562.004	LB346931	07 May 2025	08 May 2025	21 May 2025	13 May 2025	21 May 2025	14 May 2025
QD1	SE282562.005	LB346931	07 May 2025	08 May 2025	21 May 2025	13 May 2025	21 May 2025	14 May 2025
TS	SE282562.006	LB346931	07 May 2025	08 May 2025	21 May 2025	13 May 2025	21 May 2025	15 May 2025
TB	SE282562.007	LB346931	07 May 2025	08 May 2025	21 May 2025	13 May 2025	21 May 2025	15 May 2025
QR1	SE282562.008	LB346931	07 May 2025	08 May 2025	21 May 2025	13 May 2025	21 May 2025	14 May 2025

SURROGATES

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA/QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Full 8270 SVOC in Water

Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
2,4,6-Tribromophenol (Surrogate)	BH1M	SE282562.001	%	40 - 130%	69
2-fluorobiphenyl (Surrogate)	BH1M	SE282562.001	%	40 - 130%	72
d14-p-terphenyl (Surrogate)	BH1M	SE282562.001	%	40 - 130%	60
d5-nitrobenzene (Surrogate)	BH1M	SE282562.001	%	40 - 130%	94
d5-phenol (Surrogate)	BH1M	SE282562.001	%	20 - 130%	59

OC Pesticides in Water

Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Tetrachloro-m-xylene (TCMX) (Surrogate)	BH1M	SE282562.001	%	40 - 130%	85

OP Pesticides in Water

Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
2-fluorobiphenyl (Surrogate)	BH1M	SE282562.001	%	40 - 130%	75
	BH2M	SE282562.002	%	40 - 130%	76
	BH3M	SE282562.003	%	40 - 130%	73
	BH6M	SE282562.004	%	40 - 130%	73
d14-p-terphenyl (Surrogate)	BH1M	SE282562.001	%	40 - 130%	65
	BH2M	SE282562.002	%	40 - 130%	65
	BH3M	SE282562.003	%	40 - 130%	62
	BH6M	SE282562.004	%	40 - 130%	60

PAH (Polynuclear Aromatic Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
2-fluorobiphenyl (Surrogate)	BH1M	SE282562.001	%	40 - 130%	75
	BH2M	SE282562.002	%	40 - 130%	76
	BH3M	SE282562.003	%	40 - 130%	73
	BH6M	SE282562.004	%	40 - 130%	73
d14-p-terphenyl (Surrogate)	BH1M	SE282562.001	%	40 - 130%	65
	BH2M	SE282562.002	%	40 - 130%	65
	BH3M	SE282562.003	%	40 - 130%	62
	BH6M	SE282562.004	%	40 - 130%	60
d5-nitrobenzene (Surrogate)	BH1M	SE282562.001	%	40 - 130%	75
	BH2M	SE282562.002	%	40 - 130%	80
	BH3M	SE282562.003	%	40 - 130%	80
	BH6M	SE282562.004	%	40 - 130%	73

PCBs in Water

Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
TCMX (Surrogate)	BH1M	SE282562.001	%	40 - 130%	85

Per- and Polyfluoroalkyl Substances (PFAS) in Aqueous Samples

Method: ME-(AU)-[ENV]AN404

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
(13C2_PFTeDA) Isotopically Labelled Internal Recovery Standard	BH1M	SE282562.001	%	10 - 150%	74
(13C2-4:2 FTS) Isotopically Labelled Internal Recovery Standard	BH1M	SE282562.001	%	40 - 300%	64
(13C2-6:2 FTS) Isotopically Labelled Internal Recovery Standard	BH1M	SE282562.001	%	40 - 300%	82
(13C2-8:2 FTS) Isotopically Labelled Internal Recovery Standard	BH1M	SE282562.001	%	40 - 300%	64
(13C2-PFDoA) Isotopically Labelled Internal Recovery Standard	BH1M	SE282562.001	%	10 - 150%	60
(13C3-PFBS) Isotopically Labelled Internal Recovery Standard	BH1M	SE282562.001	%	40 - 150%	78
(13C3-PFHxS) Isotopically Labelled Internal Recovery Standard	BH1M	SE282562.001	%	40 - 150%	82
(13C4_PFOA) Isotopically Labelled Internal Recovery Standard	BH1M	SE282562.001	%	40 - 150%	78
(13C4-PFBA) Isotopically Labelled Internal Recovery Standard	BH1M	SE282562.001	%	5 - 150%	87
(13C4-PFHpA) Isotopically Labelled Internal Recovery Standard	BH1M	SE282562.001	%	40 - 150%	98
(13C5-PFHxA) Isotopically Labelled Internal Recovery Standard	BH1M	SE282562.001	%	40 - 150%	88
(13C5-PFPeA) Isotopically Labelled Internal Recovery Standard	BH1M	SE282562.001	%	35 - 150%	86
(13C6-PFDA) Isotopically Labelled Internal Recovery Standard	BH1M	SE282562.001	%	40 - 150%	58
(13C7-PFUdA) Isotopically Labelled Internal Recovery Standard	BH1M	SE282562.001	%	30 - 150%	76
(13C8-PFOS) Isotopically Labelled Internal Recovery Standard	BH1M	SE282562.001	%	40 - 150%	67
(13C8-PFOSA) Isotopically Labelled Internal Recovery Standard	BH1M	SE282562.001	%	20 - 150%	69
(13C9-PFNA) Isotopically Labelled Internal Recovery Standard	BH1M	SE282562.001	%	40 - 150%	91
(D3-N-MeFOSA) Isotopically Labelled Internal Recovery Standard	BH1M	SE282562.001	%	10 - 150%	57

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA/QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Per- and Polyfluoroalkyl Substances (PFAS) in Aqueous Samples (continued)

Method: ME-(AU)-[ENV]AN404

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
(D3-N-MeFOSAA) Isotopically Labelled Internal Recovery Standard	BH1M	SE282562.001	%	30 - 170%	50
(D5-N-EtFOSA) Isotopically Labelled Internal Recovery Standard	BH1M	SE282562.001	%	10 - 150%	67
(D5-N-EtFOSAA) Isotopically Labelled Internal Recovery Standard	BH1M	SE282562.001	%	20 - 150%	102
(D7-N-MeFOSE) Isotopically Labelled Internal Recovery Standard	BH1M	SE282562.001	%	10 - 150%	87
(D9-N-EtFOSE) Isotopically Labelled Internal Recovery Standard	BH1M	SE282562.001	%	10 - 150%	84

VOCs in Water

Method: ME-(AU)-[ENV]AN433

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	BH1M	SE282562.001	%	40 - 130%	99
	BH2M	SE282562.002	%	40 - 130%	87
	BH3M	SE282562.003	%	40 - 130%	89
	BH6M	SE282562.004	%	40 - 130%	90
	QD1	SE282562.005	%	40 - 130%	89
	TS	SE282562.006	%	40 - 130%	87
	TB	SE282562.007	%	40 - 130%	85
	QR1	SE282562.008	%	40 - 130%	87
d4-1,2-dichloroethane (Surrogate)	BH1M	SE282562.001	%	40 - 130%	93
	BH2M	SE282562.002	%	40 - 130%	79
	BH3M	SE282562.003	%	40 - 130%	79
	BH6M	SE282562.004	%	40 - 130%	79
	QD1	SE282562.005	%	40 - 130%	80
	TS	SE282562.006	%	40 - 130%	87
	TB	SE282562.007	%	40 - 130%	76
	QR1	SE282562.008	%	40 - 130%	78
d8-toluene (Surrogate)	BH1M	SE282562.001	%	40 - 130%	90
	BH2M	SE282562.002	%	40 - 130%	85
	BH3M	SE282562.003	%	40 - 130%	85
	BH6M	SE282562.004	%	40 - 130%	84
	QD1	SE282562.005	%	40 - 130%	85
	TS	SE282562.006	%	40 - 130%	90
	TB	SE282562.007	%	40 - 130%	83
	QR1	SE282562.008	%	40 - 130%	84

Volatile Petroleum Hydrocarbons in Water

Method: ME-(AU)-[ENV]AN433

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	BH1M	SE282562.001	%	40 - 130%	99
	BH2M	SE282562.002	%	40 - 130%	87
	BH3M	SE282562.003	%	40 - 130%	89
	BH6M	SE282562.004	%	40 - 130%	90
	QD1	SE282562.005	%	40 - 130%	89
	QR1	SE282562.008	%	40 - 130%	87
d4-1,2-dichloroethane (Surrogate)	BH1M	SE282562.001	%	60 - 130%	93
	BH2M	SE282562.002	%	60 - 130%	79
	BH3M	SE282562.003	%	60 - 130%	79
	BH6M	SE282562.004	%	60 - 130%	79
	QD1	SE282562.005	%	60 - 130%	80
	QR1	SE282562.008	%	60 - 130%	78
d8-toluene (Surrogate)	BH1M	SE282562.001	%	40 - 130%	90
	BH2M	SE282562.002	%	40 - 130%	85
	BH3M	SE282562.003	%	40 - 130%	85
	BH6M	SE282562.004	%	40 - 130%	84
	QD1	SE282562.005	%	40 - 130%	85
	QR1	SE282562.008	%	40 - 130%	84

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Alkalinity

Method: ME-(AU)-[ENV]AN135

Sample Number	Parameter	Units	LOR	Result
LB347104.001	Bicarbonate Alkalinity as CaCO3	mg/L	5	<5
	Carbonate Alkalinity as CaCO3	mg/L	5	<5
	Total Alkalinity as CaCO3	mg/L	5	<5

Ammonia Nitrogen by Discrete Analyser

Method: ME-(AU)-[ENV]AN291

Sample Number	Parameter	Units	LOR	Result
LB346718.001	Ammonia Nitrogen, NH_3 as N	mg/L	0.01	<0.01

Anions by Ion Chromatography in Water

Method: ME-(AU)-[ENV]AN245

Sample Number	Parameter	Units	LOR	Result
LB346792.001	Fluoride	mg/L	0.1	<0.10
	Chloride	mg/L	0.05	<0.05
	Bromide	mg/L	0.05	<0.05
	Nitrate Nitrogen, NO3-N	mg/L	0.005	<0.005
	Sulfate, SO4	mg/L	1	<1.0

Conductivity and TDS by Calculation - Water

Method: ME-(AU)-[ENV]AN106

Sample Number	Parameter	Units	LOR	Result
LB346668.001	Conductivity @ 25 C	µS/cm	2	<2

Dissolved Oxygen by Membrane Electrode

Method: ME-(AU)-[ENV]AN176

Sample Number	Parameter	Units	LOR	Result
LB346750.001	Dissolved Oxygen**	mg/L	0.5	<0.5

Filterable Reactive Phosphorus (FRP)

Method: ME-(AU)-[ENV]AN278

Sample Number	Parameter	Units	LOR	Result
LB346718.001	Filterable Reactive Phosphorus as P	mg/L	0.005	<0.005

Forms of Carbon

Method: ME-(AU)-[ENV]AN190

Sample Number	Parameter	Units	LOR	Result
LB347072.001	Total Organic Carbon as NPOC	mg/L	0.2	<0.2

Full 8270 SVOC in Water

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result
LB346778.001	01-PAHs	Acenaphthene	µg/L	0.1	<0.1
		Acenaphthylene	µg/L	0.1	<0.1
		Anthracene	µg/L	0.1	<0.1
		Benzo(a)anthracene	µg/L	0.1	<0.1
		Benzo(b&j&k)fluoranthene	µg/L	0.2	<0.2
		Benzo(a)pyrene	µg/L	0.1	<0.1
		Chrysene	µg/L	0.1	<0.1
		Dibenzo(ah)anthracene	µg/L	0.1	<0.1
		Fluoranthene	µg/L	0.1	<0.1
		Fluorene	µg/L	0.1	<0.1
		1-methylnaphthalene	µg/L	0.1	<0.1
		2-methylnaphthalene	µg/L	0.1	<0.1
		Naphthalene	µg/L	0.1	<0.1
		Phenanthrene	µg/L	0.1	<0.1
		Pyrene	µg/L	0.1	<0.1
		2-acetylaminofluorene	µg/L	0.5	<0.5
		7,12-dimethyl-benz(a)anthracene	µg/L	0.5	<0.5
		3-methylcholanthrene	µg/L	0.5	<0.5
	02-OCs	Aldrin	µg/L	0.1	<0.1
		Alpha-BHC	µg/L	0.1	<0.1

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Full 8270 SVOC in Water (continued)

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result
LB346778.001	02-OCs	Beta-BHC	µg/L	0.1	<0.1
		Delta-BHC	µg/L	0.1	<0.1
		Gamma-BHC (Lindane)	µg/L	0.1	<0.1
		p,p-DDD	µg/L	0.1	<0.1
		p,p-DDE	µg/L	0.1	<0.1
		p,p-DDT	µg/L	0.1	<0.1
		Dieldrin	µg/L	0.1	<0.1
		Alpha-endosulfan	µg/L	0.1	<0.1
		Beta-endosulfan	µg/L	0.1	<0.1
		Endosulfan sulphate	µg/L	0.1	<0.1
		Endrin	µg/L	0.1	<0.1
		Heptachlor	µg/L	0.1	<0.1
		Heptachlor epoxide	µg/L	0.1	<0.1
		Methoxychlor	µg/L	0.1	<0.1
		Mirex	µg/L	0.1	<0.1
		Alpha-chlordane	µg/L	0.1	<0.1
		Gamma-chlordane	µg/L	0.1	<0.1
		Endrin ketone	µg/L	0.1	<0.1
	03-OPs	Azinphos-methyl (Guthion)	µg/L	0.2	<0.2
		Bromophos ethyl	µg/L	0.2	<0.2
		Carbophenothion	µg/L	0.5	<0.5
		Chlorfenvinphos-cis	µg/L	5	<5
		Chlorfenvinphos-trans	µg/L	0.5	<0.5
		Chlorpyrifos (Chlorpyrifos Ethyl)	µg/L	0.2	<0.2
		Chlorpyrifos-methyl	µg/L	0.5	<0.5
		Co-Ral (Coumaphos)	µg/L	0.5	<0.5
		Diazinon (Dimpylate)	µg/L	0.5	<0.5
		Dichlorvos	µg/L	0.5	<0.5
		Demeton-S-methyl	µg/L	0.5	<0.5
		Dimethoate	µg/L	0.5	<0.5
		Disulfoton (Di-syston)	µg/L	0.5	<0.5
		EPN*	µg/L	0.5	<0.5
		Ethion	µg/L	0.2	<0.2
		Ethoprophos (ethoprop or prophos)	µg/L	0.5	<0.5
		Famphur (Famophos)	µg/L	0.5	<0.5
		Fenamiphos (Phenamiphos)	µg/L	0.5	<0.5
		Fenchlorophos (Ronnel)	µg/L	0.5	<0.5
		Fenitrothion	µg/L	0.2	<0.2
		Fenthion	µg/L	0.5	<0.5
		Malathion (Maldison)	µg/L	0.2	<0.2
		Methidathion	µg/L	0.5	<0.5
		Mevinphos-cis/trans	µg/L	1	<1
		o,o,o-triethyl phosphorothioate	µg/L	0.5	<0.5
		Parathion ethyl (Parathion)	µg/L	0.2	<0.2
		Parathion methyl	µg/L	0.5	<0.5
		Phorate	µg/L	0.5	<0.5
		Pirimiphos-ethyl	µg/L	0.5	<0.5
		Pirimiphos-methyl	µg/L	0.5	<0.5
		Profenofos	µg/L	0.5	<0.5
		Prothiophos (Tokuthion)*	µg/L	0.5	<0.5
		Sulfotepp	µg/L	0.5	<0.5
	04-PCB UPAC(7) Congeners	PCB Congener C28	µg/L	0.1	<0.1
		PCB Congener C52	µg/L	0.1	<0.1
		PCB Congener C101	µg/L	0.1	<0.1
		PCB Congener C118	µg/L	0.1	<0.1
		PCB Congener C138	µg/L	0.1	<0.1
		PCB Congener C153	µg/L	0.1	<0.1
		PCB Congener C180	µg/L	0.1	<0.1
	05-SVCH (Cl Benzenes, Hydrocarbons & VOCs)	Hexachlorobenzene (HCB)	µg/L	0.1	<0.1
		1,2-dichlorobenzene	µg/L	0.5	<0.5
		1,3-dichlorobenzene	µg/L	0.5	<0.5

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Full 8270 SVOC in Water (continued)

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result
LB346778.001	05-SVCH (Cl Benzenes, Hydrocarbons & VOCs)	1,4-dichlorobenzene	µg/L	0.5	<0.5
		Hexachlorobutadiene	µg/L	0.5	<0.5
		Hexachlorocyclopentadiene	µg/L	2	<2
		Hexachloroethane	µg/L	0.5	<0.5
		Hexachloroproprene	µg/L	0.5	<0.5
		Pentachlorobenzene	µg/L	0.5	<0.5
		Pentachloroethane	µg/L	0.5	<0.5
		1,2,3,5 and 1,2,4,5 -tetrachlorobenzene	µg/L	1	<1
		1,2,3,4-tetrachlorobenzene	µg/L	0.5	<0.5
		1/2-Chloronaphthalene	µg/L	1	<1
		1,2,4-trichlorobenzene	µg/L	0.5	<0.5
	06-Phthalates	Bis(2-ethylhexyl)phthalate	µg/L	10	<10
		Bis(2-ethylhexyl)adipate	µg/L	1	<1
		Butyl benzyl phthalate	µg/L	1	<1
		Di-n-butyl phthalate	µg/L	10	<10
		Diethyl phthalate	µg/L	5	<5
		Dimethyl phthalate	µg/L	1	<1
		Di-n-octyl phthalate	µg/L	1	<1
	07-Carbamates	Carbofuran	µg/L	0.5	<0.5
		Carbaryl	µg/L	0.5	<0.5
	08-Herbicides (normal)	Trifluralin	µg/L	0.5	<0.5
	09-Nitrosamines	N-nitroso-di-n-butylamine (NDBA)	µg/L	1	<1
		N-nitroso-diethylamine (NDEA)	µg/L	1	<1
		N-nitroso-di-n-propylamine (NDPA)	µg/L	1	<1
		N-nitroso-morpholine (NMOR)	µg/L	1	<1
		N-nitroso-piperidine (NPIP)	µg/L	1	<1
		N-nitroso-pyrrolidine (NPYR)	µg/L	1	<1
		4-amino biphenyl	µg/L	1	<1
	10-Nitroaromatics and Ketones	Acetophenone	µg/L	1	<1
		1,3-dinitrobenzene	µg/L	1	<1
		2,4-dinitrotoluene	µg/L	1	<1
		2,6-dinitrotoluene	µg/L	1	<1
		Isophorone	µg/L	1	<1
		Nitrobenzene	µg/L	1	<1
		p-(dimethylamino) azobenzene	µg/L	1	<1
		Phenacetin	µg/L	1	<1
		Pentachloronitrobenzene (quintozene)	µg/L	1	<1
	11-Anilines and Amines	Aniline	µg/L	5	<5
		4-chloroaniline	µg/L	1	<1
		2-nitroaniline	µg/L	1	<1
		3-nitroaniline	µg/L	1	<1
		4-nitroaniline	µg/L	1	<1
		Diphenylamine	µg/L	1	<1
		o-toluidine	µg/L	1	<1
		5-nitro-o-toluidine	µg/L	1	<1
		1-naphthylamine	µg/L	2	<2
		2-naphthylamine	µg/L	2	<2
	12-Haloethers	Bis(2-chloroethoxy) methane	µg/L	1	<1
		Bis(2-chloroethyl) ether	µg/L	1	<1
		Bis(2-chloroisopropyl) ether	µg/L	1	<1
		4-chlorophenyl phenyl ether	µg/L	1	<1
		4-bromophenyl phenyl ether	µg/L	1	<1
	13-Other SVOCs	Methyl methanesulfonate	µg/L	1	<1
		Ethyl methanesulfonate	µg/L	1	<1
		Dibenzofuran	µg/L	1	<1
		Benzyl alcohol	µg/L	1	<1
		Safrole	µg/L	1	<1
		Isosafrole Isomer 1	µg/L	1	<1
		Isosafrole Isomer 2	µg/L	1	<1
		1,4-naphthoquinone	µg/L	1	<1
		Thionazin	µg/L	1	<1

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Full 8270 SVOC in Water (continued)

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result
LB346778.001	14-Speciated Routine Phenols	3/4-methyl phenol (m/p-cresol)	µg/L	1	<1
		2-methyl phenol (o-cresol)	µg/L	0.5	<0.5
		2,6-dichlorophenol	µg/L	0.5	<0.5
		2,4,5-trichlorophenol	µg/L	0.5	<0.5
		4-chloro-3-methylphenol	µg/L	2	<2
		2-chlorophenol	µg/L	0.5	<0.5
		2,4-dichlorophenol	µg/L	0.5	<0.5
		2,4-dimethylphenol	µg/L	0.5	<0.5
		2-nitrophenol	µg/L	0.5	<0.5
		Phenol	µg/L	0.5	<0.5
		2,4,6-trichlorophenol	µg/L	0.5	<0.5
		Pentachlorophenol	µg/L	0.5	<0.5
		4-nitrophenol	µg/L	1	<1
	Surrogates	d5-phenol (Surrogate)	%	-	98
		d5-nitrobenzene (Surrogate)	%	-	128
		2-fluorobiphenyl (Surrogate)	%	-	70
		2,4,6-Tribromophenol (Surrogate)	%	-	101
		d14-p-terphenyl (Surrogate)	%	-	86

Mercury (dissolved) in Water

Method: ME-(AU)-[ENV]AN311(Perth)/AN312

Sample Number	Parameter	Units	LOR	Result
LB346779.001	Mercury	mg/L	0.0001	<0.0001

Metals in Water (Dissolved) by ICPOES

Method: ME-(AU)-[ENV]AN320

Sample Number	Parameter	Units	LOR	Result
LB346630.001	Calcium, Ca	mg/L	0.2	<0.2
	Magnesium, Mg	mg/L	0.1	<0.1
	Potassium, K	mg/L	0.1	<0.1
	Silicon, Si*	mg/L	0.05	<0.05
	Sodium, Na	mg/L	0.5	<0.5
LB346630.025	Calcium, Ca	mg/L	0.2	<0.2
	Magnesium, Mg	mg/L	0.1	<0.1
	Potassium, K	mg/L	0.1	<0.1
	Silicon, Si*	mg/L	0.05	<0.05
	Sodium, Na	mg/L	0.5	<0.5

Nitrite in Water

Method: ME-(AU)-[ENV]AN277

Sample Number	Parameter	Units	LOR	Result
LB346718.001	Nitrite Nitrogen, NO2 as N	mg/L	0.005	<0.005

OC Pesticides in Water

Method: ME-(AU)-[ENV]AN420

Sample Number	Parameter	Units	LOR	Result
LB346778.001	Alpha BHC	µg/L	0.1	<0.1
	Hexachlorobenzene (HCB)	µg/L	0.1	<0.1
	Beta BHC	µg/L	0.1	<0.1
	Lindane (gamma BHC)	µg/L	0.1	<0.1
	Delta BHC	µg/L	0.1	<0.1
	Heptachlor	µg/L	0.1	<0.1
	Aldrin	µg/L	0.1	<0.1
	Heptachlor epoxide	µg/L	0.1	<0.1
	Gamma Chlordane	µg/L	0.1	<0.1
	Alpha Chlordane	µg/L	0.1	<0.1
	Alpha Endosulfan	µg/L	0.1	<0.1
	p,p'-DDE	µg/L	0.1	<0.1
	Dieldrin	µg/L	0.1	<0.1
	Endrin	µg/L	0.1	<0.1
	Beta Endosulfan	µg/L	0.1	<0.1
	p,p'-DDD	µg/L	0.1	<0.1
	Endrin aldehyde	µg/L	0.1	<0.1

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

OC Pesticides in Water (continued)

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result
LB346778.001		Endosulfan sulphate	µg/L	0.1	<0.1
		p,p'-DDT	µg/L	0.1	<0.1
		Endrin ketone	µg/L	0.1	<0.1
		Methoxychlor	µg/L	0.1	<0.1
		Mirex	µg/L	0.1	<0.1
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	85

OP Pesticides in Water

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result
LB346778.001		Azinphos-methyl	µg/L	0.2	<0.2
		Bromophos Ethyl	µg/L	0.2	<0.2
		Chlorpyrifos (Chlorpyrifos Ethyl)	µg/L	0.2	<0.2
		Diazinon (Dimpylate)	µg/L	0.5	<0.5
		Dichlorvos	µg/L	0.5	<0.5
		Dimethoate	µg/L	0.5	<0.5
		Ethion	µg/L	0.2	<0.2
		Fenitrothion	µg/L	0.2	<0.2
		Malathion	µg/L	0.2	<0.2
		Methidathion	µg/L	0.5	<0.5
		Parathion-ethyl (Parathion)	µg/L	0.2	<0.2
	Surrogates	2-fluorobiphenyl (Surrogate)	%	-	70
		d14-p-terphenyl (Surrogate)	%	-	62

PAH (Polynuclear Aromatic Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result
LB346778.001		Naphthalene	µg/L	0.1	<0.1
		2-methylnaphthalene	µg/L	0.1	<0.1
		1-methylnaphthalene	µg/L	0.1	<0.1
		Acenaphthylene	µg/L	0.1	<0.1
		Acenaphthene	µg/L	0.1	<0.1
		Fluorene	µg/L	0.1	<0.1
		Phenanthrene	µg/L	0.1	<0.1
		Anthracene	µg/L	0.1	<0.1
		Fluoranthene	µg/L	0.1	<0.1
		Pyrene	µg/L	0.1	<0.1
		Benzo(a)anthracene	µg/L	0.1	<0.1
		Chrysene	µg/L	0.1	<0.1
		Benzo(b&j&k)fluoranthene	µg/L	0.2	<0.2
		Benzo(a)pyrene	µg/L	0.1	<0.1
		Indeno(1,2,3-cd)pyrene	µg/L	0.1	<0.1
		Dibenzo(ah)anthracene	µg/L	0.1	<0.1
		Benzo(ghi)perylene	µg/L	0.1	<0.1
	Surrogates	d5-nitrobenzene (Surrogate)	%	-	70
		2-fluorobiphenyl (Surrogate)	%	-	70
		d14-p-terphenyl (Surrogate)	%	-	62

PCBs in Water

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result
LB346778.001		Arochlor 1016	µg/L	1	<1
		Arochlor 1221	µg/L	1	<1
		Arochlor 1232	µg/L	1	<1
		Arochlor 1242	µg/L	1	<1
		Arochlor 1248	µg/L	1	<1
		Arochlor 1254	µg/L	1	<1
		Arochlor 1260	µg/L	1	<1

Per- and Polyfluoroalkyl Substances (PFAS) in Aqueous Samples

Method: ME-(AU)-[ENV]AN404

Sample Number		Parameter	Units	LOR	Result
LB346853.001		Perfluorobutanoic acid (PFBA)	µg/L	0.05	<0.05
		Perfluoropentanoic acid (PFPeA)	µg/L	0.01	<0.01
		Perfluorohexanoic acid (PFHxA)	µg/L	0.01	<0.01
		Perfluoroheptanoic acid (PFHpA)	µg/L	0.01	<0.01
		Perfluorooctanoic acid (PFOA)	µg/L	0.01	<0.01

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Per- and Polyfluoroalkyl Substances (PFAS) in Aqueous Samples (continued) Method: ME-(AU)-[ENV]AN404

Sample Number	Parameter	Units	LOR	Result
LB346853.001	Perfluorononanoic acid (PFNA)	µg/L	0.01	<0.01
	Perfluorodecanoic acid (PFDA)	µg/L	0.01	<0.01
	Perfluoroundecanoic acid (PFUnDA)	µg/L	0.01	<0.01
	Perfluorododecanoic acid (PFDoDA)	µg/L	0.01	<0.01
	Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.01	<0.01
	Perfluorotridecanoic acid (PFTrDA)	µg/L	0.01	<0.01
	Perfluoropropane sulfonic acid (PFPrS)	µg/L	0.01	<0.01
	Perfluorobutane sulfonic acid (PFBS)	µg/L	0.01	<0.01
	Perfluoropentane sulfonic acid (PFPeS)	µg/L	0.01	<0.01
	Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.01	<0.01
	Perfluoroheptane sulfonic acid (PFHpS)	µg/L	0.01	<0.01
	Perfluorooctane sulfonic acid (PFOS)	µg/L	0.01	<0.01
	Perfluorononane sulfonic acid (PFNS)	µg/L	0.01	<0.01
	Perfluorodecane sulfonic acid (PFDS)	µg/L	0.01	<0.01
	1H,1H,2H,2H-Perfluorohexane sulfonic acid (4:2 FTS)	µg/L	0.01	<0.01
	1H,1H,2H,2H-Perfluorooctane sulfonic acid (6:2 FTS)	µg/L	0.01	<0.01
	1H,1H,2H,2H-Perfluorodecane sulfonic acid (8:2 FTS)	µg/L	0.01	<0.01
	1H,1H,2H,2H-Perfluorododecane sulfonic acid (10:2 FTS)	µg/L	0.01	<0.01
	Perfluorooctane sulfonamide (FOSA)	µg/L	0.01	<0.01
	N-Methylperfluoroctane sulfonamide (N-MeFOSA)	µg/L	0.01	<0.01
	N-Ethylperfluoroctane sulfonamide (N-EtFOSA)	µg/L	0.01	<0.01
	N-Methylperfluorooctanesulfonamidoacetic acid (N_MeFOSAA)	µg/L	0.05	<0.05
	N-Ethylperfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	µg/L	0.05	<0.05
	2-(N-Methylperfluorooctane sulfonamido)-ethanol (N-MeFOSE)	µg/L	0.05	<0.05
	2-(N-Ethylperfluorooctane sulfonamido)-ethanol (N-EtFOSE)	µg/L	0.05	<0.05

Total and Volatile Suspended Solids (TSS / VSS) Method: ME-(AU)-[ENV]AN114

Sample Number	Parameter	Units	LOR	Result
LB346815.001	Total Suspended Solids Dried at 103-105°C	mg/L	5	<5

Total Cyanide in water by Discrete Analyser Method: ME-(AU)-[ENV]AN077/AN287

Sample Number	Parameter	Units	LOR	Result
LB346677.001	Total Cyanide	mg/L	0.004	<0.004

Total Dissolved Solids (TDS) in water Method: ME-(AU)-[ENV]AN113

Sample Number	Parameter	Units	LOR	Result
LB346814.001	Total Dissolved Solids Dried at 175-185°C	mg/L	10	<10

Total Phenolics in Water Method: ME-(AU)-[ENV]AN295

Sample Number	Parameter	Units	LOR	Result
LB346809.001	Total Phenols	mg/L	0.05	<0.05

Total Phosphorus by Kjeldahl Digestion DA in Water Method: ME-(AU)-[ENV]AN279/AN293(Sydney only)

Sample Number	Parameter	Units	LOR	Result
LB347058.001	Total Phosphorus (Kjeldahl Digestion) as P	mg/L	0.02	<0.02

Trace Metals (Dissolved) in Water by ICPMS Method: ME-(AU)-[ENV]AN318

Sample Number	Parameter	Units	LOR	Result
LB346671.001	Aluminium	µg/L	5	<5
	Antimony	µg/L	1	<1
	Arsenic	µg/L	1	<1
	Barium	µg/L	1	<1
	Beryllium	µg/L	1	<1
	Boron	µg/L	5	<5

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Trace Metals (Dissolved) in Water by ICPMS (continued)

Method: ME-(AU)-[ENV]AN318

Sample Number	Parameter	Units	LOR	Result
LB346671.001	Cadmium	µg/L	0.1	<0.1
	Chromium	µg/L	1	<1
	Cobalt	µg/L	1	<1
	Copper	µg/L	1	<1
	Iron	µg/L	5	<5
	Lead	µg/L	1	<1
	Manganese	µg/L	1	<1
	Molybdenum	µg/L	1	<1
	Nickel	µg/L	1	<1
	Selenium	µg/L	1	<1
	Silver	µg/L	1	<1
	Strontium	µg/L	1	<1
	Uranium	µg/L	1	<1
	Vanadium	µg/L	1	<1
	Zinc	µg/L	5	<5
LB346671.025	Aluminium	µg/L	5	<5
	Antimony	µg/L	1	<1
	Arsenic	µg/L	1	<1
	Barium	µg/L	1	<1
	Beryllium	µg/L	1	<1
	Boron	µg/L	5	<5
	Cadmium	µg/L	0.1	<0.1
	Chromium	µg/L	1	<1
	Cobalt	µg/L	1	<1
	Copper	µg/L	1	<1
	Iron	µg/L	5	<5
	Lead	µg/L	1	<1
	Manganese	µg/L	1	<1
	Molybdenum	µg/L	1	<1
	Nickel	µg/L	1	<1
	Selenium	µg/L	1	<1
	Silver	µg/L	1	<1
	Strontium	µg/L	1	<1
	Uranium	µg/L	1	<1
	Vanadium	µg/L	1	<1
	Zinc	µg/L	5	<5

TRH (Total Recoverable Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN403

Sample Number	Parameter	Units	LOR	Result
LB346778.001	TRH C10-C14	µg/L	50	<50
	TRH C15-C28	µg/L	200	<200
	TRH C29-C36	µg/L	200	<200
	TRH C37-C40	µg/L	200	<200

Turbidity

Method: ME-(AU)-[ENV]AN119

Sample Number	Parameter	Units	LOR	Result
LB346669.001	Turbidity	NTU	0.5	<0.5

VOCs in Water

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result
LB346931.001	Fumigants	2,2-dichloropropane	µg/L	0.5	<0.5
		1,2-dichloropropane	µg/L	0.5	<0.5
		cis-1,3-dichloropropene	µg/L	0.5	<0.5
		trans-1,3-dichloropropene	µg/L	0.5	<0.5
		1,2-dibromoethane (EDB)	µg/L	0.5	<0.5
	Halogenated Aliphatics	Dichlorodifluoromethane (CFC-12)	µg/L	5	<5
		Chloromethane	µg/L	5	<5
		Vinyl chloride (Chloroethene)	µg/L	0.3	<0.3
		Bromomethane	µg/L	10	<10
		Chloroethane	µg/L	5	<5

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

VOCs in Water (continued) Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result
LB346931.001	Halogenated Aliphatics	Trichlorofluoromethane	µg/L	1	<1
		1,1-dichloroethene	µg/L	0.5	<0.5
		Iodomethane	µg/L	5	<5
		Dichloromethane (Methylene chloride)	µg/L	5	<5
		Allyl chloride	µg/L	2	<2.0
		trans-1,2-dichloroethene	µg/L	0.5	<0.5
		1,1-dichloroethane	µg/L	0.5	<0.5
		cis-1,2-dichloroethene	µg/L	0.5	<0.5
		Bromochloromethane	µg/L	0.5	<0.5
		1,2-dichloroethane	µg/L	0.5	<0.5
		1,1,1-trichloroethane	µg/L	0.5	<0.5
		1,1-dichloropropene	µg/L	0.5	<0.5
		Carbon tetrachloride	µg/L	0.5	<0.5
		Dibromomethane	µg/L	0.5	<0.5
		Trichloroethene (Trichloroethylene,TCE)	µg/L	0.5	<0.5
		1,1,2-trichloroethane	µg/L	0.5	<0.5
		1,3-dichloropropane	µg/L	0.5	<0.5
		Tetrachloroethene (Perchloroethylene,PCE)	µg/L	0.5	<0.5
		1,1,1,2-tetrachloroethane	µg/L	0.5	<0.5
		1,1,2,2-tetrachloroethane	µg/L	0.5	<0.5
		1,2,3-trichloropropane	µg/L	0.5	<0.5
		trans-1,4-dichloro-2-butene	µg/L	1	<1
		1,2-dibromo-3-chloropropane	µg/L	0.5	<0.5
		Hexachlorobutadiene	µg/L	0.5	<0.5
	Halogenated Aromatics	Chlorobenzene	µg/L	0.5	<0.5
		Bromobenzene	µg/L	0.5	<0.5
		2-chlorotoluene	µg/L	0.5	<0.5
		4-chlorotoluene	µg/L	0.5	<0.5
		1,3-dichlorobenzene	µg/L	0.5	<0.5
		1,4-dichlorobenzene	µg/L	0.3	<0.3
		1,2-dichlorobenzene	µg/L	0.5	<0.5
		1,2,4-trichlorobenzene	µg/L	0.5	<0.5
		1,2,3-trichlorobenzene	µg/L	0.5	<0.5
	Monocyclic Aromatic Hydrocarbons	Benzene	µg/L	0.5	<0.5
		Toluene	µg/L	0.5	<0.5
		Ethylbenzene	µg/L	0.5	<0.5
		m/p-xylene	µg/L	1	<1
		Styrene (Vinyl benzene)	µg/L	0.5	<0.5
		o-xylene	µg/L	0.5	<0.5
		Isopropylbenzene (Cumene)	µg/L	0.5	<0.5
		n-propylbenzene	µg/L	0.5	<0.5
		1,3,5-trimethylbenzene	µg/L	0.5	<0.5
		tert-butylbenzene	µg/L	0.5	<0.5
		1,2,4-trimethylbenzene	µg/L	0.5	<0.5
		sec-butylbenzene	µg/L	0.5	<0.5
		p-isopropyltoluene	µg/L	0.5	<0.5
		n-butylbenzene	µg/L	0.5	<0.5
	Nitrogenous Compounds	Acrylonitrile	µg/L	0.5	<0.5
	Oxygenated Compounds	Acetone (2-propanone)	µg/L	10	<10
		MtBE (Methyl-tert-butyl ether)	µg/L	0.5	<0.5
		Vinyl acetate*	µg/L	10	<10
		MEK (2-butanone)	µg/L	10	<10
		MIBK (4-methyl-2-pentanone)	µg/L	5	<5
		2-hexanone (MBK)	µg/L	5	<5
	Polycyclic VOCs	Naphthalene (VOC)*	µg/L	0.5	<0.5
	Sulphonated	Carbon disulfide	µg/L	2	<2.0
	Surrogates	d4-1,2-dichloroethane (Surrogate)	%	-	89
		d8-toluene (Surrogate)	%	-	88
		Bromofluorobenzene (Surrogate)	%	-	95
	Trihalomethanes	Chloroform (THM)	µg/L	0.5	<0.5
		Bromodichloromethane (THM)	µg/L	0.5	<0.5

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

VOCs in Water (continued)

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result
LB346931.001	Trihalomethanes	Dibromochloromethane (THM)	µg/L	0.5	<0.5
		Bromoform (THM)	µg/L	0.5	<0.5

Volatile Petroleum Hydrocarbons in Water

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result
LB346931.001		TRH C6-C9	µg/L	40	<40
	Surrogates	d4-1,2-dichloroethane (Surrogate)	%	-	89
		d8-toluene (Surrogate)	%	-	88
		Bromofluorobenzene (Surrogate)	%	-	95

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

NOTE: The RPD reported is calculated from the unrounded data for the original and replicate result. Manual calculation of the RPD from the rounded data reported may

Alkalinity

Method: ME-(AU)-[ENV]AN135

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE282572.009	LB347104.013	Bicarbonate Alkalinity as CaCO3	mg/L	5	38.181616666	37.740816666	19	0
		Carbonate Alkalinity as CaCO3	mg/L	5	0	0	200	0
		Total Alkalinity as CaCO3	mg/L	5	38.181616666	37.740816666	19	0
SE282815.001	LB347104.025	Bicarbonate Alkalinity as CaCO3	mg/L	5	88	36.2774166666	21	2
		Carbonate Alkalinity as CaCO3	mg/L	5	<0	0	200	0
		Total Alkalinity as CaCO3	mg/L	5	88	86	21	2

Ammonia Nitrogen by Discrete Analyser

Method: ME-(AU)-[ENV]AN291

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE282572.002	LB346718.014	Ammonia Nitrogen, NH_3 as N	mg/L	0.01	8.4	8.4	15	0
SE282587.001	LB346718.024	Ammonia Nitrogen, NH_3 as N	mg/L	0.01	0.06	0.06	31	1

Anions by Ion Chromatography in Water

Method: ME-(AU)-[ENV]AN245

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE282561.010	LB346792.014	Fluoride	mg/L	0.1	0.10	<0.1	113	4
		Chloride	mg/L	0.05	20	19	15	5
		Sulfate, SO4	mg/L	1	160	160	16	3
SE282562.001	LB346792.025	Fluoride	mg/L	0.1	0.21	0.21	63	4
		Chloride	mg/L	0.05	6600	6500	15	1
		Sulfate, SO4	mg/L	1	1100	1100	15	1

Conductivity and TDS by Calculation - Water

Method: ME-(AU)-[ENV]AN106

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE282562.004	LB346668.011	Conductivity @ 25 C	µS/cm	2	2700	2700	15	0

Forms of Carbon

Method: ME-(AU)-[ENV]AN190

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE282572.006	LB347072.015	Total Organic Carbon as NPOC	mg/L	0.2	7.058	6.641	18	6
SE282667.002	LB347072.021	Total Organic Carbon as NPOC	mg/L	0.2	2.146	2.28	24	6

Metals in Water (Dissolved) by ICPOES

Method: ME-(AU)-[ENV]AN320

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE282561.005	LB346630.014	Calcium, Ca	mg/L	0.2	19	19	16	1
		Magnesium, Mg	mg/L	0.1	17	17	16	1
		Potassium, K	mg/L	0.1	2.6	2.6	19	1
		Sodium, Na	mg/L	0.5	15	15	18	1
SE282561.015	LB346630.028	Calcium, Ca	mg/L	0.2	50	50	15	0
		Magnesium, Mg	mg/L	0.1	28	28	15	1
		Potassium, K	mg/L	0.1	4.3	4.3	17	0
		Sodium, Na	mg/L	0.5	11	11	20	0
SE282562.004	LB346630.034	Calcium, Ca	mg/L	0.2	18	18	16	0
		Magnesium, Mg	mg/L	0.1	38	39	15	1

OP Pesticides in Water

Method: ME-(AU)-[ENV]AN420

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE282562.003	LB346778.028	Azinphos-methyl	µg/L	0.2	<0.2	0	200	0
		Bromophos Ethyl	µg/L	0.2	<0.2	0	200	0
		Chlorpyrifos (Chlorpyrifos Ethyl)	µg/L	0.2	<0.2	0.0017543451	200	0
		Diazinon (Dimpylate)	µg/L	0.5	<0.5	0.0015915446	200	0
		Dichlorvos	µg/L	0.5	<0.5	0.0200675686	200	0
		Dimethoate	µg/L	0.5	<0.5	0.0032588041	200	0
		Ethion	µg/L	0.2	<0.2	0	200	0
		Fenitrothion	µg/L	0.2	<0.2	0	200	0
		Malathion	µg/L	0.2	<0.2	0.0039526119	200	0
		Methidathion	µg/L	0.5	<0.5	0.0007591261	200	0
		Parathion-ethyl (Parathion)	µg/L	0.2	<0.2	0	200	0
	Surrogates	2-fluorobiphenyl (Surrogate)	µg/L	-	0.36	0.3358788737	30	8
		d14-p-terphenyl (Surrogate)	µg/L	-	0.31	0.2970341428	30	5

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

NOTE: The RPD reported is calculated from the unrounded data for the original and replicate result. Manual calculation of the RPD from the rounded data reported may

PAH (Polynuclear Aromatic Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN420

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE282562.003	LB346778.028		Naphthalene	µg/L	0.1	0.2	0.2192620744	73	10
			2-methylnaphthalene	µg/L	0.1	0.3	0.2403629078	70	9
			1-methylnaphthalene	µg/L	0.1	0.3	0.2810857021	64	10
			Acenaphthylene	µg/L	0.1	<0.1	0.0033906053	200	0
			Acenaphthene	µg/L	0.1	<0.1	0.0047987849	200	0
			Fluorene	µg/L	0.1	<0.1	0.0137811793	200	0
			Phenanthrene	µg/L	0.1	<0.1	0.0542281268	200	0
			Anthracene	µg/L	0.1	<0.1	0.0035757171	200	0
			Fluoranthene	µg/L	0.1	<0.1	0.0032360926	200	0
			Pyrene	µg/L	0.1	<0.1	0.0058289721	200	0
			Benzo(a)anthracene	µg/L	0.1	<0.1	0.0249703500	200	0
			Chrysene	µg/L	0.1	<0.1	0.0283215942	200	0
			Benzo(b&j)fluoranthene	µg/L	0.1	<0.1	0.0051827845	200	0
			Benzo(k)fluoranthene	µg/L	0.1	<0.1	0.0055948773	200	0
			Benzo(b&j&k)fluoranthene	µg/L	0.2	<0.2	0.0107776619	200	0
			Benzo(a)pyrene	µg/L	0.1	<0.1	0.0028754878	200	0
			Indeno(1,2,3-cd)pyrene	µg/L	0.1	<0.1	0.0011679773	200	0
			Dibenzo(ah)anthracene	µg/L	0.1	<0.1	0.0013273673	200	0
			Benzo(ghi)perylene	µg/L	0.1	<0.1	0.0055344354	200	0
		Surrogates	d5-nitrobenzene (Surrogate)	µg/L	-	0.40	0.3644031646	30	9
			2-fluorobiphenyl (Surrogate)	µg/L	-	0.36	0.3358788737	30	8
			d14-p-terphenyl (Surrogate)	µg/L	-	0.31	0.2970341428	30	5

pH in water

Method: ME-(AU)-[ENV]AN101

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE282562.004	LB346668.011	pH**	pH Units	0.1	7.7	7.6	16	0

Redox Potential (Eh) in water

Method: ME-(AU)-[ENV]AN240

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE282562.001	LB346719.006	Eh of Sample Relative to Standard H+ Electrode***	mV	-500	389	387	15	1

TKN Kjeldahl Digestion by Discrete Analyser

Method: ME-(AU)-[ENV]AN292

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE282511.001	LB347058.028	Total Kjeldahl Nitrogen	mg/L	0.05	66	66	15	1

Total and Volatile Suspended Solids (TSS / VSS)

Method: ME-(AU)-[ENV]AN114

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE282404.010	LB346815.013	Total Suspended Solids Dried at 103-105°C	mg/L	5	36	42	28	15
SE282499.001	LB346815.025	Total Suspended Solids Dried at 103-105°C	mg/L	5	410	420	16	5

Total Cyanide in water by Discrete Analyser

Method: ME-(AU)-[ENV]AN077/AN287

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE282604.001	LB346677.013	Total Cyanide	mg/L	0.004	<0.004	<0.004	200	0

Total Dissolved Solids (TDS) in water

Method: ME-(AU)-[ENV]AN113

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE282418.001	LB346814.013	Total Dissolved Solids Dried at 175-185°C	mg/L	10	1600	1500	16	4
SE282442.001	LB346814.025	Total Dissolved Solids Dried at 175-185°C	mg/L	10	3000	3100	15	3

Total Phenolics in Water

Method: ME-(AU)-[ENV]AN295

Original	Duplicate	Parameter	Units	LOR

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

NOTE: The RPD reported is calculated from the unrounded data for the original and replicate result. Manual calculation of the RPD from the rounded data reported may

Total Phenolics in Water (continued)

Method: ME-(AU)-[ENV]AN295

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE282563.001	LB346809.014	Total Phenols	mg/L	0.05	<0.05	<0.05	200	0
SE282563.002	LB346809.016	Total Phenols	mg/L	0.05	<0.05	<0.05	200	0

Total Phosphorus by Kjeldahl Digestion DA in Water

Method: ME-(AU)-[ENV]AN279/AN293(Sydney only)

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE282363.002	LB347058.014	Total Phosphorus (Kjeldahl Digestion) as P	mg/L	0.02	0.31	0.32	21	0
SE282511.001	LB347058.028	Total Phosphorus (Kjeldahl Digestion) as P	mg/L	0.02	26	27	15	4

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE282561.010	LB346671.014	Aluminium	μg/L	5	<5	<5	177	0
		Arsenic	μg/L	1	11	11	24	2
		Barium	μg/L	1	45	45	17	1
		Beryllium	μg/L	1	<1	<1	200	0
		Boron	μg/L	5	17	18	43	8
		Cadmium	μg/L	0.1	22	22	15	0
		Chromium	μg/L	1	<1	<1	200	0
		Cobalt	μg/L	1	<1	<1	200	0
		Copper	μg/L	1	5	5	34	1
		Lead	μg/L	1	25	25	19	1
		Manganese	μg/L	1	8	8	27	1
		Molybdenum	μg/L	1	<1	<1	200	0
		Nickel	μg/L	1	5	5	35	1
		Zinc	μg/L	5	1200	1200	15	1
SE282562.004	LB346671.028	Aluminium	μg/L	5	11	11	61	0
		Arsenic	μg/L	1	3	3	55	1
		Cadmium	μg/L	0.1	<0.1	<0.1	200	0
		Chromium	μg/L	1	<1	<1	200	0
		Copper	μg/L	1	<1	<1	200	0
		Lead	μg/L	1	<1	<1	200	0
		Nickel	μg/L	1	1	<1	111	8
		Zinc	μg/L	5	<5	<5	154	0
SE282562.008	LB346671.031	Arsenic	μg/L	1	<1	<1	200	0
		Cadmium	μg/L	0.1	<0.1	<0.1	200	0
		Chromium	μg/L	1	<1	<1	200	0
		Copper	μg/L	1	<1	<1	200	0
		Lead	μg/L	1	<1	<1	200	0
		Nickel	μg/L	1	<1	<1	200	0
		Zinc	μg/L	5	<5	<5	200	0

TRH (Total Recoverable Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN403

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE282562.003	LB346778.028		TRH C10-C14	μg/L	50	56	69	110	21
			TRH C15-C28	μg/L	200	<200	<200	200	0
			TRH C29-C36	μg/L	200	<200	<200	200	0
			TRH C37-C40	μg/L	200	<200	<200	200	0
			TRH C10-C40	μg/L	320	<320	<320	180	0
		TRH F Bands	TRH >C10-C16	μg/L	60	63	75	117	18
			TRH >C10-C16 - Naphthalene (F2)	μg/L	60	63	75	117	18
			TRH >C16-C34 (F3)	μg/L	500	<500	<500	200	0
			TRH >C34-C40 (F4)	μg/L	500	<500	<500	200	0
SE282641.012	LB346778.027		TRH C10-C14	μg/L	50	0	0	200	0
			TRH C15-C28	μg/L	200	0	0	200	0
			TRH C29-C36	μg/L	200	0	0	200	0
			TRH C37-C40	μg/L	200	0	0	200	0
			TRH C10-C40	μg/L	320	0	0	200	0
		TRH F Bands	TRH >C10-C16	μg/L	60	0	0	200	0
			TRH >C10-C16 - Naphthalene (F2)	μg/L	60	-0.4192183934	0	200	0
			TRH >C16-C34 (F3)	μg/L	500	0	0	200	0

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

NOTE: The RPD reported is calculated from the unrounded data for the original and replicate result. Manual calculation of the RPD from the rounded data reported may

TRH (Total Recoverable Hydrocarbons) in Water (continued)

Method: ME-(AU)-[ENV]AN403

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE282641.012	LB346778.027	TRH F Bands	TRH >C34-C40 (F4)	µg/L	500	0	0	200	0

Turbidity

Method: ME-(AU)-[ENV]AN119

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE282562.004	LB346669.011		Turbidity	NTU	0.5	16000	16000	15	2

VOCs in Water

Method: ME-(AU)-[ENV]AN433

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE282562.003	LB346931.023	Monocyclic Aromatic	Benzene	µg/L	0.5	<0.5	0.0377203825	200	0
			Toluene	µg/L	0.5	<0.5	0.3550741480	172	0
			Ethylbenzene	µg/L	0.5	<0.5	0.0375684127	200	0
			m/p-xylene	µg/L	1	<1	1.1698730966	125	16
			o-xylene	µg/L	0.5	<0.5	0.4750757903	149	0
		Polycyclic	Naphthalene (VOC)*	µg/L	0.5	<0.5	0.2907622609	200	0
		Surrogates	d4-1,2-dichloroethane (Surrogate)	µg/L	-	7.9	9.7	30	20
			d8-toluene (Surrogate)	µg/L	-	8.5	9.1	30	7
			Bromofluorobenzene (Surrogate)	µg/L	-	8.9	10.0	30	12
		Totals	Total BTEX	µg/L	3	<3	1.1698730966	200	0
SE282562.008	LB346931.024	Monocyclic Aromatic	Benzene	µg/L	0.5	<0.5	0.0207539939	200	0
			Toluene	µg/L	0.5	<0.5	0.0624774672	200	0
			Ethylbenzene	µg/L	0.5	<0.5	0.0140649390	200	0
			m/p-xylene	µg/L	1	<1	0.0449252909	200	0
			o-xylene	µg/L	0.5	<0.5	0.0175316217	200	0
		Polycyclic	Naphthalene (VOC)*	µg/L	0.5	<0.5	0.0947128226	200	0
		Surrogates	d4-1,2-dichloroethane (Surrogate)	µg/L	-	7.8	8.2	30	5
			d8-toluene (Surrogate)	µg/L	-	8.4	9.0	30	7
			Bromofluorobenzene (Surrogate)	µg/L	-	8.7	10.1	30	15
		Totals	Total BTEX	µg/L	3	<3	0	200	0

Volatile Petroleum Hydrocarbons in Water

Method: ME-(AU)-[ENV]AN433

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE282562.003	LB346931.023		TRH C6-C10	µg/L	50	<50	10.9653001611	200	0
			TRH C6-C9	µg/L	40	<40	5.6202011287	200	0
		Surrogates	d4-1,2-dichloroethane (Surrogate)	µg/L	-	7.9	9.6527549526	30	20
			d8-toluene (Surrogate)	µg/L	-	8.5	9.0633286348	30	7
			Bromofluorobenzene (Surrogate)	µg/L	-	8.9	10.0245324729	30	12
		VPH F Bands	Benzene (F0)	µg/L	0.5	<0.5	0.0377203825	200	0
			TRH C6-C10 minus BTEX (F1)	µg/L	50	<50	9.7954270644	200	0
SE282562.008	LB346931.024		TRH C6-C10	µg/L	50	<50	0	200	0
			TRH C6-C9	µg/L	40	<40	0	200	0
		Surrogates	d4-1,2-dichloroethane (Surrogate)	µg/L	-	7.8	8.1679148058	30	5
			d8-toluene (Surrogate)	µg/L	-	8.4	9.0210553488	30	7
			Bromofluorobenzene (Surrogate)	µg/L	-	8.7	10.1135081897	30	15
		VPH F Bands	Benzene (F0)	µg/L	0.5	<0.5	0.0207539939	200	0
			TRH C6-C10 minus BTEX (F1)	µg/L	50	<50	0	200	0

Laboratory Control Standard (LCS) results are evaluated against an expected result, typically the concentration of analyte spiked into the control during the sample preparation stage, producing a percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Ammonia Nitrogen by Discrete Analyser

Method: ME-(AU)-[ENV]AN291

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB346718.002	Ammonia Nitrogen, NH_3 as N	mg/L	0.01	2.5	2.5	80 - 120	99

Anions by Ion Chromatography in Water

Method: ME-(AU)-[ENV]AN245

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB346792.002	Fluoride	mg/L	0.1	2.0	2	80 - 120	98
	Chloride	mg/L	0.05	19	20	80 - 120	96
	Bromide	mg/L	0.05	2.0	2	80 - 120	101
	Nitrate Nitrogen, NO3-N	mg/L	0.005	2.0	2	80 - 120	101
	Sulfate, SO4	mg/L	1	21	20	80 - 120	105

Conductivity and TDS by Calculation - Water

Method: ME-(AU)-[ENV]AN106

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB346668.002	Conductivity @ 25 C	µS/cm	2	990	1015	85 - 115	98

Filterable Reactive Phosphorus (FRP)

Method: ME-(AU)-[ENV]AN278

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB346718.002	Filterable Reactive Phosphorus as P	mg/L	0.005	0.11	0.1	80 - 120	107

Forms of Carbon

Method: ME-(AU)-[ENV]AN190

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB347072.002	Total Organic Carbon as NPOC	mg/L	0.2	20	20	80 - 120	100

Full 8270 SVOC in Water

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB346778.002	01-PAHs	Acenaphthene	µg/L	0.1	38	40	60 - 140	95
		Acenaphthylene	µg/L	0.1	38	40	60 - 140	96
		Anthracene	µg/L	0.1	35	40	60 - 140	89
		Benzo(a)pyrene	µg/L	0.1	46	40	60 - 140	115
		Fluoranthene	µg/L	0.1	34	40	60 - 140	86
		Naphthalene	µg/L	0.1	36	40	60 - 140	91
		Phenanthrene	µg/L	0.1	37	40	60 - 140	94
		Pyrene	µg/L	0.1	36	40	60 - 140	89
	02-OCs	Aldrin	µg/L	0.1	3.3	4	60 - 140	83
		Delta-BHC	µg/L	0.1	4.2	4	60 - 140	105
		p,p-DDT	µg/L	0.1	2.8	4	60 - 140	71
		Dieldrin	µg/L	0.1	4.2	4	60 - 140	105
		Endrin	µg/L	0.1	3.0	4	60 - 140	74
		Heptachlor	µg/L	0.1	2.8	4	60 - 140	71
	03-OPs	Chlorpyrifos (Chlorpyrifos Ethyl)	µg/L	0.2	7.4	8	60 - 140	92
		Diazinon (Dimpylate)	µg/L	0.5	9.5	8	60 - 140	119
		Dichlorvos	µg/L	0.5	9.7	8	60 - 140	121
		Ethion	µg/L	0.2	7.0	8	60 - 140	87
	05-SVCH (Cl Benzenes,	Hexachlorobenzene (HCB)	µg/L	0.1	4.0	4	60 - 140	99
		Hexachlorobutadiene	µg/L	0.5	4.2	4	60 - 140	105
		Hexachloroethane	µg/L	0.5	4.0	4	60 - 140	99
		Pentachlorobenzene	µg/L	0.5	3.9	4	60 - 140	98
		1,2,3,4-tetrachlorobenzene	µg/L	0.5	3.9	4	60 - 140	97
	06-Phthalates	Bis(2-ethylhexyl)phthalate	µg/L	10	<10	8	60 - 140	78
		Butyl benzyl phthalate	µg/L	1	6	8	60 - 140	73
		Di-n-butyl phthalate	µg/L	10	<10	8	60 - 140	89
		Diethyl phthalate	µg/L	5	8	8	60 - 140	104
		Dimethyl phthalate	µg/L	1	7	8	60 - 140	88
		Di-n-octyl phthalate	µg/L	1	5	8	60 - 140	63
	09-Nitrosamine	N-nitroso-di-n-propylamine (NDPA)	µg/L	1	28	32	60 - 140	88
	10-Nitroaromat	Pentachloronitrobenzene (quintozene)	µg/L	1	5	4	60 - 140	135

Laboratory Control Standard (LCS) results are evaluated against an expected result, typically the concentration of analyte spiked into the control during the sample preparation stage, producing a percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Full 8270 SVOC in Water (continued)

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB346778.002	14-Speciated Routine	2,4-dichlorophenol	µg/L	0.5	45	40	60 - 140	112
		Phenol	µg/L	0.5	45	40	60 - 140	111
		2,4,6-trichlorophenol	µg/L	0.5	50	40	60 - 140	126
		Pentachlorophenol	µg/L	0.5	47	40	60 - 140	119
	Surrogates	d5-phenol (Surrogate)	µg/L	-	2.0	2	40 - 130	98
		d5-nitrobenzene (Surrogate)	µg/L	-	0.59	0.5	40 - 130	118
		2-fluorobiphenyl (Surrogate)	µg/L	-	0.35	0.5	40 - 130	70
		2,4,6-Tribromophenol (Surrogate)	µg/L	-	5.1	5	40 - 130	102
		d14-p-terphenyl (Surrogate)	µg/L	-	0.26	0.5	40 - 130	52

Metals in Water (Dissolved) by ICPOES

Method: ME-(AU)-[ENV]AN320

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB346630.002	Calcium, Ca	mg/L	0.2	56	50.5	80 - 120	111
	Lithium, Li	mg/L	0.005	0.091	0.1	80 - 120	91
	Magnesium, Mg	mg/L	0.1	53	50.5	80 - 120	106
	Potassium, K	mg/L	0.1	55	55	80 - 120	101
	Silicon, Si*	mg/L	0.05	0.20	0.25	80 - 120	80
	Sodium, Na	mg/L	0.5	55	50.5	80 - 120	110
LB346630.026	Calcium, Ca	mg/L	0.2	53	50.5	80 - 120	104
	Lithium, Li	mg/L	0.005	0.091	0.1	80 - 120	91
	Magnesium, Mg	mg/L	0.1	50	50.5	80 - 120	99
	Potassium, K	mg/L	0.1	52	55	80 - 120	95
	Silicon, Si*	mg/L	0.05	0.20	0.25	80 - 120	80
	Sodium, Na	mg/L	0.5	52	50.5	80 - 120	102

Nitrite in Water

Method: ME-(AU)-[ENV]AN277

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB346718.002	Nitrite Nitrogen, NO2 as N	mg/L	0.005	0.087	0.1	80 - 120	87

OC Pesticides in Water

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB346778.002		Delta BHC	µg/L	0.1	0.2	0.2	60 - 140	105
		Heptachlor	µg/L	0.1	0.2	0.2	60 - 140	110
		Aldrin	µg/L	0.1	0.2	0.2	60 - 140	105
		Dieldrin	µg/L	0.1	0.2	0.2	60 - 140	108
		Endrin	µg/L	0.1	0.2	0.2	60 - 140	103
		p,p'-DDT	µg/L	0.1	0.2	0.2	60 - 140	118
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	µg/L	-	0.14	0.15	40 - 130	96

OP Pesticides in Water

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB346778.002		Chlorpyrifos (Chlorpyrifos Ethyl)	µg/L	0.2	7.5	8	60 - 140	94
		Diazinon (Dimpylate)	µg/L	0.5	7.4	8	60 - 140	92
		Dichlorvos	µg/L	0.5	9.7	8	60 - 140	121
		Ethion	µg/L	0.2	8.5	8	60 - 140	106
	Surrogates	2-fluorobiphenyl (Surrogate)	µg/L	-	0.36	0.5	40 - 130	72
		d14-p-terphenyl (Surrogate)	µg/L	-	0.26	0.5	40 - 130	52

PAH (Polynuclear Aromatic Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB346778.002		Naphthalene	µg/L	0.1	29	40	60 - 140	72
		Acenaphthylene	µg/L	0.1	31	40	60 - 140	77
		Acenaphthene	µg/L	0.1	31	40	60 - 140	77
		Phenanthrene	µg/L	0.1	30	40	60 - 140	74
		Anthracene	µg/L	0.1	28	40	60 - 140	69
		Fluoranthene	µg/L	0.1	30	40	60 - 140	76
		Pyrene	µg/L	0.1	28	40	60 - 140	70
		Benzo(a)pyrene	µg/L	0.1	30	40	60 - 140	76
	Surrogates	d5-nitrobenzene (Surrogate)	µg/L	-	0.32	0.5	40 - 130	64
		2-fluorobiphenyl (Surrogate)	µg/L	-	0.36	0.5	40 - 130	72
		d14-p-terphenyl (Surrogate)	µg/L	-	0.26	0.5	40 - 130	52

Laboratory Control Standard (LCS) results are evaluated against an expected result, typically the concentration of analyte spiked into the control during the sample preparation stage, producing a percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

PCBs in Water

Method: ME-(AU)-[ENV]AN420

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB346778.002	Arochlor 1260	µg/L	1	<1	0.4	60 - 140	85

Per- and Polyfluoroalkyl Substances (PFAS) in Aqueous Samples

Method: ME-(AU)-[ENV]AN404

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB346853.002	Perfluoroheptanoic acid (PFHpA)	µg/L	0.01	0.17	0.2	40 - 160	83
	Perfluorooctanoic acid (PFOA)	µg/L	0.01	0.24	0.2	40 - 160	120
	Perfluorononanoic acid (PFNA)	µg/L	0.01	0.20	0.2	40 - 160	100
	Perfluorodecanoic acid (PFDA)	µg/L	0.01	0.20	0.2	40 - 160	101
	Perfluoroundecanoic acid (PFUnDA)	µg/L	0.01	0.18	0.2	40 - 160	92
	Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.01	0.20	0.2	40 - 160	100
	Perfluorooctane sulfonic acid (PFOS)	µg/L	0.01	0.18	0.2	40 - 160	91
	Perfluorooctane sulfonamide (FOSA)	µg/L	0.01	0.17	0.2	40 - 160	84

pH in water

Method: ME-(AU)-[ENV]AN101

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB346668.003	pH**	pH Units	0.1	7.5	7.415	98 - 102	101

Redox Potential (Eh) in water

Method: ME-(AU)-[ENV]AN240

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB346719.001	Eh of Sample Relative to Standard H+ Electrode***	mV	-500	433	428	90 - 110	101

Total and Volatile Suspended Solids (TSS / VSS)

Method: ME-(AU)-[ENV]AN114

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB346815.002	Total Suspended Solids Dried at 103-105°C	mg/L	5	88	100	80 - 120	88

Total Cyanide in water by Discrete Analyser

Method: ME-(AU)-[ENV]AN077/AN287

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB346677.002	Total Cyanide	mg/L	0.004	0.028	0.025	80 - 120	111

Total Phenolics in Water

Method: ME-(AU)-[ENV]AN295

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB346809.002	Total Phenols	mg/L	0.05	0.21	0.2	80 - 120	104

Total Phosphorus by Kjeldahl Digestion DA in Water

Method: ME-(AU)-[ENV]AN279/AN293(Sydney only)

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB347058.002	Total Phosphorus (Kjeldahl Digestion) as P	mg/L	0.02	1.1	1	80 - 120	109

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB346671.002	Aluminium	µg/L	5	19	20	80 - 120	96
	Antimony	µg/L	1	18	20	80 - 120	90
	Arsenic	µg/L	1	20	20	80 - 120	98
	Barium	µg/L	1	19	20	80 - 120	96
	Beryllium	µg/L	1	23	20	80 - 120	115
	Boron	µg/L	5	22	20	80 - 120	112
	Cadmium	µg/L	0.1	20	20	80 - 120	99
	Chromium	µg/L	1	20	20	80 - 120	99
	Cobalt	µg/L	1	20	20	80 - 120	101
	Copper	µg/L	1	20	20	80 - 120	100
	Iron	µg/L	5	18	20	80 - 120	91
	Lead	µg/L	1	19	20	80 - 120	97

Laboratory Control Standard (LCS) results are evaluated against an expected result, typically the concentration of analyte spiked into the control during the sample preparation stage, producing a percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Trace Metals (Dissolved) in Water by ICPMS (continued)

Method: ME-(AU)-[ENV]AN318

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB346671.002		Manganese	µg/L	1	20	20	80 - 120	101
		Molybdenum	µg/L	1	19	20	80 - 120	94
		Nickel	µg/L	1	20	20	80 - 120	98
		Selenium	µg/L	1	20	20	80 - 120	99
		Silver	µg/L	1	18	20	80 - 120	88
		Strontium	µg/L	1	21	20	80 - 120	105
		Uranium	µg/L	1	21	20	80 - 120	104
		Vanadium	µg/L	1	19	20	80 - 120	96
		Zinc	µg/L	5	21	20	80 - 120	104
LB346671.026		Aluminium	µg/L	5	21	20	80 - 120	103
		Antimony	µg/L	1	18	20	80 - 120	89
		Arsenic	µg/L	1	20	20	80 - 120	102
		Barium	µg/L	1	19	20	80 - 120	97
		Beryllium	µg/L	1	21	20	80 - 120	106
		Boron	µg/L	5	22	20	80 - 120	111
		Cadmium	µg/L	0.1	20	20	80 - 120	101
		Chromium	µg/L	1	20	20	80 - 120	98
		Cobalt	µg/L	1	20	20	80 - 120	99
		Copper	µg/L	1	19	20	80 - 120	97
		Iron	µg/L	5	17	20	80 - 120	84
		Lead	µg/L	1	20	20	80 - 120	99
		Manganese	µg/L	1	20	20	80 - 120	102
		Molybdenum	µg/L	1	18	20	80 - 120	91
		Nickel	µg/L	1	19	20	80 - 120	96
		Selenium	µg/L	1	22	20	80 - 120	111
		Silver	µg/L	1	18	20	80 - 120	88
		Strontium	µg/L	1	21	20	80 - 120	105
		Uranium	µg/L	1	21	20	80 - 120	104
		Vanadium	µg/L	1	19	20	80 - 120	97
		Zinc	µg/L	5	21	20	80 - 120	104

TRH (Total Recoverable Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN403

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB346778.002		TRH C10-C14	µg/L	50	1100	1200	60 - 140	94
		TRH C15-C28	µg/L	200	1300	1200	60 - 140	105
		TRH C29-C36	µg/L	200	1200	1200	60 - 140	97
	TRH F Bands	TRH >C10-C16	µg/L	60	1200	1200	60 - 140	101
		TRH >C16-C34 (F3)	µg/L	500	1300	1200	60 - 140	105
		TRH >C34-C40 (F4)	µg/L	500	550	600	60 - 140	92

VOCs in Water

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB346931.002	Halogenated Aliphatics	1,1-dichloroethene	µg/L	0.5	53	45.45	60 - 140	118
		1,2-dichloroethane	µg/L	0.5	58	45.45	60 - 140	128
		Trichloroethene (Trichloroethylene,TCE)	µg/L	0.5	56	45.45	60 - 140	123
	Halogenated	Chlorobenzene	µg/L	0.5	43	45.45	60 - 140	95
	Monocyclic Aromatic	Benzene	µg/L	0.5	44	45.45	60 - 140	97
		Toluene	µg/L	0.5	45	45.45	60 - 140	98
		Ethylbenzene	µg/L	0.5	43	45.45	60 - 140	94
		m/p-xylene	µg/L	1	84	90.9	60 - 140	92
		o-xylene	µg/L	0.5	42	45.45	60 - 140	93
	Surrogates	d4-1,2-dichloroethane (Surrogate)	µg/L	-	10	10	60 - 140	100
		d8-toluene (Surrogate)	µg/L	-	11	10	70 - 130	105
		Bromofluorobenzene (Surrogate)	µg/L	-	9.7	10	70 - 130	97
	Trihalomethan	Chloroform (THM)	µg/L	0.5	61	45.45	60 - 140	134

Volatile Petroleum Hydrocarbons in Water

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB346931.002		TRH C6-C10	µg/L	50	650	946.63	60 - 140	68
		TRH C6-C9	µg/L	40	530	818.71	60 - 140	64
	Surrogates	d4-1,2-dichloroethane (Surrogate)	µg/L	-	10	10	60 - 140	100
		d8-toluene (Surrogate)	µg/L	-	11	10	70 - 130	105

Laboratory Control Standard (LCS) results are evaluated against an expected result, typically the concentration of analyte spiked into the control during the sample preparation stage, producing a percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Volatile Petroleum Hydrocarbons in Water (continued)

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB346931.002	Surrogates	Bromofluorobenzene (Surrogate)	µg/L	-	9.7	10	70 - 130	97
	VPH F Bands	TRH C6-C10 minus BTEX (F1)	µg/L	50	390	639.67	60 - 140	61

Matrix Spike (MS) results are evaluated as the percentage recovery of an expected result, typically the concentration of analyte spiked into a field sub-sample during the sample preparation stage. The original sample's result is subtracted from the sub-sample result before determining the percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA/QC plan (ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Ammonia Nitrogen by Discrete Analyser

Method: ME-(AU)-[ENV]AN291

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE282511.001	LB346718.004	Ammonia Nitrogen, NH_3 as N	mg/L	0.01	9.4	7.35405	2.5	82

Anions by Ion Chromatography in Water

Method: ME-(AU)-[ENV]AN245

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE282561.001	LB346792.004	Fluoride	mg/L	0.1	2.3	<0.10	2	113
		Chloride	mg/L	0.05	24	4.3	20	97
		Sulfate, SO4	mg/L	1	21	<1.0	20	105

Filterable Reactive Phosphorus (FRP)

Method: ME-(AU)-[ENV]AN278

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE282521.001	LB346718.026	Filterable Reactive Phosphorus as P	mg/L	0.005	0.11	0.0066	0.1	103

Forms of Carbon

Method: ME-(AU)-[ENV]AN190

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE282562.001	LB347072.022	Total Organic Carbon as NPOC	mg/L	0.2	54	1.5	50	105

Metals in Water (Dissolved) by ICPOES

Method: ME-(AU)-[ENV]AN320

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE282497.001	LB346630.004	Calcium, Ca	mg/L	0.2	59	3.0	50.5	110
		Magnesium, Mg	mg/L	0.1	53	<0.1	50.5	105
		Potassium, K	mg/L	0.1	55	<0.2	55	99
		Silicon, Si*	mg/L	0.05	0.93	0.62	0.25	124
		Sodium, Na	mg/L	0.5	56	1.2	50.5	109
SE282562.001	LB346630.030	Calcium, Ca	mg/L	0.2	270	220	50.5	101
		Lithium, Li	mg/L	0.005	0.19	0.19	-	-
		Potassium, K	mg/L	0.1	89	33	55	102
		Silicon, Si*	mg/L	0.05	7.4	7.1	0.25	110

Nitrite in Water

Method: ME-(AU)-[ENV]AN277

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE282521.001	LB346718.026	Nitrite Nitrogen, NO2 as N	mg/L	0.005	0.086	0.00548	0.1	81

TKN Kjeldahl Digestion by Discrete Analyser

Method: ME-(AU)-[ENV]AN292

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE282513.001	LB347058.029	Total Kjeldahl Nitrogen	mg/L	0.05	2.7	0.07846	2.5	105

Total Cyanide in water by Discrete Analyser

Method: ME-(AU)-[ENV]AN077/AN287

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE282611.001	LB346677.012	Total Cyanide	mg/L	0.004	0.030	<0.004	0.025	124

Total Phenolics in Water

Method: ME-(AU)-[ENV]AN295

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE282653.001	LB346809.004	Total Phenols	mg/L	0.05	0.22	<0.05	0.2	110

Total Phosphorus by Kjeldahl Digestion DA in Water

Method: ME-(AU)-[ENV]AN279/AN293(Sydney only)

QC Sample	Sample Number	Parameter	Units	LOR

Matrix Spike (MS) results are evaluated as the percentage recovery of an expected result, typically the concentration of analyte spiked into a field sub-sample during the sample preparation stage. The original sample's result is subtracted from the sub-sample result before determining the percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA/QC plan (ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Total Phosphorus by Kjeldahl Digestion DA in Water (continued)

Method: ME-(AU)-[ENV]AN279/AN293(Sydney only)

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE282513.001	LB347058.029	Total Phosphorus (Kjeldahl Digestion) as P	mg/L	0.02	1.0	0.00922	1	102

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE282561.001	LB346671.004	Aluminium	μg/L	5	45	27	20	89
		Arsenic	μg/L	1	19	<1	20	93
		Barium	μg/L	1	41	21	20	102
		Beryllium	μg/L	1	19	<1	20	96
		Boron	μg/L	5	22	<5	20	92
		Cadmium	μg/L	0.1	20	<0.1	20	99
		Chromium	μg/L	1	20	<1	20	98
		Cobalt	μg/L	1	21	<1	20	102
		Copper	μg/L	1	21	1	20	98
		Lead	μg/L	1	20	<1	20	101
		Manganese	μg/L	1	30	10	20	99
		Molybdenum	μg/L	1	19	<1	20	92
		Nickel	μg/L	1	20	<1	20	97
		Zinc	μg/L	5	25	<5	20	101
SE282562.008	LB346671.030	Arsenic	μg/L	1	19	<1	20	96
		Cadmium	μg/L	0.1	20	<0.1	20	102
		Chromium	μg/L	1	20	<1	20	101
		Copper	μg/L	1	21	<1	20	106
		Lead	μg/L	1	21	<1	20	104
		Nickel	μg/L	1	20	<1	20	100
		Zinc	μg/L	5	22	<5	20	106

VOCs in Water

Method: ME-(AU)-[ENV]AN433

QC Sample	Sample Number		Parameter	Units	LOR	Original	Spike	Recovery%
SE282562.001	LB346931.025	Monocyclic Aromatic	Benzene	μg/L	0.5	<0.5	45.45	102
			Toluene	μg/L	0.5	<0.5	45.45	114
			Ethylbenzene	μg/L	0.5	<0.5	45.45	98
			m/p-xylene	μg/L	1	<1	90.9	97
			o-xylene	μg/L	0.5	<0.5	45.45	95
		Polycyclic	Naphthalene (VOC)*	μg/L	0.5	<0.5	-	-
		Surrogates	d4-1,2-dichloroethane (Surrogate)	μg/L	-	9.3	-	97
			d8-toluene (Surrogate)	μg/L	-	9.0	-	113
			Bromofluorobenzene (Surrogate)	μg/L	-	9.9	-	92
		Totals	Total BTEX	μg/L	3	<3	-	-

Volatile Petroleum Hydrocarbons in Water

Method: ME-(AU)-[ENV]AN433

QC Sample	Sample Number		Parameter	Units	LOR	Original	Spike	Recovery%
SE282562.001	LB346931.025		TRH C6-C10	μg/L	50	<50	946.63	71
			TRH C6-C9	μg/L	40	<40	818.71	74
		Surrogates	d4-1,2-dichloroethane (Surrogate)	μg/L	-	9.3	-	97
			d8-toluene (Surrogate)	μg/L	-	9.0	-	113
			Bromofluorobenzene (Surrogate)	μg/L	-	9.9	-	92
		VPH F Bands	Benzene (F0)	μg/L	0.5	<0.5	-	-
			TRH C6-C10 minus BTEX (F1)	μg/L	50	<50	639.67	62

MATRIX SPIKE DUPLICATES

Matrix spike duplicates are calculated as Relative Percent Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The original result is the analyte concentration of the matrix spike. The Duplicate result is the analyte concentration of the matrix spike duplicate.

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the

No matrix spike duplicates were required for this job.

Samples analysed as received.

Solid samples expressed on a dry weight basis.

QC criteria are subject to internal review according to the SGS QA/QC plan and may be provided on request or alternatively can be found here: https://www.sgs.com.au/~/media/Local/Australia/Documents/Technical Documents/MP-AU-ENV-QU-022 QA QC Plan.pdf

*	NATA accreditation does not cover the performance of this service.
**	Indicative data, theoretical holding time exceeded.
***	Indicates that both * and ** apply.
-	Sample not analysed for this analyte.
IS	Insufficient sample for analysis.
LNR	Sample listed, but not received.
LOR	Limit of reporting.
QFH	QC result is above the upper tolerance.
QFL	QC result is below the lower tolerance.
①	At least 2 of 3 surrogates are within acceptance criteria.
②	RPD failed acceptance criteria due to sample heterogeneity.
③	Results less than 5 times LOR preclude acceptance criteria for RPD.
④	Recovery failed acceptance criteria due to matrix interference.
⑤	Recovery failed acceptance criteria due to the presence of significant concentration of analyte (i.e. the concentration of analyte exceeds the spike level).
⑥	LOR was raised due to sample matrix interference.
⑦	LOR was raised due to dilution of significantly high concentration of analyte in sample.
⑧	Reanalysis of sample in duplicate confirmed sample heterogeneity and inconsistency of results.
⑨	Recovery failed acceptance criteria due to sample heterogeneity.
⑩	LOR was raised due to high conductivity of the sample (required dilution).
†	Refer to relevant report comments for further information.

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 380237

Client Details

Client	EI Australia
Attention	Jordan Goehner-Drewe
Address	Suite 6.01, 55 Miller Street, Pyrmont, NSW, 2009

Sample Details

Your Reference	**E26733, 135 Badgerys Road, Bradfield NSW**
Number of Samples	1 Water
Date samples received	09/05/2025
Date completed instructions received	08/05/2025

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	16/05/2025
Date of Issue	14/05/2025

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
Giovanni Agosti, Group Technical Manager
Timothy Toll, Senior Chemist

Authorised By
Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Water		
Our Reference		380237-1
Your Reference	UNITS	QT1
Date Sampled		07/05/2025
Type of sample		Water
Date extracted	-	12/05/2025
Date analysed	-	13/05/2025
TRH C_6 - C_9	µg/L	<10
TRH C_6 - C_{10}	µg/L	<10
TRH C_6 - C_{10} less BTEX (F1)	µg/L	<10
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	%	102
Surrogate Toluene-d8	%	99
Surrogate 4-Bromofluorobenzene	%	92

svTRH (C10-C40) in Water		
Our Reference		380237-1
Your Reference	UNITS	QT1
Date Sampled		07/05/2025
Type of sample		Water
Date extracted	-	12/05/2025
Date analysed	-	13/05/2025
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	%	92

HM in water - dissolved		
Our Reference		380237-1
Your Reference	UNITS	QT1
Date Sampled		07/05/2025
Type of sample		Water
Date prepared	-	12/05/2025
Date analysed	-	12/05/2025
Arsenic-Dissolved	μg/L	<1
Cadmium-Dissolved	μg/L	<0.1
Chromium-Dissolved	μg/L	<1
Copper-Dissolved	μg/L	<1
Lead-Dissolved	μg/L	<1
Mercury-Dissolved	μg/L	<0.05
Nickel-Dissolved	μg/L	4
Zinc-Dissolved	μg/L	6

Method ID	Methodology Summary
Metals-021	Determination of Mercury by Cold Vapour AAS.
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.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Water					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			12/05/2025	1	12/05/2025	13/05/2025		12/05/2025	[NT]
Date analysed	-			13/05/2025	1	13/05/2025	14/05/2025		13/05/2025	[NT]
TRH C_6 - C_9	µg/L	10	Org-023	<10	1	<10	<10	0	105	[NT]
TRH C_6 - C_{10}	µg/L	10	Org-023	<10	1	<10	<10	0	105	[NT]
Benzene	µg/L	1	Org-023	<1	1	<1	<1	0	108	[NT]
Toluene	µg/L	1	Org-023	<1	1	<1	<1	0	107	[NT]
Ethylbenzene	µg/L	1	Org-023	<1	1	<1	<1	0	103	[NT]
m+p-xylene	µg/L	2	Org-023	<2	1	<2	<2	0	104	[NT]
o-xylene	µg/L	1	Org-023	<1	1	<1	<1	0	103	[NT]
Naphthalene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-023	98	1	102	102	0	99	[NT]
Surrogate Toluene-d8	%		Org-023	99	1	99	98	1	101	[NT]
Surrogate 4-Bromofluorobenzene	%		Org-023	97	1	92	92	0	105	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Water					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date extracted	-			12/05/2025	[NT]	[NT]	[NT]	[NT]	12/05/2025	[NT]
Date analysed	-			13/05/2025	[NT]	[NT]	[NT]	[NT]	13/05/2025	[NT]
TRH C_{10} - C_{14}	µg/L	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	92	[NT]
TRH C_{15} - C_{28}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	102	[NT]
TRH C_{29} - C_{36}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	114	[NT]
TRH $>C_{10}$ - C_{16}	µg/L	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	92	[NT]
TRH $>C_{16}$ - C_{34}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	102	[NT]
TRH $>C_{34}$ - C_{40}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	114	[NT]
Surrogate o-Terphenyl	%		Org-020	92	[NT]	[NT]	[NT]	[NT]	108	[NT]

QUALITY CONTROL: HM in water - dissolved					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date prepared	-			12/05/2025	[NT]	[NT]	[NT]	[NT]	12/05/2025	[NT]
Date analysed	-			12/05/2025	[NT]	[NT]	[NT]	[NT]	12/05/2025	[NT]
Arsenic-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	100	[NT]
Cadmium-Dissolved	µg/L	0.1	Metals-022	<0.1	[NT]	[NT]	[NT]	[NT]	101	[NT]
Chromium-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	100	[NT]
Copper-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	101	[NT]
Lead-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	108	[NT]
Mercury-Dissolved	µg/L	0.05	Metals-021	<0.05	[NT]	[NT]	[NT]	[NT]	102	[NT]
Nickel-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	101	[NT]
Zinc-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	100	[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.

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.

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.

Air volumes are typically provided by customers (often as flow rate(s) and sampling time(s) and/or simply volumes) sampled or exposure times (determines 'volume' passive badges are exposed to)). Hence in such circumstances the volume measurement is inevitably not covered by Envirolab's NATA accreditation. An exception may occur where Envirolab Newcastle does the sampling where accreditation exists for certain types of sampling and hence volume determination(s). Note air volumes are often used to determine concentrations for dust and/or analyses on filters, sorbents and in impingers. For canister sampling, the air volume is covered by Envirolab's NATA accreditation.

Urine Analysis - The BEI values listed are taken from the 2022 edition of "TLVs and BEIs Threshold Limits" by ACGIH.

WC 8/5/25, 1040

Sheet 1 of 1

135 Badgerys road, Bradfield, NSW

Project No: E26733

Laboratory:

Envirolab Services
12 Ashley Street,
CHATSWOOD NSW 2067
P: 02 9910 6200

Sample ID	Laboratory ID	Container Type	Sampling Date	Sampling Time	SOIL	WATER	0.45 µm field filtered	OTHER	HM^A /TRH/BTEX/PAHs OCP/OP/PCB/Asbestos	HM^A /TRH/PAHs	HM^A /TRH/BTEX	BTEX	VOCs	Asbestos	Asbestos Quantification	Excavated Natural Material (ENM) Suite	Dewatering Suite	pH / pH peroxide	sPOCAS	Chromium Reducible Sulfur (CrS)	PFAS	pH / CEC (cation exchange)	pH / EC (electrical conductivity)	Sulphate / Chloride	HOLD		TCLP HM^B / PAH
① QT1		SPVC	7/25/25	AM		X					X																

ENVIROLAB
Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200
Job No: 380237
Date Received: 9/5/25
Time Received: 1655
Received By: KC
Temp: [✓ Cool]/Ambient
Cooling: Ice/[✓ Icepack]
Security: [✓ Intact]/Broken/None

Comments

HM^A
Arsenic
Cadmium
Chromium
Copper
Lead
Mercury
Nickel
Zinc

HM^B
Arsenic
Cadmium
Chromium
Lead
Mercury
Nickel

Dewatering Suite
pH & EC
TDS / TDU
Hardness
Total Cyanide
Metals (Al, As, Cd, Cr, Cu, Pb, Hg, Ni, Zn)
TRH (F1, F2, F3, F4)
BTEX
PAH

LABORATORY TURNAROUND

☒ Standard
☐ 24 Hours
☐ 48 Hours
☐ 72 Hours
☐ Other______

Container Type:
J = solvent washed, acid rinsed, Teflon sealed glass jar
S = solvent washed, acid rinsed glass bottle
P = natural HDPE plastic bottle
VC = glass vial, Teflon Septum
ZLB = Zip-Lock Bag

Investigator: I attest that these samples were collected in accordance with standard EI field sampling procedures.

Sampler's Name (EI): Sh[illegible]	Received by (Envirolab):
Print Jordan Goehner-Drane	Print Katherine Chau
Signature	Signature K.C
Date 8/5/2025	Date 9/5/25

Report with EI Waste Classification Table ☐

Sampler's Comments:
CC sergio in results please

IMPORTANT:
Please e-mail laboratory results to: lab@eiaustralia.com.au

eiaustralia

Suite 6.01, 55 Miller Street,
PYRMONT NSW 2009
Ph: 9516 0722
lab@eiaustralia.com.au

COC June 2021 FORM v.5 - Envirolab

Sheet _1_ of _1_

Site: 135 Badgerys creek road, Bradfield, NSW

Project No: E26733

Laboratory:
SGS Australia
Unit 16, 33 Maddox Street,
ALEXANDRIA NSW 2015
P: 02 8594 0400 F: 02 8594 0499

Sample ID	Laboratory ID	Container Type	Sampling Date	Sampling Time	Sample Matrix: SOIL	WATER	0.45 µm field filtered	OTHER	Analysis: HM ^{A} /TRH (including F1, F2, F3, F4)/BTEX/ PAHs/ OCP/OP/PCB/Asbestos	HM ^{A} /TRH (including F1, F2, F3, F4)/ BTEX/PAHs	HM ^{A} /TRH (including F1, F2, F3, F4)/BTEX	BTEX	Appendix A Table A2 NSW DPE	Asbestos	Asbestos Quantification (500ml)	Asbestos 10L field screening	Excavated Natural Material (ENM) Suite	ENM Suite - Stockpile discrete (TRH/BTEX/PAHs)	ENM Suite - Stockpile composite (HM ^{A} /pH / EC / Foreign Materials)	Dewatering Suite	pH / pH peroxide	sPOCAS	Chromium Reducible Sulfur (CrS)	Hold	pH / CEC (cation exchange)	pH / EC (electrical conductivity)	Sulphate / Chloride	Lead	TCLP HM ^{B} / PAH
BH1M		SPVC	7/5/25	AM		X							X																
BH2M		SP		PM																X									
BH3M		SPVC		PM																X									
BH6M		SPVC		PM																X									
QD1		SPVC		AM							X																		
TS		VC		AM								X																	
TB		VC		AM								X																	
QR1		SPVC		PM							X																		
QRB1		SPVC		PM																				X					

Comments

HM ^{A}
Arsenic
Cadmium
Chromium
Copper
Lead
Mercury
Nickel
Zinc

HM ^{B}
Arsenic
Cadmium
Chromium
Lead
Mercury
Nickel

Dewatering Suite
pH & EC
TDS / TDU
Hardness
Total Cyanide
Metals (Al, As, Cd, Cr, Cu, Pb, Hg, Ni, Zn)
TRH (F1, F2, F3, F4)
BTEX
PAH
Total Phenol

LABORATORY TURNAROUND

☒ Standard
☐ 24 Hours
☐ 48 Hours
☐ 72 Hours
☐ Other____

Container Type:
J = solvent washed, acid rinsed, Tefton sealed glass jar
S = solvent washed, acid rinsed glass bottle
P = natural HDPE plastic bottle
VC = glass vial, Tefton Septum
ZLB = Zip-Lock Bag BB = Bulk Bag

Investigator: I attest that these samples were collected in accordance with standard EI field sampling procedures.

Report with EI Waste Classification Table ☐

Sampler's Name (EI):	Received by ~~(SGS)~~: ELS SYD
Print Jordan Goehner-Drane	Print Katherine [illegible]
Signature	Signature
Date 8/05/25	Date 9/5/25 1655

IMPORTANT:
Please e-mail laboratory results to: lab@eiaustralia.com.au

Sampler's Comments:
CC Sergio in results please. Please forward QT1 to envirolab.

①

eiaustralia
Contamination | Remediation | Geotechnical

Suite 6.01, 55 Miller Street,
PYRMONT NSW 2009
Ph: 9516 0722
lab@eiaustralia.com.au

COC June 2021 FORM v.5 - SGS

#382237
9/5
KC

Sheet _1_ of _1_

Site: 135 Badgerys creek road, Bradfield, NSW

Project No: E26733

Laboratory:
SGS Australia
Unit 16, 33 Maddox Street,
ALEXANDRIA NSW 2015
P: 02 8594 0400 F: 02 8594 0499

Sample Matrix | Analysis

Sample ID	Laboratory ID	Container Type	Sampling Date	Sampling Time	SOIL	WATER	0.45 µm field filtered	OTHER	HM^A /TRH (including F1, F2, F3, F4)/BTEX/ PAHs/ OCP/OP/PCB/Asbestos	HM^A /TRH (including F1, F2, F3, F4)/ BTEX/PAHs	HM^A /TRH (including F1, F2, F3, F4)/BTEX	BTEX	Appendix A table A2 NSW DPEs	Asbestos	Asbestos Quantification (500ml)	Asbestos 10L field screening	Excavated Natural Material (ENM) Suite	ENM Suite - Stockpile discrete (TRH/BTEX/PAHs)	ENM Suite - Stockpile composite (HM^A /pH / EC / Foreign Materials)	Dewatering Suite	pH / pH peroxide	sPOCAS	Chromium Reducible Sulfur (CrS)	Hold	pH / CEC (cation exchange)	pH / EC (electrical conductivity)	Sulphate / Chloride	Lead	TCLP HM^B / PAH
BH1M		SPVC	7/5/25	AM		X							X																
BH2M		SP		PM																X									
BH3M		SPVC		PM																X									
BH6M		SPVC		PM																X									
QD1		SPVC		AM							X																		
TS		VC		AM								X																	
TB		VC		AM								X																	
QR1		SPVC		PM							X																		
QRB1		SPVC		PM																				X					

Comments

HM^A
Arsenic
Cadmium
Chromium
Copper
Lead
Mercury
Nickel
Zinc

HM^B
Arsenic
Cadmium
Chromium
Lead
Mercury
Nickel

Dewatering Suite
pH & EC
TDS / TDU
Hardness
Total Cyanide
Metals (Al, As, Cd, Cr, Cu, Pb, Hg, Ni, Zn)
TRH (F1, F2, F3, F4)
BTEX
PAH
Total Phenol

LABORATORY TURNAROUND
☒ Standard
☐ 24 Hours
☐ 48 Hours
☐ 72 Hours
☐ Other_____

Container Type:
J = solvent washed, acid rinsed, Tefton sealed glass jar
S = solvent washed, acid rinsed glass bottle
P = natural HDPE plastic bottle
VC = glass vial, Tefton Septum
ZLB = Zip-Lock Bag BB = Bulk Bag

eiaustralia
Contamination | Remediation | Geotechnical

Suite 6.01, 55 Miller Street,
PYRMONT NSW 2009
Ph: 9516 0722
lab@eiaustralia.com.au

COC June 2021 FORM v.5 - SGS

Investigator: I attest that these samples were collected in accordance with standard EI field sampling procedures.

Report with EI Waste Classification Table ☐

Sampler's Name (EI):	Received by (SGS):
Print Jordan Goehner-Drewe	Print
Signature	Signature
Date 8/05/25	Date

IMPORTANT:
Please e-mail laboratory results to: lab@eiaustralia.com.au

Sampler's Comments:
CC Sergio in results please. Please forward QT1 to envirolab.

Appendix G – Methodology

METHODOLOGY

G.1 Sampling, Analytical and Quality Plan (SAQP)

The SAQP for this water quality assessment played a crucial role in ensuring that the data collected were representative and provided a robust basis for decisions. The SAQP included:

- Data quality objectives (DQOs), including a summary of the objectives of the assessment;
- Investigation methodology, including media sampled, a description of the sampling points and the analytes to be monitored;
- Sampling methods;
- Field screening methods;
- Analysis methods;
- Sample handling, preservation and storage; and
- Analytical quality assurance and quality control (QA/QC).

The DQOs were determined in accordance with US EPA (2006) *Data Quality Assessment: A Reviewer's Guide* and the DEC (2006) *Guidelines for the NSW Site Auditor Scheme*. They helped identify the appropriate scope and level of quality needed for the specific requirements of the project.

The DQO process that was applied for this assessment is documented in **Table G-1**. This process fed into the Quality Assurance program. QA comprised an assessment of the reliability of the field procedures and laboratory results against standard industry practices and the SAQP.

Table G-1 Summary of Project Data Quality Objectives

DQO Step	Details
1. State the problem	Dewatering of the site is required to allow the construction of residential buildings overlying a lower ground level then a common basement for car parking. The purpose of this groundwater sampling event was to establish the existing quality, to assist management of the extracted water during the basement construction process.
2. Identify the decisions	The required management measure(s) for the water extracted during dewatering will be determined by initial assessment and on-going monitoring. For this assessment, the required decision related to answering the following question: ▪ What is the existing (baseline / pre-dewatering water quality)?
3. Identify inputs to decision	Information inputs to the decision included: a) Investigation of groundwater quality, including observation, primary and quality control duplicate sampling and laboratory analyses; b) Assessment of groundwater analytical results in relation to the adopted criteria; c) Detailed design drawings for proposed basement construction.
4. Define the boundaries of the study	The assessment involved a groundwater monitoring event (GME), utilising four wells identified as BH3M, BH6M, BH11M and BH12M (**Figure 2**, **Appendix A**). The findings of this assessment will hold true for as long as the site use remains passive in nature; that is, for as long as the site is used for the proposed use and there are no activities taking place onsite or on immediately adjacent (upgrading) properties that may compromise onsite environmental conditions.
5. Develop a decision rule	The decision rule was: ▪ If the concentrations of contaminants in the groundwater exceed the adopted criteria, then assess the need for additional testing and/or treatment.
6. Specify limits on decision errors	Specific limits for this project were in accordance with National and EPA guidance for contaminated sites. Errors were limited by: ▪ The field sampling design, frequency, and methodology, sample preservation techniques and laboratory analytical procedures being in accordance with industry-accepted / NATA accredited methodologies; and ▪ Field and laboratory primary and quality control analytical results were compared against Data Quality Indicators for precision, accuracy, representativeness, completeness and comparability as outlined in NEPC (2013) *Schedule B2, Site Characterisation*.
7. Optimise the design for obtaining data	To ensure resource-effective sampling, analysis and data collection for the study that is expected to satisfy the DQOs, the following were performed: ▪ Field works and analyses were undertaken in accordance with this SAQP; ▪ Written instructions guided personnel in the required fieldwork activities; ▪ Field notes were reviewed by the project team to keep abreast of project activities. ▪ Four representative samples were collected from wells BH3M, BH6M, BH11M and BH12M, and analysed for characterisation; ▪ Field and laboratory data were tabulated for review.

G.2 Data Quality Indicators

The data quality indicators (DQIs) identified in **Table G-2** were integrated into the QA/QC program for the assessment.

Table G-2 Data Quality Indicators

QA/QC Component	Data Quality Indicators	Acceptable Range
Accuracy – A quantitative measure of the closeness of reported data to the “true” value	Field – Split duplicate Field – Rinsate blank Laboratory – Laboratory duplicate and matrix spike duplicate	< 30% RPD < laboratory LOR Prescribed by the laboratories
Precision – A quantitative measure of the variability (or reproducibility) of data	Field – Blind duplicate Laboratory – Laboratory duplicate and matrix spike duplicate	< 30% RPD Prescribed by the laboratories
Representativeness – The confidence (expressed qualitatively) that data are representative of each medium present onsite	Field – Rinsate blank Laboratory – Method blank	< laboratory LOR Prescribed by the laboratories
Completeness – A measure of the amount of useable data from a data collection activity	Completion (%)	Analytical data sets acquired during the assessment will be evaluated as complete upon confirmation that SOPs for sampling protocols were adhered to and copies of all COC documentation are presented and found to be properly completed. It can therefore be considered whether the proportion of “useable data” generated in the data collection activities is sufficient for the purposes of the land use assessment.

Notes:
LOR = limit of reporting
RPD = relative percentage difference
SOP = standard operating procedure
COC = Chain-of-Custody

G.3 Sampling

Sample collection and analysis were required for the assessment. The corresponding methodology is outlined in Table **G-3**.

Table G-3 Groundwater Sampling

Activity/Item	Details
Drilling Locations	Four groundwater monitoring wells (BH3M, BH6M, BH11M and BH12M) were installed during the previous investigations: ▪ BH3M, BH11M and BH12M are located outside the basement footprint; and ▪ BH6M is located inside of the basement footprint.
Drilling Methodology	Drilling at the location of groundwater monitoring well was advanced using a track-mounted, mechanical, solid-flight auger rig.
Well Construction	Well construction involved the following: ▪ Ø50 mm, Class 18 uPVC, threaded, machine-slotted screen and casing, with slotted intervals set to screen to at least 1 m above the standing water level to allow sampling of phase-separated hydrocarbon product, if present;

Activity/Item	Details
	▪ Base and top of each well is to sealed with a uPVC cap; ▪ Annular, graded sand filter was to be approximately 500 mm above top of screen interval; ▪ Granular bentonite to be applied above annular filter to seal the screened interval; ▪ Cement slurry to be used to backfill the bore annulus to just below ground level; and ▪ Surface completion to comprise of Ø50 mm uPVC casing to approximately 0.8 m above ground level.
Well Development	Well development was conducted for newly installed well following installation. This involved agitation within the full length of the water column using a dedicated, HDPE, disposable bailer, followed by removal of water and accumulated sediment until no further reduction in suspended sediment is observed (i.e. after removal of several well volumes).
Well Survey (Elevation)	Well elevations at ground level were surveyed during the current investigation in metres relative to Australian Height Datum (mAHD).
Well Gauging	Monitoring wells were gauged for standing water level (SWL, depth to groundwater) prior to well purging at the commencement of the GME.
Well Purging and Field Testing	Measurement of water quality parameters was conducted repeatedly during well purging and were recorded onto field data sheets until water quality parameters stabilise in accordance with NEPC (2013) guidelines (to within ± 10% for DO, ± 3% for EC , ± 0.2 for pH, ± 0.2° for temperature and ± 20 for redox). Field measurements for Dissolved Oxygen (DO), Electrical Conductivity (EC) and pH of the purged water are to be recorded during well purging. Purged water volumes removed from each well and field test results are to be summarised**.**
Sampling Frequency	One groundwater monitoring event (GME) was conducted.
Groundwater Sampling	Groundwater samples (BH3M, BH6M, BH11M and BH12M) were sampled by a low-flow / minimal draw-down method, using a peristaltic pump with dedicated tubing. Water was measured for field parameters (Temperature, EC, Redox, DO and pH). Once stabilised groundwater field parameters were achieved, groundwater sampling was undertaken.
Decontamination Procedure	Dedicated gloves were used for the collection of each sample. Sampling equipment (interface probe and water quality kit probes) were decontaminated between uses by washing in a solution of potable water and PFAS-free detergent (Decon 90®), then rinsed with potable water. Decontamination was not required for the sampling pump, as dedicated disposal tubing were used for sampling at each individual well. Dedicated gloves were used for the collection of each sample. New tubing was used at each individual well. All sample containers were supplied by the laboratory for the particular project and only opened once immediately prior to sampling. Ice packs were used to keep the samples cool when kept in an insulated chest.
Sample Containers, Preservation and Handling Time	Laboratory supplied containers. ▪ Metals: 60 mL plastic, nitric acid, chill to 12 oC; Metals: 180 days; Mercury: 28 days; Hexavalent Chromium: 14 days ▪ TRH/VOC: 2 x 40 mL amber glass vials, sulfuric acid or sodium bisulfate for airfreight, chill to 12 oC; TRH: 7 days VOC: 7-14 days ▪ SVOC: 100 mL amber glass, no preservative, two additional bottles for lab QA/QC, chill to 12 oC; SVOC: 7 days ▪ Nutrients: 125 mL amber glass. Nutrients: 7 days

Activity/Item	**Details**
	Samples for metals analysis were field-filtered using 0.45 µm pore-size filter. All containers were filled with zero headspace, then capped and stored in ice-filled chests, until completion of the fieldwork and during sample transit to the laboratory. Sample containers were labelled with individual and unique identification including Project No., Sample No., and date of sampling.
Sample Transport	After sampling, refrigerated sample chests were transported to the primary laboratory using COC procedures. SRA documentation is to be provided by each laboratory to document sample condition upon receipt.
Laboratory Analyses	Groundwater samples were submitted for the following analysis: ▪ Metals (aluminium (Al), antimony (Sb), arsenic (As), barium (Ba), beryllium (Be), boron (B), cadmium (Cd), total chromium (Cr), cobalt (Co), copper (Cu), iron (Fe), lead (Pb), lithium (Li), manganese (Mn), mercury (Hg), molybdenum (Mo), nickel (Ni), selenium (Se), silica (dissolved SiO2), silver (Ag), strontium (Sr), uranium (U), vanadium (V), zinc (Zn)) ▪ TRH/BTEX ▪ PAHs ▪ Total VOCs ▪ Total Phenols ▪ Total Cyanide ▪ PFAS ▪ Major Anions (sulfate (SO4), chloride (Cl), carbonates (CO3), bromide (Br), fluoride (F)); ▪ Major Cations (calcium (Ca), magnesium (Mg), sodium (Na), potassium (K)); ▪ Nutrients (ammonia (NH3), nitrate (NO3), total nitrogen (N), oxidised nitrogen (N), total phosphorus (P), reactive phosphorus (P)); ▪ Microbiological organisms (Faecal coliforms, faecal streptococci, Escherichia Coli); ▪ Electrical Conductivity ▪ pH ▪ Total Dissolved Solids ▪ Hardness ▪ Dissolved oxygen
Field QA/QC	Field QA/QC involved: ▪ Sampling in accordance with EI's *Standard Operating Procedures Manual*; ▪ A site safety plan was developed prior to works commencement; ▪ The analysis of blind / split field duplicates; ▪ The analysis of one VOC trip blank sample and one equipment wash blank sample; ▪ Samples were stored under secure, temperature controlled conditions; ▪ Chain of custody documentation was completed, to confirm the handling, transport and delivery of samples to the contracted environmental laboratories.
Laboratory QA/QC	The contract laboratory conducted in-house QA/QC procedures involving the analysis of: ▪ Reagent blanks; ▪ Spike recoveries; ▪ Laboratory duplicates; and ▪ Calibration / control standards and blanks.

G.4 QA/QC Program

A summary of the QA/QC measures incorporated into the assessment is given in **Table G-4**.

Table G-4 Assessment QA/QC Measures

Task	Description	Project
Field QA/QC		
General	Work was to be undertaken following standard field procedures which are based on industry accepted standard practice.	Groundwater samples were obtained using sample bottles/vials provided by the laboratory.
	All fieldwork was completed by a suitably qualified and experienced person	Yes
Equipment Decontamination	Sampling equipment to be decontaminated after the collection of each soil sample by washing with phosphate-free detergent and potable water, followed by a final distilled water rinse. One rinsate blank would be collected and analysed for the primary contaminants. All results should be non-detect.	Yes One rinsate blank sample (GW-QRB1) was collected on 14 August 2024. All results were reported as below the detection limits.
Transport	Samples stored in a chilled cooler and transported to the laboratories by courier under 'chain of custody' procedures, describing sample preservation and transport duration.	Yes. See sample receipt documentation, **Appendix F**.
Trip Blanks	Trip blank samples were to be prepared and analysed by the primary laboratory for BTEX. Analytical results to be below the laboratory LOR, indicating satisfactory sample transport and handling conditions were achieved.	One trip blank sample prepared by the primary laboratory was analysed for BTEX during groundwater investigation. All results were reported below the laboratory LOR, indicating that no cross-contamination of volatiles occurred during sample transport and handling.
Trip Spikes	Trip spike samples were to be prepared and analysed by the primary laboratory for BTEX. Analytical results to be within 80-120% recovery, indicating satisfactory sample transport and handling conditions were achieved.	One trip spike samples prepared by the primary laboratory was analysed for BTEX during groundwater investigation. All results met the required DQIs.
Duplicates	Field duplicate samples were to be analysed as follows (as per NEPM): ▪ intra-laboratory duplicates at a rate of 1 in 20 primary samples; and ▪ inter-laboratory duplicates at a rate of 1 in 20 primary samples. Field and laboratory acceptable limits between 30-50% RPD as stated by AS4482.1–2005. RPDs that exceed this range may be considered acceptable where: ▪ Results are less than 10 times the limits of reporting (LOR); ▪ Results are less than 20 times the LOR and the RPD is less than 50%; or ▪ Heterogeneous materials or volatile compounds are encountered. Non-compliance is to be documented in the report and the sample re-analysed or a higher level conservatively adopted.	Laboratory duplicates were prepared and analysed for the groundwater investigation. The RPD values calculated for the field duplicates were all compliant with the DQIs. The data was fit for use. Field QC samples and calculated RPD values are presented in **Table B3**. Copies of laboratory reports are included in **Appendix F**.

Task	Description	Project
Laboratory QA/QC		
Laboratory Analysis	The laboratories selected are NATA accredited for the analytes selected and perform their own internal QA/QC programs.	Yes SGS - primary laboratory Laboratory QA/QC analyses are included in **Appendix G**.
	Appropriate detection limits were used for the analyses to be undertaken.	Limits of reporting for all tested parameters are presented in laboratory analytical reports in **Appendix G**.
Holding Times	Holding times are the maximum permissible elapsed time in days from the collection of the sample to its extraction and/or analysis, in line with standard guidelines.	Assessment of holding times has been undertaken by the laboratory. All samples were within the holding times.
Method Blanks	Method blanks identify contamination in the reagent materials and assess potential bias in the sample analysis due to contaminated reagents. The QC criterion aims to find no detectable contamination in the reagents.	Yes
Laboratory Duplicates	Laboratory duplicates are field samples that are split in the laboratory and subsequently analysed a number of times in the same batch. These sub-samples are selected by the laboratory to assess the accuracy and precision of the analytical method. The selected laboratories should undertake QA/QC procedures at a frequency of 1 in 10 samples.	Assessment of laboratory duplicates has been undertaken by the laboratory. Duplicate RPD outside acceptable range for VOCs and volatile petroleum hydrocarbons due to sample heterogeneity. Minor non-conformance, with negligible effects on data use for interpretative purposes.
Laboratory Control Standard	A laboratory control standard is a standard reference material used in preparing primary standards. The concentration should be equivalent to a mid-range standard to confirm the primary calibration, and should be analysed at a rate of 1 per 20 samples (min 1 per batch)	Assessment of laboratory control standard has been undertaken by the laboratory. All laboratory control standards were within acceptable ranges.
Matrix Spikes	Matric spikes are field samples to which a predetermined stock solution of known concentration has been added. The samples are then analysed for recovery of the known addition. Recoveries should be within the stated laboratory control limits of 70 to 130% and duplicates should have RPDs of less than 50%.	Assessment of matrix spikes has been undertaken by the laboratory. Matrix spike outside of acceptable range for sodium due to the presence of significant concentration of analyte (i.e. the concentration exceeds the spike level). Minor non-conformance, with negligible effects on data use for interpretative purposes.
Surrogate Spikes	Surrogate spikes provide a means of checking, for every analysis that no gross errors have occurred at any stage of the procedure leading to significant analyte loss. Recoveries should be within the stated laboratory control limits of 70 to 130%.	Assessment of surrogate spikes has been undertaken by the laboratory.
Conclusion	The QA/QC indicators should either all comply with the required standards or showed no variations that would have no significant effect on the quality of the data.	Assessment of the investigation QA/QC is presented in the following sections.

Field QA/QC

The field (intra- / inter- laboratory) duplicate samples collected are summarised in **Table G-5**.

Table G-5 Field QC Samples

Matrix	Primary QA Sample	Duplicate (Primary Lab)	Triplicate (Secondary Lab)	Total Duplicates
Groundwater	BH11M	GWQD1	GWQT1	2

Review of the field data quality indicators is presented in **Table G-6** below.

Table G-6 Field Data Quality Indicators

QA Component	Data Quality Indicator(s)	Conformance
Accuracy – a quantitative measure of the closeness of reported data to the "true" value	SOPs appropriate and complied with	Yes
	Results for inter-laboratory (split field) duplicates acceptable	Yes
Precision – A quantitative measure of the variability (or reproducibility) of data	SOPs appropriate and complied with	Yes
	Results for intra-laboratory (blind field) duplicates acceptable	Yes
Completeness – A measure of the amount of useable data from a data collection activity	Each critical location sampled	Yes
	Samples collected at targeted locations and depth	Yes
	SAQP appropriate and complied with	Yes
	Experienced sampler	Yes
	Field documentation correct	Yes
Comparability – The confidence (expressed qualitatively) that data may be considered to be equivalent for each sampling and analytical event	Same sampling method used on each occasion/location	Yes
	Experienced sampler	Yes
	Same type of samples collected (filtered, size, fractions)	Yes
Representativeness – The confidence (expressed qualitatively) that data are representative of each medium present onsite	Appropriate media sampled according to SAQP	Yes
	Each media identified in SAQP sampled	Yes
	Appropriate sample collection methodologies, handling, storage and preservation techniques used	Yes

Conclusion for the Field QA/QC

All field work, including equipment decontamination and sample preservation and transport, was conducted in accordance with the SAQP, which were devised with reference to industry-approved guidelines. Appropriate QC measures were integrated into each sampling event and the DQIs were met.

All samples, including field QC samples, were transported to the primary and secondary laboratories under refrigerated conditions, using strict COC procedures. Relevant documents (COC forms) were presented with the samples at the times of delivery. All supporting documents (COCs and SRAs) were completed in full and signed, where appropriate. EI considered the field QA/QC program carried out during the assessment to be appropriate.

Laboratory QA/QC

Laboratory Accreditation

Primary and intra-laboratory duplicate samples were analysed by SGS (located in Alexandria NSW). All laboratories are accredited by NATA for the analyses undertaken.

Laboratory QC Summary

Review of the laboratory data quality indicators is presented in **Table G-7** below.

Table G-7 Laboratory Data Quality Indicators

QA Component	Item	Conformance
Completeness A measure of the amount of useable data (expressed as %) from a data collection activity	All critical samples analysed according to SAQP and proposal	Yes
	All analytes analysed according to SAQP in proposal	Yes
	Appropriate methods and PQLs	Yes
	Sample documentation complete	Yes
	Sample holding times complied with	Yes
Comparability The confidence (expressed qualitatively) that data may be considered to be equivalent for each sampling and analytical event	Sample analytical methods used (including clean-up)	Yes
	Sample PQLs (justify/ quantify if different)	Yes
	Same laboratories (justify/ quantify if different)	Yes
	Same units (justify/ quantify if different)	Yes
Representativeness Confidence that data are representative of each media	All key samples analysed according to SAQP in the proposal	Yes
Precision A quantitative measure of the variability (or reproducibility) of data	Analysis of laboratory duplicates	Yes
	Analysis of field duplicates	Yes
	Analysis of laboratory-prepared volatile trip spikes	Yes
Accuracy A quantitative measure of the closeness of reported data to the true value	Analysis of field blanks	Yes
	Analysis of rinsate/ rinsate blanks	Yes
	Analysis of method blanks	Yes
	Analysis of matrix spikes (MS)	Yes
	Analysis of surrogate spikes	Yes
	Analysis of laboratory control samples	Yes

Conclusion for the Laboratory QA/QC

All contracted laboratories (SGS and Envirolab) were accredited by NATA for the analyses undertaken. All analytical procedures used were industry recognised and endorsed standard methods. Appropriate QC measures were integrated into each testing batch and the DQIs were met, or if not, the variability was suitably justified.

All final reports were submitted in full and included all requested analyses, as per the signed COC forms. EI considered the laboratory QA/QC programs carried out during the assessment to be appropriate.

Conclusion for the Assessment QA/QC

The sampling procedures and laboratory methods used for the assessment were consistent with EI protocols. The project DQOs and DQIs specified in **Sections G1 to G3** were achieved, and ensured that the data collated were accurate, precise and representative of the site condition. It was therefore considered results were appropriate for interpretative use.

Appendix H – Completion Report for Dewatering Work

eiaustralia

Completion report for dewatering work

Providing a completion report is a condition of the approval and a copy of the completed form **must** be supplied **when or before you surrender the approval** to finalise the dewatering activity. You cannot surrender the approval without it.

All the information to be supplied is specified within this form.

To complete the form, you will be required to gather data at the commencement of works and during the dewatering activity.

How to use this form

Use this form to record and report groundwater taken by aquifer interference activities[1]

Section A to E:

These sections require information on the following:

Approval held, dewatering duration/groundwater source, details of person taking water, activity description and location.

Section F to I:

For these sections you will be required to gather data at the commencement of works and during the dewatering activity.

Information to enter includes:
Summary of total water taken, record of metered volumes taken, summary of water level measurements from monitoring bores and water testing undertaken.

Note:

- Information must be supplied in accordance with approval held, refer to approval.
- To measure volumes, a meter must be used[7].
- Excel soft copies of measurement data may also be required. Please ensure these are provided in accordance with the instructions shown in that section.

Section J:

Complete form declaration.

Refer to the end of the form for information on:

- Returning completed forms and any attachments
- Where to get help
- Privacy Statement
- Notes section

Section A: Approval held

Report submission date	
Dewatering approval number	
Approval expiry date	
Date received (Office use only)	

Section B: Dewatering duration / groundwater source

Dewatering duration	Days/Weeks/Months/Years
Dewatering start date	
Dewatering end date	
Groundwater source[2]	

Section C: Details of person taking water[3]

Full name		
Company/organisation (including ACN/ABN)		
Postal address		
Suburb	State	Postcode
Phone number		
Email		

Section D: Activity description

Project name
Describe the activity/s resulting in groundwater being taken[4]
Describe the means by which the groundwater is being taken[5]
Is your dewatering activity exempt from obtaining a water access licence under the *Water Management (General) Regulation 2018* ☐ Yes ☐ No
If no, please provide your water access licence number

Section E: Activity location

Address		
Suburb	State	Postcode

or

Lot / Deposited Plan / Section

or

GPS coordinates[6] *(for example, 32.25316 S   148.60022 E)*

Section F: Summary of total water taken

Provide the below in accordance to approval held. **Important**: a meter must be used to measure volumes[7].

1. Duration of dewatering (pumping)[8] either a) or b):		
a) ☐ for water year	1 July	**to** 30 June
b) ☐ during dewatering period	From	**to**

2. Total volume pumped in either **a)**, **b)** or **c)** units[9]		
a) ☐ in Litres		L
b) ☐ in Kilolitres		kL
c) ☐ in Megalitres		ML

Section G: Record of metered volumes taken

Complete this section to record **metered** volumes taken. Either **daily** or **weekly** readings are required.

Refer to the conditions of your approval and the exemption (if applicable) to determine the reading frequency you need to provide.

Notes:

- A meter must be used to measure volumes[7].
- Please update the table required.
- If entries are longer than 5 lines, provide an Excel spreadsheet soft copy with the data. If a soft copy is provided - use the same headings and naming conventions as per the required daily or weekly table following.

Daily

Are any attachments included? ☐ Yes ☐ No	
If yes, provide attachment name/s	

Meter brand type		**Meter serial number**	

Start date and time	**Start meter reading**	**End date and time**	**End meter reading**	**Volume taken**	**Units** (L, kL, ML)	**Date and time record made**

Weekly

If entries are longer than 5 lines, provide an Excel spreadsheet soft copy with the data. If provided in soft copy - use the same headings and naming conventions as per the table below.

Are any attachments included? ☐ Yes ☐ No	
If yes, provide attachment name/s	

Meter brand type		**Meter serial number**	

Week ending	Start date and time	Start meter reading	End date and time	End meter reading	Volume taken	Units (L, kL, ML)	Date and time record made

Section H: Summary of water level measurements from monitoring bores

Refer to the approval you hold to determine if required. If required, enter information in the table below and provide all measurement data separately in an Excel spreadsheet (soft copy).

If automatic loggers are used, the default Excel output soft copy, will be accepted provided it includes all the relevant measurement data and units.

If automatic loggers are not used, the Excel output soft copy must include as a minimum the following:

- Bore ID
- Date
- Time
- Water level measurement (m below MP)
- Measuring point description
- Measuring point RL (m AHD)
- Comments.

Are any attachments included?	☐ Yes ☐ No
If yes, provide attachment name/s	

Bore ID	**Measuring point RL (m AHD)**	**Depth to water before dewatering (m)**	**Depth to water during dewatering (m)**	**Depth to water after dewatering (m)**	**File name of measurements spreadsheet attached**
For Example: *MB1*	*1.000*	*0.5*	*4.0*	*0.6*	*MB1.xlsx*

Section I: Water testing undertaken

Information supporting these entries must be captured and supplied as an attachment in Excel soft copy form:

Are any attachments included?	☐ Yes ☐ No
If yes, provide attachment name/s	

a) Range in pH measured	
b) Range in electrical conductivity (Salinity) in (µS/cm)	
c) Any other exceedance of water quality criteria?	☐ Yes (specify below) ☐ No

Exceedance(s)

Section J: Declaration

I declare all information contained in this record is accurate, true and complete.

Signature	Date	
Name/Company officeholder		
Position	Phone	
Address		
Suburb	State	Postcode
Email		

Giving false or misleading information is a serious offence under Part 5A of the *Crimes Act 1900*. It is an offence under section 91J of the *Water Management Act 2000* for a person to make a statement or furnish information in or in connection with a metering record required to be kept that the person knows to be false or misleading in a material particular.

Privacy statement

The personal information that is provided in this form will be managed by WaterNSW in accordance with its Privacy Procedure, or other such Policy document as updated from time to time. The information provided in this form is being collected and used for purposes relating to the Record confirmation of specified matters before water is taken described in this form to the *Water Management Act 2000* (NSW). The information provided in this form may be disclosed to public authorities and other authorised parties as required.

If you choose not to provide the requested information in this form, you may not be able to take water and you may be in breach of the *Water Management Act 2000*. You have the right to request access to, and correct details of, your personal information held by WaterNSW. Further information regarding privacy can be obtained from waternsw.com.au/privacy.

Returning completed forms

Please return your completed form/s and any attachments to:
Customer.Helpesk@waternsw.com.au
In the subject line: Dewatering completion report - Approval (Approval reference number)
or

WaterNSW
PO Box 398
Parramatta NSW 2124

Where to get help

Further information is available at:
waternsw.com.au/dewatering | 1300 662 077 | Customer.Helpdesk@waternsw.com.au

Notes

1. **Aquifer interference activity** has the same meaning as set out in the Dictionary to the *Water Management Act 2000* which is an activity involving any of the following:
   a. the penetration of an aquifer,
   b. the interference with water in an aquifer,
   c. the obstruction of the flow of water in an aquifer,
   d. the taking of water from an aquifer in the course of carrying out mining, or any other activity prescribed by the regulations,
   e. the disposal of water taken from an aquifer as referred to in paragraph d).
2. Refer to your approval for the **groundwater source** you are taking water from.
3. For infrastructure or construction projects this may be the **applicants' representative** for example a contractor.
4. **Describe the activity/s taking groundwater** while conducting the aquifer interference activity, and the number of works involved.
   For example:
   - extraction using a battery of 15 spear points to dewater a building construction site
   - groundwater extracted from a permanent sump in a building basement
   - groundwater extracted from a trench or excavation
5. Examples of the **means by which the groundwater is taken** include surface pump, airlift, downhole/submersible pump, bailer, water removed with ground materials, water freely draining from a cutting, pit seepage / inflow, evaporation from artificial lake that has filled from groundwater. Where several means of take are involved please identify the number and type of each.
6. Please provide GPS coordinates as longitude and latitude in decimal degrees.
7. Metering equipment must be used to measure volumes. Metering equipment consists of a meter and a data logger. **Telemetry is not required.** However, other metering equipment and standards may be specified by a condition of the water supply work approval.
   In the **event metering equipment becomes faulty**, you must report within 24 hours to WaterNSW at waternsw.com.au/s91i. An offence applies under section 91IA of the *Water Management Act 2000* for failing to report faulty metering equipment within 24 hours.
8. For Section F - I: Duration of dewatering (pumping) is elapsed time between the start and end dates for a period of continuous take. If the period of take extends over more than one water year, annual reporting may be required. This record must be retained for five years.
9. Record the **total volume of groundwater taken** in the water year/s for the groundwater source in either litres (L), kilolitres (kL) or megalitres (ML).