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Hydrogeological Report including Dewatering Management Plan and Groundwater Seepage Analysis

881-885 Bourke Street, Waterloo NSW

E26442.E16_Rev1
27 August 2025

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Table of Contents

		Page Number
1.	**INTRODUCTION AND PROJECT DESCRIPTION**	**1**
2.	**SITE CONTEXT AND DESCRIPTION**	**2**
3.	**SEARS REPORTING REQUIREMENTS**	**3**
4.	**OBJECTIVES, SCOPE AND FRAMEWORK**	**4**
4.1	Report Objectives	4
4.2	Scope of Work	4
4.3	Regulatory Framework	5
5.	**DEVELOPMENT SETTING**	**6**
5.1	Property Identification, Location and Physical Setting	6
5.2	Surrounding Land Use	6
5.3	Regional Setting	7
5.4	Local Groundwater Use	7
5.5	Potential Sources of Contamination	8
5.5.1	*Onsite Sources*	*8*
5.5.2	*Offsite Sources*	*8*
5.6	Potential Environmental Receptors	9
5.7	Groundwater Dependent Ecosystems (GDEs)	9
5.8	Soil Salinity	9
5.9	Acid Sulfate Soils	9
5.10	Soil Erosion	9
5.11	Proposed Development	10
6.	**GROUNDWATER CONDITIONS**	**11**
6.1	Previous Investigations	11
6.2	Conceptual Hydrogeological Model	11
6.3	Pre-dewatering Groundwater Depth and Hydraulic Gradient	12
6.4	Baseline Groundwater Quality Assessment	12
6.4.1	*Monitoring Well Locations*	*12*
6.4.2	*Sampling, Analytical and Quality Plan*	*12*
6.4.3	*Data Quality Assessment*	*13*
6.4.4	*Groundwater Sampling Methodology*	*13*
6.4.5	*Tested Parameters*	*14*
6.4.6	*Assessment Criteria*	*14*
6.4.7	*Field-based Water Quality Testing and Observations*	*15*
6.4.8	*Laboratory Analytical Results*	*16*
6.4.9	*Water Treatment Requirements*	*16*
7.	**DEWATERING METHODOLOGY**	**17**
7.1	Excavation and Shoring	17
7.2	Estimated Groundwater Take Volumes	17

7.3 Dewatering Level, Drawdown-Induced Ground Settlement &Monitoring 17
7.4 Dewatering Method 18
7.4.1 Construction Phase Dewatering 18
7.4.2 Operational Phase Dewatering 18
7.5 Discharge Flow and Volume Monitoring 18
7.6 Potential Drawdown-Induced Impacts 19

8. WATER QUALITY MANAGEMENT 20
8.1 Responsibility 20
8.2 Discharge Water Quality Guidelines 20
8.3 Additional Pre-dewatering Monitoring Event 22
8.4 Discharge Water Quality Monitoring 23
8.4.1 Visual Monitoring 23
8.4.2 Sample Collection and Analysis 23
8.4.3 Reporting of Water Quality Results 24
8.4.4 Reporting of Other Information 24
8.5 Water Treatment 24
8.5.1 Treatment System Design 24
8.5.2 Treatment System Maintenance 25
8.6 Dewatering Completion Report (DCR) 25

9. SITE MANAGEMENT CONTROLS 27
9.1 Deviations from this Plan 27
9.2 Contact Details for Key Personnel 27
9.3 Summary of Specific Activities 27
9.4 Vibration, Noise, and Odour Management 28
9.5 Dewatering Contingencies 28

10. MINIMAL HARM ASSESSMENT 32
10.1 Consideration of NSW Aquifer Interference Policy 32
10.1.2 Groundwater Source Category 32
10.1.3 Minimal Impact Considerations 32
10.1.4 Minimal Impact Assessment Conclusions 33
10.2 Assessment Inputs 33

11. CONCLUSION 35

12. STATEMENT OF LIMITATIONS 36

13. REFERENCES 37

ABBREVIATIONS 38

Schedule of Tables (in-text)

Table 4-1	Regulatory Framework	5
Table 5-1	Site Identification, Location, Zoning and Soil Profile	6
Table 5-2	Local Land Uses	6
Table 5-3	Regional Setting Information	7
Table 5-4	Summary of active groundwater supply bores	7
Table 6-1	Summary of Groundwater Depth Measurements	12
Table 6-2	Summary of Groundwater Sampling Methodology	13
Table 6-3	Summary of Groundwater Quality Test Parameters	14
Table 6-4	Groundwater Field Data	15
Table 7-1	Assessment of Potential Dewatering Effects	19
Table 8-1	Discharge Water Criteria	20
Table 9-1	Mitigation Measures for Potential Dewatering Issues	28
Table 10-1	Assessment inputs summary	33

Appendices

APPENDIX A – FIGURES

APPENDIX B – REGISTERED WATER SUPPLY BORES

APPENDIX C – DEVELOPMENT PLANS AND SURVEY

APPENDIX D – GROUNDWATER SEEPAGE ANALYSIS

APPENDIX E – MONITORING BORE LOGS

APPENDIX F – TABLES

APPENDIX G – LABORATORY DOCUMENTATION

APPENDIX H – QA/QC ASSESSMENT

APPENDIX I – WATERNSW DEWATERING COMPLETION REPORT FORM

1. INTRODUCTION AND PROJECT DESCRIPTION

This Hydrogeological Report including Dewatering Management Plan and Groundwater Seepage Analysis been prepared by EI Australia on behalf Waterloo Property Pty Ltd as trustee for the Waterloo Property Unit Trust (the Applicant) in support of a Housing Delivery Authority (HDA) nominated State Significant Development Application (SSDA) for a proposed mixed-use development at 881-885 Bourke Street, Waterloo, with concurrent rezoning (SSD-80441462). The report is submitted to the NSW Department of Planning, Housing, and Infrastructure (DPHI).

This application is preceded by a separate SSDA for Early Works that prepare the Site for the proposed development (SSD-80911502).

Specifically, consent is sought for the following Main Works for the Waterloo Mixed Use Development:

- Site establishment and enabling works (that were not included in the preceding Early Works SSDA);
- Construction of residential and mixed-use buildings across four development parcels, inclusive of;
    - build to rent apartments and associated amenities;
    - affordable apartments;
    - non residential floor space including commercial premises and creative industry;
- Construction of a consolidated basement with below-ground links between development parcels, comprising car parking, plant and storage area;
- Landscaping and publicly accessible open space;
- Works to site frontages; and
- Extension and augmentation of infrastructure and services (that were not included in the preceding early Works SSDA) as required.

Development on the site was declared State Significant Development (SSD) pursuant to State Significant Declaration Order 2025 (Order) dated 17 February 2025. The Order declares development specified in EOI application 229420 dated 8 January 2025, including development for the purposes of mixed-use development (Build to Rent including affordable housing) with ground floor non-residential uses at 881-885 Bourke Steet, as identified in Schedule 3, is SSD.

On 5 March 2025, the Department of Planning, Housing and Infrastructure (the Department) issued SEARs and concurrent rezoning requirements for the project.

The site is subject to an existing Voluntary Planning Agreement (VPA) that sets out dedication of public domain between four development parcels. The public domain includes a new east-west street, a through site link and public open space area (comprising future shared zones and park). The development parcels and public domain as set out in the VPA will be delivered notwithstanding the works proposed in this SSDA.

This report has been prepared to describe site-specific measures for the appropriate management of surface and groundwater during basement construction. It is assumed that all water draining into the excavation area will be discharged into the municipal stormwater system with Council approval.

2. SITE CONTEXT AND DESCRIPTION

The site is legally described as Lot 1 DP1308636 and Lot 2 DP1308636 and is located at 881-885 Bourke Street, Waterloo (**Figure A1, Appendix A**).. The site has an area of 21,554m^2. It has an irregular shape, is generally flat and has been cleared of all light industrial and large format commercial buildings. The site currently has vehicle access from Young Street and Bourke Street.

The site is located within Gadigal Land, in the Sydney Local Government Area (LGA) and is approximately 4km south of the Sydney CBD. The site is approximately 950m walking distance east of an entrance to the Waterloo Metro Station, approximately 1.1km northeast of the Green Square Train Station and approximately 1.5km southeast of Redfern Train Station. The site is also immediately adjacent to a bus stop on Bourke Street.

There are a number of trees along the Danks and Young Street frontages. Additional trees on these frontages are located outside the site boundary. There are commercial and business premises to the west, high-density residential and business premises to the north, primarily high-density residential to the east and high density residential under construction to the south.

An aerial of the site is provided in **Figure 1**.



Figure 1 Site Aerial
(Source: Nearmap, Ethos Urban)

3. SEARs REPORTING REQUIREMENTS

This Hydrogeological Report including Dewatering Management Plan and Groundwater Seepage Analysis report has been prepared to address the *Planning Secretary's Environmental Assessment Requirements* (SEARs) issued by the Department of Planning, Housing and Infrastructure (DPHI) for the subject SSDA, with specific SEAR(s) identified in the table below.

SEAR	SEAR Description	Report Name or Report Section
12 Ground and Groundwater Conditions	▪ Assess potential impacts on soil resources and related infrastructure and riparian lands on and near the site and including soil erosion	Hydrogeological Report including Dewatering Management Plan and Groundwater Seepage Analysis **(Sections 4 to 12 and Appendices)**
	▪ Where required provide a Groundwater Impact Assessment in accordance with relevant Groundwater Guidelines. If the proposed development is on land identified as a having high salinity or acid sulfate soil potential in an EPI provide a Salinity Management Plan or Acid Sulfate Soil Management Plan that includes appropriate management measures and strategies	Management / mitigation measures and strategies are detailed under Dewatering Contingencies in **Section 9.5**

4. OBJECTIVES, SCOPE AND FRAMEWORK

4.1 Report Objectives

As the proposed basement will intercept the shallow groundwater system, temporary site dewatering is required to enable basement construction. In view of this, 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, hydraulic gradient and groundwater quality;
- Summarise relevant hydrogeological and groundwater modelling information, with reference to the groundwater seepage assessment (GSA) as detailed in the attached GSA report;
- Describe the dewatering methodology, groundwater treatment requirements, monitoring and reporting procedures to be employed during construction phase dewatering;
- Provide effective management and contingency procedures, to ensure that dewatering discharge does not pose unacceptable risks to the receiving environment, in compliance with the Protection of the Environment Operations Act 1997; and
- Provide relevant information on anticipated groundwater impacts, with reference to the NSW Aquifer Interference policy to properly inform the regulatory approval process.

This DMP will also form the basis for Council approval for connection and discharge to the municipal stormwater system and water supply works (dewatering licence) approval by WaterNSW.

It is also noted that WaterNSW may not fully assess the dewatering license application until Council issues a stormwater discharge permit. To facilitate the approval process however, this DMP is issued concurrently to WaterNSW and Council.

4.2 Scope of Work

With reference to the above report objectives, the following works were undertaken:

- A desktop study including:
  - Review of the development proposal and proposed shoring/dewatering designs;
  - Review of geological, landscape and acid sulfate soils (ASS) risk maps for the area;
  - Review Council DA consent and WaterNSW requirements to determine the generic and site specific conditions placed on the development relevant to the dewatering process;
  - A search of government records for previously installed registered bores located within a 500m radius of the site to review local groundwater usage;
  - Review of previous environmental and geotechnical investigation reports to inform the conceptual hydrogeological model and identify potential onsite and offsite sources of contamination that may impact the beneficial use category of the groundwater source;
  - Review of existing reports and laboratory analytical data obtained during previous groundwater monitoring events (GME) and carrying out a new GME to characterise baseline groundwater quality, for water treatment planning;
  - Groundwater elevation contouring and flow analysis based on recent GME data to determine hydraulic gradient;

- Review of GSA findings based on computer modelling for the assessment of groundwater inflow volumes, predicted drawdown effects and drawdown-induced ground settlement in response to construction dewatering; and

- Data analysis and report preparation.

4.3 Regulatory Framework

The following regulatory framework and guidelines were considered during the preparation of this report:

Table 4-1 Regulatory Framework

NSW Legislation and Regulatory Instruments	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 Environment Protection Agency (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.
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.
City of Sydney Council Plans and Policies	Provide controls and guidelines for development in the area. Relevant to this site are: ▪ *Sydney Development Control Plan 2012*; and ▪ *Sydney Local Environmental Plan 2012*. 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.
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; ▪ DPE (2022) *Minimum requirements for building site groundwater investigations and reporting;* and ▪ NHMRC (2008) *Guidelines for Managing Risks in Recreational Water;* and ▪ NSW DEC (2007) *Guidelines for the Assessment and Management of Groundwater Contamination.*

5. DEVELOPMENT SETTING

5.1 Property Identification, Location and Physical Setting

Site identification details and associated information are summarised in **Table 5-1**. Site location and the assessment area are illustrated in the figures included in **Appendix A**.

Table 5-1 Site Identification, Location, Zoning and Soil Profile

Attribute	Description
Street Address	881-885 Bourke Street, Waterloo
Location Description	2.8 km southeast of Sydney central business district. The property is an irregular shaped block of land, comprised of light industrial and large commercial buildings bound by commercial properties and Danks Street (north), Young Street (west), Bourke Street (east) and vacant land and commercial properties followed by McEvoy Street (south).
Lot and DP	Lots 1 and 2 in DP1308636
Site Area	21,554 m^2
Site Coordinates	Northern-western corner of site (GDA2020-MGA56): ▪ Easting: 334445.137 ▪ Northing: 6247746.539 (Source: http://maps.six.nsw.gov.au)
Local Government Authority	Council of the City of Sydney
Current Zoning	MU1 – Mixed Use E1: Local Centre (*Sydney Local Environmental Plan 2012*)
Current Land Use	At the time of this investigation, the site was fenced and undergoing earthworks.
Typical Soil Profile	**Fill –** Sandy Gravel and Clayey SAND; from 0.0m to 4.5Mbgl; overlying **Natural soil** – Sand and Silty CLAY from 0.3m to around 10 mBGL; overlying **Bedrock** – Sandstone from 6.6 m to maximum investigation depth of 12.4mBGL.

5.2 Surrounding Land Use

The site is situated within a commercial and residential area, as described in **Table 5-2**.

Table 5-2 Local Land Uses

Direction	Land Use Description
North	Danks Street, followed by mixed use commercial and residential properties
South	Undergoing construction, followed by McEvoy Street, then mixed use commercial and residential properties
East	Bourke Street, followed by mixed use commercial and residential properties
West	Young Street, followed by mixed use commercial and residential properties

5.3 Regional Setting

A description of the regional setting, including ground surface topography, hydrogeology, acid sulphate soil conditions and soil landscape, is summarised in **Table 5-3**.

Table 5-3 Regional Setting Information

Attribute	Description
Topography	The site is located within gently (0° to 5°) dipping topography with site levels varying from R.L. 29.70 m at the north east site corner to R.L. 26.44 m at the south west site corner.
Site Drainage	Expected to be consistent with the slope, collected in pits and drained to the municipal collection system, which is inferred to drain to Sheas Creek (1.2km south-west) and ultimately to Botany Bay (a further 6.5km south).
Regional Geology	Information on regional sub-surface conditions, referenced from the DMR (1983) *Sydney 1:100,000 Geological Series Sheet 9130* is characterised by the Quaternary *Botany Sands*, comprising marine sands and aeolian-reworked coastal sand dunes near the surface. These sediments are underlain by the Triassic *Hawkesbury Sandstone* (Rh), which consists of medium to coarse-grained quartz sandstone with very minor shale and laminite lenses.
Soil Landscape	eSPADE v2.2 (DCCEEW, 2024) indicates that the site overlies a Tuggerah (tg) aeolian landscape, which is characterised by gently undulating to rolling coastal dunefields (local relief to 20m, slope gradients generally 1-10% but occasionally up to 35%, north-south oriented dunes with convex narrow crests, moderately inclined slopes and broad gently inclined concave swales).
Acid Sulfate Soil (ASS) Risk	The Sydney Local Environmental Plan 2012 - Acid Sulfate Soils Map has the site within a Class 5 area. The site lies within an area classified as having “No Known Occurrence” with respect to ASS (Murphy (1997) *1:25,000 Botany Bay Acid Sulfate Soil Risk Map*). In such cases, ASS are not known or expected to occur.
Nearest Water Feature	Sheas Creek, located approx.1.2 km south-west of the site. Sheas Creek feeds into Alexandra Canal before Cooks River and eventually flows into Botany Bay.
Groundwater depth and flow direction	Groundwater depths encountered during previous onsite investigations ranged between 0.85 and 3.83 mBGL (RL 23.57 to 26.5 mAHD). With reference to regional hydrogeological studies of the Botany Basin (Ref. Hatley, 2004) groundwater in the Waterloo area flows in a south westerly direction, towards Sheas Creek.

5.4 Local Groundwater Use

An online search for groundwater bores registered with WaterNSW was conducted by EI on 20 June 2025 (https://realtimedata.waternsw.com.au/water.stm). The search identified 91 registered groundwater bores within 500m radius of the site, comprising 86 monitoring bores and five bores registered for water supply purposes, three of which showed license status as ‘cancelled’. Only two active water supply bores are therefore currently registered, as summarised as listed in **Table 2-4**.

Table 5-4 Summary of active groundwater supply bores

Bore No.	Drilled Date (Bore Depth in mBGL)	SWL (m BGL)	Authorised Bore Purpose	Distance in relation to Site
GW037956	1/04/1972 (21.10)	-	Industrial	207m east

Bore No.	Drilled Date (Bore Depth in mBGL)	SWL (m BGL)	Authorised Bore Purpose	Distance in relation to Site
GW108245	21/09/2006 (20.80)	5.800	Recreation	288m east

A registered bore location plan and archived bore record details are attached in **Appendix B.** The presence of registered recreation and industrial bores indicates that groundwater may be used for beneficial uses in the locality.

5.5 Potential Sources of Contamination

Potential contamination sources noted from the previous environmental reports Senversa (2021a) were:

- Previous commercial activities on the property (former and current dry cleaning and laundry operations, historical manufacturing, former bus depot, commercial and trucking depot, substation);
- Fill soils of unknown origin and quality;
- Minor spills and leaks from parked vehicles; and
- Migration of mobile contaminants from off-site commercial and industrial properties (whether historical or present).

5.5.1 Onsite Sources

Previous site contamination investigations have identified onsite groundwater impacts Senversa (2021a) in relation to volatile chlorinated hydrocarbons (VCHs), due to chemical leakage from dry cleaning activities that were historically performed on the property.

Stage 1 remediation was completed in October 2024, while Stage 2 remedial works were in progress at the time of this assessment. The remediation strategy included on-site treatment of impacted soil materials, the intention being to re-use treated (remediated) soils for backfilling where possible. Grossly contaminated materials (soil) were disposed off-site in accordance with the EPA (2014) Waste Classification Guidelines.

Clean-up of VCHs in groundwater was achieved before 2016, via the implementation of an extraction and treatment system, the latter involving enhanced in situ bioremediation.

Notwithstanding the remedial action already undertaken at the site, site dewatering may draw in residual impacts from former contamination sources, thereby producing what is expected to be low-level impacted groundwater. It is therefore essential that water treatment measures be implemented to address potential water quality non-compliances.

5.5.2 Offsite Sources

A search of surrounding land indicates that commercial/industrial land uses have been historically taking place immediately adjacent to the site, and the neighbouring parts of the locality, including petrol service stations, dry cleaners, iron and steel foundries. This indicated that any groundwater with residual contaminant levels may potentially be drawn closer to the site dewatering activity.

Construction dewatering must therefore be mindful of potential contaminants that may be drawn into the extracted groundwater, which will be pumped through a water treatment system, to ensure that only compliant water quality is discharged to stormwater. Water quality management is addressed in more detail in **Section 6.4.9** and **8.5**.

5.6 Potential Environmental Receptors

It is proposed that during construction, extracted groundwater will be pumped through a water treatment system (**Section 7.4**) and then discharged into the local municipal stormwater system, which is understood to drain into Sheas Creek (approximately 1.2km south-west of the site).

As described in **Section 5.3**, Sheas Creek feeds into Alexandra Canal, which joins Cooks River, which in turn drains into Botany Bay and ultimately the Pacific Ocean. Due to tidal influences on the receiving water bodies, Sheas Creek and Alexandra Canal are deemed to be disturbed marine water ecosystems for the selection of appropriate discharge water quality criteria, which are detailed in **Section 8.2**.

5.7 Groundwater Dependent Ecosystems (GDEs)

A search of the *NSW Water Sharing Plan for the Greater Metropolitan Region Groundwater Sources 2023 – Schedule 4* was conducted on 20 June 2025. The site or related discharge water systems were not identified as high-priority groundwater-dependent ecosystems.

This information was used in the minimal harm assessment considerations under the NSW Aquifer Interference Policy, as described in **Section 10** of this report.

5.8 Soil Salinity

The site and its surrounding area have not been recorded within any salinity classification according to the Map of Salinity Potential in Western Sydney (DCCE, 2002). It was therefore assumed the potential for saline soils was low, and further assessment of saline soils was considered unwarranted for the subject site.

5.9 Acid Sulfate Soils

As documented in **Table 2-3**, both the Sydney Local Environmental Plan 2012 and Botanty Bay Acid Sulfate Soil Risk Map (1:25,000 scale; Murphy, 1997), identified a no known occurrence of acid sulphate soils. Given the land's elevation, the map information and the proposed development, further assessment of ASS was considered unwarranted for the subject site.

5.10 Soil Erosion

As the site will be largely covered by building structures and landscaping with underlying, constructed basement car parking facilities, pedestrian walkways and drainage control, erosive dispersion is not a significant risk for the proposed development.

The following measures are also considered relevant for minimising erosion in proposed landscaped areas with vegetation:

- Areas of established vegetation should be maintained (where possible). In areas of deep soil, mulch should be used or salt tolerant plants should be planted to use the groundwater source and reduce infiltration.
- Landscaping plans apply to 'waterwise' gardening principles. However, procedures designed to encourage excessive infiltration through the soil should be avoided. In certain landscaping situations, infiltration measures to be incorporated may include a sub-surface drain and liner when rapid infiltration to groundwater is likely to occur.
- Irrigation systems should be properly installed to avoid leakage and smart sprinkler systems should be considered.
- Watering of open space should be kept to a minimum.
- Over-watering must be avoided.

5.11 Proposed Development

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Based on the provided plans, (**Appendix C**) involves the demolition of all existing site structures, followed by the construction of mixed-use development (Build to Rent (BTR) including affordable housing) with ground floor non-residential uses, overlying a two-level basement. The lowest basement levels are proposed to have Finished Floor Levels (FFLs) ranging from RL 20.5 m AHD to RL 23.4 m AHD. Bulk Excavation Levels (BELs) are assumed to range approximately from RL 19.5 m AHD to RL 22.34 m AHD, including an allowance for the construction of the hydrostatic basement slab. To achieve the BEL, excavation depths of up to 11 m below the existing ground level (BGL) are estimated. Locally deeper excavations for lift pits footings, service trenches and crane pads are expected.

6. GROUNDWATER CONDITIONS

6.1 Previous Investigations

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

- Senversa (2021a) *Detailed Site Investigation*, Jeffman Danks Street South Precinct, Waterloo, Ref. s17025_026_rpt_rev3, 26 February 2021 (the 'DSI report');
- Senversa (2021b) *Remediation Action Plan*, Jeffman Danks Street South Precinct, Waterloo, Ref. s17025_028_rpt_rev2rap, 26 February 2021;
- EI (2025a) *Geotechnical Investigation; 881-885 Bourke Street, Waterloo NSW,* EI Australia Report E26442.G03_Rev2, 15 August 2025; and
- EI (2025b) *Groundwater Seepage Analysis; 881-885 Bourke Street, Waterloo NSW,* EI Australia Report E26442.G12_Rev2, 26 August 2025 (the 'GSA Report');

The GSA report (copy attached in **Appendix D**), provides details of the proposed excavation and site-specific groundwater modelling, including predicted water level drawdowns, groundwater inflow and discharge volumes, and potential, drawdown-induced ground settlement rates at varying distances from the basement excavation.

As reported in the DSI report, previous investigations identified potential onsite contamination sources from historical industrial land uses lasting for more than 60 years. Soil and groundwater at the site has since undergone remediation in regards to volatile chlorinated hydrocarbons (VCHs), resulting from previous contamination associated with former dry cleaning activities.

Clean-up of VCH impacts in groundwater were remediated before 2016, via groundwater extraction and treatment incorporating enhanced in situ bioremediation; thus minimising risks to long-term users of the site, and to local groundwater quality.

6.2 Conceptual Hydrogeological Model

Based on a review of published hydrogeological data and previous geotechnical and environmental investigation reports, the Conceptual Hydrogeological Model is outlined as follows:

- The sub-soil profile comprises:
  - Fill – Sandy Gravel and Clayey SAND; from 0.0m to 4.5mBGL, overlying;
  - Natural – marine SAND and Silty CLAY from 0.3m to 10.0mBGL, overlying;
  - Bedrock – Sandstone from 6.6 m, to maximum investigation depth of 12.4mBGL.
- Water table conditions within the sand aquifer exist at the site with groundwater level ranging between 1.40 to 3.80 mBGL (i.e. 24.7 and 27.1 m AHD), as measured in monitoring wells located inside and outside of the proposed basement excavation footprint area (**Table 6-1**);
- Hydraulic conductivity assessed in the field for the various strata were: 4.2 x 10^{-6} for the marine sand, and 3.5 x 10^{-7} m/s for Class V Sandstone; and
- Groundwater flow direction in the vicinity of the site is anticipated to be southwest, towards Sheas Creek (**Section 5.3**).

More detailed reviews of baseline groundwater depth variations and groundwater quality across the site are addressed in **Sections 6.3** and **6.4**, respectively.

6.3 Pre-dewatering Groundwater Depth and Hydraulic Gradient

EI conducted a groundwater monitoring event (GME) on 27 May 2025, as summarised in the GSA report. A summary of groundwater level measurements for monitoring locations outside and inside the proposed basement excavation footprint area are presented in **Table 6-1**. EI borehole / monitoring well logs are presented in **Appendix E** and monitoring well locations are illustrated in **Figure A2**.

Table 6-1 Summary of Groundwater Depth Measurements

Monitoring Well ID	Well location relative to basement	Measurement Date	Depth to Groundwater (m AHD)
BH101M	Inside	27 May 2025	25.33
BH102M	Outside	27 May 2025	2541
BH106M	Inside	27 May 2025	26.80
BH109M	Outside	27 May 2025	25.03
BH112M	Outside	27 May 2025	27.19

Note: Data measured from Groundwater Monitoring Event by EI on27 May 2025.

The monitoring data have shown groundwater levels to be above the bulk excavation level (RL 19.5m to 22.34m AHD). As discussed in the GSA report, a design groundwater level has been conservatively assumed and modelled at the existing ground surface level. This was deemed to be a reasonable assumption based on EI experience of groundwater level fluctuations on other sites with similar hydrogeological conditions.

Groundwater level data collected during GME performed by EI on 27 May 2025 for the available monitoring wells were used to produce the groundwater contour map presented in **Figure A3**. The analysis indicated west to south-westerly groundwater flow direction under a hydraulic gradient of 0.019.

6.4 Baseline Groundwater Quality Assessment

6.4.1 Monitoring Well Locations

Baseline groundwater quality data were derived from the same monitoring event (27 May 2025), which included groundwater sampling from five existing monitoring wells (BH101M, BH102M, BH106M, BH109M and BH112M) results are presented in **Tables F1** and **F2**, in **Appendix F**.

6.4.2 Sampling, Analytical and Quality Plan

The sampling, analytical and quality plan (SAQP) ensures that the data collected are representative and provide a robust basis for assessment decisions. The SAQP for the baseline GME included consideration of the following:

- Data quality objectives (DQO), including a summary of the objectives of the GME;
- Data quality indicators (DQI), applied to the field and laboratory quality control samples;
- Sampling methodology, including the wells to be sampled (sampling points), screening procedures, handling, preservation and storage, and details of the analytes be monitored;
- Laboratory analysis methods;
- Appropriate water quality assessment criteria; and
- Analytical quality assurance / quality control (QA/QC).

6.4.3 Data Quality Assessment

Internal laboratory QA/QC data are presented as part of the laboratory analytical reports in **Appendix G**. A data quality assessment in relation to field tests and laboratory QA/QC is presented in **Appendix H**. EI's data validation process found that the overall quality of field-based and laboratory analytical data produced for baseline groundwater samples were of an acceptable standard for interpretive use.

6.4.4 Groundwater Sampling Methodology

The groundwater sampling methodology followed during the GME is described in **Table 6-2**.

Table 6-2 Summary of Groundwater Sampling Methodology

Activity/Item	Details
Fieldwork	A single GME, involving water level gauging, well purging, measurement of physiochemical parameters and groundwater sampling was conducted on 27 May 2025 at five previously installed monitoring wells, listed below.
Well depth	▪ BH101M: total well depth 12.10m BGL; ▪ BH102M: total well depth 12.56m BGL; ▪ BH106M: total well depth 12.10 BGL; ▪ BH109M: total well depth 13.10 BGL; ▪ BH112M: total well depth 12.25 BGL;
Well Gauging	Monitoring wells were gauged to determine standing water levels (SWL) prior to groundwater sampling. Gauging was conducted using an electric, contact water/oil interface probe.
Well Purging, Water Quality Measurements and Sampling	Groundwater was purged and sampled using a low-flow bladder pump. During the purging process, water was continuously measured for the field parameters temperature (T), electrical conductivity (EC), oxidation-reduction potential (ORP), dissolved oxygen (DO) and pH, using a *Hanna* Multi Parameter 9829 positioned within an open flow-through cell. Once the parameters stabilised (i.e. within ± 10% for DO, ± 3% for EC, ± 0.05 for pH, ± 0.2° for temperature and ± 20mV for ORP), groundwater sampling was undertaken, by diverting the outlet of the sampling pump (immediately before the flow cell) to the sampling vials and bottles.
Decontamination Procedure	Sampling equipment (interface and water quality kit probes) were decontaminated before use, by washing in a solution of potable water and phosphate-free *Decon 90*®), then rinsed with potable water. Decontamination was performed between sampling locations. Unused gloves were used for the collection of each sample.
Sample Preservation	Pre-preserved sample containers were supplied by the laboratory with the following preservatives: ▪ One, 500ml amber glass, acid-washed and solvent-rinsed bottle; ▪ Two, 40ml glass vials, pre-preserved with dilute hydrochloric acid, Teflon-sealed; ▪ One, 500mL, HDPE bottle, sterilised; ▪ One, 150mL, HDPE bottle, pre-preserved with dilute nitric acid (1 mL); and Samples for metals analysis were field-filtered using 0.45 µm pore-size filters. All containers were filled with sample to the brim then capped and stored in insulated chests (containing ice bricks), until completion of the fieldwork and during sample transit to the laboratory.
Sample Transport	After sampling, the chilled sample chests were transported to SGS Pty Ltd (SGS; the primary laboratory) using strict chain-of-custody (COC) procedures. Sample Receipt Advice (SRA) was provided by the laboratory to document sample condition upon receipt. Copies of the SRA and COC certificates are presented in **Appendix G**.
Quality Control, Laboratory Analysis and Sample Transport	Groundwater samples were analysed by SGS for the requested analytes as detailed on the COC form. All samples were analysed within the required holding period, as documented in the corresponding laboratory reports (also included in **Appendix G**). In addition to an inter-laboratory duplicate sample (analysed by Envirolab Services Pty Ltd, the secondary laboratory), QC analyses comprised a blind (intra-laboratory) field duplicate, a laboratory-prepared, trip spike water sample and a laboratory-prepared, trip blank water sample, all analysed by SGS.

6.4.5 Tested Parameters

Groundwater samples from wells BH101M, BH106M and BH112M were analysed for a condensed ('Standard') test suite of analytes; however, the sample from well BH102M and BH109M was analysed for an extended ('Baseline') suite of analytes, which included all mandatory groundwater quality test parameters listed under Appendix A of DPE (2022), plus a number of additional parameters selected by the EI investigation team for site characterisation purposes.

In summary, the *Baseline* test suite, included:

- **Physical parameters:** Alkalinity (bicarbonate, carbonate, hydroxide and total), electrical conductivity (EC), pH, redox potential (Eh), total dissolved solids (TDS), total hardness, temperature, dissolved oxygen (DO);
- **Other physical parameters:** Turbidity (NTU), total suspended solids* (TSS), total organic carbon* (TOC), sodium absorption ratio (SAR);
- **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 (as a percentage);
- **Dissolved inorganics & metals:** Aluminium (Al), antimony (Sb), arsenic (As), barium (Ba), beryllium (Be), boron (B), cadmium (Cd), chromium (Cr), cobalt (Co), copper (Cu), iron (Fe), lead (Pb), lithium (Li), manganese (Mn), mercury (Hg), molybdenum (Mo), nickel (Ni), selenium (Se), silica (dissolved SiO_2), silver (Ag), strontium (Sr), uranium (U), vanadium (V), zinc (Zn);
- **Nutrients:** Ammonia (NH_3), nitrate (NO_3), total nitrogen (N), oxidised nitrogen (N), total phosphorus (P), reactive phosphorus (P);
- **Microbiological organisms:** Faecal coliforms, faecal streptococci, Escherichia coli; and
- **Organics:** Benzene toluene ethylbenzene xylene (BTEX), polycyclic aromatic hydrocarbons (PAHs), total recoverable hydrocarbons (TRHs).

The *Standard* test suite, included:

- Physical parameters: pH, EC, TDS and Hardness.
- Dissolved metals: aluminium, arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc;
- Organics: TRHs, BTEX, PAHs, VOCs, SVOCs, chlorinated aliphatic compounds; and
- Total cyanide and total phenols.

The test suite applied to each groundwater sample is summarised in **Table 6-3**.

Table 6-3 Summary of Groundwater Quality Test Parameters

Sampling Date	Monitoring Well	Testing
27/05/2025	BH101M	Standard suite
	BH102M	Extended Baseline suite
	BH106M	Standard suite
	BH109M	Extended Baseline suite
	BH112M	Standard suite

6.4.6 Assessment Criteria

The ANZG (2018) *95% Marine water Default Guideline Values* (*DGVs)* and 99% *DGVs* for bio-accumulative toxicants (cadmium, mercury and benzo(a)pyrene) were adopted as the water quality

trigger values for stormwater discharge purposes. For parameters that are not currently addressed by the ANZG marine water DGVs, relevant alternative criteria were adopted. These were also selected as the appropriate discharge water criteria (DWC) during site dewatering, as detailed in **Section 8.2**.

6.4.7 Field-based Water Quality Testing and Observations

A summary of field water quality test and laboratory analytical results for baseline groundwater samples collected during the February 2025 GME, assessed against the adopted DWC, is presented in **Tables F1** and **F2, in Appendix F**. Laboratory documentation is attached in **Appendix G**.

With reference to the summary of laboratory analytical results in **Table F2**, the water quality parameters dissolved oxygen (DO), pH, electrical conductivity (EC), temperature and adjusted Reduction/Oxidation potential (Eh), were measured in the field and recorded immediately prior to sampling, as summarised in **Table 6-4**. The groundwater samples were then evaluated on the basis of odour and visual signs of contamination and descriptions were recorded as follows:

- Groundwater in the monitoring well BH101M was clear, with low turbidity;
- Groundwater in the monitoring well BH102M was murky brown, with high turbidity;
- Groundwater in the monitoring well BH106M was yellow, with medium turbidity;
- Groundwater in the monitoring well BH109M was brown, with high turbidity;
- Groundwater in the monitoring well BH112M was brown/grey, with high turbidity;
- BH101M groundwater was noted to have a hydrocarbon odour;
- No visual evidence of contamination was detected during well purging or groundwater sampling; and
- No petrochemical surface sheen was observed on any groundwater sample.

Table 6-4 Groundwater Field Data

Well	SWL Pre Purge (m BTOC) [1]	Approximate RL of Groundwater Level (m AHD) [2]	DO (mg/L)	pH	EC (µS/cm)	Temperature (°C)	Eh [3] (mV)
BH101M	2.82	25.3	-	5.01	953	17.05	159.2
BH102M	4.70	25.1	-	4.42	765	18.22	179.9
BH106M	4.03	-	0	6.19	1272	18.55	116.4
BH109M	4.74	24.7	0	5.36	268	17.61	125.0
BH112M	3.40	27.1	-	5.82	246	18.14	101.5

Note 1 m BTOC: metres below top of well casing

Note 2 m AHD: groundwater level extrapolated from GSA (EI, 2025b)

Note 3 Eh was calculated as the field Reduction-oxidation potential (Redox) reading plus the Standard Hydrogen Electrode (SHE) potential 205mV

Based on the field water quality results, the groundwater was considered to be generally acidic to slightly acidic (pH: 4.42-6.19), fresh to marginal in terms of salinity as indicated by the EC values (EC: 765-1272 µS/cm), oxygen-depleted (DO: 0.0 mg/L) and in an oxidising environment (Eh: 101.5-179.9mV).

The measured water levels (RL 24.7 – 27.1 mAHD) indicated that the water table surface was above the proposed bulk excavation level (lower basement floor) range of 19.7m to 22.1m AHD.

6.4.8 Laboratory Analytical Results

With reference to the results summaries in **Tables F1** and **F2**, reported concentrations were within the DWC for most samples, with the following exceptions:

- Turbidity (230 - 16000 NTU), was above the criterion value of 10 NTU in all groundwater samples;
- Field and laboratory pH (4.42 - 6.3) in all samples were outside the DWC range of pH 6.5 - 8.4;
- Aluminium (91 µg/L) at BH101M and (86 µg/L) at BH102M, exceeded the DWC value of 80 µg/L;
- Cobalt (3 µg/L) at BH102M, exceeded the DWC value of 1 µg/L;
- Iron (5,800 µg/L) at BH102M, exceeded the DWC value of 3,000 µg/L; and
- Manganese (300 µg/L) at BH102M, exceeded the DWC value of 80 µg/L.

6.4.9 Water Treatment Requirements

Construction Phase Dewatering

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

- pH to ensure it is within the range 6.5-8.4;
- Turbidity to ensure it is maintained below 10 NTU; and
- Dissolved metals, in particular *aluminium, cobalt, iron* and *manganese* to achieve compliance with the corresponding DWC.

In many cases lowering water turbidity through appropriate water treatment can significantly reduce the levels of other elevated water quality parameters. A potentially suitable water treatment option may involve pumping tail waters through a sediment settlement (baffle) tank, where the following could be implemented:

- pH correction via the addition of sodium hydroxide solution;
- Addition of flocculent/coagulant for settlement of suspended particles, which would lower turbidity; and
- Adjustment of the flow rate to allow sufficient residence time for flocculation/coagulation and settlement to take place.

While the above provides basic guidance in relation to available treatment options, a water treatment specialist should be engaged to advise on appropriate water treatment technologies for site specific conditions. It would be appropriate to engage the water treatment specialist early to allow sufficient time for the design of the water treatment system, prior to the start of dewatering.

After water treatment is in place, testing of treated water quality is required prior to discharge to confirm that water treatment procedures are effectively achieving compliant discharge water quality. Further details on water quality monitoring and management are included in **Section 5.4**.

Operational Phase Dewatering

As the basement will be constructed as a tanked structure, there will be no operational dewatering.

7. DEWATERING METHODOLOGY

7.1 Excavation and Shoring

The proposed development will include a two-level (tanked) basement, with bulk excavation to 11m below the BEL to allow construction of the corresponding, lower floor basement slab.

With reference to the GSA report, an impermeable shoring wall, such as a secant pile wall will be implemented. The shoring wall should be socketed into a low-permeability stratum to reduce the potential for groundwater ingress into the excavation area.

A secant pile wall surrounding the basement footprint was assumed, socketed to a depth of 3 m below the BEL and extending at least 1 m into the residual soil in the northeast area (due to thick sandy layer), and to 1.5 m below the BEL elsewhere onsite.

For the purpose of this DMP, the secant pile wall is assumed to be impermeable. Operational phase groundwater take will be negligible during lifetime of the building based on a tanked basement design.

7.2 Estimated Groundwater Take Volumes

As described in the GSA report (**Appendix D**, groundwater take will comprise:

- An initial volume of pore water dewatered from within the saturated sand layer excavated from inside of the basement footprint area; followed by
- Dewatering of groundwater seepage flow through and beneath the shoring wall during the basement construction works.

Groundwater seepage analysis was undertaken using the software package PLAXIS 3D Advanced (Version 2024.2.0.1144). PLAXIS 3D is a finite element numerical modelling package intended for three dimensional analysis in geotechnical engineering. This package is capable of analysing various aspects of geotechnical structures and construction processes. PLAXIS 3D estimates the seepage rate of water entering the excavation through and beneath the shoring wall and predicts the volume of groundwater take during basement construction.

Based on a specific set of assumptions and field test data, which included the design groundwater levels for the basements (**Section 6.3**) and calculated, layer-specific hydraulic conductivities for the various substrata encountered at the site (detailed in the GSA report), annual groundwater seepage flow draining through the shored walls into the excavation during construction, is predicted as follows:

- **36.4 ML** from initial dewatering of pore water within the excavated materials; and
- **12.5 ML** / 365 days for from groundwater seepage through the basement footprint.

Groundwater seepage inflows post-construction (i.e. during the occupational/operational phase) will be zero due to the tanked basement design.

It is noted that in accordance with the NSW *Water Management (General) Regulation 2018*, as the site is within the Botany Sands Groundwater Source, the exemption from needing a water access licence applies to the site.

7.3 Dewatering Level, Drawdown-Induced Ground Settlement &Monitoring

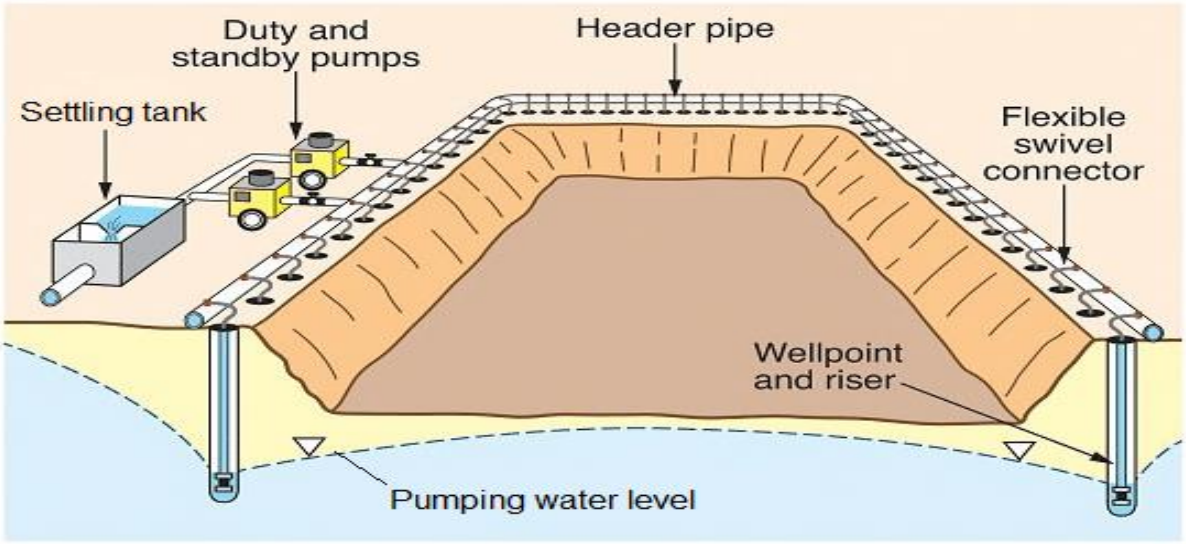
Based on the PLAXIS modelling results the predicted maximum groundwater drawdown outside the site boundary due to dewatering is 4 m. The maximum predicted ground settlement occurring immediately outside of the shoring wall is less than 6 mm, which is deemed to pose a 'negligible' risk in terms of the category of damage risk due to dewatering, as referenced in the GSA report.

Groundwater elevations will be monitored periodically during the construction dewatering period at selected monitoring wells. This may be achieved by gauging groundwater depth manually using an electric water contact meter, during each dewatering monitoring event, as described in **Section 8.4**.

7.4 Dewatering Method

Dewatering of the saturated, sandy aquifer may be achieved by a perimeter network of vacuum spear point wells that are manifolded via a pumping arrangement that directs extracted water to a centralised treatment system, as illustrated in **Figure 4-1**.

Figure 4-1 Hypothetical layout of a Well Point dewatering system



7.4.1 Construction Phase Dewatering

During construction, groundwater will be pumped into a sediment settlement vessel (basin, or equivalent) for treatment prior to discharge off-site (preferably to the local stormwater network, subject to consent authority approval). The preferred vessel type will generally require capacity to accommodate the rate of groundwater seepage, which is estimated to be as high as 34.2 m^3/day (i.e. based on an annual water take of 12.5 ML, from **Section 7.2**).

Groundwater treatment will be undertaken either in the vessel, or via a water treatment system installed nearby. The treated water will then be discharged into the municipal storm water pit provided that prior approval has been obtained.

It is envisaged that the pumping system will operate on a full-time basis (or as required) for the approved dewatering period, to control seepage during excavation and construction. In regards to the disposal of (treated) water to the local stormwater network, the client must provide details of the off-site connection point, preferably in the form of a drawing, as part of the discharge permit application to the relevant consent authority.

7.4.2 Operational Phase Dewatering

As the basement will be designed as a tanked structure for the life of the development, zero groundwater take is expected during the operational (post-construction) phase of the development.

7.5 Discharge Flow and Volume Monitoring

The volume of water discharged off-site must be monitored by a calibrated flow meter (or equivalent alternative means) that is integrated with the dewatering system. Such monitoring will be implemented

throughout the entire dewatering period. The flow meter will display the cumulative volume discharged, which will be documented as part of the dewatering monitoring records.

Flow and (cumulative / total) volume data will be documented by a site official, under supervision of the Site Manager. Records must be made available to the Environmental Consultant for inclusion in the monitoring reports. These records will be used to calculate the actual groundwater volume discharged from the site and will be included in the final *Dewatering Completion Report* (DCR) to be issued to Council and WaterNSW upon completion of the dewatering activities, as detailed in **Section 8.6** of this plan.

7.6 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 7-1.**

Table 7-1 Assessment of Potential Dewatering Effects

Attribute	Description
Proximity of Groundwater Dependent Ecosystems (GDEs)	No high priority groundwater dependent ecosystems were documented within a 40m radius of the site, as described in **Section 5.7**.
Water supply losses at water supply bores	A maximum groundwater level drawdown of 4m was predicted immediately outside the site boundary. As described in **Section 5.4** a review of registered bores within a 500 m radius of the site identified two active water bores, the closest located around 207 m east of the site. Water supply losses are unlikely to be experienced at the existing bores as drawdown will be minimised due to: ▪ the existing water supply bores being significantly distant from the site; and ▪ site dewatering will commence after secant pile shoring, which will minimise the permeability of the basement structure.
Potential impacts on groundwater quality resulting from contaminant migration towards existing water supply bores	Potential groundwater contamination sources were identified on the site and close to the site (as described in **Section 5.5**). As the active water supply bores are located 207m and 288m distance from the site; the risk of a reduced beneficial use category due to groundwater quality impacts resulting directly from the dewatering activity was deemed unlikely. Furthermore, onsite contamination sources will be removed during basement excavation, and any migration to the basement from offsite sources will be addressed by the water treatment system.
Potential subsidence of neighbouring structures	Drawdown-induced ground settlement was modelled at less than 6mm immediately outside the shoring wall, and lower levels with increasing distance from the wall. Ground settlements less than 10mm are considered to be a 'Negligible' risk in regards to category of damage risk due to dewatering, as defined in Cashman and Preene (2021).
Mounding of water up gradient of structure	The constructed basement will be tanked; however, it is unlikely that groundwater mounding effects up-gradient of the finished structure will be attributable to the proposed structure, due to the available space between developments, which would allow groundwater to flow with minimal hindrance along the regional flow path.

8. WATER QUALITY MANAGEMENT

8.1 Responsibility

The Principal Contractor or Site Manager, appointed by the client for the construction works, will be responsible for implementing the procedures for water quality management as described in this DMP.

8.2 Discharge Water Quality Guidelines

In accordance with statutory requirements for site dewatering operations, discharged water 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 primary receiving water body is Sheas Creek/Alexandra Canal, which is tidally influenced and deemed to be a disturbed marine water ecosystem (**Section 5.6**). The ANZG (2018) *95% Marine Water Default Guideline Values* (*DGVs)*, in combination with the 99% *Marine Water DGVs* for bio-accumulative toxicants, will be adopted as the discharge water criteria (DWC) for the temporary site dewatering program.

For water quality parameters not addressed by the ANZG (2018) Marine Water DGVs, relevant alternative criteria are to be adopted. The listed parameters and their respective criteria that are applicable for the assessment of water quality during site dewatering are presented in **Table 8-1**.

Table 8-1 Discharge Water Criteria

Analyte	DWC (µg/L) [1]
Dissolved Metals	
Aluminium (for waters with pH > 6.5) (Al)	80 [2]
Antimony (Sb)	9 [2]
Arsenic III (As III)	94 [2]
Arsenic V (As V)	42 [2]
Barium (Ba)	20,000 [9]
Beryllium (Be)	600 [9]
Boron (B)	1500 [2]
Cadmium (Cd)	0.7
Chromium III (Cr III)	27
Chromium VI (Cr VI)	4.4
Cobalt (Co)	1
Copper (Cu)	13 [3]
Iron (Fe)	3,000 [9]
Lead (Pb)	4.4
Lithium (Li)	No Relevant Criteria
Manganese (Mn)	80
Mercury (total) (Hg)	0.1
Molybdenum (Mo)	34 [2]

Nickel (Ni)	70
Selenium (Se)	18 [2]
Silica (dissolved SiO_2)	No Relevant Criteria
Silver (Ag)	1.4
Strontium (Sr)	No Relevant Criteria
Uranium (U)	0.5 [2]
Vanadium (V)	100
Zinc (Zn)	80 [3]
Petroleum Hydrocarbons	
Oil and grease	*No visible sheens, surface films or oil and grease* [4]
Volatile TPH ($C_6 – C_9$)	No Relevant Criteria
Semi-volatile to heavy TPH ($C_{10} – C_{40}$)	No Relevant Criteria
Monocyclic Aromatic Hydrocarbons (BTEX)	
Benzene	700
Toluene	180
Ethylbenzene	80
o - xylene	470 [2]
p - xylene	250 [2]
m - xylene	75
Polycyclic Aromatic Hydrocarbons (PAH)	
Benzo(a)pyrene	0.1
Naphthalene	70
Microbiological Organisms	
Faecal coliforms	No Relevant Criteria
Faecal streptococci	No Relevant Criteria
Escherichia coli (E. coli)	Not detectable in 100 mL [9]
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	910
Nitrate (NO_3)	3,400 [5]
Nitrite (NO_2)	30,000 [9]
Total Oxidised Nitrogen (NO_x)	5 [8]
Total Nitrogen (TN)	120 [8]
Total Phosphorus (TP)	25 [8]

Reactive Phosphorus (FRP)	10 [8]
Other	
Total Cyanide	4
Phenol	400
PFOS	0.13 [10]
PFAS	220 [10]
Physiochemical Parameters	
pH (pH units)	6.5 to 8.4 [6]
Turbidity (NTU)	10 [7]

Note 1 Discharge water criteria are the ANZG (2018) *95% Default Guideline Values (DGVs)* for the protection of slightly to moderately disturbed marine ecosystems, with the *99% DGVs* applied for the bio-accumulative parameters *benzo(a)pyrene*, *cadmium* and *mercury*, unless otherwise indicated. The ANZG (2018) only provides marine criteria at an 'unknown' level (%) of species protection for *manganese*; therefore, these DGVs are applied.

Note 2 The ANZG (2018) *90% Freshwater DGVs* for typical slightly - moderately disturbed freshwater ecosystems are applied for the indicated parameters (*aluminium, arsenic, boron, selenium, o – xylene and p - xylene*), in the absence of *marine* water criteria. The ANZG (2018) only provides freshwater criteria at an 'unknown' level (%) of species protection for *antimony, molybdenum* and *uranium*; therefore, these DGVs are applied.

Note 3 For the metals *copper* and *zinc*, which are commonly present as regional background components in groundwater at concentrations above the ANZG 2018 95% Marine DGVs, discharge water criteria are set at one order of magnitude (10 x) higher than the ANZG 2018 DGV.

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 marine DGVs in relation to *nitrate*, the Freshwater 90% trigger value was sourced from ANZECC & ARMCANZ 2000 Table 3.4.1 *Trigger values for toxicants for moderately to highly disturbed systems*. A marine trigger value is not currently available under ANZECC/ARMCANZ 2000.

Note 6 In the absence of ANZG (2018) criteria for *pH*, the ANZECC / ARMCANZ (2000) Table 3.3.2 Default trigger values for physical and chemical stressors for south-east Australia for slightly disturbed ecosystems are applied. The adopted pH range is between the lower and upper limit values for *Marine* water settings.

Note 7 In the absence of ANZG (2018) criteria for *Turbidity*, the ANZECC & ARMCANZ (2000) Table 3.3.3 upper default trigger value for *estuarine and marine* ecosystems is applied.

Note 8 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.* The marine criteria for *total oxidised nitrogen (NO_x), total phosphorus (TP), reactive phosphorus (FRP)* and *total nitrogen (TN)* were adopted.

Note 9 For chemical parameters not addressed by either ANZG (2018) or ANZECC / ARMCANZ (2000), the NHMRC (2011) *Australian Drinking Water Guidelines, Vers. 3.8, Rev 2022*, Table 10.6 *Guideline values for physical and chemical characteristics*, address potential discharge to recreational beach settings. The discharge water criteria are set at one order of magnitude (10 x) higher than the Drinking water health-based value, or 10 x the aesthetic-based value, in the absence of a *drinking* value. Note: The Table 10.5 *Performance measure threshold* is applied for the microbiological parameter *Escherichia coli* (E. coli).

Note 10 DWC value is derived from the National Environmental Management Plan for PFAS (2020) - 95% species protection for slightly to moderately disturbed systems.

8.3 Additional Pre-dewatering Monitoring Event

As the baseline groundwater quality assessment included all mandatory parameters listed in Appendix A of DPE 2022 (as detailed in **Section 6.4.5**), an additional pre-dewatering GME is considered unwarranted.

8.4 Discharge Water Quality Monitoring

8.4.1 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 and water treatment equipment;
- No petrochemical sheens are visible on the water surface and no detectable hydrocarbon odours are being generated by the treated groundwater or sediment; and
- No green, blue or extremely clear effluent is observable, potentially indicating high levels of dissolved aluminium (if used in the treatment process).

The Site Manager must keep a record of all visual observations, and operational measurements, such as flow rates and water flow meter readings (if used), as detailed in **Section 7.5**.

8.4.2 Sample Collection and Analysis

On-going sample analysis must continue for the duration of the 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 the stormwater system.

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 laboratory analytical program should include the parameters listed in **Table 8-1** (**Section 8.2**); however, subject to continuing compliance of treated water quality with the DWC during the Trial Run Period (described below), the routine analyses may be reduced to the *Standard test suite* as specified in **Section 6.4.5**, excluding cyanide and total phenols.

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 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 contaminant 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.

Discharge Monitoring Period (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 a 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.

Dewatering contingency measures are detailed in **Section 9.5** (**Table 9-1**) and should be implemented where groundwater results exceed or are predicted to exceed the adopted criteria for any one monitoring event. Any changes to the sampling frequency are to be determined by the appointed environmental consultant.

All laboratory analytical results for the water samples must be retained, to be made available upon request by Council and/or WaterNSW. The Site Manager and Dewatering Contractor / Water Treatment Specialist should seek advice from the Environmental Consultant prior to deviating from any of the above monitoring requirements, to ensure the quality of discharged groundwater is not compromised.

8.4.3 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 DWC (**Table 8-1**). 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 method and procedure, groundwater level gauging results and will provide a comparison of historic and current results obtained from the site, against the adopted criteria, with corrective actions and recommendations based on the results, where required.
- *Dewatering Completion Report* - Following completion of construction dewatering activities, a Dewatering Completion Report (DCR) will be prepared by the appointed Environmental Consultant, and must include copies of all analytical results and interim monitoring reports issued during the dewatering period. The DCR will be prepared using the pro-forma available for download through the WaterNSW website, as described in **Section 8.6**.

8.4.4 Reporting of Other Information

The Site Manager must also keep records of cumulative discharge volume and periods of dewatering stoppage, which may be recorded onto the DCR form.

8.5 Water Treatment

8.5.1 Treatment System Design

Treatment of extracted groundwater will be required based on the baseline data (**Section 6.3**). EI suggests that the selection and design of the preferred water treatment system is made by the Dewatering Contractor / Water Treatment Specialist, in collaboration with the appointed

Environmental Consultant. Alternative and/or additional water treatment options will be implemented, if necessary, depending on which parameters are found to exceed the DWC.

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 **Section 7.4.1**);
- Water filtration to reduce fine particulates;
- If applicable, automated in-line chemical dosing systems for the addition of buffering solutions and/or coagulants for the adjustment of pH and other parameters, which may be required as described in **Section 9.5** *Dewatering Contingencies*;
- Groundwater treatment to reduce concentrations of contaminants exceeding the DWC (if required) to below the values presented in **Table 8-1**;
- Spare retention tank(s) (if required) 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 operational prior to the commencement of dewatering, to ensure that only treated water meeting the adopted quality criteria is discharged to the receiving water bodies.

8.5.2 Treatment System Maintenance

The groundwater 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.

8.6 Dewatering Completion Report (DCR)

In accordance with WaterNSW requirements (Ref. WaterNSW Fact Sheet: Completion report – Construction dewatering), 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.

The construction DCR will document all records collected from the beginning to the end of the construction dewatering period. A blank Report form may be downloaded using the link: https://www.waternsw.com.au/__data/assets/pdf_file/0004/167278/Completion-report-for-dewatering-work.pdf, and may be used to record all of the required information, as listed on the form itself. A copy of the blank DCR form is provided in **Appendix I**.

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 DCR form. The Site

Manager may authorise a qualified contractor/consultant to maintain the DCR on the Site Manager's behalf.

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.

9. SITE MANAGEMENT CONTROLS

9.1 Deviations from this Plan

The Site Manager should seek advice from the Environmental Consultant whenever deviation from the agreed monitoring program is considered. To ensure the monitoring data set and the early warning objectives of the DMP are not compromised, variations will only be considered where technical justification exists, and any deviations that may be accepted will be documented within the corresponding reports, and must include all justifications for the variation accepted.

Should deviations from the DWC be considered technically justifiable, approval from Council and/or WaterNSW must be obtained before alternative discharge criteria are applied.

9.2 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.

9.3 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 the recharge well(s), 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.

9.4 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 development consent 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 consent conditions, the site specific environmental management plan and the *Protection of Environmental Operation Act 1997*.
- Give consideration to noise emitted by 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).

9.5 Dewatering Contingencies

Contingent actions for scenarios that may arise during dewatering are detailed in **Table 9-1**.

Table 9-1 Mitigation Measures for Potential Dewatering Issues

Anticipated Problems	Preventive / Corrective Actions
Water Quality Criteria Non-compliance	
Water Quality Criteria Exceedance Laboratory analytical report for any monitoring event reveals that treated water quality does not satisfy the Water Quality Trigger Values.	Water quality trigger values, also referred to as the discharge water criteria (DWC), are detailed in **Section 8.2, Table 8-1**. Immediate action must be taken to halt the release of water into receiving water bodies, where water quality is found not to meet the DWC. 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 that the previously non-compliant parameter(s) is/are now meet

Anticipated Problems	Preventive / Corrective Actions
	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.	Groundwater take trigger levels are provided to ensure that appropriate measures are implemented to minimise the risk of exceeding the groundwater take limit, which would form a breach of the conditions of the WaterNSW Statement of Approval. The following trigger levels are based on the regular flow meter readings that are recorded during the dewatering monitoring program, as described in **Section 8.4**: *Trigger 1:* when the flow meter data indicates that 70% of the total approved groundwater take limit has been extracted, the monitoring manager is to notify the Site Manager and the Dewatering Contractor, to activate a review of construction progress against dewatering rate and to make adjustments if necessary, so as not to exceed the approved groundwater take limit. *Trigger 2:* at 80% of the total approved groundwater take limit, if basement construction is not close to completion, the monitoring consultant is to engage site management and the dewatering contractor to review the reasons for the increased dewatering rate and to explore options and take action to achieve sufficient lowering

Anticipated Problems	Preventive / Corrective Actions
	of the dewatering rate for compliance with the groundwater take limit. *Trigger 3:* at 90% of the total approved groundwater take limit, if effective reductions in dewatering rate cannot be implemented,, WaterNSW should be contacted to review options, which may include a combination of: ▪ Applying for an increase to the groundwater take limit, which may require a Water Access License to be acquired. ▪ Temporary retention of tail water onsite in appropriate bulk containers for subsequent removal by a licensed waste contractor; ▪ Aquifer re-injection after obtaining regulatory approval; and/or ▪ Fast-tracking of construction works to complete dewatering sooner than the scheduled timeframe.
Drawdown-Induced Ground Settlement Risk	
Excessive Water Level Drawdown	Groundwater drawdown trigger levels will also apply to minimise the risk of unforeseen impacts in relation to ground settlement on neighbouring land. As documented in the GSA report (**Appendix D**), dewatering is expected to have negligible, adverse impact on the neighbouring properties, given that dewatering will occur in competent bedrock materials. Notwithstanding, should groundwater level monitoring during site dewatering reveal declining groundwater levels greater than the predicted, maximum drawdown outside of the basement boundary, the following contingency measures will apply at the indicated trigger levels: *Trigger 1*: when monitoring of groundwater levels indicates that the maximum predicted groundwater drawdown level has been reached in the vicinity of the shored excavation boundary wall, and groundwater levels are still falling, excavation works should cease (HOLD POINT) and the monitoring manager is to notify the Site Manager and the Geotechnical Engineer to review construction progress and confirm that works can effectively continue without significant, additional groundwater level decline. The review may find that further groundwater level decline may be greater than 25% of the predicted maximum drawdown outside of the shoring wall. *Trigger 2:* should the Trigger 1 review indicate that further groundwater level decline may be greater than 25% of the predicted maximum drawdown outside the shoring wall, the appointed Structural Engineer will be notified to assesses whether this water level decline potentially poses adverse risks to neighbouring structures that would warrant mitigation measures to be implemented, and if so, to recommend relevant mitigation options for consideration and action prior to continuation of deepening the excavation.
System Performance Issues	
Dewatering System Failures	Ensure that spare equipment (where practical) is 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,

Anticipated Problems	Preventive / Corrective Actions
	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.
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.

10. MINIMAL HARM ASSESSMENT

10.1 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.

10.1.1 Hydrogeological Model Summary

With reference to the site-specific conceptual hydrogeological model (**Section 6.2**) the site is located over a sandy aquifer under water table conditions. Groundwater seepage would enter the excavation via depletion of pore water from the saturated layer from seepage through (fill and marine sand layers) and groundwater seepage from the basement floor prior to basement water proofing. Inflows to the basement would cease after basement tanking.

10.1.2 Groundwater Source Category

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

a) has total dissolved solids (TDS) 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 construction phase dewatering will extract groundwater primarily from the Botany Sands Aquifer, which has been characterised as low salinity groundwater in the vicinity of the site with moderate water EC values (**Section 6.3**) indicating TDS levels in the order of 1,200 mg/L TDS.

The modelled groundwater take 12.5 ML/year equates to an inflow rate of approximately 0.396 L/sec.

Given the salinity of the groundwater source and the fact that the water supply works yield significantly lower than 5 L/sec, the site is classed as a *"less productive groundwater source"* under the proposed shoring design, as defined under Section 3.2.1 *Aquifer impact assessment* of the NSW AIP.

10.1.3 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 alluvial water sources that are under water table conditions, the following (condensed) 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 more than 2m decline cumulatively at any water supply work then make good provisions should apply.*

Water Quality

- *Level 1 -*

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

b) *No increase of more than 1% per activity in long-term average salinity in a highly connected surface water source at the nearest point to the activity.*

c) *No mining activity to be below the natural ground surface within 200m laterally from the top of high bank or 100m vertically beneath (or the three dimensional extent of the alluvial material - whichever is the lesser distance) of a highly connected surface water source that is defined as a "reliable water supply".*

- *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.*

10.1.4 Minimal Impact Assessment Conclusions

The proposed dewatering for the construction phase of the project is considered to be compliant with the NSW AIP minimal impact criteria for the following reasons:

- While the estimated maximum cumulative pressure head decline (4 m) has been modelled to be greater than *Level 1 minimal impact considerations*, post-construction groundwater drawdown as a result of dewatering will be negligible due to the impermeable secant pile shoring with effective groundwater cut-off, resulting in fully tanked basement design.
- Given the minimal predicted (less than 6 mm) ground settlement immediately outside of the shored wall, drawdown-induced ground settlement would therefore have negligible impact on neighbouring properties, beyond the site boundary.
- Two registered active groundwater supply bores were identified within 500m radius of the site, being between 207m and 288m east of the site. Given the significant distance of these bores from the dewatering activity, and the fact that site dewatering will site dewatering will commence after secant pile shoring, which will minimise the permeability of the basement structure, it is reasonable to expect that no water losses are likely from the temporary site dewatering activity.
- Residual, onsite groundwater contamination sources will be treated/removed as part of the bulk excavation process, however, as there are no registered water supply bores in the vicinity of the site, adverse impacts to groundwater quality and corresponding lowering of the beneficial use category of the groundwater source are unlikely. *Level 1 Water Quality conditions* would therefore be maintained.
- The site is not less than 40m from any documented high priority groundwater dependent ecosystem or a high priority culturally significant site.

In addition to the above, the routine monitoring of treated water quality, cumulative drawdown and water take and the dewatering contingencies tabulated in **Section 9.5** are designed to ensure that potential construction dewatering impacts are minimised

10.2 Assessment Inputs

The inputs for assessing the potential impacts of dewatering on the groundwater system are summarised in **Table 10-1**.

Table 10-1 Assessment inputs summary

Assessment Items	Comments
1. Estimated water take volume	The water take volume during basement construction is calculated as 12.5 ML (**Section 7.2**).
2. Suitability of volume estimation	Use of PLAXIS 3D, as part of the GSA (**Appendix D**).

Assessment Items	Comments
3. Ground elevation across the site	The site is generally flat, with a gentle slope to the southwest from 26.44m to 29.70 mAHD (**Section 5.3** and **Appendix C**).
4. Geotechnical ground characterisation	Refer to GSA report in **Appendix D** and bore logs in **Appendix E**.
5. Water level measurements	Groundwater levels were at depths from 24.7 – 27.1 mAHD. Periodic groundwater level gauging will be conducted at existing monitoring well(s) during basement construction, as described in **Section 7.3**.
6. Required water level draw down and potential impacts	Dewatering will have negligible, if any, adverse impact on the neighbouring properties (EI, 2025b). The groundwater drawdown adjacent to the site cause by dewatering is considered negligible.
7. Works proposed for dewatering	A vacuum spear point wells system, as described in **Section 7.4**.
8. The base level of the aquifer	Refer to **Section 6.3**
9. Excavation footprint dimensions	Refer to basement plan included in **Appendix C**.
10. Hydraulic conductivity of lithological units	Detailed in Table 1 of the GSA report in **Appendix D**.
11. Anticipated duration of dewatering	The estimated dewatering period is 365 days (**Appendix D**). Site dewatering will not take place during the operational phase of development (**Section 7**).
12. Depth of piling embedment beneath bulk excavation	Refer to **Section 7.1** – Secant pile wall shoring system shall be adopted to approximately 3 m below the BEL and extending at least 1 m into the residual soil in the northeast area (due to thick sandy layer), and to 1.5 m below the BEL elsewhere onsite.

11. Conclusion

The site located at 881-885 Bourke Street, Waterloo NSW was the subject of Hydrogeological Report including Dewatering Management Plan and Groundwater Seepage Analysis. The conclusions of this assessment were as follows:

- EI concluded that this assessment has characterised the site-specific hydrogeological conditions, including baseline groundwater quality and pre-dewatering groundwater levels (**Section 6**).
- Laboratory analytical results showed compliant concentrations with the proposed discharge water quality criteria (**Table 8-1**, **Section 8.2**) in most samples, with the exceptions Turbidity, pH, Aluminium, Cobalt, Iron and Manganese (**Section 6.4.8**). Groundwater treatment options are presented in **Section 8.5**.
- The proposed dewatering methodology included groundwater take volumes and predicted drawdown effects during the construction dewatering and described site-specific measures for the appropriate management of surface and groundwater during basement construction (there will be no operational groundwater take due to a fully tanked basement design) (**Section 7**).
- All groundwater to be discharged into the local stormwater network is to meet (at the very least) the criteria outlined in **Table 8-1**, **Section 8.2**.
- As specified in **Section 8.4**:
  - 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 measures are listed in **Section 9.5 must be followed.*
- 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 to receiving water bodies comply with the criteria specified in **Section 8.2**.

Based on the findings of this assessment, and with consideration of the Statement of Limitations (**Section 12**), the excavation and construction of the tanked basement onsite must be performed in accordance with this assessment.

12. STATEMENT OF LIMITATIONS

This plan has been prepared for the exclusive use of Trustee for Waterloo Property Unit Trust, whom 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 Trustee for Waterloo Property Unit Trust.

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.

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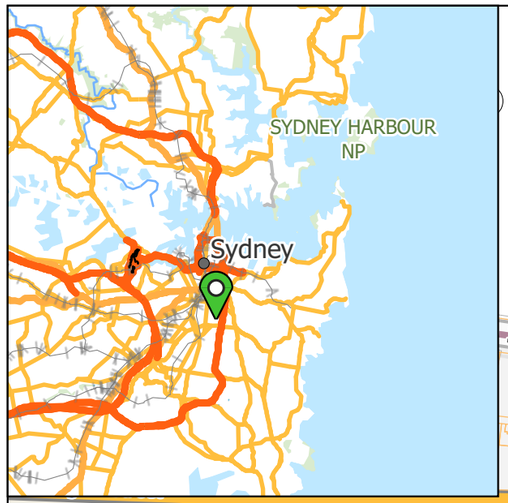
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ABBREVIATIONS

AHD	Australian Height Datum
ANZECC	Australian and New Zealand Environment Conservation Council
ANZG	Australian and New Zealand Guidelines (for water quality assessment)
ASS	Acid Sulfate Soils
BEL	Bulk Excavation Level
BGL/BEGL	Below Ground Level existing at the time of the referenced bore or excavation
BEGL	Below Existing Ground Level
BTEX	Benzene, Toluene, Ethyl benzene, Xylene
COPC	Chemical of Potential Concern
DMP	Dewatering Management Plan
DP	Deposited Plan
DWC	Discharge Water Criteria
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DPHI	Department of Planning, Housing and Infrastructure
DPE	Department of Planning and Environment
EC	Electrical Conductivity
EPA	NSW Environment Protection Authority
GME	Groundwater Monitoring Event
GSA	Groundwater Seepage Analysis
km	Kilometres
LEP	Local Environmental Plan
LOR	Limit of Reporting (limit of reporting for respective analytical method)
L/s	Litres per second
m	metres
m^3/day	cubic metres per day
ML	Megalitres
mg/L	Milligrams per litre
MPD	Maximum predicted drawdown (the target groundwater level during site dewatering)
µg/L	Micrograms per litre
µS/cm	Microsiemens per Centimetre
NA	Not Applicable
NATA	National Association of Testing Authorities
NEPC	National Environment Protection Council (of Australia)
NC	No Criterion
NTU	Nephelometric Turbidity Units (units of measure for water turbidity)
OCP	Organochlorine Pesticides
OPP	Organophosphate Pesticides
PAH	Polycyclic Aromatic Hydrocarbons
PCB	Polychlorinated Biphenyls
pH	Potential Hydrogen (a measure of the acidity or basicity of an aqueous solution)
PID	Photo-Ionisation Detector
PQL	Practical Quantitation Limit (quantitative limit for respective analytical method)
RL	Reduced Level
TDS	Total Dissolved Solids
TSS	Total Suspended Solids
TPH	Total Petroleum Hydrocarbons (superseded term equivalent to TRH)
TRH	Total Recoverable Hydrocarbons (non-specific analysis of organic compounds)

Appendix A – Figures



Telopea Street
Walker Street
Marriott Street
Baptist Street
Zamia Street
Bourke Street
South Dowling Street
Eastern Distributor
Morehead Street
Danks Street
Elizabeth Street
Wellington Street
Young Street
Waterloo
Mcevoy Street
Lachlan Street
Dacey Avenue
George Street
Archibald Avenue
Sam Sing Street
Gadigal Avenue

0 150 300 450 600 m

LEGEND **Note: 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:	C.Y.
Approved:	
Date:	26/05/2025

Main Works for Waterloo Mixed Use Development (HDA)

Hydrogeological Report including GSA & DMP

881-885 Bourke Street, Waterloo NSW, Australia

Site Locality Plan

Figure: A1

Project: E26442.E16



Map Source: Nearmap, accessed 03/04/2025

LEGEND Note: Areas are approximate

- Site Boundary
- Proposed basement boundary
- Groundwater 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:	C.Y./M.O.
Approved:	
Date:	27/08/2025

Main Works for
Waterloo Mixed Use Development (HDA)
Hydrogeological Report including GSA & DMP
881-885 Bourke Street, Waterloo NSW, Australia
Sampling Location Plan

Figure: A2

Project: E26442.E16



Map Source: Nearmap, accessed 03/04/2025

LEGEND Note: Areas are approximate

- Site Boundary
- Proposed basement boundary
- Groundwater Monitoring Well Location
- Inferred groundwater flow direction
- Groundwater contour, 0.1 m interval (mAHD)

Note: Standing water levels based on data collected during groundwater monitoring event on 16/06/25

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

Drawn:	M.C./M.O.
Approved:	G.T.
Date:	27/08/2025

Main Works for
Waterloo Mixed Use Development (HDA)
Hydrogeological Report including GSA & DMP
881-885 Bourke Street, Waterloo NSW, Australia
Groundwater Contour Plan

Figure: A3

Project: E26442.E16

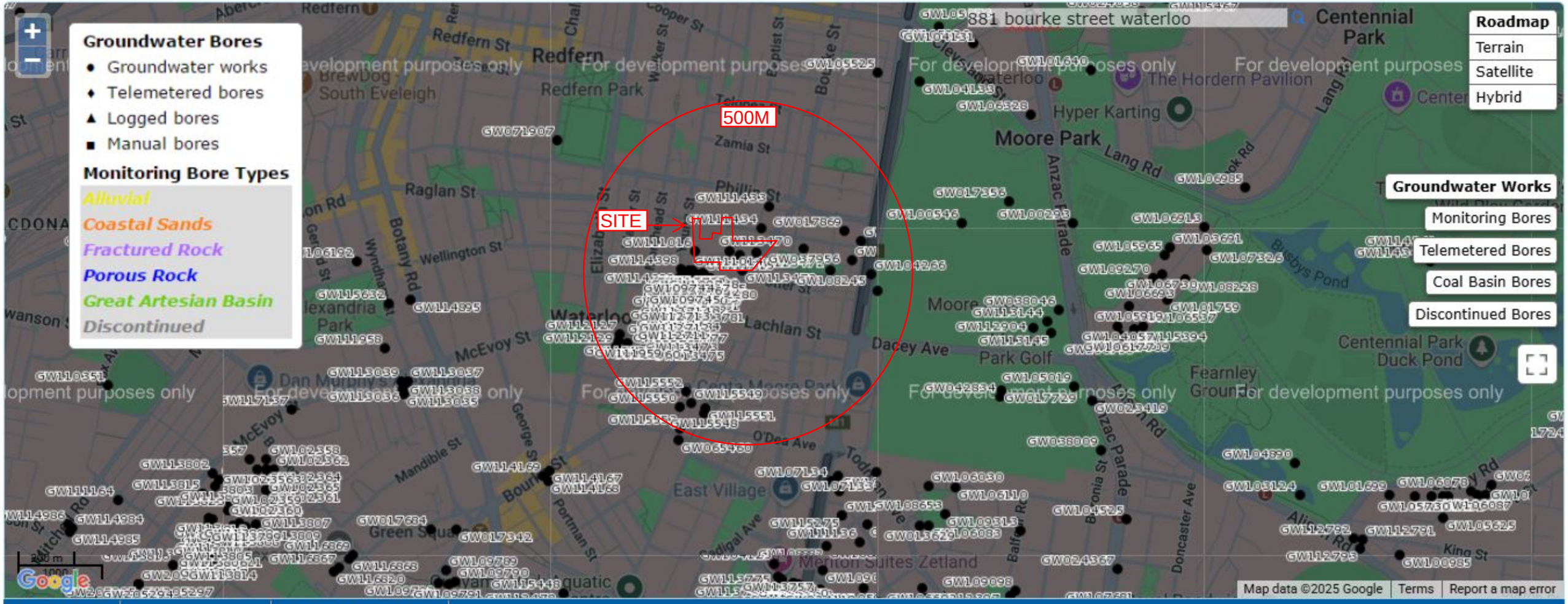
Appendix B – Registered Water Supply Bores

ALL GROUNDWATER MAP

bookmark this page

All data times are Eastern Standard Time

Map | Info



Scale = 1 : 14K | 336724, 6246863, 56

WaterNSW
Work Summary

GW037956

Licence:
Licence Status:

Authorised Purpose(s):
Intended Purpose(s): INDUSTRIAL

Work Type: Bore
Work Status:
Construct.Method:
Owner Type: Private

Commenced Date:
Completion Date: 01/04/1972
Final Depth:
Drilled Depth: 21.10 m

Contractor Name: (None)
Driller:
Assistant Driller:

Property:
GWMA:
GW Zone:
Standing Water Level (m):
Salinity Description: invalid code
Yield (L/s):

Site Details

Site Chosen By:

	County	Parish	Cadastre
Form A:	CUMBERLAND	ALEXANDRI	1
Licensed:			

Region: 10 - Sydney South Coast
River Basin: 213 - SYDNEY COAST - GEORGES RIVER
Area/District:
CMA Map: 9130-3S
Grid Zone:
Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: (Unknown)
Northing: 6247675.000
Easting: 334804.000
Latitude: 33°53'54.2"S
Longitude: 151°12'48.2"E

GS Map: -
MGA Zone: 56
Coordinate Source: GD.,PR. MAP

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1		Backfill	Backfill	0.00	21.10				
1	1	Casing	Threaded Steel	0.00	13.10	203			Suspended in Clamps
1	1	Opening	Screen	12.40	20.00			1	Stainless Steel

Water Bearing Zones

From (m)	To (m)	Thickness (m)	WBZ Type	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth	Duration (hr)	Salinity (mg/L)

							(m)		
7.90	11.70	3.80	Unconsolidated	6.40					
11.80	13.50	1.70	Unconsolidated	6.40					
15.80	20.90	5.10	Unconsolidated	4.50					

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	2.59	2.59	Made Ground	Fill	
2.59	3.04	0.45	Sand Grey	Sand	
3.04	5.02	1.98	Sand Yellow Clean	Sand	
5.02	6.40	1.38	Sand Yellow Clean Wet	Sand	
6.40	7.84	1.44	Sand Hard Cemented Very Fine	Sand	
7.84	7.92	0.08	Sand Hard Cemented	Sand	
7.92	10.51	2.59	Sand Yellow Water Supply	Sand	
10.51	11.73	1.22	Sand Dirty Water Supply	Sand	
11.73	11.81	0.08	Sand Hard Cemented	Sand	
11.81	13.56	1.75	Sand Grey Dirty Water Supply	Sand	
13.56	15.24	1.68	Sand Yellow Clean	Sand	
15.24	15.84	0.60	Clay Organic	Clay	
15.84	18.13	2.29	Sand Grey Water Supply	Sand	
18.13	20.11	1.98	Sand White Clean Water Supply	Sand	
20.11	21.10	0.99	Clay Dark Grey Water Supply	Clay	

Remarks

09/12/1978: BACKFILLED & CONCRETED OVER-1978

***** End of GW037956 *****

Warning To Clients: This raw data has been supplied to the WaterNSW by drillers, licensees and other sources. WaterNSW does not verify the accuracy of this data. The data is presented for use by you at your own risk. You should consider verifying this data before relying on it. Professional hydrogeological advice should be sought in interpreting and using this data.

WaterNSW
Work Summary

GW108245

Licence: 10WA114749 **Licence Status:** CURRENT

Authorised Purpose(s): RECREATION (GROUNDWATER)
Intended Purpose(s): RECREATION (GROU

Work Type: Bore
Work Status:
Construct.Method: Rotary
Owner Type:

Commenced Date: **Final Depth:** 20.80 m
Completion Date: 21/09/2006 **Drilled Depth:** 20.80 m

Contractor Name: INTERTEC DRILLING SERVICES
Driller: William Crump
Assistant Driller:

Property: CORNING PARK 10 Broome St WATERLOO 2017 NSW **Standing Water Level (m):** 5.800
GWMA: **Salinity Description:**
GW Zone: **Yield (L/s):** 1.500

Site Details

Site Chosen By:

	County	Parish	Cadastre
Form A:	CUMBERLAND	ALEXANDRI	56 1038380
Licensed:	CUMBERLA	ALEXANDR	Whole Lot 562//1132501

Region: 10 - Sydney South Coast **CMA Map:**
River Basin: - Unknown **Grid Zone:** **Scale:**
Area/District:

Elevation: 0.00 m (A.H.D.) **Northing:** 6247612.000 **Latitude:** 33°53'56.2"S
Elevation Source: Unknown **Easting:** 334890.000 **Longitude:** 151°12'51.5"E

GS Map: - **MGA Zone:** 56 **Coordinate Source:** Unknown

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1		Hole	Hole	0.00	0.75	355			Rotary Air
1		Hole	Hole	0.75	20.80	305			Rotary Air
1		Annulus	Waterworn/Rounded	1.00	20.80				Graded, Q:1476.000m3
1	1	Casing	Pvc Class 9	-0.40	16.77	140			Other, Screwed and Glued
1	1	Casing	Stainless Steel	-0.40	0.10	168			Suspended in Clamps
1	1	Opening	Screen - Wire Wound	16.77	19.77	140		0	Stainless Steel, Screwed and Glued, A: 0.80mm
1	1	Casing	Stainless Steel	19.77	20.30	140			Seated on Bottom, Welded

Water Bearing Zones

From (m)	To (m)	Thickness (m)	WBZ Type	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
6.00	19.90	13.90	Unknown	5.80		1.50	16.50	00:15:00	198.00

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	0.75	0.75	SANDSTONE ROCKS & FILL	Sandstone	
0.75	2.00	1.25	SAND AND RUBBISH	Sand	
2.00	5.00	3.00	SAND AND HEAVY PEAT	Sand	
5.00	13.00	8.00	SAND	Sand	
13.00	19.90	6.90	SAND WITH PEAT LAYERS	Sand	
19.90	20.80	0.90	SANDSTONE GREY	Sandstone	

Remarks

03/07/2007: Previous Lic No:10BL159905
22/07/2008: Previous Lic No:10BL165753

***** End of GW108245 *****

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Appendix C – Development Plans and Survey



KEY

PRIVATE	AFFORDABLE	SHARED	
STUDIO	1 BED	LOBBY	RETAIL
1 BED	2 BED	COMMUNAL CORRIDOR	ONE PLAYGROUND
2 BED	3 BED	COMMUNAL SPACE	PLANT ROOM
3 BED		DEEP SOIL	LOADING
BALCONY		GREEN SPACE	SERVICES

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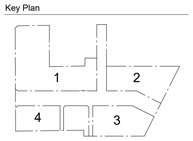
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7	30/06/25	FOR INFORMATION	CC	DM
8	01/07/25	FOR INFORMATION	CC	DM
9	01/08/25	FOR INFORMATION	CC	RY
10	15/08/25	FOR INFORMATION	CC	RY

Client

CORONATION

Key Plan



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Project

Bourke & Young St
Waterloo NSW 2017

Country: Gadigal

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PRECINCT PLAN - LEVEL 00

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3 BED		DEEP SOIL	LOADING
BALCONY		GREEN SPACE	SERVICES

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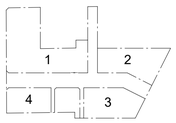
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6	01/08/25	FOR INFORMATION	CC	RY
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Project

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Waterloo NSW 2017

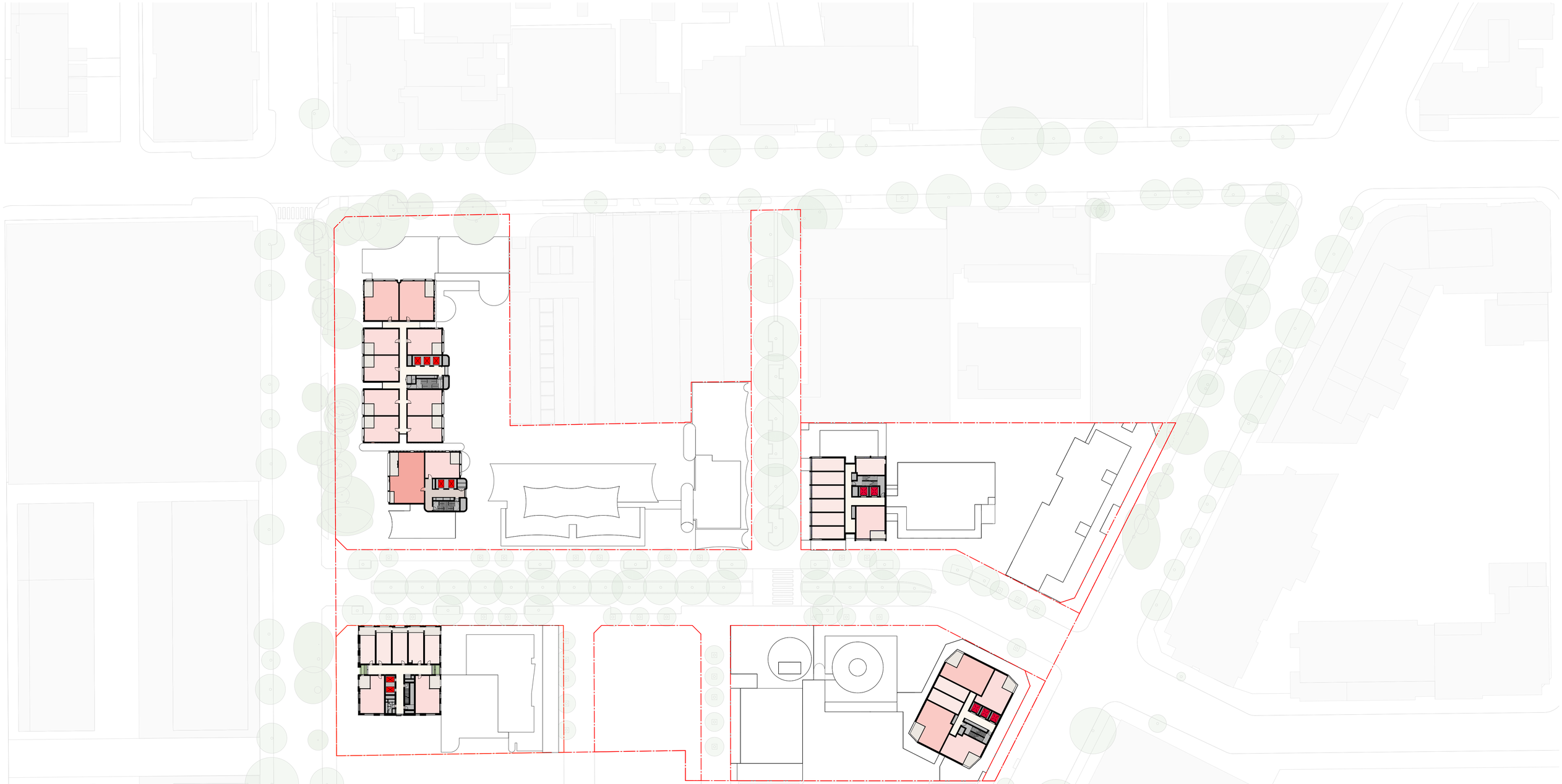
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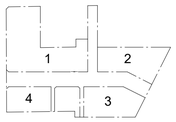
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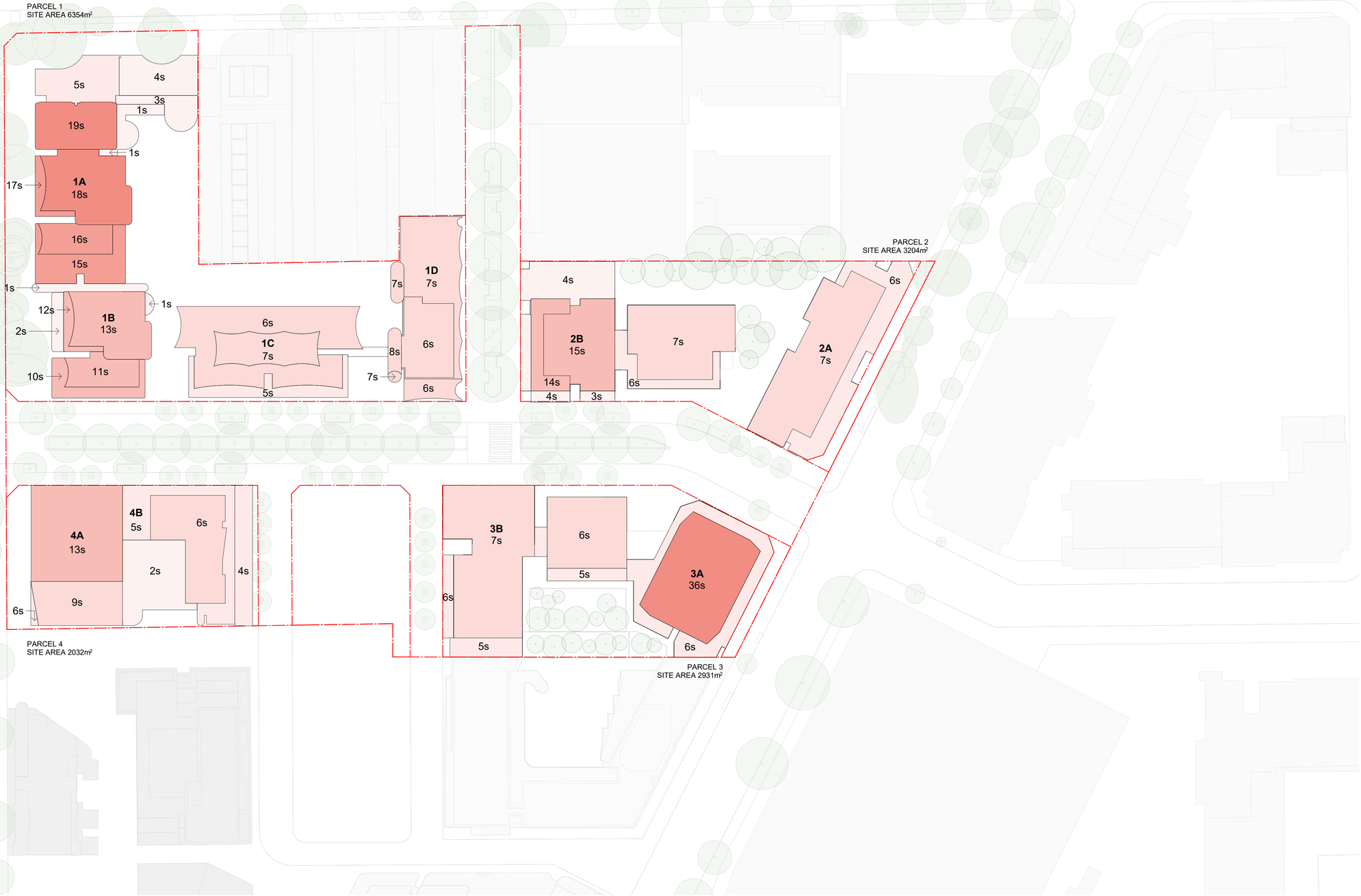
Bourke & Young St
Waterloo NSW 2017

Country: Gadigal

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Drawing No.		Revision
WL-AR-SSDA-PR-0311		/ 6



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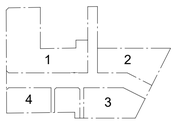
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Key Plan



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Waterloo NSW 2017

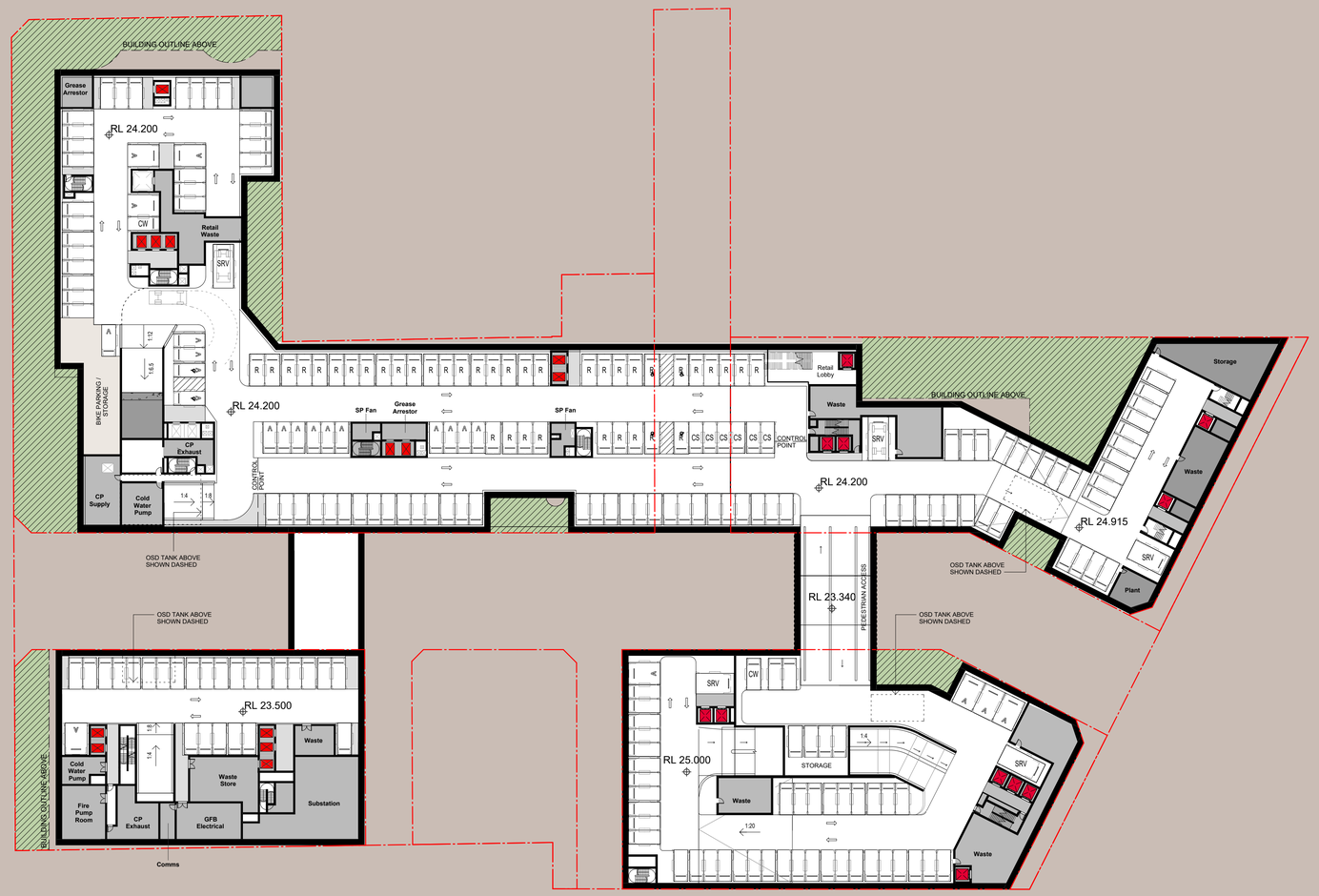
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CC	RY	

Drawing No. **WL-AR-SSDA-PR-0319** Revision / 8



PARKING SCHEDULE	
LOCATION	TOTAL
P1	
ADAPTABLE 5400x3800	9
CARSHARE 5400x2600	6
CARWASH 5400x2400	1
RESIDENTIAL 5400x2400	157
RESIDENTIAL SMALL 5400x2300	1
RETAIL 5500x2600	35
RETAIL ACCESSIBLE 5500x2600	4
SERVICE 3500x7500	1
VISITOR 5400x2400	13
VISITOR ACCESSIBLE 5400x2400	2
P1: 229	229
P2	
ADAPTABLE 5400x3800	4
RESIDENTIAL 5400x2400	80
SERVICE 3500x7500	1
P2: 85	85
P3	
ADAPTABLE 5400x3800	7
CARWASH 5400x2400	1
RESIDENTIAL 5400x2400	130
SERVICE 3500x6500	2
SERVICE 3500x7500	1
P3: 141	141
P4	
ADAPTABLE 5400x3800	3
RESIDENTIAL 5400x2400	59
P4: 62	62
Grand total	517

DEEP SOIL ZONES

	Site Area	Deep Soil	%
STAGE 1	8386sqm	1425sqm	17%
STAGE 2	6135sqm	752sqm	12%
TOTAL	14521sqm	2177sqm	15%

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PRELIMINARY

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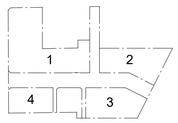
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Rev	Date	Revision	By	Chk.
1	19/06/25	FOR INFORMATION	CC	DM
2	26/06/25	FOR INFORMATION	CC	DM
3	01/07/25	FOR INFORMATION	CC	DM
4	15/08/25	FOR INFORMATION	CC	RY

Client

CORONATION

Key Plan



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Project

Bourke & Young St
Waterloo NSW 2017

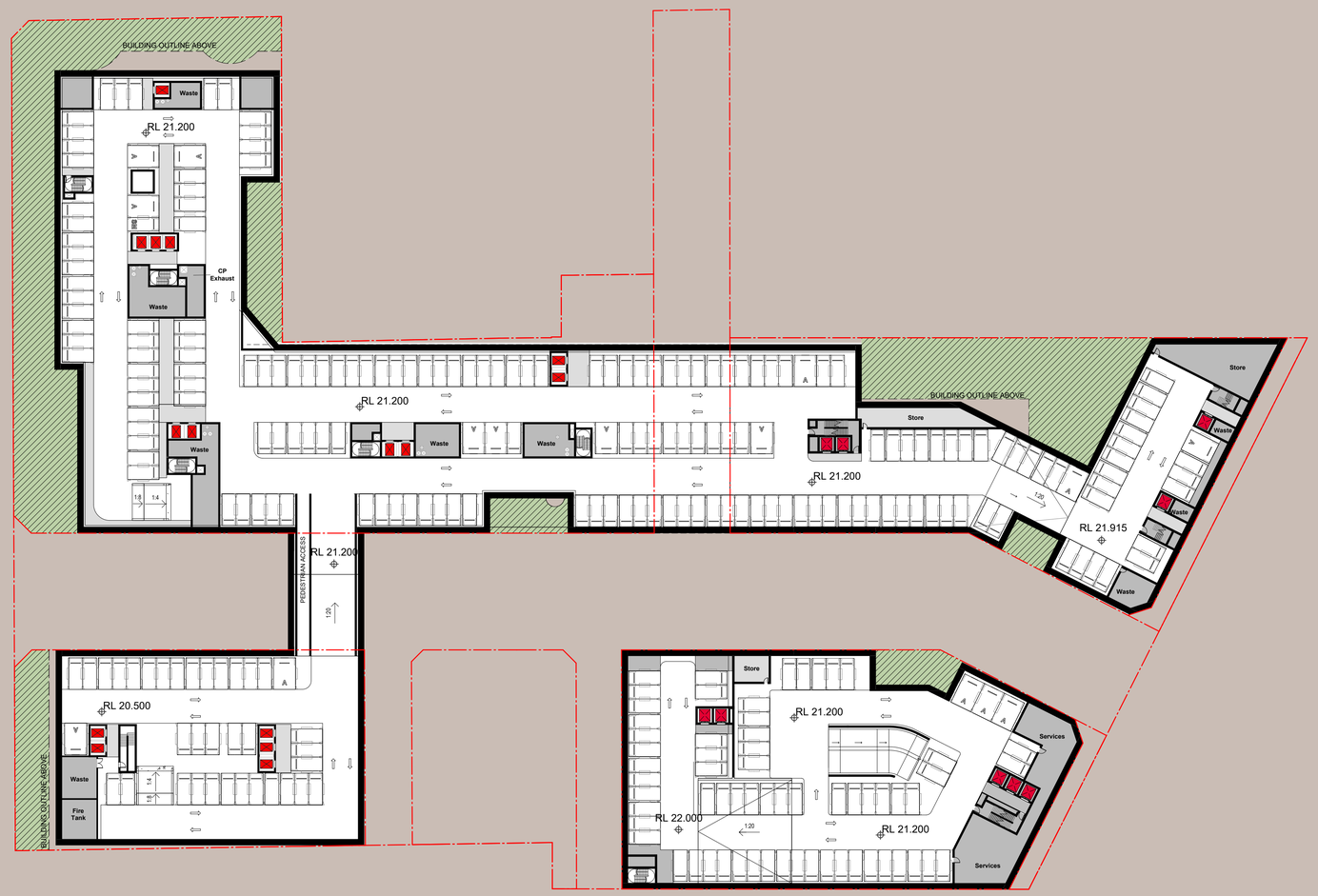
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Drawing Name

PRECINCT PLAN - BASEMENT 01

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Drawing No. **WL-AR-SSDA-PR-0320** Revision / 4



PARKING SCHEDULE

LOCATION	TOTAL
P1	
ADAPTABLE 5400x3800	9
CARSHARE 5400x2600	6
CARWASH 5400x2400	1
RESIDENTIAL 5400x2400	157
RESIDENTIAL SMALL 5400x2300	1
RETAIL 5500x2600	35
RETAIL ACCESSIBLE 5500x2600	4
SERVICE 3500x7500	1
VISITOR 5400x2400	13
VISITOR ACCESSIBLE 5400x2400	2
P1: 229	229
P2	
ADAPTABLE 5400x3800	4
RESIDENTIAL 5400x2400	80
SERVICE 3500x7500	1
P2: 85	85
P3	
ADAPTABLE 5400x3800	7
CARWASH 5400x2400	1
RESIDENTIAL 5400x2400	130
SERVICE 3500x6500	2
SERVICE 3500x7500	1
P3: 141	141
P4	
ADAPTABLE 5400x3800	3
RESIDENTIAL 5400x2400	59
P4: 62	62
Grand total	517

DEEP SOIL ZONES

	Site Area	Deep Soil	%
STAGE 1	8386sqm	1425sqm	17%
STAGE 2	6135sqm	752sqm	12%
TOTAL	14521sqm	2177sqm	15%

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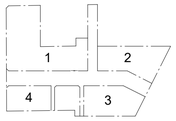
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Project
Bourke & Young St
Waterloo NSW 2017

Country: Gadigal

Drawing Name
PRECINCT PLAN - BASEMENT 02

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Drawing No. **WL-AR-SSDA-PR-0321** Revision **/ 1**

Appendix D – Groundwater Seepage Analysis

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26 August 2025
E26442.G12_Rev2

The Trustee for Waterloo Property Unit Trust
c/-Tom Tang from Coronation Property Co Pty Ltd
Level 2, 66 Wentworth Avenue,
SURRY HILLS, NSW 2010

Groundwater Seepage Analysis
Main Works for Waterloo Mixed-Use Development (HDA)
881-885 Bourke Street, Waterloo, NSW

1. INTRODUCTION AND PROJECT DESCRIPTION

1.1 Background

This Groundwater Seepage Analysis (GSA) has been prepared by EI Australia (EI) on behalf of Waterloo Property Pty Ltd as The Trustee for Waterloo Property Unit Trust (the Client/Applicant) in support of a Housing Delivery Authority (HDA) nominated State Significant Development Application (SSDA) for a proposed mixed-use development at 881-885 Bourke Street, Waterloo, NSW (the site), with concurrent rezoning (SSD-80441462). The report is submitted to the NSW Department of Planning, Housing, and Infrastructure (DPHI).

This application is preceded by a separate SSDA for Early Works that prepare the Site for the proposed development (SSD-80911502).

Specifically, consent is sought for the following Main Works for the Waterloo Mixed Use Development:

- Site establishment and enabling works (that were not included in the preceding Early Works SSDA);
- Construction of residential and mixed-use buildings across four development parcels, inclusive of;
  - build to rent apartments and associated amenities;
  - affordable apartments;
  - non residential floor space including commercial premises and creative industry;
- Construction of a consolidated basement with below-ground links between development parcels, comprising car parking, plant and storage area;
- Landscaping and publicly accessible open space;
- Works to site frontages; and
- Extension and augmentation of infrastructure and services (that were not included in the preceding early Works SSDA) as required.

Development on the site was declared State Significant Development (SSD) pursuant to State Significant Declaration Order 2025 (Order) dated 17 February 2025. The Order declares development specified in EOI application 229420 dated 8 January 2025, including development for the purposes of mixed-use development (Build to Rent including affordable housing) with ground floor non-residential uses at 881-885 Bourke Steet, as identified in Schedule 3, is SSD.

On 5 March 2025, the Department of Planning, Housing and Infrastructure (the Department) issued SEARs and concurrent rezoning requirements for the project.

The site is subject to an existing Voluntary Planning Agreement (VPA) that sets out dedication of public domain between four development parcels. The public domain includes a new east-west street, a through site link and public open space area (comprising future shared zones and park). The development parcels and public domain as set out in the VPA will be delivered notwithstanding the works proposed in this SSDA.

This report has been prepared to provide an estimation of the groundwater take volumes that require pumping out during the construction and operational stages of the development, estimation of the groundwater drawdown as a result of the dewatering, and any associated ground settlements.

NOTE: At the request of the Client, this GSA includes analysis for both Stage 1 (Parcels 1 and 4) and Stage 2 (Parcels 2 and 3) of the proposed development. However, no intrusive ground investigation works were undertaken in the Stage 2 area by EI at the time of producing this report. Therefore, the stratigraphy and water levels condition for Stage 2 have been inferred, based on the results of the Stage 1 intrusive works and in-house data. Once investigation results become available in the future, this GSA should be reviewed and updated accordingly.

1.2 Proposed Development

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

- Architectural drawings prepared by SJB Architects – Project No. N/A, Drawing No. WL-AR-SSDA-PR-0320 (Rev. 4), WL-AR-SSDA-PR-0321 (Rev.1), dated 15 August 2025;
- Site survey plan prepared by SDG Pty Ltd – Referenced 9350, Sheet 1 of 5, Issued B, dated 7 April 2025; and
- Geotechnical Investigation (GI) report by EI Australia – Report no. E26442.G03_Rev2, dated 15 August 2025.

The datum adopted in the above documents is in Australian Height Datum (AHD), hence all Reduced Levels (RL) mentioned in this GSA report are henceforth in AHD.

Based on the provided documents above, EI understands that the lowest basement levels are proposed to have Finished Floor Levels (FFLs) ranging from RL 20.5 m AHD to RL 23.34 m AHD. Bulk Excavation Levels (BELs) are assumed to range approximately from RL 19.5 m AHD to RL 22.34 m AHD, including an allowance for the construction of the basement slab. To achieve the BEL, excavation depths of up to 11 m below the existing ground level (BEGL) are estimated. Locally deeper excavations may be required for footings, lift overrun pits, crane pads, and service trenches. The basement footprint areas adopted in the analysis are shown in **Figure 1**.

2. SITE CONTEXT AND DESCRIPTION

The site is legally described as Lot 1 DP1308636 and Lot 2 DP1308636 and is located at 881-885 Bourke Street, Waterloo. The site has an area of 21,554m². It has an irregular shape, is generally flat and was recently cleared of light industrial and large format commercial buildings. The site has vehicle access from Young Street and Bourke Street.

The site is located within Gadigal Land, in the Sydney Local Government Area (LGA) and is approximately 4 km south of the Sydney CBD. The site is approximately 950 m walking distance east of an entrance to the Waterloo Metro Station, approximately 1.1 km northeast of the Green Square Train Station and approximately 1.5 km southeast of Redfern Train Station. The site is also immediately adjacent to a bus stop on Bourke Street.

There are a number of trees along the Danks and Young Street frontages. Additional trees on these frontages are located outside the site boundary. There are commercial and business premises to the west, high-density residential and business premises to the north, primarily high-density residential to the east and high density residential under construction to the south.

An aerial of the site is provided in **Plate 1**.



Plate 1 Site Aerial of the Proposed Site Development
(Source: Nearmap, Ethos Urban)

3. SITE MODEL

3.1. Subsurface Conditions Permeability

For the purpose of the groundwater seepage assessment, the subsurface conditions outlined in Table 3-4 of EI's GI report have been adopted. Permeability values which were adopted for the assessment of groundwater take volumes are presented in **Table 1**.

Table 1 Summary of Subsurface Conditions and Adopted Design Parameters

Unit	Material [1]	Adopted Permeability (m/s)	$k_{vertical}$ / $k_{horizontal}$
1	Fill and Marine Soil [2]	1.0×10^{-5}	1.0
2	Residual Soil [2]	1.0×10^{-7}	1.0
3	Class V Sandstone [3]	3.5×10^{-7}	0.5
4	Class IV Sandstone or Better [4]	5.0×10^{-8}	0.3

Notes:

1 For more detailed descriptions of subsurface conditions reference should be made to the EI's GI Report.
2 Permeability value has been correlated for this unit encountered during the GI using Look (2014).
3 Permeability value was adopted based on the permeability result observed in BH102M.
4 Permeability value of Unit 4 has been adopted and correlated based on Pells (2019) and in-house data.

3.2. Groundwater Observations and Rising Head Tests

Rising head tests were undertaken by EI in four monitoring wells (BH101M, BH102M, BH109M, and BH112M) to estimate hydraulic conductivity (or permeability) values, as summarised in **Table 2**. The rising head test involved initial removal of water from the well, then measuring the rise in water level at regular time intervals to assess the rate of water level recovery. 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**).

Table 2 Monitoring Well Details and Rising Head Test Results

Monitoring Well ID	Total Well Depth (m BEGL)	Screen Length (m)	Screened Section	Date of Test	Approximate RL of Groundwater Level (m AHD)	Calculated Permeability (m/s) [3]
BH101M	6.0	3.0	Marine Soil (Sand)	23/5/2025	25.3	4.2×10^{-6}
BH102M	9.2[1]	1.2[1]	Class V Sandstone	04/6/2025	25.1	3.5×10^{-7}
BH109M	9.0	3.0	Marine Soil (Sand)	04/6/2025	24.7	- [2]
BH112M	8.5	3.0	Marine Soil (Sand)	23/5/2025	27.1	- [2]

Notes:

1 The screen was blocked at 9.2 m BEGL.
2 EI was unable to perform rising head tests on these two wells due to high groundwater flow observed during the tests. Therefore, a conservative hydraulic conductivity value of 10^{-5} m/s was adopted for Unit 1, as recommended in Look (2014).

Based on the site investigation, it is noted that the groundwater level is approximately 2 m BEGL and present within the Botany Sands. In our experience, groundwater levels in this formation can fluctuate due to rainfall and seasonal variations. To accommodate potential future fluctuations, the design groundwater level has been conservatively assumed and modelled at the existing ground surface level.

3.3. The Maximum Extent of the Cone of Depression

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 (m).
- H = Highest design groundwater level (m).
- 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. Based on the formula above, the maximum extent of the cone of depression has been estimated at approximately 100 m from the basement outline. Therefore, a constant head boundary condition has been applied at this distance in the analysis.

3.4. Shoring System

At the time of this analysis, design of the shoring system is not available. Given the presence of a relatively thick sandy layer within the proposed excavation depth, it is assumed that an impermeable shoring wall, such as a secant pile wall, will be implemented. Furthermore, the shoring wall should be socketed into a low-permeability stratum to reduce the potential for groundwater ingress into the excavation area.

For the purpose of the GSA modelling, a secant pile wall surrounding the basement footprint was assumed, socketed to a depth of **3 m below the BEL** and extending at least 1 m into the residual soil in the northeast area (because of thick sandy layer), and to **1.5 m below the BEL** elsewhere. The area with a 3 m socketed depth below the BEL is shown in **Figure 1**.

The shoring wall is assumed to be impermeable, with drainage occurring from the base of the excavation. It is understood that some leakage between the piles may occur; however, this is not expected to significantly affect the predicted water drawdown and the estimated groundwater inflow in this analysis.

This analysis does not assess the overall stability and embedment depth of the shoring system. Once the designs are updated, this analysis should be revised accordingly.

4. GROUNDWATER TAKE ASSESSMENT

4.1. Initial Volume of Pore Water Dewatered within Excavated Materials

For calculation of the volume of water (V_{water}) pumped out prior to bulk excavation works the following assumptions have been made:

- Sand layer (Fill and Marine Soil) below the natural ground level is assumed to be completely submerged and saturated.
- Initial dewatering of the sand layer, with an average thickness of 7 m, inside the basement perimeter.
- Porosity (η) of 0.4 for sand layer is assumed for this calculation.

Therefore every 1m^3 of sand material removed from below the water table, contains approximately 0.4m^3 of water

The total volume of sand material below the water table estimated for dewatering is

$V_{sat} = A \times D$, where

$$A = Area\ of\ the\ excavation\ (approx.)$$

$$D = Depth\ of\ dewatering\ below\ the\ water\ table\ (Sand)$$

$$\therefore V_{sat} = 12{,}993 \times 7.0 = 90{,}951\ m^3$$

Therefore, volume of water removed from the site as a result of bulk excavation work is approximately:

$$V_{water} = \eta V_{sat} = 0.4 \times 90{,}951 = 36{,}380\ m^3 \approx 36.4\ ML$$

The estimated total groundwater take in the form of pore water within the sand material during initial dewatering is therefore expected to be about **36.4 ML**.

4.2. Groundwater Seepage Volumes During Construction Phase

Groundwater seepage analysis during construction has been undertaken using PLAXIS 3D Ultimate (Version 2024.2.0.1144). PLAXIS 3D is a commercially available finite element package intended for three dimensional analyses 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 3D estimates the seepage rate of water entering the excavation. 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 outlined in EI's GI (referenced in Section 1.2 of this report) were applied to model the stratigraphy of the model.
- The permeability values presented in **Table 1** were adopted for modelling each of the units.
- The shoring system is assumed to be an impermeable secant pile wall as outlined in Section 3.4 of this report.
- The base of the basement excavation is assumed to be permeable and free to drain.
- Temporary dewatering will be undertaken within the basement retaining wall perimeter to 0.5 m below the proposed BEL.
- A plan showing the modelled locations of the adopted boreholes, site boundary, perimeter of the proposed basement excavation, and design BEL for this assessment is presented in **Figure 1**.

- The design groundwater levels adopted in the model based on Section 3.2 of this report.
- The constant head boundary condition has been modelled as outlined in Section 3.3 of this report.
- The PLAXIS model is modelled with a base elevation or RL 8.0 m AHD.

The PLAXIS 3D results are presented in **Appendix A. Table 3** below provides the estimated groundwater inflow rate into the basement.

Table 3 Summary of Analysis Results

Inflow into excavation (m^3/day)	Total Inflow per year (ML/year)
34.2	12.5

4.3. Assessment of Groundwater Take During Operational Phase

A fully tanked/watertight basement solution is to be adopted for the long term management of groundwater. Hence, groundwater ingress in a tanked basement is not expected during the life of the proposed development.

4.4. Groundwater Drawdown and Induced Settlement

Based on the analysis findings, the predicted groundwater drawdown behind the shoring wall surrounding the basement boundary is generally less than 1 m, with a localised maximum drawdown of up to 4 m observed between Parcel 3 and Parcel 4. The resulting ground settlements outside the site boundary due to the proposed dewatering are estimated to be less than 6 mm. This level of settlement is considered to pose a 'negligible' risk in terms of the category of damage risk due to dewatering, as defined by Cashman and Preene (2021), as shown in the excerpt in **Plate 2**. 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, and other construction-related influences.

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 2 Excerpt from Cashman and Preene (2021)

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.

5. CONCLUSIONS AND COMMENTS

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

- The predicted groundwater take during the construction phase is approximately:
  - 36.4 ML from initial dewatering of pore water within excavated materials; and
  - 12.5 ML/year from groundwater seepage through the basement footprint.
- The above groundwater take estimates are based on the following assumptions:
  - The shoring system is an impermeable wall as per Section 3.4 of this report;
  - Continuous dewatering in order to maintain the groundwater to 0.5 m below BEL during construction; and
  - 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.
- Operational phase groundwater take is not expected due to a tanked basement design.
- The predicted groundwater drawdown behind the shoring wall surrounding the basement boundary is generally less than 1 m, with a localised maximum drawdown of up to 4 m observed between the Parcel 3 and Parcel 4 buildings.
- The ground settlements resulting from the predicted groundwater drawdowns outside the site boundary are estimated to be less than 6 mm. This level of settlement is considered to pose 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.

Should any design or construction conditions differ from that adopted in this report; this GSA should be reviewed and updated as required.

6. LIMITATIONS

This report has been prepared for the exclusive use of The Trustee for Waterloo Property Unit Trust 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 The Trustee for Waterloo Property Unit Trust.

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.

NOTE: As previously explained in Section 1.1, the GSA assessment herein for the Stage 1 (Parcels 1 and 4) and Stage 2 (Parcels 2 and 3) development area is based on the results of the intrusive investigations within the Stage 1 area only. Ground conditions for Stage 2 have been inferred from the Stage 1 area investigations. Upon completion of Stage 2 investigations, this GSA should be reviewed and updated accordingly.

7. CLOSURE

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

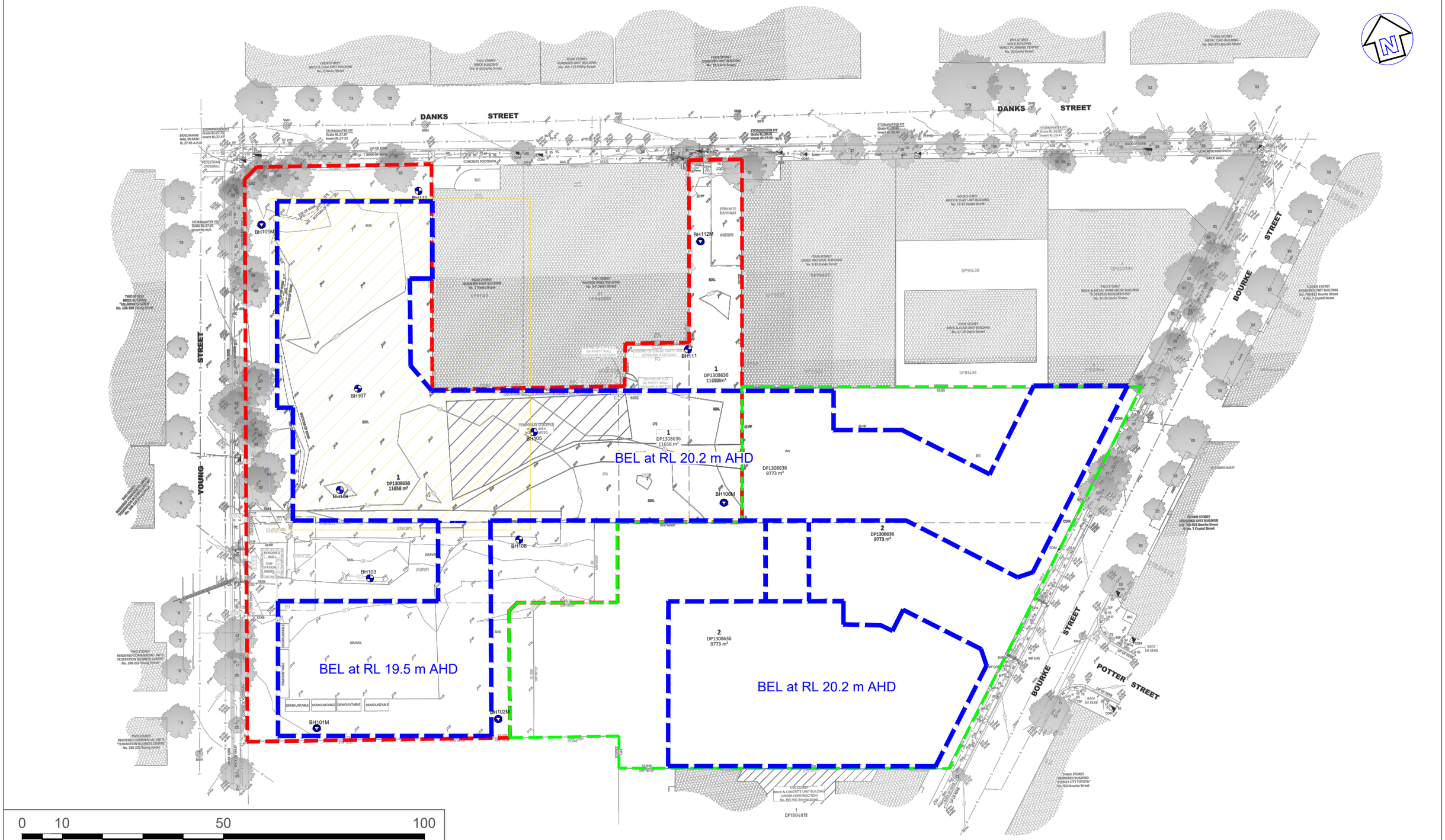
For and on behalf of
EI Australia

Author	Technical Reviewer
	
Ernest Widjaja Geotechnical Engineer	Huu Dang Principal Design Engineer

Attachments: **Figure 1** – Excavation Plan for GSA and Location of Boreholes
Appendix A – PLAXIS 3D Model and Results
Appendix B – Rising Head Permeability Tests
Appendix C – Important Information

Figures

Figure 1 Excavation Plan for GSA and Location of Boreholes



Map Source: Site survey plan prepared by Ramsay Surveyors Pty Ltd – Referenced 8811, Sheet Nos. 8 to 14, dated on 18 July 2024.

LEGEND (All Locations are Approximate)

- Stage 1 Site Boundary
- Stage 2 Site Boundary
- Basement Boundary
- Borehole/monitoring well location
- Borehole location

Area with piles surrounding the basement footprint to be socketed to a depth of 3 m below the BEL and minimum 1m within the residual soil

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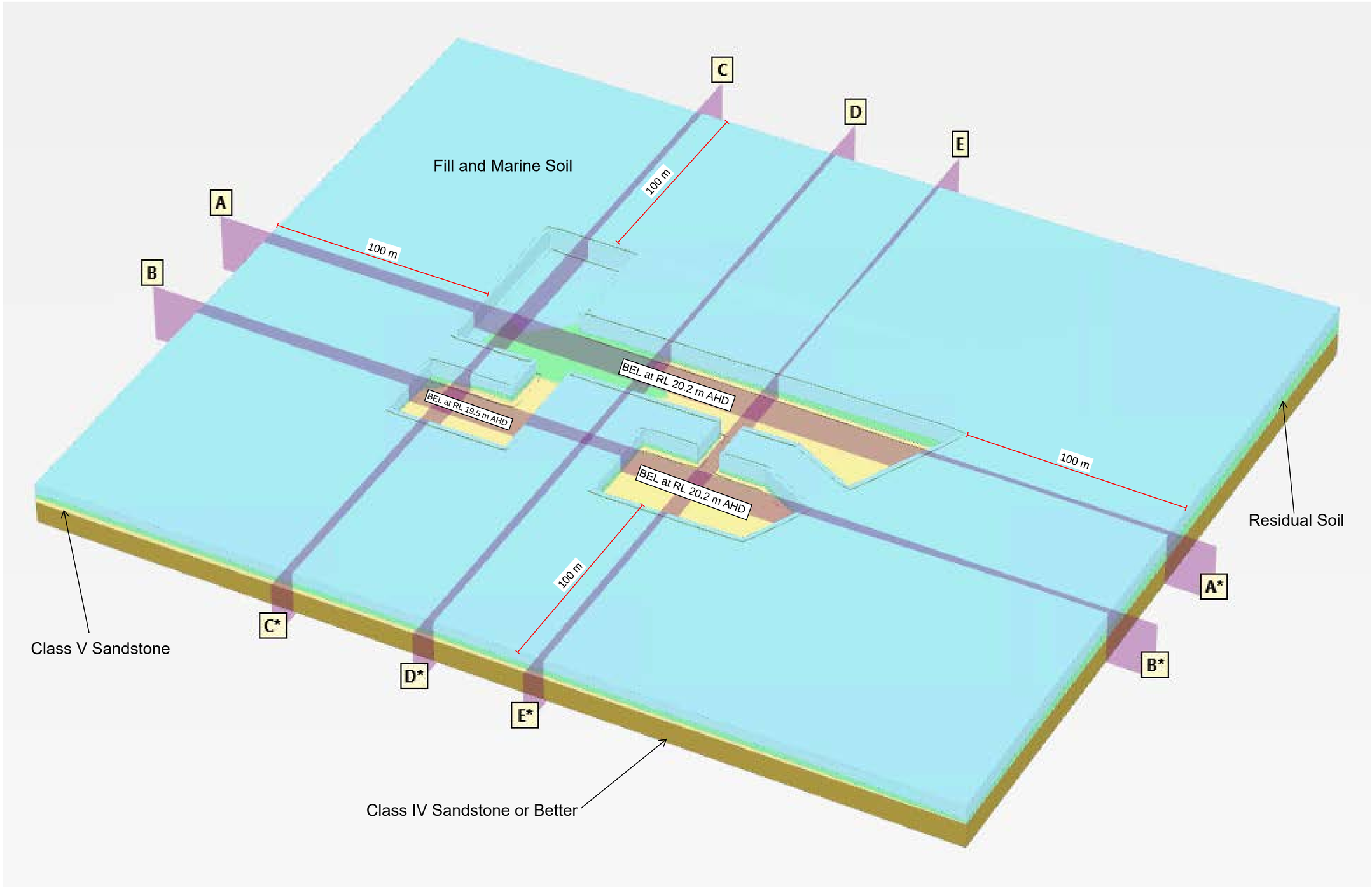
Drawn:	E.W.
Approved:	H.D.
Date:	26-8-25

The Trustee for Waterloo Property Unit Trust
Groundwater Seepage Analysis
881-885 Bourke Street, Waterloo NSW
Excavation Plan for GSA and Location of Boreholes

Figure: 1

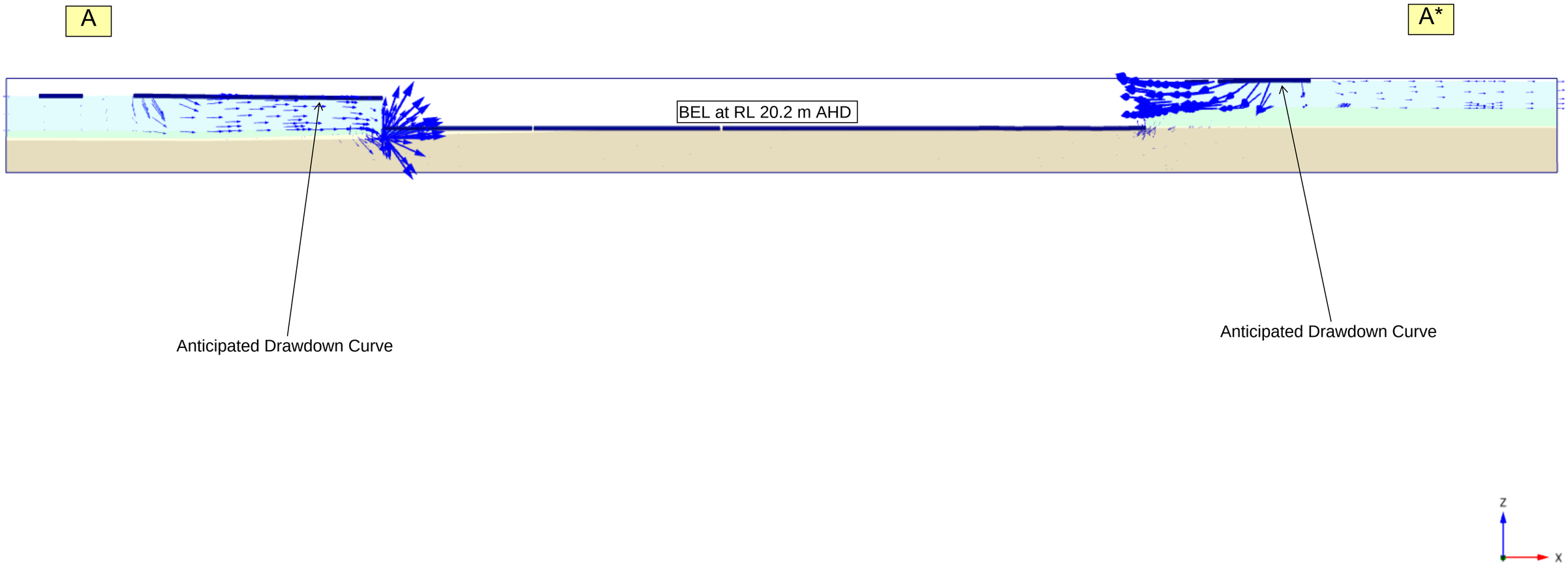
Project: E26442.G12_Rev2

Appendix A – PLAXIS 3D Model and Results



PLAXIS® 3D

Project description: 881-885 Bourke Street, Waterloo, NSW (Stage 1 & 2)			Date: 22/07/2025
Project filename: E26442.G12_Rev1_GSA (Stage 1 & 2)	Step: 11	Company: El Australia	

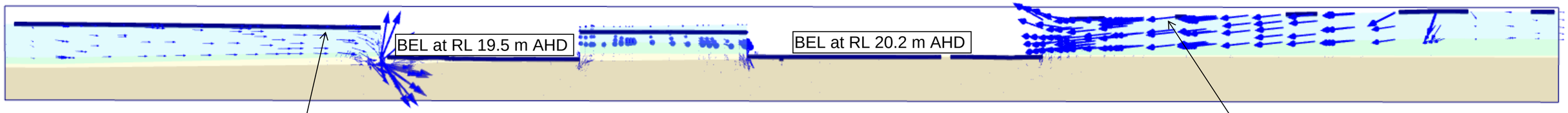


PLAXIS® 3D

Project description		Date
Anticipated Groundwater Flow and Drawdown Curve for Section A-A*		22/07/2025
Project filename	Step	Company
E26442.G12_Rev1_GSA (Stage 1 & 2)	11	El Australia

B

B*



Anticipated Drawdown Curve

Anticipated Drawdown Curve

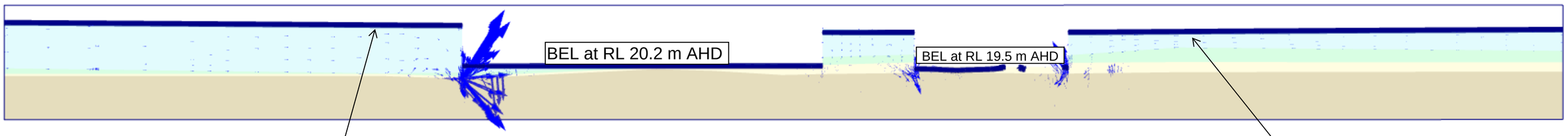


PLAXIS® 3D

Project description			Date
Anticipated Groundwater Flow and Drawdown Curve for Section B-B*			22/07/2025
Project filename	Step	Company	
E26442.G12_Rev1_GSA (Stage 1 & 2)	11	El Australia	

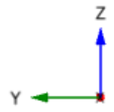
C

C*



Anticipated Drawdown Curve

Anticipated Drawdown Curve

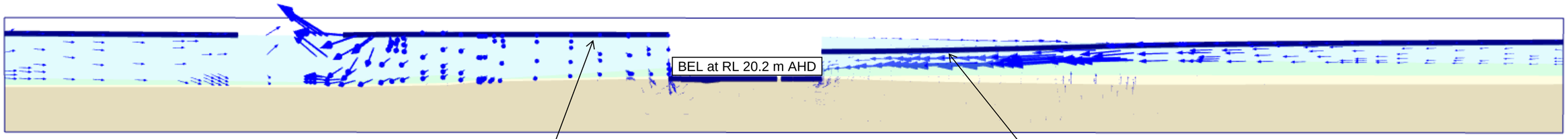


PLAXIS® 3D

Project description: Anticipated Groundwater Flow and Drawdown Curve for Section C-C*			Date: 22/07/2025
Project filename: E26442.G12_Rev1_GSA (Stage 1 & 2)	Step: 11	Company: El Australia	

D

D*



Anticipated Drawdown Curve

Anticipated Drawdown Curve

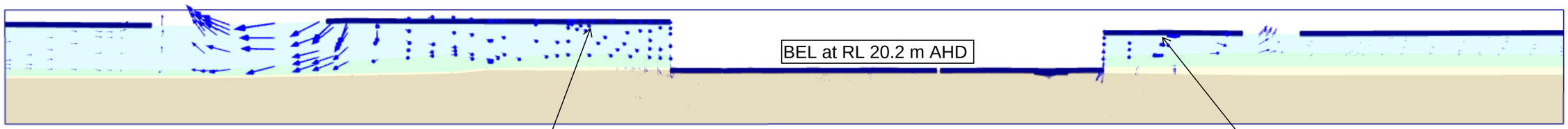


PLAXIS® 3D

Project description Anticipated Groundwater Flow and Drawdown Curve for Section D-D*		*Date* 22/07/2025
Project filename E26442.G12_Rev1_GSA (Stage 1 & 2)	*Step* 11	*Company* El Australia

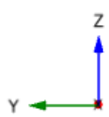
E

E*



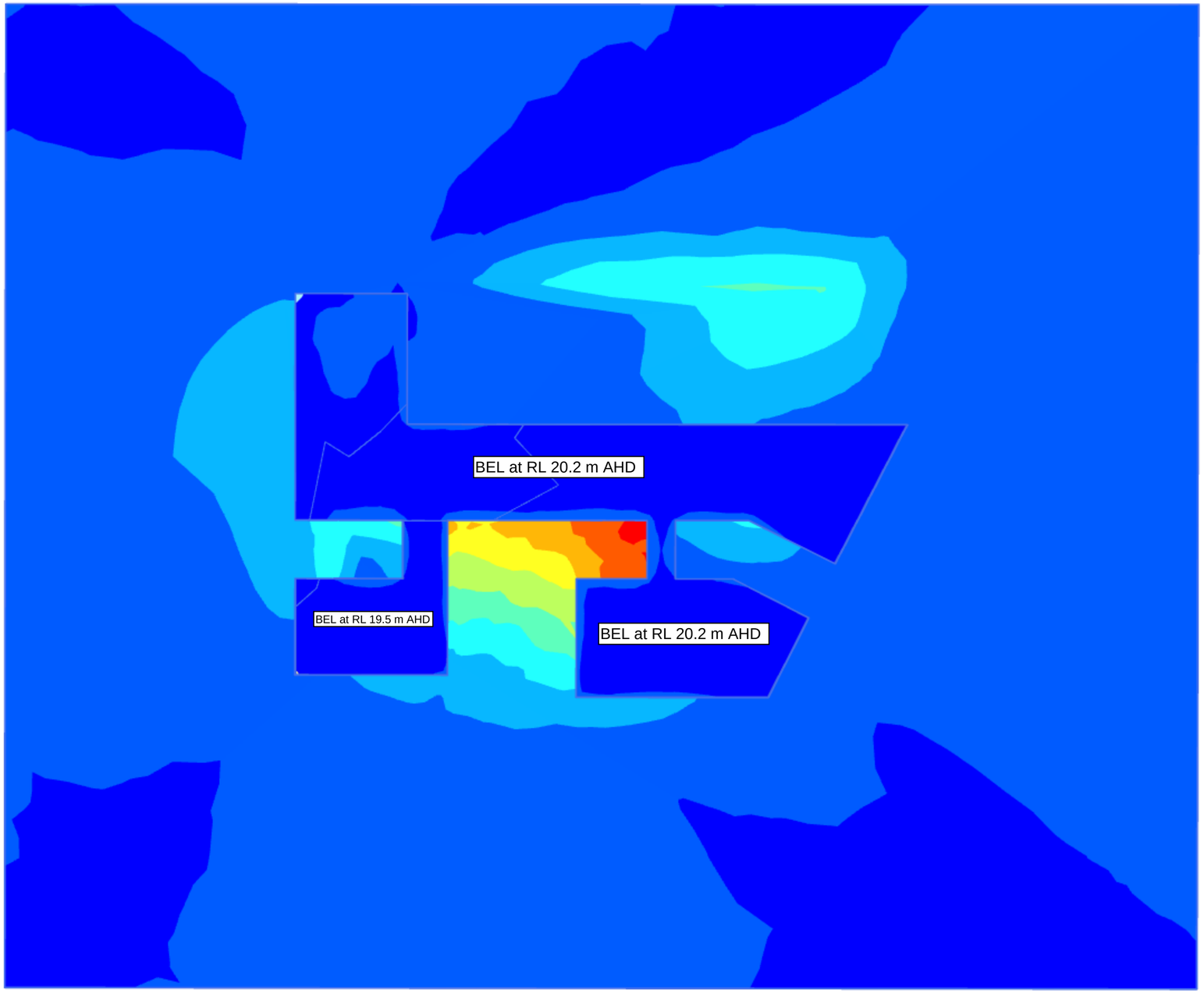
Anticipated Drawdown Curve

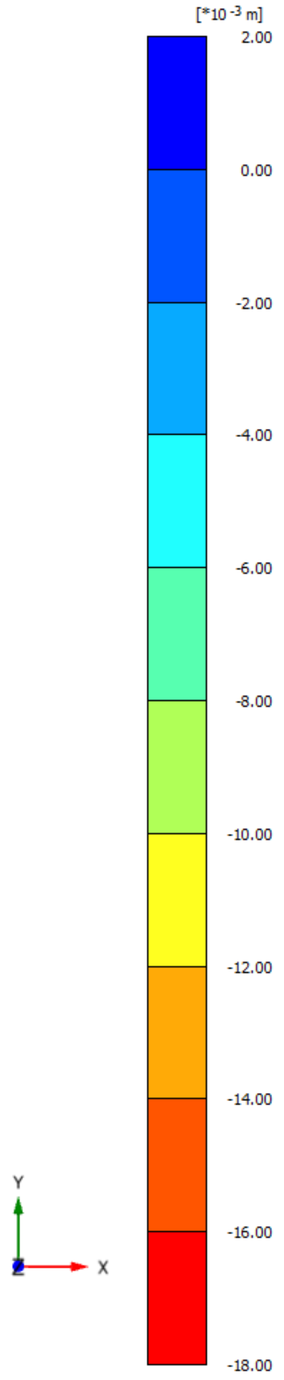
Anticipated Drawdown Curve



PLAXIS® 3D

Project description Anticipated Groundwater Flow and Drawdown Curve for Section E-E*		*Date* 22/07/2025
Project filename E26442.G12_Rev1_GSA (Stage 1 & 2)	*Step* 11	*Company* El Australia





Total displacements u_z (scaled up 500 times)

Maximum value = $3.982*10^{-3}$ m (Element 5798 at Node 1132)

Minimum value = -0.01685 m (Element 3113 at Node 6860)

PLAXIS® 3D	*Project description* Drawdown-Induced Settlements		*Date* 22/07/2025
	Project filename E26442.G12_Rev1_GSA (Stage 1 & 2)	*Step* 11	*Company* El Australia

Appendix B – Rising Head Permeability Tests

Rising Head Permeability Test

EI Job No.	E26442.G12		Test Date	23/05/2025
By	MS		Location	881-885 Bourke Street, Waterloo, NSW

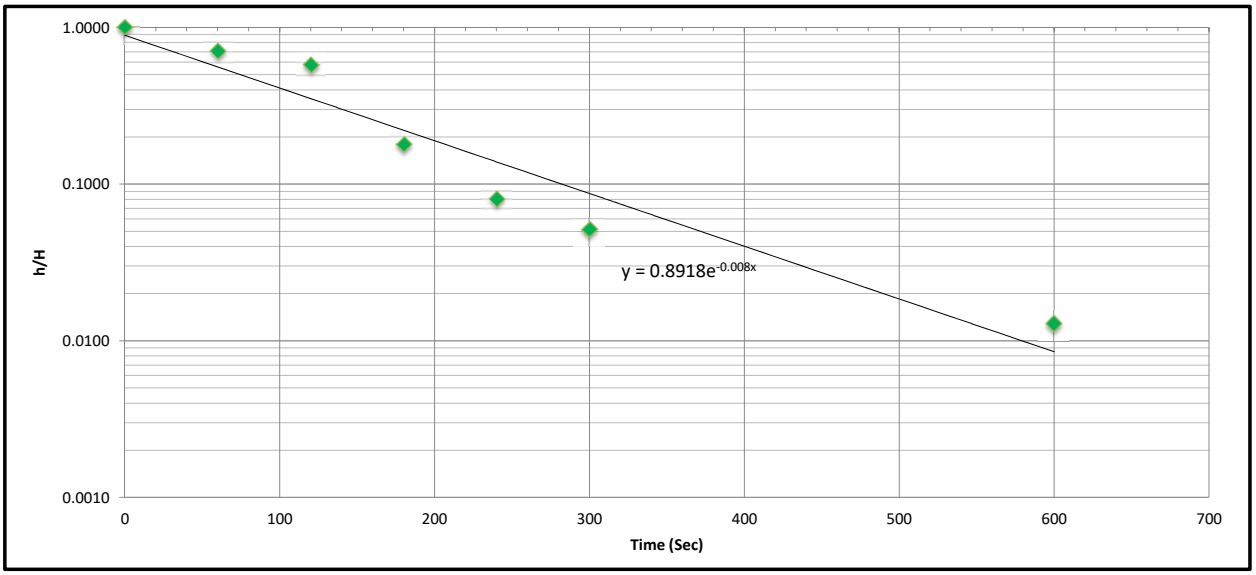
Borehole Detail

BH No.	BH101M
Casing Stick-up (m)	0.86
Effective Piezo Screen Length (m)	3
Piezo Radius r (m)	0.025
Borehole radius (m)	0.038
Depth of the piezometer (m BGL)	6
Static Water Level (m BToC)	2.9
Lag time T0 (sec)	110.13
Calculated Permeability k	**4.13E-06** m/sec

Based on Hvorslev Method

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

Time (mins)	Time (sec)	Depth to water (ft BToC)	Depth to water (m BToC)	Change in Level (m)	h/H
Static			2.90		
0	0		6.00	3.10	1.0000
1	60		5.10	2.20	0.7097
2	120		4.70	1.80	0.5806
3	180		3.46	0.56	0.1806
4	240		3.15	0.25	0.0806
5	300		3.06	0.16	0.0516
10	600		2.94	0.04	0.0129
15	900		2.93	0.03	0.0097
20	1200		2.93	0.03	0.0097
25	1500		2.93	0.03	0.0097
30	1800		2.93	0.03	0.0097
45	2700		2.92	0.02	0.0065
60	3600		2.92	0.02	0.0065



Rising Head Permeability Test

EI Job No.	E26442.G12		Test Date	4/06/2025
By	LL		Location	881-885 Bourke Street, Waterloo, NSW

Borehole Detail

BH No.	BH102M
Casing Stick-up (m)	1
Effective Piezo Screen Length (m)	1.2
Piezo Radius r (m)	0.025
Borehole radius (m)	0.038
Depth of the piezometer (m BGL)	9.2
Static Water Level (m BToC)	3.3
Calculated Permeability k	**3.54E-07**

The screen was blocked at 9.2 m BGL

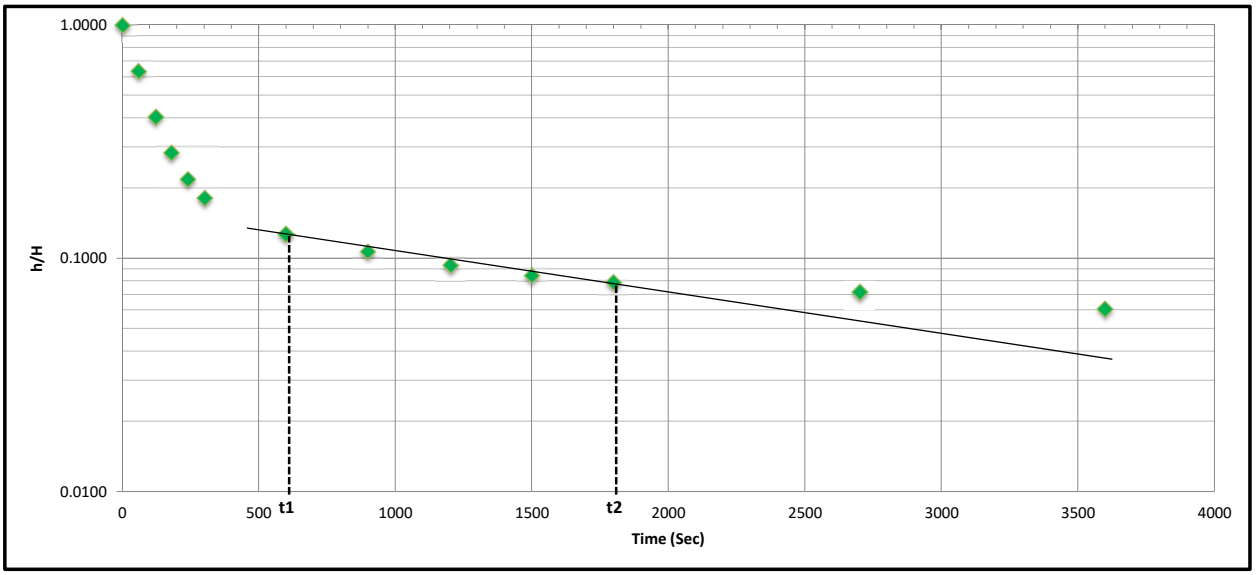
m/sec

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	600
t2	1800
h1	0.1266
h2	0.0789

Time (mins)	Time (sec)	Depth to water (ft BToC)	Depth to water (m BToC)	Change in Level (m)	h/H
Static			3.30		
0	0		8.75	5.45	1.0000
1	60		6.76	3.46	0.6349
2	120		5.50	2.20	0.4037
3	180		4.84	1.54	0.2826
4	240		4.49	1.19	0.2183
5	300		4.29	0.99	0.1817
10	600		3.99	0.69	0.1266
15	900		3.88	0.58	0.1064
20	1200		3.81	0.51	0.0936
25	1500		3.76	0.46	0.0844
30	1800		3.73	0.43	0.0789
45	2700		3.69	0.39	0.0716
60	3600		3.63	0.33	0.0606



Appendix C – 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 – Monitoring Bore Logs

BOREHOLE LOG

BH ID: BH101M

Location	Stage 1 & 2, Young and Danks Street, Waterloo			**Started**	16 May 2025
Client	Coronation Property Co. Pty Ltd			**Completed**	16 May 2025
Job No.	E26442.G03			**Logged By**	MS **Date** 16 May 2025
Sheets	1 of 3			**Review By**	TW **Date** 10 June 2025
Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈27.35 m (AHD)	**Northing**	6247617.1417 (MGA 2020 Zone 56)
Plant	Hanjin D&B 8-D	**Inclination**	90°	**Easting**	334427.1219 (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		BH101M_0.50-0.60		0.00		27.35	FILL: Clayey SAND: fine to medium grained, brown, pale grey, trace fine to medium sub-angular to angular gravels	M	-	FILL
		BH101M_1.50-1.95 SPT 1.50-1.95 1,1,3 N=4		1.80		25.55	SAND: fine to medium grained, brown	W	VL	MARINE SOIL
	16/05/2025 02:24 PM	BH101M_4.50-4.95 SPT 4.50-4.95 1,0,1 N=1		4.70		22.65	From 4.70m, grey, brown, trace clay bands			
WB		BH101M_6.00-6.30 SPT 6.00-6.30 11,16/150 mm HB N=R		6.00		21.35	Silty CLAY: high plasticity, brown and pale red, trace iron staining	M > PL	H	RESIDUAL SOIL
				7.00		20.35	*Log continued on next page.*			

BOREHOLE CORE LOG

BH ID: BH101M

Location	Stage 1 & 2, Young and Danks Street, Waterloo			**Started**	16 May 2025
Client	Coronation Property Co. Pty Ltd			**Completed**	16 May 2025
Job No.	E26442.G03			**Logged By**	MS **Date** 16 May 2025
Sheets	2 of 3			**Review By**	TW **Date** 10 June 2025
Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈27.35 m (AHD)	**Northing**	6247617.1417 (MGA 2020 Zone 56)
Plant	Hanjin D&B 8-D	**Inclination**	90°	**Easting**	334427.1219 (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	50	7			SANDSTONE: medium to coarse grained, grey, brown	DW		7.05-9.40: XWZ	

BOREHOLE CORE LOG

BH ID: BH101M

Location	Stage 1 & 2, Young and Danks Street, Waterloo			**Started**	16 May 2025
Client	Coronation Property Co. Pty Ltd			**Completed**	16 May 2025
Job No.	E26442.G03			**Logged By**	MS **Date** 16 May 2025
Sheets	3 of 3			**Review By**	TW **Date** 10 June 2025
Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈27.35 m (AHD)	**Northing**	6247617.1417 (MGA 2020 Zone 56)
Plant	Hanjin D&B 8-D	**Inclination**	90°	**Easting**	334427.1219 (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)
		100	100	10.00		17.35	From 10.00m, grey	FR	M	10.17: BP SM CN 10.21: BP SM CN 10.36: BP SM CN 10.46: Handling Break 10.90: Handling Break 11.26: JT 5° PR SM CN 11.42: BP SM CN 11.58: BP SM CN 11.63: BP SM CN 11.69: BP SM CN 11.76: JT 5° CU SM CN 11.92: Handling Break	100
				12		15.25	Terminated at 12.10m. Target Depth Reached.				
				13							
				14							
				15							
				16							
				17							
				18							
				19							
				20							

MONITORING WELL LOG

BH ID: BH101M

Location	Stage 1 & 2, Young and Danks Street, Waterloo			**Started**	16 May 2025
Client	Coronation Property Co. Pty Ltd			**Completed**	16 May 2025
Job No.	E26442.G03			**Logged By**	MS **Date** 16 May 2025
Sheets	1 of 2			**Review By**	TW **Date** 10 June 2025
Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈27.35 m (AHD)	**Northing**	6247617.1417 (MGA 2020 Zone 56)
Plant	Hanjin D&B 8-D	**Inclination**	90°	**Easting**	334427.1219 (MGA 2020 Zone 56)

WATER	SAMPLES & FIELD TESTS	DEPTH (m)	RL (m AHD)	MATERIAL DESCRIPTION	MOISTURE CONDITION
	BH101M_0.50-0.60	0.00	27.35	FILL: Clayey SAND: fine to medium grained, brown, pale grey, trace fine to medium sub-angular to angular gravels	M
	BH101M_1.50-1.95 SPT 1.50-1.95 1,1,3 N=4	1.80	25.55	SAND: fine to medium grained, brown	
16/05/2025 02:24 PM	BH101M_4.50-4.95 SPT 4.50-4.95 1,0,1 N=1	4.70	22.65	From 4.70m, grey, brown, trace clay bands	W
	BH101M_6.00-6.30 SPT 6.00-6.30 11,16/150 mm HB N=R	6.00	21.35	Silty CLAY: high plasticity, brown and pale red, trace iron staining	M > PL
90%		7.00	20.35	SANDSTONE: medium to coarse grained, grey, brown	

BACKFILL DETAILS	STANDPIPE DETAILS
	Well Stickup =1.0m (RL 28.35m)
Sand 0.00m - 2.00m	-1.0m - 3.0m PVC casing (50mm Ø)
Bentonite 2.00m - 2.50m	
Sand 2.50m - 6.00m	3.0m - 6.0m PVC screen (50mm Ø)
Bentonite 6.00m - 7.00m	
Sand 7.00m - 12.10m	

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

MONITORING WELL LOG

BH ID: BH101M

Location	Stage 1 & 2, Young and Danks Street, Waterloo			**Started**	16 May 2025
Client	Coronation Property Co. Pty Ltd			**Completed**	16 May 2025
Job No.	E26442.G03			**Logged By**	MS **Date** 16 May 2025
Sheets	2 of 2			**Review By**	TW **Date** 10 June 2025
Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈27.35 m (AHD)	**Northing**	6247617.1417 (MGA 2020 Zone 56)
Plant	Hanjin D&B 8-D	**Inclination**	90°	**Easting**	334427.1219 (MGA 2020 Zone 56)

WATER	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG	RL (m AHD)	MATERIAL DESCRIPTION	MOISTURE CONDITION	BACKFILL DETAILS	STANDPIPE DETAILS
		10.00		17.35	From 10.00m, grey			
		12		15.25	Terminated at 12.10m. Target Depth Reached.			

BOREHOLE LOG

BH ID: BH102M

Location	Stage 1 & 2, Young and Danks Street, Waterloo			**Started**	15 May 2025
Client	Coronation Property Co. Pty Ltd			**Completed**	15 May 2025
Job No.	E26442.G03			**Logged By**	MS **Date** 15 May 2025
Sheets	1 of 3			**Review By**	TW **Date** 10 June 2025
Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈27.40 m (AHD)	**Northing**	6247603.2356 (MGA 2020 Zone 56)
Plant	Hanjin D&B 8-D	**Inclination**	90°	**Easting**	334478.2869 (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	20/05/2025 03:24 PM	BH102M_0.20-0.30		0.00		27.40	FILL: Clayey SAND: medium to coarse grained, orange, trace sandstone cobbles	M	-	FILL
		BH102M_0.50-0.95 SPT 0.50-0.95 4,5,8 N=13		0.50		26.90	From 0.50m, brown, orange			
		BH102M_1.50-1.95 SPT 1.50-1.95 3,2,2 N=4		1.50		25.90	Silty CLAY: high plasticity, pale-grey, mottled red, orange, trace iron staining	M > PL	S	RESIDUAL SOIL
		BH102M_2.50-2.60								
		BH102M_3.00-3.45 SPT 3.00-3.45 3,5,8 N=13		3.50		23.90	From 3.50m, grading into extremely weathered material		St	
		BH102M_4.50-4.95 SPT 4.50-4.95 6,11,14 N=25		4.50		22.90	From 4.50m, trace medium to coarse grained sand, grey		VSt	
				6.80		20.60	*Log continued on next page.*			

BOREHOLE CORE LOG

BH ID: BH102M

Location	Stage 1 & 2, Young and Danks Street, Waterloo			**Started**	15 May 2025
Client	Coronation Property Co. Pty Ltd			**Completed**	15 May 2025
Job No.	E26442.G03			**Logged By**	MS **Date** 15 May 2025
Sheets	2 of 3			**Review By**	TW **Date** 10 June 2025
Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈27.40 m (AHD)	**Northing**	6247603.2356 (MGA 2020 Zone 56)
Plant	Hanjin D&B 8-D	**Inclination**	90°	**Easting**	334478.2869 (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	62	7			SANDSTONE: medium to coarse grained, grey, pale-red, orange, thinly bedded	DW		6.85-6.95: XWS 7.40: BP SM CN 7.53: BP SM CN 7.57: BP SM CN 7.60-7.75: XWZ 7.93-8.15: XWZ 8.15-8.30: JT 50° CU SM CN 8.30-8.40: CS	
				8.40		19.00	From 8.40m, dark grey			8.50: JT 15° CU SM CN 8.55: BP SM CN 8.57: BP SM CN 8.67: BP SM CN 8.72: JT 5° CU SM CN 8.80: BP SM CN 8.83: BP SM CN 8.88: BP SM CN 8.96: BP SM CN	
		100	98	8.80		18.60	From 8.80m, grey, mottled orange, thinly bedded				
				10							

BOREHOLE CORE LOG

BH ID: BH102M

Location	Stage 1 & 2, Young and Danks Street, Waterloo			**Started**	15 May 2025		
Client	Coronation Property Co. Pty Ltd			**Completed**	15 May 2025		
Job No.	E26442.G03			**Logged By**	MS	**Date**	15 May 2025
Sheets	3 of 3			**Review By**	TW	**Date**	10 June 2025
Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈27.40 m (AHD)	**Northing**	6247603.2356 (MGA 2020 Zone 56)		
Plant	Hanjin D&B 8-D	**Inclination**	90°	**Easting**	334478.2869 (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		16.45	From 8.80m, grey, mottled orange, thinly bedded			10.10: Handling Break 10.48: BP SM Clay VN 10.73: JT 5° CU SM CN	
	90%	100	99	10.95			From 10.95m, grey	FR			
				12		14.84	Terminated at 12.56m. Target Depth Reached.				
				13							
				14							
				15							
				16							
				17							
				18							
				19							
				20							

MONITORING WELL LOG

BH ID: BH102M

Location	Stage 1 & 2, Young and Danks Street, Waterloo			**Started**	15 May 2025
Client	Coronation Property Co. Pty Ltd			**Completed**	15 May 2025
Job No.	E26442.G03			**Logged By**	MS **Date** 15 May 2025
Sheets	1 of 2			**Review By**	TW **Date** 10 June 2025
Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈27.40 m (AHD)	**Northing**	6247603.2356 (MGA 2020 Zone 56)
Plant	Hanjin D&B 8-D	**Inclination**	90°	**Easting**	334478.2869 (MGA 2020 Zone 56)

WATER	SAMPLES & FIELD TESTS	DEPTH (m)	RL (m AHD)	MATERIAL DESCRIPTION	MOISTURE CONDITION
	BH102M_0.20-0.30	0.00	27.40	FILL: Clayey SAND: medium to coarse grained, orange, trace sandstone cobbles	
	BH102M_0.50-0.95 SPT 0.50-0.95 4,5,8 N=13	0.50	26.90	From 0.50m, brown, orange	M
	BH102M_1.50-1.95 SPT 1.50-1.95 3,2,2 N=4	1.50	25.90	Silty CLAY: high plasticity, pale-grey, mottled red, orange, trace iron staining	
	BH102M_2.50-2.60				
	BH102M_3.00-3.45 SPT 3.00-3.45 3,5,8 N=13	3.50	23.90	From 3.50m, grading into extremely weathered material	M > PL
10/05/2025 03:24 PM	BH102M_4.50-4.95 SPT 4.50-4.95 6,11,14 N=25	4.50	22.90	From 4.50m, trace medium to coarse grained sand, grey	
90%		6.80	20.60	SANDSTONE: medium to coarse grained, grey, pale-red, orange, thinly bedded	
		8.40	19.00	From 8.40m, dark grey	
		8.80	18.60	From 8.80m, grey, mottled orange, thinly bedded	

BACKFILL DETAILS

Sand
0.00m - 6.50m

Bentonite
6.50m - 7.50m

Sand
7.50m - 12.00m

STANDPIPE DETAILS

Well Stickup =1.0m
(RL 28.40m)

-1.0m - 8.0m
PVC casing (50mm Ø)

MONITORING WELL LOG

BH ID: BH102M

Location	Stage 1 & 2, Young and Danks Street, Waterloo			**Started**	15 May 2025	
Client	Coronation Property Co. Pty Ltd			**Completed**	15 May 2025	
Job No.	E26442.G03			**Logged By**	MS	**Date** 15 May 2025
Sheets	2 of 2			**Review By**	TW	**Date** 10 June 2025
Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈27.40 m (AHD)	**Northing**	6247603.2356 (MGA 2020 Zone 56)	
Plant	Hanjin D&B 8-D	**Inclination**	90°	**Easting**	334478.2869 (MGA 2020 Zone 56)	

WATER	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG	RL (m AHD)	MATERIAL DESCRIPTION	MOISTURE CONDITION	BACKFILL DETAILS	STANDPIPE DETAILS
90%		10.95		16.45	From 8.80m, grey, mottled orange, thinly bedded			8.0m - 12.0m PVC screen (50mm Ø)
		12			From 10.95m, grey		Sand 12.00m - 12.56m	
		13		14.84	Terminated at 12.56m. Target Depth Reached.			
		14						
		15						
		16						
		17						
		18						
		19						
		20						

BOREHOLE LOG

BH ID: BH103

Location	Stage 1 & 2, Young and Danks Street, Waterloo			**Started**	16 May 2025
Client	Coronation Property Co. Pty Ltd			**Completed**	19 May 2025
Job No.	E26442.G03			**Logged By**	MS **Date** 19 May 2025
Sheets	1 of 3			**Review By**	TW **Date** 10 June 2025
Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈27.50 m (AHD)	**Northing**	6247670.2713 (MGA 2020 Zone 56)
Plant	Hanjin D&B 8-D	**Inclination**	90°	**Easting**	334638.7579 (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		27.50	ASPHALT: 500mm thick		-	ASPHALT
		BH103_0.50-0.95 SPT 0.50-0.95 3,4,5 N=9		0.50		27.00	FILL: SAND: fine to medium grained, brown, grey	M	-	FILL
		BH103_1.50-1.95 SPT 1.50-1.95 1,4,4 N=8		1.50		26.00	From 1.50m, dark brown			
				2.00		25.50	SAND: fine to medium grained, brown	W	MD	MARINE SOIL
		BH103_3.00-3.45 SPT 3.00-3.45 2,5,11 N=16		3						
		BH103_4.50-4.95 SPT 4.50-4.95 3,5,9 N=14		4.50		23.00	Silty CLAY: high plasticity, grey, pale red, trace ironstone gravels, trace fine to medium grained sand	M > PL	St	RESIDUAL SOIL
		BH103_6.00-6.35 SPT 6.00-6.35 8,11,7/50 mm N=R		6					H	
				6.60		20.90	*Log continued on next page.*			
				7						
				8						
				9						
				10						

BOREHOLE CORE LOG

BH ID: BH103

Location	Stage 1 & 2, Young and Danks Street, Waterloo			**Started**	16 May 2025
Client	Coronation Property Co. Pty Ltd			**Completed**	19 May 2025
Job No.	E26442.G03			**Logged By**	MS **Date** 19 May 2025
Sheets	2 of 3			**Review By**	TW **Date** 10 June 2025
Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈27.50 m (AHD)	**Northing**	6247670.2713 (MGA 2020 Zone 56)
Plant	Hanjin D&B 8-D	**Inclination**	90°	**Easting**	334638.7579 (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.*				
				1							
				2							
				3							
				4							
				5							
				6							
NMLC	80%	97	87	7			SANDSTONE: medium to coarse grained, grey, pale-red, trace with iron staining, thinly bedded	DW		6.86: BP SM CN 7.08: BP SM CN 7.14: BP SM CN 7.37: BP SM Clay VN 7.59: BP SM CN 7.69: JT SM Fe SN 7.72: JT SM Fe SN 7.74: BP SM CN 8.10-8.22: XWZ	
				8.00		19.50	NO CORE: 340mm thick				
				8.34		19.16	SANDSTONE: medium to coarse grained, pale-red, grey, thinly bedded			8.40: JT SM CN 8.52: BP SM Clay VN	
				9						9.33: JT 5° PR SM CN	
	90%			9.70		17.80	From 9.70m, grey				
				10							

BOREHOLE CORE LOG

BH ID: BH103

Location	Stage 1 & 2, Young and Danks Street, Waterloo			**Started**	16 May 2025
Client	Coronation Property Co. Pty Ltd			**Completed**	19 May 2025
Job No.	E26442.G03			**Logged By**	MS **Date** 19 May 2025
Sheets	3 of 3			**Review By**	TW **Date** 10 June 2025
Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈27.50 m (AHD)	**Northing**	6247670.2713 (MGA 2020 Zone 56)
Plant	Hanjin D&B 8-D	**Inclination**	90°	**Easting**	334638.7579 (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 9.70m, grey	FR		10.17: Handling Break 10.19: Handling Break 10.73: JT 5° PR SM SN 11.08: JT 5° CU SM CN 11.40: JT 5° CU SM Clay VN 11.70: BP SM CN 11.94: BP SM CN 11.97: Handling Break	
				12		15.40	Terminated at 12.10m. Target Depth Reached.				
				13							
				14							
				15							
				16							
				17							
				18							
				19							
				20							

BOREHOLE LOG

BH ID: BH104

Location	Stage 1 & 2, Young and Danks Street, Waterloo			**Started**	19 May 2025
Client	Coronation Property Co. Pty Ltd			**Completed**	19 May 2025
Job No.	E26442.G03			**Logged By**	MS **Date** 19 May 2025
Sheets	1 of 3			**Review By**	TW **Date** 10 June 2025
Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈28.40 m (AHD)	**Northing**	6247671.6262 (MGA 2020 Zone 56)
Plant	Hanjin D&B 8-D	**Inclination**	90°	**Easting**	334452.9422 (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		28.40	FILL: Gravelly SAND: fine to medium grained, brown, trace medium to coarse sub-angular to angular gravels	M	-	FILL
		BH104_0.50-0.60		0.30		28.10	SAND: fine to medium grained, brown		L	MARINE SOIL
		BH104_1.50-1.95 SPT 1.50-1.95 1,2,3 N=5		1						
		SPT 3.00-3.45 3,5,6 N=11		3				W	MD	
		BH104_4.50-4.95 SPT 4.50-4.95 5,14,24 HB N=38		4.90		23.50	From 4.90m, grey		D	
WB		BH104_6.00-6.45 SPT 6.00-6.45 4,2,1 N=3		6					VL	
		BH104_7.50-7.95 SPT 7.50-7.95 8,2,6 N=8		7.50		20.90	Silty CLAY: high plasticity, grey, pale red, trace medium to coarse grained sand, trace ironstone gravels	M > PL	St	RESIDUAL SOIL
				9.00		19.40	*Log continued on next page.*			

BOREHOLE CORE LOG

BH ID: BH104

Location	Stage 1 & 2, Young and Danks Street, Waterloo			**Started**	19 May 2025		
Client	Coronation Property Co. Pty Ltd			**Completed**	19 May 2025		
Job No.	E26442.G03			**Logged By**	MS	**Date**	19 May 2025
Sheets	2 of 3			**Review By**	TW	**Date**	10 June 2025
Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈28.40 m (AHD)	**Northing**	6247671.6262 (MGA 2020 Zone 56)		
Plant	Hanjin D&B 8-D	**Inclination**	90°	**Easting**	334452.9422 (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.*				
				9			SANDSTONE: medium to coarse grained, grey, pale red, thinly bedded			9.23: BP SM Fe SN 9.28: BP SM CN 9.44: BP SM CN 9.54: BP SM CN	

BOREHOLE CORE LOG

BH ID: BH104

Location	Stage 1 & 2, Young and Danks Street, Waterloo			**Started**	19 May 2025		
Client	Coronation Property Co. Pty Ltd			**Completed**	19 May 2025		
Job No.	E26442.G03			**Logged By**	MS	**Date**	19 May 2025
Sheets	3 of 3			**Review By**	TW	**Date**	10 June 2025
Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈28.40 m (AHD)	**Northing**	6247671.6262 (MGA 2020 Zone 56)		
Plant	Hanjin D&B 8-D	**Inclination**	90°	**Easting**	334452.9422 (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
				11			SANDSTONE: medium to coarse grained, grey, pale red, thinly bedded			10.07: JT 5° CU SM CN 10.38-10.70: XWZ SM Fe SN 10.38: JT 20° CU SM Fe SN 11.22: BP SM CN 11.80: Handling Break	
				12		16.35	Terminated at 12.05m. Target Depth Reached.				
				13							
				14							
				15							
				16							
				17							
				18							
				19							
				20							

BOREHOLE LOG

BH ID: BH105

Location	Stage 1 & 2, Young and Danks Street, Waterloo			**Started**	12 May 2025
Client	Coronation Property Co. Pty Ltd			**Completed**	12 May 2025
Job No.	E26442.G03			**Logged By**	MS **Date** 12 May 2025
Sheets	1 of 4			**Review By**	TW **Date** 10 June 2025
Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈29.30 m (AHD)	**Northing**	6247691.8935 (MGA 2020 Zone 56)
Plant	Hanjin D&B 8-D	**Inclination**	90°	**Easting**	334520.4215 (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		BH105_0.20-0.30		0.00		29.30	FILL: SAND: fine grained, dark grey	M	-	FILL
		BH105_0.50-0.95 SPT 0.50-0.95 4,5,7 N=12		0.50		28.80	From 0.50m, brown, grey			
				1.00		28.30	From 1.00m, brown			
		BH105_1.40-1.50 BH105_1.50-1.95 SPT 1.50-1.95 3,4,5 N=9		2.00		27.30	From 2.00m, dark brown			
		BH105_2.50-2.60								
		BH105_3.00-3.45 SPT 3.00-3.45 3,3,2 N=5		4						
	▷	BH105_4.50-4.95 SPT 4.50-4.95 3,4,6 N=10		4.50		24.80	SAND: fine to medium grained, brown	W	L	MARINE SOIL
		BH105_6.00-6.45 SPT 6.00-6.45 6,3,4 N=7		6						
				6.30		23.00	From 6.30m, grey			
WB				7.00		22.30	Silty CLAY: high plasticity, brown, pale-grey, mottled yellow	M > PL	H	RESIDUAL SOIL
		BH105_7.50-7.80 SPT 7.50-7.80 4,7/150 mm HB N=R		7.80		21.50	From 7.80m, pale-grey			
				9						
				9.30		20.00	*Log continued on next page.*			
				10						

BOREHOLE CORE LOG

BH ID: BH105

Location	Stage 1 & 2, Young and Danks Street, Waterloo			**Started**	12 May 2025		
Client	Coronation Property Co. Pty Ltd			**Completed**	12 May 2025		
Job No.	E26442.G03			**Logged By**	MS	**Date**	12 May 2025
Sheets	2 of 4			**Review By**	TW	**Date**	10 June 2025
Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈29.30 m (AHD)	**Northing**	6247691.8935 (MGA 2020 Zone 56)		
Plant	Hanjin D&B 8-D	**Inclination**	90°	**Easting**	334520.4215 (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.*				
				1							
				2							
				3							
				4							
				5							
				6							
				7							
				8							
				9							
	90%			10			SANDSTONE: medium to coarse grained, pale-grey, mottled red, with iron staining, thinly to medium bedded	XW DW XW		9.62-9.83: XWZ	

BOREHOLE CORE LOG

BH ID: BH105

Location	Stage 1 & 2, Young and Danks Street, Waterloo			**Started**	12 May 2025
Client	Coronation Property Co. Pty Ltd			**Completed**	12 May 2025
Job No.	E26442.G03			**Logged By**	MS **Date** 12 May 2025
Sheets	3 of 4			**Review By**	TW **Date** 10 June 2025
Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈29.30 m (AHD)	**Northing**	6247691.8935 (MGA 2020 Zone 56)
Plant	Hanjin D&B 8-D	**Inclination**	90°	**Easting**	334520.4215 (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)
NMLC	90%	96	96	11			SANDSTONE: medium to coarse grained, pale-grey, mottled red, with iron staining, thinly to medium bedded	DW		9.97-10.02: XWS 10.16: BP SM SN 10.22-10.33: XWZ 10.71: JT 15° CU SM CN 10.88: Handling Break 11.05: Handling Break 11.19: JT 30° CU SM CN 11.52: BP PR SM CN 11.68: JT 10° CU SM CN 11.87: BP PR SM CN 11.95: Handling Break 12.25: JT 10° PR SM CN 12.32-12.39: CS	
				12							
				12.44		16.86	From 12.44m, grey, mottled orange, thinly bedded			12.67: BP SM CN 12.80-12.83: XWS 12.95: Handling Break 13.18: BP SM CN 13.56: Handling Break 13.87-13.94: XWS 14.16: JT 10° CU SM CN 14.65: JT -10° CU SM CN 14.72-14.89: XWZ	
		96	96	13							
				14							
				15				FR		15.12: BP SM CN	
				15.57		13.73	From 15.57m, grey, thinly to medium bedded			15.72: BP SM CN 15.78: BP SM Clay VN 16.50: JT 10° CU SM CN 16.85: JT 10° CU SM CN 16.92: JT 10° CU SM CN 16.96: JT 5° CU SM CN 17.85: JT 15° CU SM CN 18.34: JT 10° CU SM CN	
		96	96	16							
				17							
				18							
				19						18.84: BP SM Clay VN 19.05: BP SM CN 19.24: BP SM CN 19.56: JT 10° CU SM CN 19.69: JT 10° CU SM CN 19.90: JT 15° CU SM CN	
				20							

BOREHOLE CORE LOG

BH ID: BH105

Location	Stage 1 & 2, Young and Danks Street, Waterloo			**Started**	12 May 2025
Client	Coronation Property Co. Pty Ltd			**Completed**	12 May 2025
Job No.	E26442.G03			**Logged By**	MS **Date** 12 May 2025
Sheets	4 of 4			**Review By**	TW **Date** 10 June 2025
Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈29.30 m (AHD)	**Northing**	6247691.8935 (MGA 2020 Zone 56)
Plant	Hanjin D&B 8-D	**Inclination**	90°	**Easting**	334520.4215 (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
							From 15.57m, grey, thinly to medium bedded			20.30: JT 10° PR SM CN 20.34: BP SM CN 20.44: BP SM Clay VN	
						8.75	Terminated at 20.55m. Target Depth Reached.				
				21							
				22							
				23							
				24							
				25							
				26							
				27							
				28							
				29							
				30							

BOREHOLE LOG

BH ID: BH106M

Location	Stage 1 & 2, Young and Danks Street, Waterloo			**Started**	14 May 2025
Client	Coronation Property Co. Pty Ltd			**Completed**	14 May 2025
Job No.	E26442.G03			**Logged By**	MS **Date** 14 May 2025
Sheets	1 of 3			**Review By**	TW **Date** 10 June 2025
Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈29.35 m (AHD)	**Northing**	6247689.7843 (MGA 2020 Zone 56)
Plant	Hanjin D&B 8-D	**Inclination**	90°	**Easting**	334533.7047 (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		BH106M_0.50-0.60		0.00		29.35	FILL: Gravelly SAND: fine to medium grained, brown, trace fine to medium sub-angular to angular gravels			FILL
		BH106M_1.50-1.95 SPT 1.50-1.95 3,5,5 N=10		1.50		27.85	From 1.50m, brown, grey	M	-	
	21/05/2025 11:23 AM	BH106M_4.50-4.95 SPT 4.50-4.95 2,5,10 N=15		3.00		26.35	SAND: fine to medium, dark brown	W	MD	MARINE SOIL
WB		BH106M_7.50-7.95 SPT 7.50-7.95 5,6,12 N=18		7.50		21.85	Silty CLAY: high plasticity, brown, pale-grey, mottled red, trace ironstone gravels	M > PL	VSt	RESIDUAL SOIL
				9.00		20.35	*Log continued on next page.*			

BOREHOLE CORE LOG

BH ID: BH106M

Location	Stage 1 & 2, Young and Danks Street, Waterloo			**Started**	14 May 2025		
Client	Coronation Property Co. Pty Ltd			**Completed**	14 May 2025		
Job No.	E26442.G03			**Logged By**	MS	**Date**	14 May 2025
Sheets	2 of 3			**Review By**	TW	**Date**	10 June 2025
Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈29.35 m (AHD)	**Northing**	6247689.7843 (MGA 2020 Zone 56)		
Plant	Hanjin D&B 8-D	**Inclination**	90°	**Easting**	334533.7047 (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.*				
				1							
				2							
				3							
				4							
				5							
				6							
				7							
				8							
				9							
	90%						SANDSTONE: medium to coarse grained, grey, red, mottled orange, thinly bedded			9.06: BP SM CN 9.23: BP SM CN 9.38: BP SM CN 9.45: BP SM CN 9.47: BP SM CN 9.86: BP SM CN	
				10							

BOREHOLE CORE LOG

BH ID: BH106M

Location	Stage 1 & 2, Young and Danks Street, Waterloo			**Started**	14 May 2025
Client	Coronation Property Co. Pty Ltd			**Completed**	14 May 2025
Job No.	E26442.G03			**Logged By**	MS **Date** 14 May 2025
Sheets	3 of 3			**Review By**	TW **Date** 10 June 2025
Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈29.35 m (AHD)	**Northing**	6247689.7843 (MGA 2020 Zone 56)
Plant	Hanjin D&B 8-D	**Inclination**	90°	**Easting**	334533.7047 (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)
NMLC	90%	97	97	11			SANDSTONE: medium to coarse grained, grey, red, mottled orange, thinly bedded	FR	M 1	10.23: Handling Break 10.65: JT 5° CU SM CN 10.70: JT 5° CU SM CN 10.77: BP SM CN 11.18: Handling Break 11.26: Handling Break 11.76: Handling Break 11.97: BP SM CN	100
				12		17.25	Terminated at 12.10m. Target Depth Reached.				
				13							
				14							
				15							
				16							
				17							
				18							
				19							
				20							

MONITORING WELL LOG

BH ID: BH106M

Location	Stage 1 & 2, Young and Danks Street, Waterloo			**Started**	14 May 2025
Client	Coronation Property Co. Pty Ltd			**Completed**	14 May 2025
Job No.	E26442.G03			**Logged By**	MS **Date** 14 May 2025
Sheets	1 of 2			**Review By**	TW **Date** 10 June 2025
Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈29.35 m (AHD)	**Northing**	6247689.7843 (MGA 2020 Zone 56)
Plant	Hanjin D&B 8-D	**Inclination**	90°	**Easting**	334533.7047 (MGA 2020 Zone 56)

WATER	SAMPLES & FIELD TESTS	DEPTH (m)	RL (m AHD)	MATERIAL DESCRIPTION	MOISTURE CONDITION	BACKFILL DETAILS	STANDPIPE DETAILS
	BH106M_0.50-0.60	0.00	29.35	FILL: Gravelly SAND: fine to medium grained, brown, trace fine to medium sub-angular to angular gravels			Well Stickup =1.0m (RL 30.35m)
	BH106M_1.50-1.95 SPT 1.50-1.95 3,5,5 N=10	1.50	27.85	From 1.50m, brown, grey	M		
▽		3.00	26.35	SAND: fine to medium, dark brown			
21/05/2025 11:23 AM	BH106M_4.50-4.95 SPT 4.50-4.95 2,5,10 N=15				W	Sand 0.00m - 8.00m	-1.0m - 9.10m PVC casing (50mm Ø)
	BH106M_7.50-7.95 SPT 7.50-7.95 5,6,12 N=18	7.50	21.85	Silty CLAY: high plasticity, brown, pale-grey, mottled red, trace ironstone gravels	M > PL	Bentonite 8.00m - 8.50m	
90%		9.00	20.35	SANDSTONE: medium to coarse grained, grey, red, mottled orange, thinly bedded			

MONITORING WELL LOG

BH ID: BH106M

Location	Stage 1 & 2, Young and Danks Street, Waterloo			**Started**	14 May 2025	
Client	Coronation Property Co. Pty Ltd			**Completed**	14 May 2025	
Job No.	E26442.G03			**Logged By**	MS	**Date** 14 May 2025
Sheets	2 of 2			**Review By**	TW	**Date** 10 June 2025
Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈29.35 m (AHD)	**Northing**	6247689.7843 (MGA 2020 Zone 56)	
Plant	Hanjin D&B 8-D	**Inclination**	90°	**Easting**	334533.7047 (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			SANDSTONE: medium to coarse grained, grey, red, mottled orange, thinly bedded		Sand 8.50m - 12.10m	9.10m - 12.10m PVC screen (50mm Ø)
		12		17.25	Terminated at 12.10m. Target Depth Reached.			
		13						
		14						
		15						
		16						
		17						
		18						
		19						
		20						

BOREHOLE LOG

BH ID: BH107

Location	Stage 1 & 2, Young and Danks Street, Waterloo			**Started**	19 May 2025
Client	Coronation Property Co. Pty Ltd			**Completed**	20 May 2025
Job No.	E26442.G03			**Logged By**	MS **Date** 20 May 2025
Sheets	1 of 3			**Review By**	TW **Date** 10 June 2025
Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈28.65 m (AHD)	**Northing**	6247704.2535 (MGA 2020 Zone 56)
Plant	Hanjin D&B 8-D	**Inclination**	90°	**Easting**	334481.7340 (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		BH107_0.20-0.30		0.00		28.65	FILL: Gravelly SAND: fine to medium grained, brown, trace fine to medium sub-angular to angular gravels		-	FILL
		BH107_0.50-0.95 SPT 0.50-0.95 4,4,5 N=9		0.80		27.85	SAND: fine to medium grained, brown	M		MARINE SOIL
	▷	BH107_3.00-3.45 SPT 3.00-3.45 2,2,3 N=5		3.30		25.35	From 3.30m, dark grey		L	
WB		BH107_6.00-6.45 SPT 6.00-6.45 6,13,14 N=27						W	MD	
		BH107_8.00-8.45 SPT 8.00-8.45 6,3,8 N=11		8.00		20.65	From 8.00m, medium to coarse grained, grey, pale red, brown	M	MD	
				9.00		19.65	*Log continued on next page.*			

BOREHOLE CORE LOG

BH ID: BH107

Location	Stage 1 & 2, Young and Danks Street, Waterloo			**Started**	19 May 2025		
Client	Coronation Property Co. Pty Ltd			**Completed**	20 May 2025		
Job No.	E26442.G03			**Logged By**	MS	**Date**	20 May 2025
Sheets	2 of 3			**Review By**	TW	**Date**	10 June 2025
Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈28.65 m (AHD)	**Northing**	6247704.2535 (MGA 2020 Zone 56)		
Plant	Hanjin D&B 8-D	**Inclination**	90°	**Easting**	334481.7340 (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.*				
				1							
				2							
				3							
				4							
				5							
				6							
				7							
				8							
				9							
	90%			10			SANDSTONE: medium to coarse grained, grey, pale red, thinly bedded			9.20: BP SM CN 9.23: BP SM CN 9.38: BP SM CN 9.80: JT 5° PR SM CN	

BOREHOLE CORE LOG

BH ID: BH107

Location	Stage 1 & 2, Young and Danks Street, Waterloo			**Started**	19 May 2025
Client	Coronation Property Co. Pty Ltd			**Completed**	20 May 2025
Job No.	E26442.G03			**Logged By**	MS **Date** 20 May 2025
Sheets	3 of 3			**Review By**	TW **Date** 10 June 2025
Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈28.65 m (AHD)	**Northing**	6247704.2535 (MGA 2020 Zone 56)
Plant	Hanjin D&B 8-D	**Inclination**	90°	**Easting**	334481.7340 (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)
NMLC	90%	100	97	11			SANDSTONE: medium to coarse grained, grey, pale red, thinly bedded	FR	M	10.08: BP SM CN 10.24-10.29: XWS 10.35: JT 5° CU SM CN 10.59: JT 5° CU SM CN 10.67: JT 5° PR SM CN 10.78: JT 5° CU SM CN 10.94: JT 5° PR SM CN 11.12: BP SM CN 11.30: JT 10° PR SM CN 11.38: JT 15° CU SM CN 11.46: BP SM CN 11.53: BP SM CN 11.82: BP SM CN 11.84: BP SM CN	100
				12		16.65	Terminated at 12.00m. Target Depth Reached.				
				13							
				14							
				15							
				16							
				17							
				18							
				19							
				20							

BOREHOLE LOG

BH ID: BH108

Location	Stage 1 & 2, Young and Danks Street, Waterloo			**Started**	14 May 2025
Client	Coronation Property Co. Pty Ltd			**Completed**	15 May 2025
Job No.	E26442.G03			**Logged By**	MS **Date** 15 May 2025
Sheets	1 of 3			**Review By**	TW **Date** 10 June 2025
Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈28.60 m (AHD)	**Northing**	6247648.7080 (MGA 2020 Zone 56)
Plant	Hanjin D&B 8-D	**Inclination**	90°	**Easting**	334494.9495 (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						
				0.00		28.60	FILL: SAND: fine to medium grained, brown, grey		-	FILL
				0.50		28.10	SAND: fine to medium grained, grey			MARINE SOIL
		BH108_1.50-1.95 SPT 1.50-1.95 1,2,2 N=4		1				M		
	▽			2						
				3		25.60	From 3.00m, brown		VL	
		BH108_4.50-4.95 SPT 4.50-4.95 1,1,1 N=2		4				W		
				5						
WB				6						
				6.50		22.10	Silty CLAY: high plasticity, brown, pale-grey, mottled red, grading into extremely weathered material	M > PL	H	RESIDUAL SOIL
		BH108_6.70-7.15 SPT 6.70-7.15 7,14,20 N=34		7						
				7.50		21.10	*Log continued on next page.*			
				8						
				9						
				10						

BOREHOLE CORE LOG

BH ID: BH108

Location	Stage 1 & 2, Young and Danks Street, Waterloo			**Started**	14 May 2025
Client	Coronation Property Co. Pty Ltd			**Completed**	15 May 2025
Job No.	E26442.G03			**Logged By**	MS **Date** 15 May 2025
Sheets	2 of 3			**Review By**	TW **Date** 10 June 2025
Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈28.60 m (AHD)	**Northing**	6247648.7080 (MGA 2020 Zone 56)
Plant	Hanjin D&B 8-D	**Inclination**	90°	**Easting**	334494.9495 (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.*				
				1							
				2							
				3							
				4							
				5							
				6							
				7							
NMLC	90%	100	0	8			Silty CLAY: high plasticity, grey, pale-red, mottled orange, grading into weathered rock, trace ironstone gravels	XW - DW			
				8.40		20.20	SANDSTONE: medium to coarse grained, grey, pale-grey, mottled orange, thinly bedded			8.45-8.49: CS 8.82-8.86: XWS 9.10: Handling Break 9.25: Handling Break 9.47-9.53: XWS 9.47: BP SM CN 9.87: BP SM CN	
				9							
				10							

BOREHOLE CORE LOG

BH ID: BH108

Location	Stage 1 & 2, Young and Danks Street, Waterloo			**Started**	14 May 2025
Client	Coronation Property Co. Pty Ltd			**Completed**	15 May 2025
Job No.	E26442.G03			**Logged By**	MS **Date** 15 May 2025
Sheets	3 of 3			**Review By**	TW **Date** 10 June 2025
Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈28.60 m (AHD)	**Northing**	6247648.7080 (MGA 2020 Zone 56)
Plant	Hanjin D&B 8-D	**Inclination**	90°	**Easting**	334494.9495 (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
		94	88	11			SANDSTONE: medium to coarse grained, grey, pale-grey, mottled orange, thinly bedded	FR		10.48: BP SM CN 10.80: Handling Break 10.90: JT 5° PR SM CN 11.12: BP SM CN	
						17.00	Terminated at 11.60m. Target Depth Reached.				
				12							
				13							
				14							
				15							
				16							
				17							
				18							
				19							
				20							

BOREHOLE LOG

BH ID: BH109M

Location	Stage 1 & 2, Young and Danks Street, Waterloo			**Started**	21 May 2025
Client	Coronation Property Co. Pty Ltd			**Completed**	21 May 2025
Job No.	E26442.G03			**Logged By**	MS **Date** 21 May 2025
Sheets	1 of 3			**Review By**	TW **Date** 10 June 2025
Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈28.50 m (AHD)	**Northing**	6247740.5811 (MGA 2020 Zone 56)
Plant	Hanjin D&B 8-D	**Inclination**	90°	**Easting**	334460.6112 (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		BH109M_0.50-0.95 SPT 0.50-0.95 3,6,4 N=10		0.00 1 1.50		28.50 27.00	FILL: Gravelly SAND: fine to medium grained, brown, trace fine to medium sub-angular to angular gravels	M	-	FILL
				2			SAND: fine to medium grained, brown			MARINE SOIL
		BH109M_3.00-3.45 SPT 3.00-3.45 1,2,4 N=6		3 4					L	
	21/05/2025 04:25 PM			4.50		24.00	From 4.50m, grey	W		
WB		BH109M_6.00-6.45 SPT 6.00-6.45 1,5,10 N=15		6 7 8 9 10					MD	

BOREHOLE LOG

BH ID: BH109M

Location	Stage 1 & 2, Young and Danks Street, Waterloo			**Started**	21 May 2025
Client	Coronation Property Co. Pty Ltd			**Completed**	21 May 2025
Job No.	E26442.G03			**Logged By**	MS **Date** 21 May 2025
Sheets	2 of 3			**Review By**	TW **Date** 10 June 2025
Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈28.50 m (AHD)	**Northing**	6247740.5811 (MGA 2020 Zone 56)
Plant	Hanjin D&B 8-D	**Inclination**	90°	**Easting**	334460.6112 (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
				10.00		18.50	Silty CLAY: high plasticity, dark grey, grey, trace with medium to coarse sand			RESIDUAL SOIL
				11						
				12		16.50				
				12.00			*Log continued on next page.*			
				13						
				14						
				15						
				16						
				17						
				18						
				19						
				20						

BOREHOLE CORE LOG

BH ID: BH109M

Location	Stage 1 & 2, Young and Danks Street, Waterloo			**Started**	21 May 2025
Client	Coronation Property Co. Pty Ltd			**Completed**	21 May 2025
Job No.	E26442.G03			**Logged By**	MS **Date** 21 May 2025
Sheets	3 of 3			**Review By**	TW **Date** 10 June 2025
Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈28.50 m (AHD)	**Northing**	6247740.5811 (MGA 2020 Zone 56)
Plant	Hanjin D&B 8-D	**Inclination**	90°	**Easting**	334460.6112 (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			*Log continued from previous page.*				
				11							
NMLC	90%	97	35	12			SANDSTONE: medium to coarse grained, dark grey, grey	FR		12.07: JT 5° PR SM CN 12.40: BP SM Clay VN 12.47: JT 5° PR SM CN 12.84: JT 5° PR SM CN 12.91: BP SM CN 13.04: Handling Break	
				13		15.40	Terminated at 13.10m. Target Depth Reached.				
				14							
				15							
				16							
				17							
				18							
				19							
				20							

MONITORING WELL LOG

BH ID: BH109M

Location	Stage 1 & 2, Young and Danks Street, Waterloo			**Started**	21 May 2025
Client	Coronation Property Co. Pty Ltd			**Completed**	21 May 2025
Job No.	E26442.G03			**Logged By**	MS **Date** 21 May 2025
Sheets	1 of 2			**Review By**	TW **Date** 10 June 2025
Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈28.50 m (AHD)	**Northing**	6247740.5811 (MGA 2020 Zone 56)
Plant	Hanjin D&B 8-D	**Inclination**	90°	**Easting**	334460.6112 (MGA 2020 Zone 56)

WATER	SAMPLES & FIELD TESTS	DEPTH (m)	RL (m AHD)	MATERIAL DESCRIPTION	MOISTURE CONDITION	BACKFILL DETAILS	STANDPIPE DETAILS
	BH109M_0.50-0.95 SPT 0.50-0.95 3,6,4 N=10	0.00	28.50	FILL: Gravelly SAND: fine to medium grained, brown, trace fine to medium sub-angular to angular gravels			Well Stickup =1.0m (RL 29.50m)
		1.50	27.00	SAND: fine to medium grained, brown	M	Sand 0.00m - 5.00m	-1.0m - 6.60m PVC casing (50mm Ø)
▽	BH109M_3.00-3.45 SPT 3.00-3.45 1,2,4 N=6						
21/05/2025 04:25 PM		4.50	24.00	From 4.50m, grey		Bentonite 5.00m - 6.60m	
	BH109M_6.00-6.45 SPT 6.00-6.45 1,5,10 N=15				W		
						Sand 6.60m - 9.60m	6.60m - 9.60m PVC screen (50mm Ø)

MONITORING WELL LOG

BH ID: BH109M

Location	Stage 1 & 2, Young and Danks Street, Waterloo			**Started**	21 May 2025
Client	Coronation Property Co. Pty Ltd			**Completed**	21 May 2025
Job No.	E26442.G03			**Logged By**	MS **Date** 21 May 2025
Sheets	2 of 2			**Review By**	TW **Date** 10 June 2025
Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈28.50 m (AHD)	**Northing**	6247740.5811 (MGA 2020 Zone 56)
Plant	Hanjin D&B 8-D	**Inclination**	90°	**Easting**	334460.6112 (MGA 2020 Zone 56)

WATER	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG	RL (m AHD)	MATERIAL DESCRIPTION	MOISTURE CONDITION	BACKFILL DETAILS	STANDPIPE DETAILS
90%		10.00		18.50	Silty CLAY: high plasticity, dark grey, grey, trace with medium to coarse sand		Sand 9.60m - 13.10m	
		12.00		16.50	SANDSTONE: medium to coarse grained, dark grey, grey			
		13.10		15.40	Terminated at 13.10m. Target Depth Reached.			

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

BOREHOLE LOG

BH ID: BH110

Location	Stage 1 & 2, Young and Danks Street, Waterloo			**Started**	20 May 2025
Client	Coronation Property Co. Pty Ltd			**Completed**	20 May 2025
Job No.	E26442.G03			**Logged By**	MS **Date** 20 May 2025
Sheets	1 of 3			**Review By**	TW **Date** 10 June 2025
Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈28.65 m (AHD)	**Northing**	6247749.4409 (MGA 2020 Zone 56)
Plant	Hanjin D&B 8-D	**Inclination**	90°	**Easting**	334477.5884 (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		BH110_0.50-0.60		0.00		28.65	FILL: SAND: fine to medium grained, grey	M	-	FILL
		BH110_1.00-1.10		1.00		27.65	From 1.00m, brown, trace fine to medium sub-angular to angular ironstone gravels			
	▷	BH110_1.50-1.95 SPT 1.50-1.95 2,2,2 N=4		2.00		26.65	SAND: fine to medium grained, brown			MARINE SOIL
				3.40		25.25	From 3.40m, dark grey			
WB		BH110_4.50-4.95 SPT 4.50-4.95 3,7,11 N=18						W	MD	
		BH110_7.50-7.80 SPT 7.50-7.80 12,23/150 mm HB N=R							VD	

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

BOREHOLE LOG

BH ID: BH110

Location	Stage 1 & 2, Young and Danks Street, Waterloo			**Started**	20 May 2025
Client	Coronation Property Co. Pty Ltd			**Completed**	20 May 2025
Job No.	E26442.G03			**Logged By**	MS **Date** 20 May 2025
Sheets	2 of 3			**Review By**	TW **Date** 10 June 2025
Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈28.65 m (AHD)	**Northing**	6247749.4409 (MGA 2020 Zone 56)
Plant	Hanjin D&B 8-D	**Inclination**	90°	**Easting**	334477.5884 (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
				10.00		18.65	NO CORE: 550mm thick			
				10.55		18.10	*Log continued on next page.*			
				11						
				12						
				13						
				14						
				15						
				16						
				17						
				18						
				19						
				20						

BOREHOLE CORE LOG

BH ID: BH110

Location	Stage 1 & 2, Young and Danks Street, Waterloo			**Started**	20 May 2025
Client	Coronation Property Co. Pty Ltd			**Completed**	20 May 2025
Job No.	E26442.G03			**Logged By**	MS **Date** 20 May 2025
Sheets	3 of 3			**Review By**	TW **Date** 10 June 2025
Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈28.65 m (AHD)	**Northing**	6247749.4409 (MGA 2020 Zone 56)
Plant	Hanjin D&B 8-D	**Inclination**	90°	**Easting**	334477.5884 (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			*Log continued from previous page.*				
NMLC	80%	100	80	11			SANDSTONE: medium to coarse grained, grey, thinly to medium bedded	FR		10.75: BP SM CN 11.10: BP SM CN 11.13: BP SM CN 11.35: BP SM CN 11.50: JT 30° CU SM CN 11.63: BP SM CN 11.73: BP SM CN 11.79: JT 5° CU SM CN 11.81: JT 5° CU SM CN 12.70: JT 5° CU SM CN 12.84: BP SM CN 13.10: BP SM CN 13.18: BP SM CN 13.39: JT 15° CU SM CN 13.45: BP SM CN 13.79: BP SM Clay VN 14.07: Handling Break 14.10: BP SM CN 14.24: BP SM CN 14.30-14.35: CS 14.62: JT 5° PR SM CN 14.75: BP SM CN	
	90%	100	100	12							
				13							
				14		13.85					
				15			Terminated at 14.80m. Target Depth Reached.				
				16							
				17							
				18							
				19							
				20							

BOREHOLE LOG

BH ID: BH111

Location	Stage 1 & 2, Young and Danks Street, Waterloo			**Started**	13 May 2025
Client	Coronation Property Co. Pty Ltd			**Completed**	13 May 2025
Job No.	E26442.G03			**Logged By**	MS **Date** 13 May 2025
Sheets	1 of 3			**Review By**	TW **Date** 10 June 2025
Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈29.65 m (AHD)	**Northing**	6247689.4556 (MGA 2020 Zone 56)
Plant	Hanjin D&B 8-D	**Inclination**	90°	**Easting**	334542.8497 (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		BH111_0.50-0.95 SPT 0.50-0.95 1,3,4 N=7		0.00 0.50 1 2		29.65 29.15	FILL: SAND: fine grained, brown, trace fine to medium sub-angular to angular gravels, trace geofabric From 0.50m, brown	M	-	FILL
		BH111_1.50-1.95 SPT 1.50-1.95 0,0,0 N=0								
	▷	BH111_3.00-3.45 SPT 3.00-3.45 7,9,10 N=19		2.50 3 3.50		27.15 26.15	SAND: fine to medium grained, dark brown From 3.50m, brown		MD	MARINE SOIL
		BH111_3.70-3.80		4				W		
		BH111_4.50-4.95 SPT 4.50-4.95 5,9,14 N=23		5						
WB		BH111_6.00-6.45 SPT 6.00-6.45 1,1,1 N=2		6 7					VL	
		BH111_7.50-7.95 SPT 7.50-7.95 5,4,5 N=9		7.50 8 9		22.15 20.65	Silty CLAY: high plasticity, brown, pale-grey, red, trace ironstone gravels	M > PL	St	RESIDUAL SOIL
				9.00 10			*Log continued on next page.*			

BOREHOLE CORE LOG

BH ID: BH111

Location	Stage 1 & 2, Young and Danks Street, Waterloo			**Started**	13 May 2025		
Client	Coronation Property Co. Pty Ltd			**Completed**	13 May 2025		
Job No.	E26442.G03			**Logged By**	MS	**Date**	13 May 2025
Sheets	2 of 3			**Review By**	TW	**Date**	10 June 2025
Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈29.65 m (AHD)	**Northing**	6247689.4556 (MGA 2020 Zone 56)		
Plant	Hanjin D&B 8-D	**Inclination**	90°	**Easting**	334542.8497 (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.*				
				1							
				2							
				3							
				4							
				5							
				6							
				7							
				8							
				9							
	90%			10			SANDSTONE: medium to coarse grained, grey, mottled red	DW			

BOREHOLE CORE LOG

BH ID: BH111

Location	Stage 1 & 2, Young and Danks Street, Waterloo			**Started**	13 May 2025
Client	Coronation Property Co. Pty Ltd			**Completed**	13 May 2025
Job No.	E26442.G03			**Logged By**	MS **Date** 13 May 2025
Sheets	3 of 3			**Review By**	TW **Date** 10 June 2025
Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈29.65 m (AHD)	**Northing**	6247689.4556 (MGA 2020 Zone 56)
Plant	Hanjin D&B 8-D	**Inclination**	90°	**Easting**	334542.8497 (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)
NMLC	90%	100	83	11			SANDSTONE: medium to coarse grained, grey, mottled red	FR	M 1	10.07: Handling Break 10.47-10.50: XWS 10.85: Handling Break 10.96: Handling Break 11.15: BP SM CN	1000
				12		17.65	Terminated at 12.00m. Target Depth Reached.				
				13							
				14							
				15							
				16							
				17							
				18							
				19							
				20							

BOREHOLE LOG

BH ID: BH112M

Location	Stage 1 & 2, Young and Danks Street, Waterloo			**Started**	13 May 2025
Client	Coronation Property Co. Pty Ltd			**Completed**	13 May 2025
Job No.	E26442.G03			**Logged By**	MS **Date** 13 May 2025
Sheets	1 of 3			**Review By**	TW **Date** 10 June 2025
Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈29.75 m (AHD)	**Northing**	6247727.2993 (MGA 2020 Zone 56)
Plant	Hanjin D&B 8-D	**Inclination**	90°	**Easting**	334553.3462 (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		BH112M_0.30-0.40		0.00		29.75	FILL: ASPHALT: 200mm thick	M	-	ASPHALT
		BH112M_0.50-0.95 SPT 0.50-0.95 6,15,15 N=30		0.20		29.55	FILL: SAND: medium to coarse grained, brown, pale-grey			FILL
				0.50		29.25	FILL: ASPHALT: 500mm thick			
		BH112M_1.10-1.20		1.00		28.75	FILL: SAND: medium to coarse grained, brown, trace fine to medium sub-angular to angular gravels			
		BH112M_1.50-1.95 SPT 1.50-1.95 2,5,6 N=11		2.00		27.75	SAND: fine to medium grained, brown			MARINE SOIL
		BH112M_2.50-2.60								
	4/05/2025 02:33 PM	BH112M_3.00-3.45 SPT 3.00-3.45 2,3,4 N=7		3					L	
		BH112M_4.50-4.95 SPT 4.50-4.95 3,5,9 N=14		4						
WB				5						
		BH112M_6.00-6.45 SPT 6.00-6.45 7,10,13 N=23		6				W		
				7					MD	
				8						
		BH112M_9.00-9.45 SPT 9.00-9.45 6,5,17 HB N=22		9.00		20.75	From 9.00m, brown, pale-grey, with clay bands			
				9.50		20.25	*Log continued on next page.*			
				10						

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

BOREHOLE CORE LOG

BH ID: BH112M

Location	Stage 1 & 2, Young and Danks Street, Waterloo			**Started**	13 May 2025		
Client	Coronation Property Co. Pty Ltd			**Completed**	13 May 2025		
Job No.	E26442.G03			**Logged By**	MS	**Date**	13 May 2025
Sheets	2 of 3			**Review By**	TW	**Date**	10 June 2025
Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈29.75 m (AHD)	**Northing**	6247727.2993 (MGA 2020 Zone 56)		
Plant	Hanjin D&B 8-D	**Inclination**	90°	**Easting**	334553.3462 (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.*				
	90%	100	62	10			SANDSTONE: medium to coarse grained, brown, grey			9.70-9.83: CZ	

BOREHOLE CORE LOG

BH ID: BH112M

Location	Stage 1 & 2, Young and Danks Street, Waterloo			**Started**	13 May 2025
Client	Coronation Property Co. Pty Ltd			**Completed**	13 May 2025
Job No.	E26442.G03			**Logged By**	MS **Date** 13 May 2025
Sheets	3 of 3			**Review By**	TW **Date** 10 June 2025
Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈29.75 m (AHD)	**Northing**	6247727.2993 (MGA 2020 Zone 56)
Plant	Hanjin D&B 8-D	**Inclination**	90°	**Easting**	334553.3462 (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)
NMLC	90%	100	71	11			SANDSTONE: medium to coarse grained, brown, grey	DW		10.10: BP SM CN 10.24: JT 5° PR SM CN 10.44: JT 10° CU SM CN 10.63-10.70: XWS 11.10-11.28: XWZ	
		100	98	12				FR		11.39: BP SM CN 11.54: BP SM CN	
						17.50	Terminated at 12.25m. Target Depth Reached.				
				13							
				14							
				15							
				16							
				17							
				18							
				19							
				20							

MONITORING WELL LOG

BH ID: BH112M

Location	Stage 1 & 2, Young and Danks Street, Waterloo			**Started**	13 May 2025
Client	Coronation Property Co. Pty Ltd			**Completed**	13 May 2025
Job No.	E26442.G03			**Logged By**	MS **Date** 13 May 2025
Sheets	1 of 2			**Review By**	TW **Date** 10 June 2025
Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈29.75 m (AHD)	**Northing**	6247727.2993 (MGA 2020 Zone 56)
Plant	Hanjin D&B 8-D	**Inclination**	90°	**Easting**	334553.3462 (MGA 2020 Zone 56)

WATER	SAMPLES & FIELD TESTS	DEPTH (m)	RL (m AHD)	MATERIAL DESCRIPTION	MOISTURE CONDITION
		0.00	29.75	FILL: ASPHALT: 200mm thick	
	BH112M_0.30-0.40	0.20	29.55	FILL: SAND: medium to coarse grained, brown, pale-grey	
	BH112M_0.50-0.95 SPT 0.50-0.95 6,15,15 N=30	0.50	29.25	FILL: ASPHALT: 500mm thick	
	BH112M_1.10-1.20	1.00	28.75	FILL: SAND: medium to coarse grained, brown, trace fine to medium sub-angular to angular gravels	
	BH112M_1.50-1.95 SPT 1.50-1.95 2,5,6 N=11				M
		2.00	27.75	SAND: fine to medium grained, brown	
	BH112M_2.50-2.60				
▼ 14/05/2025 02:33 PM	BH112M_3.00-3.45 SPT 3.00-3.45 2,3,4 N=7	3			
	BH112M_4.50-4.95 SPT 4.50-4.95 3,5,9 N=14	5			
	BH112M_6.00-6.45 SPT 6.00-6.45 7,10,13 N=23	6			W
	BH112M_9.00-9.45 SPT 9.00-9.45 6,5,17 HB N=22	9.00	20.75	From 9.00m, brown, pale-grey, with clay bands	
90%		9.50	20.25	SANDSTONE: medium to coarse grained, brown, grey	

BACKFILL DETAILS	STANDPIPE DETAILS
	Well Stickup =1.0m (RL 30.75m)
Sand 0.00m - 4.50m	-1.0m - 5.50m PVC casing (50mm Ø)
Bentonite 4.50m - 5.00m	
Sand 5.00m - 8.50m	5.50m - 8.50m PVC screen (50mm Ø)

MONITORING WELL LOG

BH ID: BH112M

Location	Stage 1 & 2, Young and Danks Street, Waterloo			**Started**	13 May 2025
Client	Coronation Property Co. Pty Ltd			**Completed**	13 May 2025
Job No.	E26442.G03			**Logged By**	MS **Date** 13 May 2025
Sheets	2 of 2			**Review By**	TW **Date** 10 June 2025
Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈29.75 m (AHD)	**Northing**	6247727.2993 (MGA 2020 Zone 56)
Plant	Hanjin D&B 8-D	**Inclination**	90°	**Easting**	334553.3462 (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			SANDSTONE: medium to coarse grained, brown, grey		Sand 8.50m - 12.25m	
		12		17.50	Terminated at 12.25m. Target Depth Reached.			
		13						
		14						
		15						
		16						
		17						
		18						
		19						
		20						

Appendix F – Tables

Table F1 - Summary of Baseline Groundwater Quality - Analytical Results

E26442.E16 - Waterloo

Sample ID	Sampling Date	Metals																							PAHs			BTEX					VOCs
		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(a)pyrene	Naphthalene	Benzene	Toluene	Ethylbenzene	o-xylene	m/p-xylene	Total VOCs
Groundwater Investigation (EI, 2025)																																	
BH101M-1	27/5/2025	4	<0.1	3	3	<1	<0.1	11	27	91	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	<10
BH102M-1		<1	<0.1	<1	2	<1	<0.1	7	30	86	<1	370	<1	43	3	58000	<0.005	300	<1	<1	13	<1	64	<1	<1	N.A.	<0.1	0.1	2.9	2.4	0.6	0.8	3	N.A.
BH106M-1		12	<0.1	<1	2	<1	<0.1	14	28	38	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	21
BH109M-1		1	<0.1	<1	3	<1	<0.1	1	7	50	<1	13	<1	130	<1	1100	<0.005	60	3	<1	4.6	<1	60	<1	2	N.A.	<0.1	<0.1	<0.5	<0.5	<0.5	<0.5	<1	N.A.
BH112M-1		6	<0.1	<1	3	<1	<0.1	9	6	33	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	<10
Guidelines																																	
Discharge Water Quality Criteria		94 (As III) 42 (As V)	0.7	27 (Cr III) 4.4 (Cr VI)	13	4.4	0.1	70	80	80	9	20,000	600	1,500	1	3000		80	34	18		1.4		0.5	100		0.1	70	700	180	80	470	325	

Sample ID	Sampling Date	Petroleum Hydrocarbons			Microbiological Organisms			Total Phenols	Total Cyanide	PFAS			Other																					
		Oil & Grease	TRH C6 - C9	TRH C10 - C40	Faecal coliforms	Faecal streptococci	Escherichia coli (E. coli)			PFOS	PFOS + PFHxS	PFOA	Fluoride (mg/L)	Chloride (mg/L)	Sulfate (mg/L)	Bromide (mg/L)	Ammonia Nitrogen as NH_3 as N	Nitrate Nitrogen NO_3-N	Nitrite Nitrogen NO_2 as N (mg/L)	Total Oxidised Nitrogen, NOx-N	Total Kjeldahl Nitrogen (mg/L)	Total Nitrogen (calc)	Total Phosphorus (Kjeldahl) as P	Filterable Reactive Phosphorus as P	Bicarbonate Alkalinity as $CaCO_3$ (mg/L)	Carbonate Alkalinity as $CaCO_3$ (mg/L)	Hydroxide Alkalinity as $CaCO_3$ (mg/L)	Total Alkalinity as $CaCO_3$ (mg/L)	Hydroxide Alkalinity as OH (mg/L)	Bicarbonate Alkalinity as HCO_3 (mg/L)	Carbonate Alkalinity as CO_3 (mg/L)	Ca (mg/L)	Mg (mg/L)	Na (mg/L)	K (mg/L)
Groundwater Investigation (EI, 2025)																																	
BH101M-1	27/5/2025	N.A.	<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.	64	12	N.A.	N.A.
BH102M-1		N.A.	4200	<320	<1	<1	<1	N.A.	N.A.	N.A.	N.A.	N.A.	<0.1	220	13	<0.05	0.73	0.73	<0.005	<0.005	6.6	6.6	3.7	<0.005	12	<5	<5	12	<5	15	<5	7.5	14	71	9.1
BH106M-1		N.A.	<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.	64	16	N.A.	N.A.
BH109M-1		N.A.	<40	330	100	<1	<1	N.A.	N.A.	N.A.	N.A.	N.A.	<0.1	30	18	0.29	0.84	0.84	0.007	0.18	15	15	2.4	<0.005	69	<5	<5	69	<5	84	<5	16	5.3	24	6
BH112M-1		N.A.	<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.	49	5.3	N.A.	N.A.
Guidelines																																	
Discharge Water Quality Criteria		No detectable Oilr & Grease					None detectable in 100 mL	400	4	0.13		220					910	3,400	30,000	5		120	25	10										

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 DGVs are not currently available, as explained in the footnotes to **Table 8-1**, in **Section 8** of the DMP.

1 This result was for *Total Chromium*. Chromium speciation testing was not undertaken, but should be included in future monitoring in case DWC exceeds.

Highlighted value does not meet the adopted criteria

No relevant criteria are currently available

Bold cells indicate tests for which the laboratory LOR was above the DWC value, confirmatory retesting at a lower LOR is required, as described in **Section 8.3** of the report.

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Table F2 – Summary of Baseline Groundwater Quality Results: Physicochemical Characteristics

E26442.E16 - Waterloo

Sample ID	Date sampled	Physiochemical Characteristics												Aesthetic Properties
		Electrical Conductivity (Field EC) (µs/cm)	Electrical Conductivity (Lab EC) (µs/cm)	pH (field)	pH (lab)	Total Dissolved Solids (mg/L)	Total Suspended Solids (mg/L)	Turbidity (NTU)	Field Redox (mV)[1]	Hardness (mg $CaCO_3$/L)	Dissolved Oxygen (field DO) (mg/kg)	Dissolved Oxygen (Lab DO) (mg/L)	Total Organic Carbon as NPOC (mg/L)	Oil & Grease (present/absent)
Groundwater Investigation (EI, 2025)														
BH101M-1	27/5/2025	953	860	5.01	5.5	610	N.A.	4000	159.2	210	N.A.	N.A.	N.A.	Absent
BH102M-1		765	740	4.42	4.6	460	15000	16000	179.9	76	N.A.	3.7	3	Absent
BH106M-1		1272	1200	6.19	6.3	810	N.A.	230	116.4	230	0	N.A.	N.A.	Absent
BH109M-1		268	250	5.36	5.5	200	8900	7200	125	61	0	2.9	7.7	Absent
BH112M-1		246	420	5.82	6.1	310	N.A.	730	101.5	150	N.A.	N.A.	N.A.	Absent
Guidelines														
Discharge Water Quality Criteria				6.5 - 8.4	6.5 - 8.4			10						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 8-1**, in **Section 8** of the DMP.

Highlighted value does not meet the adopted criteria

No relevant criteria are currently available

1 Field Redox in units of millivolts (mV) were calculated by adjusting Field Redox measurements to Standard Hydrogen Electrode (SHE) by adding the instrument manufacturer's quoted electrode potential (205 mV)

2 All parameters which state 'Field' were tested onsite using portable water quality test meters and probes, all other parameters were tested in the laboratory.

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Table F3 - QA/QC Results for Groundwater Samples **E26442.E16 - Waterloo**

Date	Sample Identification	Description	TRH				BTEX				Heavy Metals							
			F1	F2	F3	F4	Benzene	Toluene	Ethylbenzene	Xylenes	Arsenic	Cadmium	Chromium (Total)	Copper	Lead	Mercury	Nickel	Zinc
Intra-laboratory Duplicate																		
27/05/2025	BH102M-1	Primary Groundwater Sample	4400	85.0	<500	<500	2.9	2.4	0.6	3.7	<1	<0.1	<1	2	<1	<0.1	7	30
27/05/2025	QD1	Intra-laboratory duplicate of BH102M-1	4100	79	<500	<500	3	2	<0.5	2.8	<1	<0.1	1	<1	<1	<0.1	6	26
		RPD	***7.06***	***7.32***	***0.00***	***0.00***	***10.91***	***13.33***	***23.53***	***NA***	***0.00***	***0.00***	***0.00***	**80.00**	***0.00***	***0.00***	***15.38***	***14.29***
Inter-laboratory Duplicate																		
27/05/2025	BH102M-1	Primary Groundwater Sample	4400	85.0	<500	<500	2.9	2.4	0.6	3.7	<1	<0.1	<1	2	<1	<0.1	7	30
27/05/2025	QT1	Inter-laboratory duplicate of BH102M-1	16000	130	<100	<100	3	2	<1	<3	<1	<0.1	<1	<1	<1	<0.05	7	28
		RPD	**113.73**	***41.86***	***NA***	***NA***	***3.39***	***18.18***	**72.73**	***NA***	***0.00***	***0.00***	***0.00***	**80.00**	***0.00***	***NA***	***0.00***	***6.90***
Trip Blank																		
27/05/2025	TB1	Water	-	-	-	-	<0.5	<0.5	<0.5	<1.5	-	-	-	-	-	-	-	-
Trip Spike																		
27/05/2025	TS1	Water	-	-	-	-	[100%]	[99%]	[99%]	[98-99%]	-	-	-	-	-	-	-	-
Rinsate Blank																		
27/05/2025	QR1	Equipment rinsate water	<50	<60	<500	<500	<0.5	<0.5	<0.5	<1.5	<1	<0.1	<1	<1	<1	<0.1	<1	<5

Indicates values where a single result is found to be less than detection, with the duplicate sample found to be over the detection limit.
RPD exceeds 30-50% range referenced from AS4482.1 (2005)

Note: All water results are reported in µg/L.

F1 = TRH C6-C10 less the sum of BTEX
F2 = TRH >C10-C16 less naphthalene
F3 = TRH >C16-C34
F4 = TRH >C34-C40

eiaustralia
Contamination | Remediation | Geotechnical

Appendix G – Laboratory Documentation

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 382130

Client Details

Client	EI Australia
Attention	Andrew Ibrahim
Address	Suite 6.01, 55 Miller Street, Pyrmont, NSW, 2009

Sample Details

Your Reference	**E26442 - Danks & Young Street, Waterloo, NSW**
Number of Samples	1 Water
Date samples received	30/05/2025
Date completed instructions received	30/05/2025

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	06/06/2025
Date of Issue	06/06/2025

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

Results Approved By
Dragana Tomas, Senior Chemist
Tabitha Roberts, Senior Chemist

Authorised By
Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Water		
Our Reference		382130-1
Your Reference	UNITS	QT1
Date Sampled		27/05/2025
Type of sample		Water
Date extracted	-	03/06/2025
Date analysed	-	04/06/2025
TRH C_6 - C_9	µg/L	15,000
TRH C_6 - C_{10}	µg/L	16,000
TRH C_6 - C_{10} less BTEX (F1)	µg/L	16,000
Benzene	µg/L	3
Toluene	µg/L	2
Ethylbenzene	µg/L	<1
m+p-xylene	µg/L	<2
o-xylene	µg/L	<1
Naphthalene	µg/L	2
Surrogate Dibromofluoromethane	%	103
Surrogate Toluene-d8	%	103
Surrogate 4-Bromofluorobenzene	%	106

svTRH (C10-C40) in Water		
Our Reference		382130-1
Your Reference	UNITS	QT1
Date Sampled		27/05/2025
Type of sample		Water
Date extracted	-	02/06/2025
Date analysed	-	03/06/2025
TRH C_{10} - C_{14}	µg/L	130
TRH C_{15} - C_{28}	µg/L	<100
TRH C_{29} - C_{36}	µg/L	<100
Total +ve TRH (C10-C36)	µg/L	130
TRH >C_{10} - C_{16}	µg/L	130
TRH >C_{10} - C_{16} less Naphthalene (F2)	µg/L	130
TRH >C_{16} - C_{34}	µg/L	<100
TRH >C_{34} - C_{40}	µg/L	<100
Total +ve TRH (>C10-C40)	µg/L	130
Surrogate o-Terphenyl	%	105

HM in water - dissolved		
Our Reference		382130-1
Your Reference	UNITS	QT1
Date Sampled		27/05/2025
Type of sample		Water
Date prepared	-	02/06/2025
Date analysed	-	02/06/2025
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	7
Zinc-Dissolved	µg/L	28

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-W2	[NT]
Date extracted	-			03/06/2025	[NT]	[NT]	[NT]	[NT]	03/06/2025	[NT]
Date analysed	-			04/06/2025	[NT]	[NT]	[NT]	[NT]	04/06/2025	[NT]
TRH C_6 - C_9	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	89	[NT]
TRH C_6 - C_{10}	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	89	[NT]
Benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	90	[NT]
Toluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	90	[NT]
Ethylbenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	89	[NT]
m+p-xylene	µg/L	2	Org-023	<2	[NT]	[NT]	[NT]	[NT]	89	[NT]
o-xylene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	89	[NT]
Naphthalene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-023	107	[NT]	[NT]	[NT]	[NT]	105	[NT]
Surrogate Toluene-d8	%		Org-023	101	[NT]	[NT]	[NT]	[NT]	102	[NT]
Surrogate 4-Bromofluorobenzene	%		Org-023	97	[NT]	[NT]	[NT]	[NT]	103	[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	-			02/06/2025	[NT]	[NT]	[NT]	[NT]	02/06/2025	[NT]
Date analysed	-			03/06/2025	[NT]	[NT]	[NT]	[NT]	03/06/2025	[NT]
TRH C_{10} - C_{14}	µg/L	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	97	[NT]
TRH C_{15} - C_{28}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	105	[NT]
TRH C_{29} - C_{36}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	86	[NT]
TRH >C_{10} - C_{16}	µg/L	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	97	[NT]
TRH >C_{16} - C_{34}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	105	[NT]
TRH >C_{34} - C_{40}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	86	[NT]
Surrogate o-Terphenyl	%		Org-020	101	[NT]	[NT]	[NT]	[NT]	109	[NT]

QUALITY CONTROL: HM in water - dissolved						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W4	[NT]
Date prepared	-			02/06/2025	1	02/06/2025	02/06/2025		02/06/2025	[NT]
Date analysed	-			02/06/2025	1	02/06/2025	02/06/2025		02/06/2025	[NT]
Arsenic-Dissolved	µg/L	1	Metals-022	<1	1	<1	[NT]		103	[NT]
Cadmium-Dissolved	µg/L	0.1	Metals-022	<0.1	1	<0.1	[NT]		99	[NT]
Chromium-Dissolved	µg/L	1	Metals-022	<1	1	<1	[NT]		109	[NT]
Copper-Dissolved	µg/L	1	Metals-022	<1	1	<1	[NT]		105	[NT]
Lead-Dissolved	µg/L	1	Metals-022	<1	1	<1	[NT]		98	[NT]
Mercury-Dissolved	µg/L	0.05	Metals-021	<0.05	1	<0.05	<0.05	0	107	[NT]
Nickel-Dissolved	µg/L	1	Metals-022	<1	1	7	[NT]		105	[NT]
Zinc-Dissolved	µg/L	1	Metals-022	<1	1	28	[NT]		108	[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.

Outlook

E26442 - COC - Danks & Young Street, Waterloo NSW

From Andrew Ibrahim - EIAustralia <andrew.ibrahim@eiaustralia.com.au>
Date Thu 29/05/2025 15:05
To Envirolab Sydney Sample Receipt <Samplereceipt@envirolab.com.au>
Cc Nishtha Joshi - EIAustralia <nishtha.joshi@eiaustralia.com.au>

CAUTION: This email originated from outside of the organisation. Do not act on instructions, click links or open attachments unless you recognise the sender and know the content is authentic and safe.

Hi Envirolab,

Please test the delivered sample (QT1) on Standard TAT for:

- HMs
- TRH
- BTEX

#382130
30/05/2025
1105

Thank you.

Kind regards,

Andrew Ibrahim
MEng. (Env), BEng. (Che)
Chemical / Environmental Engineer
Senior Project Manager

T 02 9516 0722 **M** 0451224922
E andrew.ibrahim@eiaustralia.com.au

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Pyrmont, NSW 2009

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E-MAILED
27/5/25 @ 615

Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200

Job No: 382130
Date Received: 30/05/25
Time Received: 1605
Received By: TR
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

Sheet 1 of 1

Site: Danks & Young Street, Waterloo
Project No: E26942

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 ^ /TRH/BTEX/PAHs	HM ^ /TRH/BTEX	BTEX	VOCs	PFAS	pH / CEC (cation exchange)	pH / EC (electrical conductivity)	OC Pesticides	OP Pesticides	PCBs	Total Phenols	Dewatering Suite	DPIE Suite - Mandatory Parameters
BH101M-1			27/5/25	am/pm		X						X								X	
BH102M-1																					X
BH106M-1												X								X	
BH109M-1																					X
BH112M-1												X								X	
QD1										X											
QR1										X											
TB1			lab Prepared								X										
TS1			lab Prepared			X					X										

Comments:
HM ^
As, Cd, Cr, Cu, Pb, Hg, Ni, Zn

DPIE Suite - Mandatory Parameters
pH & EC
Major Anions / Major Cations
Alkalinity (bicarbonate, carbonate, hydroxide & total)
RedOx potential
TDS / NTU / TSS / TOC / SAR
Dissolved Oxygen
Hardness
Metals (Al, Sb, As, Ba, Be, B, Cd, Cr, Co, Cu, Fe, Pb, Li, Mn, Hg, Mo, Ni, Se, Si, Ag, Sr, U, V, Zn)
Nitrogen and Phosphorous
E. Coli / F. Coliforms / F. Strep
TRH / BTEXN/ PAH

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
- [x] 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 BB = Bulk Bag

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

Sampler's Name (EI): NJ & MO
Print: NJ & MO,
Signature: on their behalf AT
Date: 27/5/2025

Received by (SGS):
Print:
Signature:
Date:

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

Report with EI Waste Classification Table ☐

Sampler's Comments:
[redacted] AT
Please send QT1 to envirolab
6

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

ANALYTICAL REPORT

Accreditation No. 2562

CLIENT DETAILS

Contact	Nishtha Joshi
Client	EI AUSTRALIA
Address	SUITE 6.01 55 MILLER STREET PYRMONT NSW 2009
Telephone	61 2 95160722
Facsimile	(Not specified)
Email	nishtha.joshi@eiaustralia.com.au
Project	**E26442 Danks & Young street Waterloo**
Order Number	**E26442**
Samples	9

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	**SE283681 R0**
Date Received	27/5/2025
Date Reported	4/6/2025

COMMENTS

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

SIGNATORIES

Dong LIANG
Metals/Inorganics Team Leader

Ly Kim HA
Organic Section Head

Teresa NGUYEN
Organic Chemist

Tim MEEYAN
Lab Tech

Ying Ying ZHANG
Laboratory Technician

VOCs in Water [AN433] Tested: 30/5/2025

PARAMETER	UOM	LOR	BH101M-1 WATER - 27/5/2025 SE283681.001	BH102M-1 WATER - 27/5/2025 SE283681.002	BH106M-1 WATER - 27/5/2025 SE283681.003	BH109M-1 WATER - 27/5/2025 SE283681.004	BH112M-1 WATER - 27/5/2025 SE283681.005
Benzene	µg/L	0.5	<0.5	**2.9**	<0.5	<0.5	<0.5
Toluene	µg/L	0.5	<0.5	**2.4**	<0.5	<0.5	<0.5
Ethylbenzene	µg/L	0.5	<0.5	**0.6**	<0.5	<0.5	<0.5
m/p-xylene	µg/L	1	<1	**3**	<1	<1	<1
o-xylene	µg/L	0.5	<0.5	**0.8**	<0.5	<0.5	<0.5
Total Xylenes	µg/L	1.5	<1.5	**3.7**	<1.5	<1.5	<1.5
Total BTEX	µg/L	3	<3	**10**	<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	-	<5	-	<5
Chloromethane	µg/L	5	<5	-	<5	-	<5
Vinyl chloride (Chloroethene)	µg/L	0.3	<0.3	-	<0.3	-	<0.3
Bromomethane	µg/L	10	<10	-	<10	-	<10
Chloroethane	µg/L	5	<5	-	<5	-	<5
Trichlorofluoromethane	µg/L	1	<1	-	<1	-	<1
Acetone (2-propanone)	µg/L	10	<10	-	<10	-	<10
Iodomethane	µg/L	5	<5	-	<5	-	<5
1,1-dichloroethene	µg/L	0.5	<0.5	-	<0.5	-	<0.5
Acrylonitrile	µg/L	0.5	<0.5	-	<0.5	-	<0.5
Dichloromethane (Methylene chloride)	µg/L	5	<5	-	<5	-	<5
Allyl chloride	µg/L	2	<2	-	<2	-	<2
Carbon disulfide	µg/L	2	<2	-	<2	-	<2
trans-1,2-dichloroethene	µg/L	0.5	<0.5	-	<0.5	-	<0.5
MtBE (Methyl-tert-butyl ether)	µg/L	0.5	<0.5	-	<0.5	-	<0.5
1,1-dichloroethane	µg/L	0.5	<0.5	-	<0.5	-	<0.5
Vinyl acetate*	µg/L	10	<10	-	<10	-	<10
MEK (2-butanone)	µg/L	10	<10	-	<10	-	<10
cis-1,2-dichloroethene	µg/L	0.5	**3.0**	-	**6.0**	-	<0.5
Bromochloromethane	µg/L	0.5	<0.5	-	<0.5	-	<0.5
Chloroform (THM)	µg/L	0.5	**1.9**	-	**2.2**	-	**4.9**
2,2-dichloropropane	µg/L	0.5	<0.5	-	<0.5	-	<0.5
1,2-dichloroethane	µg/L	0.5	<0.5	-	<0.5	-	<0.5
1,1,1-trichloroethane	µg/L	0.5	<0.5	-	<0.5	-	<0.5
1,1-dichloropropene	µg/L	0.5	<0.5	-	<0.5	-	<0.5
Carbon tetrachloride	µg/L	0.5	<0.5	-	<0.5	-	<0.5
Dibromomethane	µg/L	0.5	<0.5	-	<0.5	-	<0.5
1,2-dichloropropane	µg/L	0.5	<0.5	-	<0.5	-	<0.5
Trichloroethene (Trichloroethylene,TCE)	µg/L	0.5	**0.7**	-	**2.3**	-	<0.5
2-nitropropane	µg/L	100	<100	-	<100	-	<100
Bromodichloromethane (THM)	µg/L	0.5	<0.5	-	<0.5	-	<0.5
MIBK (4-methyl-2-pentanone)	µg/L	5	<5	-	<5	-	<5
cis-1,3-dichloropropene	µg/L	0.5	<0.5	-	<0.5	-	<0.5
trans-1,3-dichloropropene	µg/L	0.5	<0.5	-	<0.5	-	<0.5
1,1,2-trichloroethane	µg/L	0.5	<0.5	-	<0.5	-	<0.5
1,3-dichloropropane	µg/L	0.5	<0.5	-	<0.5	-	<0.5
Dibromochloromethane (THM)	µg/L	0.5	<0.5	-	<0.5	-	<0.5
2-hexanone (MBK)	µg/L	5	<5	-	<5	-	<5
1,2-dibromoethane (EDB)	µg/L	0.5	<0.5	-	<0.5	-	<0.5
Tetrachloroethene (Perchloroethylene,PCE)	µg/L	0.5	**0.8**	-	**11**	-	**1.2**
1,1,1,2-tetrachloroethane	µg/L	0.5	<0.5	-	<0.5	-	<0.5
Chlorobenzene	µg/L	0.5	<0.5	-	<0.5	-	<0.5
Bromoform (THM)	µg/L	0.5	<0.5	-	<0.5	-	<0.5
Styrene (Vinyl benzene)	µg/L	0.5	<0.5	-	<0.5	-	<0.5
1,1,2,2-tetrachloroethane	µg/L	0.5	<0.5	-	<0.5	-	<0.5
1,2,3-trichloropropane	µg/L	0.5	<0.5	-	<0.5	-	<0.5
trans-1,4-dichloro-2-butene	µg/L	1	<1	-	<1	-	<1
Isopropylbenzene (Cumene)	µg/L	0.5	<0.5	-	<0.5	-	<0.5

VOCs in Water [AN433] Tested: 30/5/2025 (continued)

PARAMETER	UOM	LOR	BH101M-1 WATER - 27/5/2025 SE283681.001	BH102M-1 WATER - 27/5/2025 SE283681.002	BH106M-1 WATER - 27/5/2025 SE283681.003	BH109M-1 WATER - 27/5/2025 SE283681.004	BH112M-1 WATER - 27/5/2025 SE283681.005
Bromobenzene	µg/L	0.5	<0.5	-	<0.5	-	<0.5
n-propylbenzene	µg/L	0.5	<0.5	-	<0.5	-	<0.5
2-chlorotoluene	µg/L	0.5	<0.5	-	<0.5	-	<0.5
4-chlorotoluene	µg/L	0.5	<0.5	-	<0.5	-	<0.5
1,3,5-trimethylbenzene	µg/L	0.5	<0.5	-	<0.5	-	<0.5
tert-butylbenzene	µg/L	0.5	<0.5	-	<0.5	-	<0.5
1,2,4-trimethylbenzene	µg/L	0.5	<0.5	-	<0.5	-	<0.5
sec-butylbenzene	µg/L	0.5	<0.5	-	<0.5	-	<0.5
1,3-dichlorobenzene	µg/L	0.5	<0.5	-	<0.5	-	<0.5
1,4-dichlorobenzene	µg/L	0.3	<0.3	-	<0.3	-	<0.3
p-isopropyltoluene	µg/L	0.5	<0.5	-	<0.5	-	<0.5
1,2-dichlorobenzene	µg/L	0.5	<0.5	-	<0.5	-	<0.5
n-butylbenzene	µg/L	0.5	<0.5	-	<0.5	-	<0.5
1,2-dibromo-3-chloropropane	µg/L	0.5	<0.5	-	<0.5	-	<0.5
1,2,4-trichlorobenzene	µg/L	0.5	<0.5	-	<0.5	-	<0.5
Hexachlorobutadiene	µg/L	0.5	<0.5	-	<0.5	-	<0.5
1,2,3-trichlorobenzene	µg/L	0.5	<0.5	-	<0.5	-	<0.5
cis-1,4-dichloro-2-butene	µg/L	1	-	-	-	-	-
Total VOC	µg/L	10	<10	-	**21**	-	<10

VOCs in Water [AN433] Tested: 30/5/2025 (continued)

PARAMETER	UOM	LOR	QD1 WATER - 27/5/2025 SE283681.006	QR1 WATER - 27/5/2025 SE283681.007	TB1 WATER - 27/5/2025 SE283681.008	TS1 WATER - 27/5/2025 SE283681.009
Benzene	µg/L	0.5	**2.6**	<0.5	<0.5	[100%]
Toluene	µg/L	0.5	**2.1**	<0.5	<0.5	[99%]
Ethylbenzene	µg/L	0.5	<0.5	<0.5	<0.5	[99%]
m/p-xylene	µg/L	1	**3**	<1	<1	[98%]
o-xylene	µg/L	0.5	<0.5	<0.5	<0.5	[99%]
Total Xylenes	µg/L	1.5	**2.8**	<1.5	<1.5	-
Total BTEX	µg/L	3	**7**	<3	<3	-
Naphthalene (VOC)*	µg/L	0.5	<0.5	<0.5	<0.5	[100%]
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: 30/5/2025 (continued)

PARAMETER	UOM	LOR	QD1 WATER - 27/5/2025 SE283681.006	QR1 WATER - 27/5/2025 SE283681.007	TB1 WATER - 27/5/2025 SE283681.008	TS1 WATER - 27/5/2025 SE283681.009
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	-	-	-	-
cis-1,4-dichloro-2-butene	µg/L	1	-	-	-	-
Total VOC	µg/L	10	-	-	-	-

Volatile Petroleum Hydrocarbons in Water [AN433] Tested: 30/5/2025

PARAMETER	UOM	LOR	BH101M-1 WATER - 27/5/2025 SE283681.001	BH102M-1 WATER - 27/5/2025 SE283681.002	BH106M-1 WATER - 27/5/2025 SE283681.003	BH109M-1 WATER - 27/5/2025 SE283681.004	BH112M-1 WATER - 27/5/2025 SE283681.005
TRH C6-C9	µg/L	40	<40	**4200**	<40	<40	<40
Benzene (F0)	µg/L	0.5	<0.5	**2.9**	<0.5	<0.5	<0.5
TRH C6-C10	µg/L	50	<50	**4400**	<50	<50	<50
TRH C6-C10 minus BTEX (F1)	µg/L	50	<50	**4400**	<50	<50	<50

PARAMETER	UOM	LOR	QD1 WATER - 27/5/2025 SE283681.006	QR1 WATER - 27/5/2025 SE283681.007
TRH C6-C9	µg/L	40	**3900**	<40
Benzene (F0)	µg/L	0.5	**2.6**	<0.5
TRH C6-C10	µg/L	50	**4100**	<50
TRH C6-C10 minus BTEX (F1)	µg/L	50	**4100**	<50

TRH (Total Recoverable Hydrocarbons) in Water [AN403] Tested: 2/6/2025

PARAMETER	UOM	LOR	BH101M-1 WATER - 27/5/2025 SE283681.001	BH102M-1 WATER - 27/5/2025 SE283681.002	BH106M-1 WATER - 27/5/2025 SE283681.003	BH109M-1 WATER - 27/5/2025 SE283681.004	BH112M-1 WATER - 27/5/2025 SE283681.005
TRH C10-C14	µg/L	50	<50	**96**	<50	**100**	<50
TRH C15-C28	µg/L	200	<200	<200	<200	<200	<200
TRH C29-C36	µg/L	200	<200	<200	<200	<200	<200
TRH C37-C40	µg/L	200	<200	<200	<200	<200	<200
TRH >C10-C16	µg/L	60	<60	**86**	**70**	**110**	<60
TRH >C10-C16 - Naphthalene (F2)	µg/L	60	<60	**85**	**70**	**110**	<60
TRH >C16-C34 (F3)	µg/L	500	<500	<500	<500	<500	<500
TRH >C34-C40 (F4)	µg/L	500	<500	<500	<500	<500	<500
TRH C10-C40	µg/L	320	<320	<320	<320	**330**	<320

PARAMETER	UOM	LOR	QD1 WATER - 27/5/2025 SE283681.006	QR1 WATER - 27/5/2025 SE283681.007
TRH C10-C14	µg/L	50	**90**	<50
TRH C15-C28	µg/L	200	<200	<200
TRH C29-C36	µg/L	200	<200	<200
TRH C37-C40	µg/L	200	<200	<200
TRH >C10-C16	µg/L	60	**79**	<60
TRH >C10-C16 - Naphthalene (F2)	µg/L	60	**79**	<60
TRH >C16-C34 (F3)	µg/L	500	<500	<500
TRH >C34-C40 (F4)	µg/L	500	<500	<500
TRH C10-C40	µg/L	320	<320	<320

PAH (Polynuclear Aromatic Hydrocarbons) in Water [AN420] Tested: 2/6/2025

PARAMETER	UOM	LOR	BH101M-1 WATER - 27/5/2025 SE283681.001	BH102M-1 WATER - 27/5/2025 SE283681.002	BH106M-1 WATER - 27/5/2025 SE283681.003	BH109M-1 WATER - 27/5/2025 SE283681.004	BH112M-1 WATER - 27/5/2025 SE283681.005
Naphthalene	µg/L	0.1	<0.1	**0.1**	<0.1	<0.1	<0.1
2-methylnaphthalene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
1-methylnaphthalene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	µg/L	0.1	<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	<0.1
Chrysene	µg/L	0.1	<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	<0.1
Benzo(k)fluoranthene	µg/L	0.1	<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	<0.2
Benzo(a)pyrene	µg/L	0.1	<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	<0.1
Dibenzo(ah)anthracene	µg/L	0.1	<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	<0.1
Total PAH (18)	µg/L	1	<1	-	<1	-	<1

Total Phenolics in Water [AN295] Tested: 3/6/2025

PARAMETER	UOM	LOR	BH101M-1 WATER - 27/5/2025 SE283681.001	BH106M-1 WATER - 27/5/2025 SE283681.003	BH112M-1 WATER - 27/5/2025 SE283681.005
Total Phenols	mg/L	0.05	<0.05	<0.05	<0.05

pH in water [AN101] Tested: 30/5/2025

PARAMETER	UOM	LOR	BH101M-1 WATER - 27/5/2025 SE283681.001	BH102M-1 WATER - 27/5/2025 SE283681.002	BH106M-1 WATER - 27/5/2025 SE283681.003	BH109M-1 WATER - 27/5/2025 SE283681.004	BH112M-1 WATER - 27/5/2025 SE283681.005
pH**	pH Units	0.1	**5.5**	**4.6**	**6.3**	**5.5**	**6.1**

Conductivity and TDS by Calculation - Water [AN106] Tested: 30/5/2025

PARAMETER	UOM	LOR	BH101M-1 WATER - 27/5/2025 SE283681.001	BH102M-1 WATER - 27/5/2025 SE283681.002	BH106M-1 WATER - 27/5/2025 SE283681.003	BH109M-1 WATER - 27/5/2025 SE283681.004	BH112M-1 WATER - 27/5/2025 SE283681.005
Conductivity @ 25 C	µS/cm	2	860	740	1200	250	420

Total Dissolved Solids (TDS) in water [AN113] Tested: 30/5/2025

PARAMETER	UOM	LOR	BH101M-1 WATER - 27/5/2025 SE283681.001	BH102M-1 WATER - 27/5/2025 SE283681.002	BH106M-1 WATER - 27/5/2025 SE283681.003	BH109M-1 WATER - 27/5/2025 SE283681.004	BH112M-1 WATER - 27/5/2025 SE283681.005
Total Dissolved Solids Dried at 175-185°C	mg/L	10	**610**	**460**	**810**	**200**	**310**

Turbidity [AN119] Tested: 30/5/2025

PARAMETER	UOM	LOR	BH101M-1 WATER - 27/5/2025 SE283681.001	BH102M-1 WATER - 27/5/2025 SE283681.002	BH106M-1 WATER - 27/5/2025 SE283681.003	BH109M-1 WATER - 27/5/2025 SE283681.004	BH112M-1 WATER - 27/5/2025 SE283681.005
Turbidity	NTU	0.5	4000	16000	230	7200	730

Total Cyanide in water by Discrete Analyser [AN077/AN287] Tested: 3/6/2025

PARAMETER	UOM	LOR	BH101M-1 WATER - 27/5/2025 SE283681.001	BH106M-1 WATER - 27/5/2025 SE283681.003	BH112M-1 WATER - 27/5/2025 SE283681.005
Total Cyanide	mg/L	0.004	<0.004	<0.004	<0.004

Metals in Water (Dissolved) by ICPOES [AN320] Tested: 2/6/2025

PARAMETER	UOM	LOR	BH101M-1 WATER - 27/5/2025 SE283681.001	BH102M-1 WATER - 27/5/2025 SE283681.002	BH106M-1 WATER - 27/5/2025 SE283681.003	BH109M-1 WATER - 27/5/2025 SE283681.004	BH112M-1 WATER - 27/5/2025 SE283681.005
Calcium, Ca	mg/L	0.2	64	7.5	64	16	49
Magnesium, Mg	mg/L	0.1	12	14	16	5.3	5.3
Total Hardness by Calculation	mg CaCO3/L	1	210	76	230	61	150
Sodium Adsorption Ratio	No unit	0.2	-	3.5	-	1.4	-
Sodium, Na	mg/L	0.5	-	71	-	24	-
Potassium, K	mg/L	0.1	-	9.1	-	6.0	-
Lithium, Li	mg/L	0.005	-	<0.005	-	<0.005	-
Silicon, Si*	mg/L	0.05	-	6.2	-	2.2	-
Soluble Silicon as Silica, SiO2*	mg/L	0.1	-	13	-	4.6	-

Trace Metals (Dissolved) in Water by ICPMS [AN318] Tested: 30/5/2025

PARAMETER	UOM	LOR	BH101M-1 WATER - 27/5/2025 SE283681.001	BH102M-1 WATER - 27/5/2025 SE283681.002	BH106M-1 WATER - 27/5/2025 SE283681.003	BH109M-1 WATER - 27/5/2025 SE283681.004	BH112M-1 WATER - 27/5/2025 SE283681.005
Aluminium	µg/L	5	91	86	38	50	33
Arsenic	µg/L	1	4	<1	12	1	6
Cadmium	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium	µg/L	1	3	<1	<1	<1	<1
Copper	µg/L	1	3	2	2	3	3
Lead	µg/L	1	<1	<1	<1	<1	<1
Nickel	µg/L	1	11	7	14	1	9
Zinc	µg/L	5	27	30	28	7	6
Silver	µg/L	1	-	<1	-	<1	-
Antimony	µg/L	1	-	<1	-	<1	-
Barium	µg/L	1	-	370	-	13	-
Beryllium	µg/L	1	-	<1	-	<1	-
Boron	µg/L	5	-	43	-	130	-
Cobalt	µg/L	1	-	3	-	<1	-
Iron	µg/L	5	-	58000	-	1100	-
Manganese	µg/L	1	-	300	-	60	-
Molybdenum	µg/L	1	-	<1	-	3	-
Selenium	µg/L	1	-	<1	-	<1	-
Strontium	µg/L	1	-	64	-	60	-
Uranium	µg/L	1	-	<1	-	<1	-
Vanadium	µg/L	1	-	<1	-	2	-

PARAMETER	UOM	LOR	QD1 WATER - 27/5/2025 SE283681.006	QR1 WATER - 27/5/2025 SE283681.007
Aluminium	µg/L	5	-	-
Arsenic	µg/L	1	<1	<1
Cadmium	µg/L	0.1	<0.1	<0.1
Chromium	µg/L	1	1	<1
Copper	µg/L	1	<1	<1
Lead	µg/L	1	<1	<1
Nickel	µg/L	1	6	<1
Zinc	µg/L	5	26	<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: 2/6/2025

PARAMETER	UOM	LOR	BH101M-1 WATER - 27/5/2025 SE283681.001	BH102M-1 WATER - 27/5/2025 SE283681.002	BH106M-1 WATER - 27/5/2025 SE283681.003	BH109M-1 WATER - 27/5/2025 SE283681.004	BH112M-1 WATER - 27/5/2025 SE283681.005
Mercury	mg/L	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001

PARAMETER	UOM	LOR	QD1 WATER - 27/5/2025 SE283681.006	QR1 WATER - 27/5/2025 SE283681.007
Mercury	mg/L	0.0001	<0.0001	<0.0001

Anions by Ion Chromatography in Water [AN245] Tested: 30/5/2025

PARAMETER	UOM	LOR	BH102M-1 WATER - 27/5/2025 SE283681.002	BH109M-1 WATER - 27/5/2025 SE283681.004
Chloride	mg/L	0.05	**220**	**30**
Fluoride	mg/L	0.1	<0.10	<0.10
Sulfate, SO4	mg/L	1	**13**	**18**
Nitrate Nitrogen, NO3-N	mg/L	0.005	<0.005	**0.17**
Bromide	mg/L	0.05	<0.05	**0.29**

Alkalinity [AN135] Tested: 2/6/2025

PARAMETER	UOM	LOR	BH102M-1 WATER - 27/5/2025 SE283681.002	BH109M-1 WATER - 27/5/2025 SE283681.004
Bicarbonate Alkalinity as CaCO3	mg/L	5	**12**	**69**
Bicarbonate Alkalinity as HCO3	mg/L	5	**15**	**84**
Carbonate Alkalinity as CaCO3	mg/L	5	<5	<5
Carbonate Alkalinity as CO3	mg/L	5	<5	<5
Hydroxide Alkalinity as CaCO3	mg/L	5	<5	<5
Hydroxide Alkalinity as OH	mg/L	5	<5	<5
Total Alkalinity as CaCO3	mg/L	5	**12**	**69**
Carbonate Hardness as CaCO3*	mg CaCO3/L	2	**11.965883333333**	**68.718883333333**
Non-Carbonate Hardness as CaCO3*	mg CaCO3/L	2	-	-
Negative Hardness as CaCO3*	mg CaCO3/L	-100	-	-

Dissolved Oxygen by Membrane Electrode [AN176] Tested: 30/5/2025

PARAMETER	UOM	LOR	BH102M-1 WATER - 27/5/2025 SE283681.002	BH109M-1 WATER - 27/5/2025 SE283681.004
Temperature*	°C	-	**19.1**	**19.2**
Dissolved Oxygen**	mg/L	0.5	**3.7**	**2.9**
Dissolved Oxygen (percent saturation)**	%	1	**39.3**	**31.6**

Total and Volatile Suspended Solids (TSS / VSS) [AN114] Tested: 2/6/2025

PARAMETER	UOM	LOR	BH102M-1 WATER - 27/5/2025 SE283681.002	BH109M-1 WATER - 27/5/2025 SE283681.004
Total Suspended Solids Dried at 103-105°C	mg/L	5	**15000**	**8900**

Forms of Carbon [AN190] Tested: 2/6/2025

PARAMETER	UOM	LOR	BH102M-1 WATER - 27/5/2025 SE283681.002	BH109M-1 WATER - 27/5/2025 SE283681.004
Total Organic Carbon as NPOC	mg/L	0.2	**3.0**	**7.7**

Ammonia Nitrogen by Discrete Analyser [AN291] Tested: 30/5/2025

PARAMETER	UOM	LOR	BH102M-1 WATER - 27/5/2025 SE283681.002	BH109M-1 WATER - 27/5/2025 SE283681.004
Ammonia Nitrogen, NH_3 as N	mg/L	0.01	**0.73**	**0.84**

Calculation of Anion-Cation Balance (SAR Calc) [AN121] Tested: 3/6/2025

PARAMETER	UOM	LOR	BH102M-1 WATER - 27/5/2025 SE283681.002	BH109M-1 WATER - 27/5/2025 SE283681.004
Sum of Ions*	mg/L	10	**402**	**170**
Anion-Cation Balance	%	-100	**2.08**	**-2.58**
TFSS*	mg/L	10	**402**	**170**
Sodium Adsorption Ratio*	No unit	0.1	**3.5**	**1.4**

Nitrite in Water [AN277] Tested: 30/5/2025

PARAMETER	UOM	LOR	BH102M-1 WATER - 27/5/2025 SE283681.002	BH109M-1 WATER - 27/5/2025 SE283681.004
Nitrite Nitrogen, NO2 as N	mg/L	0.005	<0.005	**0.007**
Total Oxidised Nitrogen, NOx-N	mg/L	0.005	<0.005	**0.18**

TKN Kjeldahl Digestion by Discrete Analyser [AN292] Tested: 2/6/2025

PARAMETER	UOM	LOR	BH102M-1 WATER - 27/5/2025 SE283681.002	BH109M-1 WATER - 27/5/2025 SE283681.004
Total Kjeldahl Nitrogen	mg/L	0.05	**6.6**	**15**
Total Nitrogen (calc)	mg/L	0.05	**6.6**	**15**

Total Phosphorus by Kjeldahl Digestion DA in Water [AN279/AN293(Sydney only)] Tested: 2/6/2025

PARAMETER	UOM	LOR	BH102M-1 WATER - 27/5/2025 SE283681.002	BH109M-1 WATER - 27/5/2025 SE283681.004
Total Phosphorus (Kjeldahl Digestion) as P	mg/L	0.02	**3.7**	**2.4**

Filterable Reactive Phosphorus (FRP) [AN278] Tested: 30/5/2025

PARAMETER	UOM	LOR	BH102M-1 WATER - 27/5/2025 SE283681.002	BH109M-1 WATER - 27/5/2025 SE283681.004
Filterable Reactive Phosphorus as P	mg/L	0.005	<0.005	<0.005

Redox Potential (Eh) in water [AN240] Tested: 30/5/2025

PARAMETER	UOM	LOR	BH102M-1 WATER - 27/5/2025 SE283681.002	BH109M-1 WATER - 27/5/2025 SE283681.004
Eh of Sample Relative to Standard H+ Electrode***	mV	-500	**358**	**294**
Temperature of Sample*	°C	0.1	**20.3**	**20.3**

Enterococci in Water [AN705] Tested: 30/5/2025

PARAMETER	UOM	LOR	BH102M-1 WATER - 27/5/2025 SE283681.002	BH109M-1 WATER - 27/5/2025 SE283681.004
Date & Time Processed*	No unit	-	2025-05-29 16:09	2025-05-29 16:09
Intestinal Enterococci*	CFU/100mL	1	<1	<1
Notes*	No unit	-	-	-

E. coli, Total and Faecal (Thermotolerant) coliforms in Water (MPN) [AN735] Tested: 30/5/2025

PARAMETER	UOM	LOR	BH102M-1 WATER - 27/5/2025 SE283681.002	BH109M-1 WATER - 27/5/2025 SE283681.004
Date & Time Processed*	No unit	-	2025-05-29 16:24	2025-05-29 16:24
E. coli	MPN/100mL	1	<1	<1
Faecal Coliforms	MPN/100mL	1	<1	100

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 Nepholometry: 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.

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 .
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			
***	Indicates that both * and ** apply.		Sample listed, but not received.		

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.

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STATEMENT OF QA/QC PERFORMANCE

SE283681 R0

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Order Number	**E26442**
Samples	9

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SGS Reference	**SE283681 R0**
Date Received	27 May 2025
Date Reported	04 Jun 2025

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	2 items
	E. coli, Total and Faecal (Thermotolerant) coliforms in Water (MPN)	2 items
	Enterococci in Water	2 items
	pH in water	5 items
	Redox Potential (Eh) in water	2 items
	Turbidity	5 items
Analysis Date	Dissolved Oxygen by Membrane Electrode	2 items
	Nitrite in Water	2 items
	pH in water	5 items
	Redox Potential (Eh) in water	2 items
	Turbidity	5 items
Surrogate	VOCs in Water	2 items
	Volatile Petroleum Hydrocarbons in Water	2 items

SAMPLE SUMMARY

Type of documentation received	COC	Date documentation received	27/5/2025@6:15pm
Samples received in good order	Yes	Samples received without headspace	Yes
Sample temperature upon receipt	5.1°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

HOLDING TIME SUMMARY

SE283681 R0

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
BH102M-1	SE283681.002	LB349329	27 May 2025	27 May 2025	10 Jun 2025	02 Jun 2025	10 Jun 2025	03 Jun 2025
BH109M-1	SE283681.004	LB349329	27 May 2025	27 May 2025	10 Jun 2025	02 Jun 2025	10 Jun 2025	03 Jun 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
BH102M-1	SE283681.002	LB349111	27 May 2025	27 May 2025	24 Jun 2025	30 May 2025	24 Jun 2025	30 May 2025
BH109M-1	SE283681.004	LB349111	27 May 2025	27 May 2025	24 Jun 2025	30 May 2025	24 Jun 2025	30 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
BH102M-1	SE283681.002	LB349134	27 May 2025	27 May 2025	24 Jun 2025	30 May 2025	24 Jun 2025	03 Jun 2025
BH109M-1	SE283681.004	LB349134	27 May 2025	27 May 2025	24 Jun 2025	30 May 2025	24 Jun 2025	03 Jun 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
BH101M-1	SE283681.001	LB349121	27 May 2025	27 May 2025	24 Jun 2025	30 May 2025	24 Jun 2025	30 May 2025
BH102M-1	SE283681.002	LB349121	27 May 2025	27 May 2025	24 Jun 2025	30 May 2025	24 Jun 2025	30 May 2025
BH106M-1	SE283681.003	LB349121	27 May 2025	27 May 2025	24 Jun 2025	30 May 2025	24 Jun 2025	30 May 2025
BH109M-1	SE283681.004	LB349121	27 May 2025	27 May 2025	24 Jun 2025	30 May 2025	24 Jun 2025	30 May 2025
BH112M-1	SE283681.005	LB349121	27 May 2025	27 May 2025	24 Jun 2025	30 May 2025	24 Jun 2025	30 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
BH102M-1	SE283681.002	LB349246	27 May 2025	27 May 2025	28 May 2025	30 May 2025†	28 May 2025	30 May 2025†
BH109M-1	SE283681.004	LB349246	27 May 2025	27 May 2025	28 May 2025	30 May 2025†	28 May 2025	30 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
BH102M-1	SE283681.002	LB349095	27 May 2025	27 May 2025	28 May 2025	30 May 2025†	02 Jun 2025	29 May 2025
BH109M-1	SE283681.004	LB349095	27 May 2025	27 May 2025	28 May 2025	30 May 2025†	02 Jun 2025	29 May 2025

Enterococci in Water

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH102M-1	SE283681.002	LB349095	27 May 2025	27 May 2025	28 May 2025	30 May 2025†	02 Jun 2025	02 Jun 2025
BH109M-1	SE283681.004	LB349095	27 May 2025	27 May 2025	28 May 2025	30 May 2025†	02 Jun 2025	02 Jun 2025

Filterable Reactive Phosphorus (FRP)

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH102M-1	SE283681.002	LB349111	27 May 2025	27 May 2025	24 Jun 2025	30 May 2025	24 Jun 2025	30 May 2025
BH109M-1	SE283681.004	LB349111	27 May 2025	27 May 2025	24 Jun 2025	30 May 2025	24 Jun 2025	30 May 2025

Forms of Carbon

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH102M-1	SE283681.002	LB349264	27 May 2025	27 May 2025	03 Jun 2025	02 Jun 2025	03 Jun 2025	03 Jun 2025
BH109M-1	SE283681.004	LB349264	27 May 2025	27 May 2025	03 Jun 2025	02 Jun 2025	03 Jun 2025	03 Jun 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
BH101M-1	SE283681.001	LB349255	27 May 2025	27 May 2025	24 Jun 2025	02 Jun 2025	24 Jun 2025	02 Jun 2025
BH102M-1	SE283681.002	LB349255	27 May 2025	27 May 2025	24 Jun 2025	02 Jun 2025	24 Jun 2025	02 Jun 2025
BH106M-1	SE283681.003	LB349255	27 May 2025	27 May 2025	24 Jun 2025	02 Jun 2025	24 Jun 2025	02 Jun 2025
BH109M-1	SE283681.004	LB349255	27 May 2025	27 May 2025	24 Jun 2025	02 Jun 2025	24 Jun 2025	02 Jun 2025
BH112M-1	SE283681.005	LB349255	27 May 2025	27 May 2025	24 Jun 2025	02 Jun 2025	24 Jun 2025	02 Jun 2025
QD1	SE283681.006	LB349255	27 May 2025	27 May 2025	24 Jun 2025	02 Jun 2025	24 Jun 2025	02 Jun 2025
QR1	SE283681.007	LB349255	27 May 2025	27 May 2025	24 Jun 2025	02 Jun 2025	24 Jun 2025	02 Jun 2025

Metals in Water (Dissolved) by ICPOES

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH101M-1	SE283681.001	LB349275	27 May 2025	27 May 2025	23 Nov 2025	02 Jun 2025	23 Nov 2025	03 Jun 2025
BH102M-1	SE283681.002	LB349275	27 May 2025	27 May 2025	23 Nov 2025	02 Jun 2025	23 Nov 2025	03 Jun 2025
BH106M-1	SE283681.003	LB349275	27 May 2025	27 May 2025	23 Nov 2025	02 Jun 2025	23 Nov 2025	03 Jun 2025
BH109M-1	SE283681.004	LB349275	27 May 2025	27 May 2025	23 Nov 2025	02 Jun 2025	23 Nov 2025	03 Jun 2025
BH112M-1	SE283681.005	LB349275	27 May 2025	27 May 2025	23 Nov 2025	02 Jun 2025	23 Nov 2025	03 Jun 2025

HOLDING TIME SUMMARY

SE283681 R0

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

Nitrite in Water — Method: ME-(AU)-[ENV]AN277

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH102M-1	SE283681.002	LB349111	27 May 2025	27 May 2025	31 May 2025	30 May 2025	31 May 2025	03 Jun 2025†
BH109M-1	SE283681.004	LB349111	27 May 2025	27 May 2025	31 May 2025	30 May 2025	31 May 2025	03 Jun 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
BH101M-1	SE283681.001	LB349252	27 May 2025	27 May 2025	03 Jun 2025	02 Jun 2025	12 Jul 2025	03 Jun 2025
BH102M-1	SE283681.002	LB349252	27 May 2025	27 May 2025	03 Jun 2025	02 Jun 2025	12 Jul 2025	03 Jun 2025
BH106M-1	SE283681.003	LB349252	27 May 2025	27 May 2025	03 Jun 2025	02 Jun 2025	12 Jul 2025	03 Jun 2025
BH109M-1	SE283681.004	LB349252	27 May 2025	27 May 2025	03 Jun 2025	02 Jun 2025	12 Jul 2025	03 Jun 2025
BH112M-1	SE283681.005	LB349252	27 May 2025	27 May 2025	03 Jun 2025	02 Jun 2025	12 Jul 2025	03 Jun 2025
QD1	SE283681.006	LB349252	27 May 2025	27 May 2025	03 Jun 2025	02 Jun 2025	12 Jul 2025	03 Jun 2025
QR1	SE283681.007	LB349252	27 May 2025	27 May 2025	03 Jun 2025	02 Jun 2025	12 Jul 2025	03 Jun 2025

pH in water — Method: ME-(AU)-[ENV]AN101

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH101M-1	SE283681.001	LB349121	27 May 2025	27 May 2025	28 May 2025	30 May 2025†	28 May 2025	30 May 2025†
BH102M-1	SE283681.002	LB349121	27 May 2025	27 May 2025	28 May 2025	30 May 2025†	28 May 2025	30 May 2025†
BH106M-1	SE283681.003	LB349121	27 May 2025	27 May 2025	28 May 2025	30 May 2025†	28 May 2025	30 May 2025†
BH109M-1	SE283681.004	LB349121	27 May 2025	27 May 2025	28 May 2025	30 May 2025†	28 May 2025	30 May 2025†
BH112M-1	SE283681.005	LB349121	27 May 2025	27 May 2025	28 May 2025	30 May 2025†	28 May 2025	30 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
BH102M-1	SE283681.002	LB349244	27 May 2025	27 May 2025	28 May 2025	30 May 2025†	28 May 2025	30 May 2025†
BH109M-1	SE283681.004	LB349244	27 May 2025	27 May 2025	28 May 2025	30 May 2025†	28 May 2025	30 May 2025†

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
BH102M-1	SE283681.002	LB349327	27 May 2025	27 May 2025	24 Jun 2025	02 Jun 2025	24 Jun 2025	03 Jun 2025
BH109M-1	SE283681.004	LB349327	27 May 2025	27 May 2025	24 Jun 2025	02 Jun 2025	24 Jun 2025	03 Jun 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
BH102M-1	SE283681.002	LB349331	27 May 2025	27 May 2025	03 Jun 2025	02 Jun 2025	09 Jun 2025	03 Jun 2025
BH109M-1	SE283681.004	LB349331	27 May 2025	27 May 2025	03 Jun 2025	02 Jun 2025	09 Jun 2025	03 Jun 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
BH101M-1	SE283681.001	LB349515	27 May 2025	27 May 2025	10 Jun 2025	03 Jun 2025	10 Jun 2025	03 Jun 2025
BH106M-1	SE283681.003	LB349515	27 May 2025	27 May 2025	10 Jun 2025	03 Jun 2025	10 Jun 2025	03 Jun 2025
BH112M-1	SE283681.005	LB349515	27 May 2025	27 May 2025	10 Jun 2025	03 Jun 2025	10 Jun 2025	03 Jun 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
BH101M-1	SE283681.001	LB349135	27 May 2025	27 May 2025	03 Jun 2025	30 May 2025	03 Jun 2025	02 Jun 2025
BH102M-1	SE283681.002	LB349135	27 May 2025	27 May 2025	03 Jun 2025	30 May 2025	03 Jun 2025	02 Jun 2025
BH106M-1	SE283681.003	LB349135	27 May 2025	27 May 2025	03 Jun 2025	30 May 2025	03 Jun 2025	02 Jun 2025
BH109M-1	SE283681.004	LB349135	27 May 2025	27 May 2025	03 Jun 2025	30 May 2025	03 Jun 2025	02 Jun 2025
BH112M-1	SE283681.005	LB349135	27 May 2025	27 May 2025	03 Jun 2025	30 May 2025	03 Jun 2025	02 Jun 2025

Total Phenolics in Water — Method: ME-(AU)-[ENV]AN295

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH101M-1	SE283681.001	LB349535	27 May 2025	27 May 2025	10 Jun 2025	03 Jun 2025	10 Jun 2025	03 Jun 2025
BH106M-1	SE283681.003	LB349535	27 May 2025	27 May 2025	10 Jun 2025	03 Jun 2025	10 Jun 2025	03 Jun 2025
BH112M-1	SE283681.005	LB349535	27 May 2025	27 May 2025	10 Jun 2025	03 Jun 2025	10 Jun 2025	03 Jun 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
BH102M-1	SE283681.002	LB349327	27 May 2025	27 May 2025	24 Jun 2025	02 Jun 2025	24 Jun 2025	03 Jun 2025
BH109M-1	SE283681.004	LB349327	27 May 2025	27 May 2025	24 Jun 2025	02 Jun 2025	24 Jun 2025	03 Jun 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
BH101M-1	SE283681.001	LB349080	27 May 2025	27 May 2025	23 Nov 2025	30 May 2025	23 Nov 2025	02 Jun 2025
BH102M-1	SE283681.002	LB349080	27 May 2025	27 May 2025	23 Nov 2025	30 May 2025	23 Nov 2025	02 Jun 2025

HOLDING TIME SUMMARY

SE283681 R0

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

Trace Metals (Dissolved) in Water by ICPMS (continued)

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH106M-1	SE283681.003	LB349080	27 May 2025	27 May 2025	23 Nov 2025	30 May 2025	23 Nov 2025	02 Jun 2025
BH109M-1	SE283681.004	LB349080	27 May 2025	27 May 2025	23 Nov 2025	30 May 2025	23 Nov 2025	02 Jun 2025
BH112M-1	SE283681.005	LB349080	27 May 2025	27 May 2025	23 Nov 2025	30 May 2025	23 Nov 2025	02 Jun 2025
QD1	SE283681.006	LB349080	27 May 2025	27 May 2025	23 Nov 2025	30 May 2025	23 Nov 2025	02 Jun 2025
QR1	SE283681.007	LB349080	27 May 2025	27 May 2025	23 Nov 2025	30 May 2025	23 Nov 2025	02 Jun 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
BH101M-1	SE283681.001	LB349252	27 May 2025	27 May 2025	03 Jun 2025	02 Jun 2025	12 Jul 2025	03 Jun 2025
BH102M-1	SE283681.002	LB349252	27 May 2025	27 May 2025	03 Jun 2025	02 Jun 2025	12 Jul 2025	03 Jun 2025
BH106M-1	SE283681.003	LB349252	27 May 2025	27 May 2025	03 Jun 2025	02 Jun 2025	12 Jul 2025	03 Jun 2025
BH109M-1	SE283681.004	LB349252	27 May 2025	27 May 2025	03 Jun 2025	02 Jun 2025	12 Jul 2025	03 Jun 2025
BH112M-1	SE283681.005	LB349252	27 May 2025	27 May 2025	03 Jun 2025	02 Jun 2025	12 Jul 2025	03 Jun 2025
QD1	SE283681.006	LB349252	27 May 2025	27 May 2025	03 Jun 2025	02 Jun 2025	12 Jul 2025	03 Jun 2025
QR1	SE283681.007	LB349252	27 May 2025	27 May 2025	03 Jun 2025	02 Jun 2025	12 Jul 2025	03 Jun 2025

Turbidity

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH101M-1	SE283681.001	LB349242	27 May 2025	27 May 2025	28 May 2025	30 May 2025†	28 May 2025	30 May 2025†
BH102M-1	SE283681.002	LB349242	27 May 2025	27 May 2025	28 May 2025	30 May 2025†	28 May 2025	30 May 2025†
BH106M-1	SE283681.003	LB349242	27 May 2025	27 May 2025	28 May 2025	30 May 2025†	28 May 2025	30 May 2025†
BH109M-1	SE283681.004	LB349242	27 May 2025	27 May 2025	28 May 2025	30 May 2025†	28 May 2025	30 May 2025†
BH112M-1	SE283681.005	LB349242	27 May 2025	27 May 2025	28 May 2025	30 May 2025†	28 May 2025	30 May 2025†

VOCs in Water

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH101M-1	SE283681.001	LB349089	27 May 2025	27 May 2025	10 Jun 2025	30 May 2025	10 Jun 2025	03 Jun 2025
BH102M-1	SE283681.002	LB349089	27 May 2025	27 May 2025	10 Jun 2025	30 May 2025	10 Jun 2025	02 Jun 2025
BH106M-1	SE283681.003	LB349089	27 May 2025	27 May 2025	10 Jun 2025	30 May 2025	10 Jun 2025	03 Jun 2025
BH109M-1	SE283681.004	LB349089	27 May 2025	27 May 2025	10 Jun 2025	30 May 2025	10 Jun 2025	02 Jun 2025
BH112M-1	SE283681.005	LB349089	27 May 2025	27 May 2025	10 Jun 2025	30 May 2025	10 Jun 2025	03 Jun 2025
QD1	SE283681.006	LB349089	27 May 2025	27 May 2025	10 Jun 2025	30 May 2025	10 Jun 2025	02 Jun 2025
QR1	SE283681.007	LB349089	27 May 2025	27 May 2025	10 Jun 2025	30 May 2025	10 Jun 2025	02 Jun 2025
TB1	SE283681.008	LB349089	27 May 2025	27 May 2025	10 Jun 2025	30 May 2025	10 Jun 2025	02 Jun 2025
TS1	SE283681.009	LB349089	27 May 2025	27 May 2025	10 Jun 2025	30 May 2025	10 Jun 2025	02 Jun 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
BH101M-1	SE283681.001	LB349089	27 May 2025	27 May 2025	10 Jun 2025	30 May 2025	10 Jun 2025	02 Jun 2025
BH102M-1	SE283681.002	LB349089	27 May 2025	27 May 2025	10 Jun 2025	30 May 2025	10 Jun 2025	02 Jun 2025
BH106M-1	SE283681.003	LB349089	27 May 2025	27 May 2025	10 Jun 2025	30 May 2025	10 Jun 2025	02 Jun 2025
BH109M-1	SE283681.004	LB349089	27 May 2025	27 May 2025	10 Jun 2025	30 May 2025	10 Jun 2025	02 Jun 2025
BH112M-1	SE283681.005	LB349089	27 May 2025	27 May 2025	10 Jun 2025	30 May 2025	10 Jun 2025	02 Jun 2025
QD1	SE283681.006	LB349089	27 May 2025	27 May 2025	10 Jun 2025	30 May 2025	10 Jun 2025	02 Jun 2025
QR1	SE283681.007	LB349089	27 May 2025	27 May 2025	10 Jun 2025	30 May 2025	10 Jun 2025	02 Jun 2025
TB1	SE283681.008	LB349089	27 May 2025	27 May 2025	10 Jun 2025	30 May 2025	10 Jun 2025	03 Jun 2025
TS1	SE283681.009	LB349089	27 May 2025	27 May 2025	10 Jun 2025	30 May 2025	10 Jun 2025	03 Jun 2025

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.

PAH (Polynuclear Aromatic Hydrocarbons) in Water

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

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
2-fluorobiphenyl (Surrogate)	BH101M-1	SE283681.001	%	40 - 130%	79
	BH102M-1	SE283681.002	%	40 - 130%	101
	BH106M-1	SE283681.003	%	40 - 130%	99
	BH109M-1	SE283681.004	%	40 - 130%	91
	BH112M-1	SE283681.005	%	40 - 130%	104
d14-p-terphenyl (Surrogate)	BH101M-1	SE283681.001	%	40 - 130%	76
	BH102M-1	SE283681.002	%	40 - 130%	86
	BH106M-1	SE283681.003	%	40 - 130%	92
	BH109M-1	SE283681.004	%	40 - 130%	79
	BH112M-1	SE283681.005	%	40 - 130%	91
d5-nitrobenzene (Surrogate)	BH101M-1	SE283681.001	%	40 - 130%	80
	BH102M-1	SE283681.002	%	40 - 130%	98
	BH106M-1	SE283681.003	%	40 - 130%	99
	BH109M-1	SE283681.004	%	40 - 130%	94
	BH112M-1	SE283681.005	%	40 - 130%	102

VOCs in Water

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

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	BH101M-1	SE283681.001	%	40 - 130%	107
	BH102M-1	SE283681.002	%	40 - 130%	132 ⓘ
	BH106M-1	SE283681.003	%	40 - 130%	115
	BH109M-1	SE283681.004	%	40 - 130%	112
	BH112M-1	SE283681.005	%	40 - 130%	109
	QD1	SE283681.006	%	40 - 130%	131 ⓘ
	QR1	SE283681.007	%	40 - 130%	106
	TB1	SE283681.008	%	40 - 130%	106
	TS1	SE283681.009	%	40 - 130%	100
d4-1,2-dichloroethane (Surrogate)	BH101M-1	SE283681.001	%	40 - 130%	87
	BH102M-1	SE283681.002	%	40 - 130%	83
	BH106M-1	SE283681.003	%	40 - 130%	87
	BH109M-1	SE283681.004	%	40 - 130%	85
	BH112M-1	SE283681.005	%	40 - 130%	87
	QD1	SE283681.006	%	40 - 130%	86
	QR1	SE283681.007	%	40 - 130%	89
	TB1	SE283681.008	%	40 - 130%	88
	TS1	SE283681.009	%	40 - 130%	100
d8-toluene (Surrogate)	BH101M-1	SE283681.001	%	40 - 130%	88
	BH102M-1	SE283681.002	%	40 - 130%	90
	BH106M-1	SE283681.003	%	40 - 130%	89
	BH109M-1	SE283681.004	%	40 - 130%	90
	BH112M-1	SE283681.005	%	40 - 130%	89
	QD1	SE283681.006	%	40 - 130%	86
	QR1	SE283681.007	%	40 - 130%	88
	TB1	SE283681.008	%	40 - 130%	89
	TS1	SE283681.009	%	40 - 130%	101

Volatile Petroleum Hydrocarbons in Water

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

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	BH101M-1	SE283681.001	%	40 - 130%	107
	BH102M-1	SE283681.002	%	40 - 130%	132 ⓘ
	BH106M-1	SE283681.003	%	40 - 130%	115
	BH109M-1	SE283681.004	%	40 - 130%	112
	BH112M-1	SE283681.005	%	40 - 130%	109
	QD1	SE283681.006	%	40 - 130%	131 ⓘ
	QR1	SE283681.007	%	40 - 130%	106
d4-1,2-dichloroethane (Surrogate)	BH101M-1	SE283681.001	%	60 - 130%	87
	BH102M-1	SE283681.002	%	60 - 130%	83
	BH106M-1	SE283681.003	%	60 - 130%	87
	BH109M-1	SE283681.004	%	60 - 130%	85
	BH112M-1	SE283681.005	%	60 - 130%	87
	QD1	SE283681.006	%	60 - 130%	86
	QR1	SE283681.007	%	60 - 130%	89

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.

Volatile Petroleum Hydrocarbons in Water (continued) — **Method: ME-(AU)-[ENV]AN433**

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
d8-toluene (Surrogate)	BH101M-1	SE283681.001	%	40 - 130%	88
	BH102M-1	SE283681.002	%	40 - 130%	90
	BH106M-1	SE283681.003	%	40 - 130%	89
	BH109M-1	SE283681.004	%	40 - 130%	90
	BH112M-1	SE283681.005	%	40 - 130%	89
	QD1	SE283681.006	%	40 - 130%	86
	QR1	SE283681.007	%	40 - 130%	88

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
LB349329.001	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
LB349111.001	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
LB349134.001	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
LB349121.001	Conductivity @ 25 C	µS/cm	2	<2

Dissolved Oxygen by Membrane Electrode

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

Sample Number	Parameter	Units	LOR	Result
LB349246.001	Dissolved Oxygen**	mg/L	0.5	<0.5

Filterable Reactive Phosphorus (FRP)

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

Sample Number	Parameter	Units	LOR	Result
LB349111.001	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
LB349264.001	Total Organic Carbon as NPOC	mg/L	0.2	<0.2

Mercury (dissolved) in Water

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

Sample Number	Parameter	Units	LOR	Result
LB349255.001	Mercury	mg/L	0.0001	<0.0001

Metals in Water (Dissolved) by ICPOES

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

Sample Number	Parameter	Units	LOR	Result
LB349275.001	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

Nitrite in Water

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

Sample Number	Parameter	Units	LOR	Result
LB349111.001	Nitrite Nitrogen, NO2 as N	mg/L	0.005	<0.005

PAH (Polynuclear Aromatic Hydrocarbons) in Water

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

Sample Number	Parameter	Units	LOR

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.

PAH (Polynuclear Aromatic Hydrocarbons) in Water (continued)

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

Sample Number		Parameter	Units	LOR	Result
LB349252.001		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)	%	-	54
		2-fluorobiphenyl (Surrogate)	%	-	66
		d14-p-terphenyl (Surrogate)	%	-	78

Total and Volatile Suspended Solids (TSS / VSS)

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

Sample Number	Parameter	Units	LOR	Result
LB349331.001	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
LB349515.001	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
LB349135.001	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
LB349535.001	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
LB349327.001	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
LB349080.001	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
	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

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
LB349080.001	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
LB349252.001	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
LB349242.001	Turbidity	NTU	0.5	<0.5

VOCs in Water

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

Sample Number		Parameter	Units	LOR	Result
LB349089.001	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
		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
		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

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
LB349089.001	Halogenated Aromatics	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
	Surrogates	d4-1,2-dichloroethane (Surrogate)	%	-	90
		d8-toluene (Surrogate)	%	-	86
		Bromofluorobenzene (Surrogate)	%	-	101
	Trihalomethanes	Chloroform (THM)	µg/L	0.5	<0.5
		Bromodichloromethane (THM)	µg/L	0.5	<0.5
		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
LB349089.001		TRH C6-C9	µg/L	40	<40
	Surrogates	d4-1,2-dichloroethane (Surrogate)	%	-	90
		d8-toluene (Surrogate)	%	-	86
		Bromofluorobenzene (Surrogate)	%	-	101

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 %
SE283660.001	LB349329.022	Bicarbonate Alkalinity as CaCO3	mg/L	5	88.21623333	99.65866666	16	3
		Carbonate Alkalinity as CaCO3	mg/L	5	80.93003333	74.3915	18	4
		Total Alkalinity as CaCO3	mg/L	5	169.1462666	174.0501666	16	1
SE283746.001	LB349329.021	Bicarbonate Alkalinity as CaCO3	mg/L	5	107.3045666	117.1399166	17	5
		Carbonate Alkalinity as CaCO3	mg/L	5	0	0	200	0
		Total Alkalinity as CaCO3	mg/L	5	107.3045666	117.1399166	17	5

Ammonia Nitrogen by Discrete Analyser

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

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE283675.003	LB349111.025	Ammonia Nitrogen, NH_3 as N	mg/L	0.01	0.02	0.02	57	6

Anions by Ion Chromatography in Water

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

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE283721.008	LB349134.014	Chloride	mg/L	0.05	3326.28	3237.15	15	3
		Sulfate, SO4	mg/L	1	121.54	125.77	16	3
SE283721.011	LB349134.018	Sulfate, SO4	mg/L	1	91.85	89.37	16	3

Conductivity and TDS by Calculation - Water

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

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE283712.005	LB349121.014	Conductivity @ 25 C	µS/cm	2	43160	573500	15	0
SE283720.001	LB349121.022	Conductivity @ 25 C	µS/cm	2	2610	2600	15	0

Filterable Reactive Phosphorus (FRP)

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

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE283675.003	LB349111.025	Filterable Reactive Phosphorus as P	mg/L	0.005	<0.005	<0.005	200	0
SE283681.004	LB349111.027	Filterable Reactive Phosphorus as P	mg/L	0.005	<0.005	<0.005	164	0

Forms of Carbon

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

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE283723.008	LB349264.015	Total Organic Carbon as NPOC	mg/L	0.2	18.77	18.69	16	0
SE283746.001	LB349264.023	Total Organic Carbon as NPOC	mg/L	0.2	13.46	13.08	17	3

Mercury (dissolved) in Water

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

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE283722.002	LB349255.014	Mercury	µg/L	0.0001	<0.0001	<0.0001	200	0
SE283742.007	LB349255.024	Mercury	µg/L	0.0001	<0.0001	<0.0001	200	0

Metals in Water (Dissolved) by ICPOES

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

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE283681.004	LB349275.014	Calcium, Ca	mg/L	0.2	16	16	16	0
		Lithium, Li	mg/L	0.005	<0.005	<0.005	200	0
		Magnesium, Mg	mg/L	0.1	5.3	5.3	17	1
		Potassium, K	mg/L	0.1	6.0	6.0	17	0
		Silicon, Si*	mg/L	0.05	2.2	2.2	17	1
		Sodium, Na	mg/L	0.5	24	24	17	1

Nitrite in Water

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

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE283675.003	LB349111.025	Nitrite Nitrogen, NO2 as N	mg/L	0.005	<0.005	<0.005	168	0
SE283681.004	LB349111.028	Nitrite Nitrogen, NO2 as N	mg/L	0.005	0.007	0.008	81	7

PAH (Polynuclear Aromatic Hydrocarbons) in Water

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

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

PAH (Polynuclear Aromatic Hydrocarbons) in Water (continued)

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

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE283681.005	LB349252.025		Naphthalene	µg/L	0.1	<0.1	0.0161284363	200	0
			2-methylnaphthalene	µg/L	0.1	<0.1	0.0082463202	200	0
			1-methylnaphthalene	µg/L	0.1	<0.1	0.0081148584	200	0
			Acenaphthylene	µg/L	0.1	<0.1	0.0032735041	200	0
			Acenaphthene	µg/L	0.1	<0.1	0.0050899412	200	0
			Fluorene	µg/L	0.1	<0.1	0.0051119720	200	0
			Phenanthrene	µg/L	0.1	<0.1	0.0195182558	200	0
			Anthracene	µg/L	0.1	<0.1	0.0061319929	200	0
			Fluoranthene	µg/L	0.1	<0.1	0.0073081571	200	0
			Pyrene	µg/L	0.1	<0.1	0.0071059360	200	0
			Benzo(a)anthracene	µg/L	0.1	<0.1	0.0150059361	200	0
			Chrysene	µg/L	0.1	<0.1	0.0161525742	200	0
			Benzo(b&j)fluoranthene	µg/L	0.1	<0.1	5.5228051346	200	0
			Benzo(k)fluoranthene	µg/L	0.1	<0.1	6.0217766307	200	0
			Benzo(b&j&k)fluoranthene	µg/L	0.2	<0.2	0.0001154458	200	0
			Benzo(a)pyrene	µg/L	0.1	<0.1	0.0028648645	200	0
			Indeno(1,2,3-cd)pyrene	µg/L	0.1	<0.1	0.0013693949	200	0
			Dibenzo(ah)anthracene	µg/L	0.1	<0.1	0.0003826826	200	0
			Benzo(ghi)perylene	µg/L	0.1	<0.1	0.0026203128	200	0
		Surrogates	d5-nitrobenzene (Surrogate)	µg/L	-	0.51	0.4658076450	30	9
			2-fluorobiphenyl (Surrogate)	µg/L	-	0.52	0.4867692730	30	6
			d14-p-terphenyl (Surrogate)	µg/L	-	0.46	0.4268522047	30	7

pH in water

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

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE283712.005	LB349121.014	pH**	pH Units	0.1	5.385	5.398	17	0
SE283713.002	LB349121.023	pH**	pH Units	0.1	7.896	7.799	16	1

Redox Potential (Eh) in water

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

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE283681.004	LB349244.004	Eh of Sample Relative to Standard H+ Electrode***	mV	-500	294	292	15	1

TKN Kjeldahl Digestion by Discrete Analyser

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

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE283738.004	LB349327.014	Total Kjeldahl Nitrogen	mg/L	0.05	0.86	0.87	21	1
SE283757.001	LB349327.027	Total Kjeldahl Nitrogen	mg/L	0.05	61	59	15	3

Total and Volatile Suspended Solids (TSS / VSS)

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

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE283588.001	LB349331.013	Total Suspended Solids Dried at 103-105°C	mg/L	5	<5	<5	200	0
SE283748.010	LB349331.021	Total Suspended Solids Dried at 103-105°C	mg/L	5	200	200	18	0

Total Cyanide in water by Discrete Analyser

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

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE283737.005	LB349515.012	Total Cyanide	mg/L	0.004	0.0012	0.0018	200	0

Total Dissolved Solids (TDS) in water

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

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE283721.004	LB349135.013	Total Dissolved Solids Dried at 175-185°C	mg/L	10	7500	7300	15	2
SE283721.009	LB349135.025	Total Dissolved Solids Dried at 175-185°C	mg/L	10	4000	4100	15	1

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 %
SE283624.001	LB349535.014	Total Phenols	mg/L	0.05	<0.05	<0.05	200	0
SE283638.003	LB349535.040	Total Phenols	mg/L	0.05	<0.05	<0.05	200	0
SE283775.001	LB349535.062	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 %
SE283757.001	LB349327.027	Total Phosphorus (Kjeldahl Digestion) as P	mg/L	0.02	27.1598	28.204	15	4

Trace Metals (Dissolved) in Water by ICPMS

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

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE283681.007	LB349080.014	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
SE283702.001	LB349080.016	Aluminium	µg/L	5	11	10	63	0
		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	4	4	41	5
		Lead	µg/L	1	<1	<1	176	0
		Nickel	µg/L	1	<1	<1	126	0
		Zinc	µg/L	5	7	6	92	2

TRH (Total Recoverable Hydrocarbons) in Water

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

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE283681.005	LB349252.025		TRH C10-C14	µg/L	50	<50	61	120	21
			TRH C15-C28	µg/L	200	<200	<200	194	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	165	0
		TRH F Bands	TRH >C10-C16	µg/L	60	<60	73	120	20
			TRH >C10-C16 - Naphthalene (F2)	µg/L	60	<60	73	120	20
			TRH >C16-C34 (F3)	µg/L	500	<500	<500	200	0
			TRH >C34-C40 (F4)	µg/L	500	<500	<500	200	0

Turbidity

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

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE283681.005	LB349242.010	Turbidity	NTU	0.5	730	740	15	2

VOCs in Water

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

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE283624.001	LB349089.024	Fumigants	2,2-dichloropropane	µg/L	0.5	<0.5	<0.5	200	0
			1,2-dichloropropane	µg/L	0.5	<0.5	<0.5	200	0
			cis-1,3-dichloropropene	µg/L	0.5	<0.5	<0.5	200	0
			trans-1,3-dichloropropene	µg/L	0.5	<0.5	<0.5	200	0
			1,2-dibromoethane (EDB)	µg/L	0.5	<0.5	<0.5	200	0
		Halogenated Aliphatics	Dichlorodifluoromethane (CFC-12)	µg/L	5	<5	<5	200	0
			Chloromethane	µg/L	5	<5	<5	200	0
			Vinyl chloride (Chloroethene)	µg/L	0.3	<0.3	<0.3	200	0
			Bromomethane	µg/L	10	<10	<10	200	0
			Chloroethane	µg/L	5	<5	<5	200	0
			Trichlorofluoromethane	µg/L	1	<1	<1	200	0
			1,1-dichloroethene	µg/L	0.5	<0.5	<0.5	200	0
			Iodomethane	µg/L	5	<5	<5	200	0
			Dichloromethane (Methylene chloride)	µg/L	5	<5	<5	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

VOCs in Water (continued) — **Method: ME-(AU)-[ENV]AN433**

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE283624.001	LB349089.024	Halogenated Aliphatics	Allyl chloride	µg/L	2	<2	<2	200	0
			trans-1,2-dichloroethene	µg/L	0.5	<0.5	<0.5	200	0
			1,1-dichloroethane	µg/L	0.5	<0.5	<0.5	200	0
			cis-1,2-dichloroethene	µg/L	0.5	<0.5	<0.5	200	0
			Bromochloromethane	µg/L	0.5	<0.5	<0.5	200	0
			1,2-dichloroethane	µg/L	0.5	<0.5	<0.5	200	0
			1,1,1-trichloroethane	µg/L	0.5	<0.5	<0.5	200	0
			1,1-dichloropropene	µg/L	0.5	<0.5	<0.5	200	0
			Carbon tetrachloride	µg/L	0.5	<0.5	<0.5	200	0
			Dibromomethane	µg/L	0.5	<0.5	<0.5	200	0
			Trichloroethene (Trichloroethylene,TCE)	µg/L	0.5	<0.5	<0.5	200	0
			1,1,2-trichloroethane	µg/L	0.5	<0.5	<0.5	200	0
			1,3-dichloropropane	µg/L	0.5	<0.5	<0.5	200	0
			Tetrachloroethene (Perchloroethylene,PCE)	µg/L	0.5	<0.5	<0.5	200	0
			1,1,1,2-tetrachloroethane	µg/L	0.5	<0.5	<0.5	200	0
			1,1,2,2-tetrachloroethane	µg/L	0.5	<0.5	<0.5	200	0
			1,2,3-trichloropropane	µg/L	0.5	<0.5	<0.5	200	0
			trans-1,4-dichloro-2-butene	µg/L	1	<1	<1	200	0
			1,2-dibromo-3-chloropropane	µg/L	0.5	<0.5	<0.5	200	0
			Hexachlorobutadiene	µg/L	0.5	<0.5	<0.5	200	0
		Halogenated Aromatics	Chlorobenzene	µg/L	0.5	<0.5	<0.5	200	0
			Bromobenzene	µg/L	0.5	<0.5	<0.5	200	0
			2-chlorotoluene	µg/L	0.5	<0.5	<0.5	200	0
			4-chlorotoluene	µg/L	0.5	<0.5	<0.5	200	0
			1,3-dichlorobenzene	µg/L	0.5	<0.5	<0.5	200	0
			1,4-dichlorobenzene	µg/L	0.3	<0.3	<0.3	200	0
			1,2-dichlorobenzene	µg/L	0.5	<0.5	<0.5	200	0
			1,2,4-trichlorobenzene	µg/L	0.5	<0.5	<0.5	200	0
			1,2,3-trichlorobenzene	µg/L	0.5	<0.5	<0.5	200	0
		Monocyclic Aromatic	Benzene	µg/L	0.5	<0.5	<0.5	200	0
			Toluene	µg/L	0.5	<0.5	<0.5	200	0
			Ethylbenzene	µg/L	0.5	<0.5	<0.5	200	0
			m/p-xylene	µg/L	1	<1	<1	200	0
			Styrene (Vinyl benzene)	µg/L	0.5	<0.5	<0.5	200	0
			o-xylene	µg/L	0.5	<0.5	<0.5	200	0
			Isopropylbenzene (Cumene)	µg/L	0.5	<0.5	<0.5	200	0
			n-propylbenzene	µg/L	0.5	<0.5	<0.5	200	0
			1,3,5-trimethylbenzene	µg/L	0.5	<0.5	<0.5	200	0
			tert-butylbenzene	µg/L	0.5	<0.5	<0.5	200	0
			1,2,4-trimethylbenzene	µg/L	0.5	<0.5	<0.5	200	0
			sec-butylbenzene	µg/L	0.5	<0.5	<0.5	200	0
			p-isopropyltoluene	µg/L	0.5	<0.5	<0.5	200	0
			n-butylbenzene	µg/L	0.5	<0.5	<0.5	200	0
		Nitrogenous Compounds	Acrylonitrile	µg/L	0.5	<0.5	<0.5	200	0
			2-nitropropane	µg/L	100	<100	<100	200	0
		Oxygenated Compounds	Acetone (2-propanone)	µg/L	10	<10	<10	200	0
			MtBE (Methyl-tert-butyl ether)	µg/L	0.5	<0.5	<0.5	200	0
			Vinyl acetate*	µg/L	10	<10	<10	200	0
			MEK (2-butanone)	µg/L	10	<10	<10	200	0
			MIBK (4-methyl-2-pentanone)	µg/L	5	<5	<5	200	0
			2-hexanone (MBK)	µg/L	5	<5	<5	200	0
		Polycyclic	Naphthalene (VOC)*	µg/L	0.5	<0.5	<0.5	200	0
		Sulphonated	Carbon disulfide	µg/L	2	<2	<2	200	0
		Surrogates	d4-1,2-dichloroethane (Surrogate)	µg/L	-	9.0	9.4	30	5
			d8-toluene (Surrogate)	µg/L	-	8.8	9.0	30	2
			Bromofluorobenzene (Surrogate)	µg/L	-	10.6	10.9	30	3
		Totals	Total BTEX	µg/L	3	<3	<3	200	0
			Total VOC	µg/L	10	<10	<10	200	0
		Trihalomethanes	Chloroform (THM)	µg/L	0.5	<0.5	<0.5	200	0
			Bromodichloromethane (THM)	µg/L	0.5	<0.5	<0.5	200	0
			Dibromochloromethane (THM)	µg/L	0.5	<0.5	<0.5	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

VOCs in Water (continued)

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

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE283624.001	LB349089.024	Trihalomethan	Bromoform (THM)	µg/L	0.5	<0.5	<0.5	200	0
SE283624.005	LB349089.023	Monocyclic	Benzene	µg/L	0.5	<0.5	<0.5	200	0
		Aromatic	Toluene	µg/L	0.5	<0.5	<0.5	200	0
			Ethylbenzene	µg/L	0.5	<0.5	<0.5	200	0
			m/p-xylene	µg/L	1	<1	<1	200	0
			o-xylene	µg/L	0.5	<0.5	<0.5	200	0
		Polycyclic	Naphthalene (VOC)*	µg/L	0.5	<0.5	<0.5	200	0
		Surrogates	d4-1,2-dichloroethane (Surrogate)	µg/L	-	8.9	9.0	30	1
			d8-toluene (Surrogate)	µg/L	-	8.8	8.8	30	0
			Bromofluorobenzene (Surrogate)	µg/L	-	10.6	10.6	30	0
		Totals	Total BTEX	µg/L	3	<3	<3	200	0

Volatile Petroleum Hydrocarbons in Water

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

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE283624.001	LB349089.024		TRH C6-C10	µg/L	50	<50	<50	200	0
			TRH C6-C9	µg/L	40	<40	<40	200	0
		Surrogates	d4-1,2-dichloroethane (Surrogate)	µg/L	-	9.0	9.4	30	5
			d8-toluene (Surrogate)	µg/L	-	8.8	9.0	30	2
			Bromofluorobenzene (Surrogate)	µg/L	-	10.6	10.9	30	3
		VPH F Bands	Benzene (F0)	µg/L	0.5	<0.5	<0.5	200	0
			TRH C6-C10 minus BTEX (F1)	µg/L	50	<50	<50	200	0
SE283624.005	LB349089.023		TRH C6-C10	µg/L	50	<50	<50	200	0
			TRH C6-C9	µg/L	40	<40	<40	200	0
		Surrogates	d4-1,2-dichloroethane (Surrogate)	µg/L	-	8.9	9.0	30	1
			d8-toluene (Surrogate)	µg/L	-	8.8	8.8	30	0
			Bromofluorobenzene (Surrogate)	µg/L	-	10.6	10.6	30	0
		VPH F Bands	Benzene (F0)	µg/L	0.5	<0.5	<0.5	200	0
			TRH C6-C10 minus BTEX (F1)	µg/L	50	<50	<50	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 %
LB349111.002	Ammonia Nitrogen, NH_3 as N	mg/L	0.01	2.7	2.5	80 - 120	108

Anions by Ion Chromatography in Water

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

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB349134.002	Fluoride	mg/L	0.1	2.1	2	80 - 120	103
	Chloride	mg/L	0.05	19	20	80 - 120	95
	Bromide	mg/L	0.05	1.8	2	80 - 120	91
	Nitrate Nitrogen, NO3-N	mg/L	0.005	1.8	2	80 - 120	92
	Sulfate, SO4	mg/L	1	20	20	80 - 120	100

Conductivity and TDS by Calculation - Water

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

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB349121.002	Conductivity @ 25 C	µS/cm	2	1100	1015	85 - 115	108

Filterable Reactive Phosphorus (FRP)

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

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB349111.002	Filterable Reactive Phosphorus as P	mg/L	0.005	0.10	0.1	80 - 120	101

Forms of Carbon

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

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB349264.002	Total Organic Carbon as NPOC	mg/L	0.2	19	20	80 - 120	93

Metals in Water (Dissolved) by ICPOES

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

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB349275.002	Calcium, Ca	mg/L	0.2	53	50.5	80 - 120	105
	Lithium, Li	mg/L	0.005	0.10	0.1	80 - 120	104
	Magnesium, Mg	mg/L	0.1	60	50.5	80 - 120	119
	Potassium, K	mg/L	0.1	63	55	80 - 120	114
	Silicon, Si*	mg/L	0.05	0.27	0.25	80 - 120	108
	Sodium, Na	mg/L	0.5	56	50.5	80 - 120	110

Nitrite in Water

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

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB349111.002	Nitrite Nitrogen, NO2 as N	mg/L	0.005	0.10	0.1	80 - 120	104

PAH (Polynuclear Aromatic Hydrocarbons) in Water

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

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB349252.002		Naphthalene	µg/L	0.1	36	40	60 - 140	90
		Acenaphthylene	µg/L	0.1	38	40	60 - 140	96
		Acenaphthene	µg/L	0.1	38	40	60 - 140	94
		Phenanthrene	µg/L	0.1	35	40	60 - 140	89
		Anthracene	µg/L	0.1	33	40	60 - 140	83
		Fluoranthene	µg/L	0.1	35	40	60 - 140	86
		Pyrene	µg/L	0.1	36	40	60 - 140	90
		Benzo(a)pyrene	µg/L	0.1	33	40	60 - 140	83
	Surrogates	d5-nitrobenzene (Surrogate)	µg/L	-	0.28	0.5	40 - 130	56
		2-fluorobiphenyl (Surrogate)	µg/L	-	0.35	0.5	40 - 130	70
		d14-p-terphenyl (Surrogate)	µg/L	-	0.42	0.5	40 - 130	84

pH in water

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

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB349121.003	pH**	pH Units	0.1	7.4	7.415	98 - 102	100

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.

Redox Potential (Eh) in water

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

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB349244.001	Eh of Sample Relative to Standard H+ Electrode***	mV	-500	436	428	90 - 110	102

Total and Volatile Suspended Solids (TSS / VSS)

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

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB349331.002	Total Suspended Solids Dried at 103-105°C	mg/L	5	94	100	80 - 120	94

Total Cyanide in water by Discrete Analyser

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

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB349515.002	Total Cyanide	mg/L	0.004	0.026	0.025	80 - 120	103

Total Phenolics in Water

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

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB349535.002	Total Phenols	mg/L	0.05	0.19	0.2	80 - 120	97

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 %
LB349327.002	Total Phosphorus (Kjeldahl Digestion) as P	mg/L	0.02	1.0	1	80 - 120	103

Trace Metals (Dissolved) in Water by ICPMS

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

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB349080.002	Aluminium	µg/L	5	19	20	80 - 120	95
	Antimony	µg/L	1	19	20	80 - 120	95
	Arsenic	µg/L	1	19	20	80 - 120	94
	Barium	µg/L	1	19	20	80 - 120	97
	Beryllium	µg/L	1	22	20	80 - 120	112
	Boron	µg/L	5	22	20	80 - 120	110
	Cadmium	µg/L	0.1	21	20	80 - 120	104
	Chromium	µg/L	1	20	20	80 - 120	101
	Cobalt	µg/L	1	21	20	80 - 120	106
	Copper	µg/L	1	21	20	80 - 120	107
	Iron	µg/L	5	19	20	80 - 120	93
	Lead	µg/L	1	20	20	80 - 120	99
	Manganese	µg/L	1	20	20	80 - 120	99
	Molybdenum	µg/L	1	19	20	80 - 120	95
	Nickel	µg/L	1	20	20	80 - 120	101
	Selenium	µg/L	1	19	20	80 - 120	96
	Silver	µg/L	1	19	20	80 - 120	97
	Strontium	µg/L	1	20	20	80 - 120	99
	Uranium	µg/L	1	21	20	80 - 120	104
	Vanadium	µg/L	1	20	20	80 - 120	100
	Zinc	µg/L	5	21	20	80 - 120	103

TRH (Total Recoverable Hydrocarbons) in Water

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

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB349252.002		TRH C10-C14	µg/L	50	1000	1000	60 - 140	103
	TRH F Bands	TRH >C10-C16	µg/L	60	1100	1000	60 - 140	112

VOCs in Water

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

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB349089.002	Halogenated Aliphatics	1,1-dichloroethene	µg/L	0.5	61	45.45	60 - 140	135
		1,2-dichloroethane	µg/L	0.5	59	45.45	60 - 140	130
		Trichloroethene (Trichloroethylene,TCE)	µg/L	0.5	46	45.45	60 - 140	101
	Halogenated	Chlorobenzene	µg/L	0.5	50	45.45	60 - 140	110

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.

VOCs in Water (continued)

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

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB349089.002	Monocyclic	Benzene	µg/L	0.5	45	45.45	60 - 140	99
	Aromatic	Toluene	µg/L	0.5	46	45.45	60 - 140	100
		Ethylbenzene	µg/L	0.5	46	45.45	60 - 140	101
		m/p-xylene	µg/L	1	110	90.9	60 - 140	125
		o-xylene	µg/L	0.5	40	45.45	60 - 140	87
	Surrogates	d4-1,2-dichloroethane (Surrogate)	µg/L	-	9.9	10	60 - 140	99
		d8-toluene (Surrogate)	µg/L	-	10	10	70 - 130	104
		Bromofluorobenzene (Surrogate)	µg/L	-	10	10	70 - 130	103
	Trihalomethan	Chloroform (THM)	µg/L	0.5	60	45.45	60 - 140	133

Volatile Petroleum Hydrocarbons in Water

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

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB349089.002		TRH C6-C10	µg/L	50	860	946.63	60 - 140	91
		TRH C6-C9	µg/L	40	690	818.71	60 - 140	84
	Surrogates	d4-1,2-dichloroethane (Surrogate)	µg/L	-	9.9	10	60 - 140	99
		d8-toluene (Surrogate)	µg/L	-	10	10	70 - 130	104
		Bromofluorobenzene (Surrogate)	µg/L	-	10	10	70 - 130	103
	VPH F Bands	TRH C6-C10 minus BTEX (F1)	µg/L	50	570	639.67	60 - 140	89

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%
SE283293.001	LB349111.004	Ammonia Nitrogen, NH_3 as N	mg/L	0.01	2.8	0.01	2.5	110

Anions by Ion Chromatography in Water

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

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE283681.004	LB349134.019	Fluoride	mg/L	0.1	2.2	<0.10	2	108
		Chloride	mg/L	0.05	53	30	20	116
		Bromide	mg/L	0.05	2.7	0.29	2	123
		Nitrate Nitrogen, NO3-N	mg/L	0.005	2.1	0.17	2	97
		Sulfate, SO4	mg/L	1	39	18	20	105

Filterable Reactive Phosphorus (FRP)

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

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE283681.002	LB349111.028	Filterable Reactive Phosphorus as P	mg/L	0.005	0.098	<0.005	0.1	96

Forms of Carbon

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

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE283681.002	LB349264.005	Total Organic Carbon as NPOC	mg/L	0.2	46	3.0	50	87

Mercury (dissolved) in Water

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

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE283681.001	LB349255.004	Mercury	mg/L	0.0001	0.0017	<0.0001	0.008	84

Metals in Water (Dissolved) by ICPOES

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

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE283538.001	LB349275.004	Calcium, Ca	mg/L	0.2	68	16	50.5	103
		Magnesium, Mg	mg/L	0.1	70	6.0	50.5	126
		Sodium, Na	mg/L	0.5	87	31	50.5	109

Nitrite in Water

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

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE283681.002	LB349111.027	Nitrite Nitrogen, NO2 as N	mg/L	0.005	0.098	<0.005	0.1	93

Total Phenolics in Water

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

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE283681.001	LB349535.004	Total Phenols	mg/L	0.05	0.19	<0.05	0.2	94

VOCs in Water

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

QC Sample	Sample Number		Parameter	Units	LOR	Original	Spike	Recovery%
SE283681.004	LB349089.025	Monocyclic Aromatic	Benzene	µg/L	0.5	<0.5	45.45	101
			Toluene	µg/L	0.5	<0.5	45.45	98
			Ethylbenzene	µg/L	0.5	<0.5	45.45	96
			m/p-xylene	µg/L	1	<1	90.9	94
			o-xylene	µg/L	0.5	<0.5	45.45	96
		Polycyclic	Naphthalene (VOC)*	µg/L	0.5	<0.5	-	-
		Surrogates	d4-1,2-dichloroethane (Surrogate)	µg/L	-	8.5	-	99
			d8-toluene (Surrogate)	µg/L	-	9.0	-	99
			Bromofluorobenzene (Surrogate)	µg/L	-	11	-	95
		Totals	Total BTEX	µg/L	3	<3	-	-

Volatile Petroleum Hydrocarbons in Water

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

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.

Volatile Petroleum Hydrocarbons in Water (continued) — **Method: ME-(AU)-[ENV]AN433**

QC Sample	Sample Number		Parameter	Units	LOR	Original	Spike	Recovery%
SE283681.004	LB349089.025		TRH C6-C10	µg/L	50	<50	946.63	94
			TRH C6-C9	µg/L	40	<40	818.71	94
		Surrogates	d4-1,2-dichloroethane (Surrogate)	µg/L	-	8.5	-	99
			d8-toluene (Surrogate)	µg/L	-	9.0	-	99
			Bromofluorobenzene (Surrogate)	µg/L	-	11	-	95
		VPH F	Benzene (F0)	µg/L	0.5	<0.5	-	-
		Bands	TRH C6-C10 minus BTEX (F1)	µg/L	50	<50	639.67	97

MATRIX SPIKE DUPLICATES

SE283681 R0

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.

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source: Sydney.pdf page: 1 SGS Ref: SE283681_COC

E-MAILED
27/5/25 @ 6:15

Sheet 1 of 1

Site: Danks & Young street, Waterloo

Project No: E26942

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 ^ /TRH/BTEX/PAHs	HM ^ /TRH/BTEX	BTEX	VOCs	PFAS	pH / CEC (cation exchange)	pH / EC (electrical conductivity)	OC Pesticides	OP Pesticides	PCBs	Total Phenols	Dewatering Suite	DPIE Suite - Mandatory Parameters
BH101M-1	1		27/5/25	am/pm		X						X								X	
BH102M-1	2																				X
BH106M-1	3											X								X	
BH109M-1	4																				X
BH112M-1	5											X								X	
QD1	6									X											
QR1	7									X											
TB1	8		lab prepared								X										
TS1	9		lab prepared			↓					X										

Comments

HM ^
As, Cd, Cr, Cu, Pb, Hg, Ni, Zn

DPIE Suite - Mandatory Parameters
pH & EC
Major Anions / Major Cations
Alkalinity (bicarbonate, carbonate, hydroxide & total)
RedOx potential
TDS / NTU / TSS / TOC / SAR
Dissolved Oxygen
Hardness
Metals (Al, Sb, As, Ba, Be, B, Cd, Cr, Co, Cu, Fe, Pb, Li, Mn, Hg, Mo, Ni, Se, Si, Ag, Sr, U, V, Zn)
Nitrogen and Phosphorous
E. Coli / F. Coliforms / F. Strep
TRH / BTEXN/ PAH

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
- [x] 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): NJ & MO

Received by (SGS):

Sampler's Comments:

[redacted] AI
please send QT1 to envirolab

Print: NJ & MO
Signature: on their behalf AI
Date: 27/5/2025

Print: Joel K
Signature:
Date: 27/5 @ 11:45

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

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

SGS EHS Sydney COC
SE283681

SAMPLE RECEIPT ADVICE

SE283681

CLIENT DETAILS

Contact	Nishtha Joshi
Client	EI AUSTRALIA
Address	SUITE 6.01 55 MILLER STREET PYRMONT NSW 2009
Telephone	61 2 95160722
Facsimile	(Not specified)
Email	nishtha.joshi@eiaustralia.com.au
Project	**E26442 Danks & Young street Waterloo**
Order Number	**E26442**
Samples	9

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	Tue 27/5/2025
Report Due	Tue 3/6/2025
SGS Reference	**SE283681**

SUBMISSION DETAILS

This is to confirm that 9 samples were received on Tuesday 27/5/2025. Results are expected to be ready by COB Tuesday 3/6/2025. Please quote SGS reference SE283681 when making enquiries. Refer below for details relating to sample integrity upon receipt.

Type of documentation received	COC	Date documentation received	27/5/2025@6:15pm
Samples received in good order	Yes	Samples received without headspace	Yes
Sample temperature upon receipt	5.1°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

QRB sample has been placed on hold as no tests have been assigned for it. This sample will not be processed.
QT sample forward to Envirolab.

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SAMPLE RECEIPT ADVICE

SE283681

CLIENT DETAILS

Client EI AUSTRALIA

Project E26442 Danks & Young street Waterloo

SUMMARY OF ANALYSIS

No.	Sample ID	Conductivity and TDS by Calculation - Water	PAH (Polynuclear Aromatic Hydrocarbons) in Water	pH in water	Total Dissolved Solids (TDS) in water	Total Phenolics in Water	TRH (Total Recoverable Hydrocarbons) in Water	VOCs in Water	Volatile Petroleum Hydrocarbons in Water
001	BH101M-1	1	23	1	1	1	9	78	7
002	BH102M-1	1	22	1	1	-	9	11	6
003	BH106M-1	1	23	1	1	1	9	78	7
004	BH109M-1	1	22	1	1	-	9	11	6
005	BH112M-1	1	23	1	1	1	9	78	7
006	QD1	-	-	-	-	-	9	11	7
007	QR1	-	-	-	-	-	9	11	7
008	TB1	-	-	-	-	-	-	11	-
009	TS1	-	-	-	-	-	-	11	-

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

SE283681

CLIENT DETAILS

Client EI AUSTRALIA

Project E26442 Danks & Young street Waterloo

SUMMARY OF ANALYSIS

No.	Sample ID	Alkalinity	Anions by Ion Chromatography in Water	Dissolved Oxygen by Membrane Electrode	Mercury (dissolved) in Water	Metals in Water (Dissolved) by ICPOES	Total and Volatile Suspended Solids (TSS /	Total Cyanide in water by Discrete Analyser	Trace Metals (Dissolved) in Water by ICPMS	Turbidity
001	BH101M-1	-	-	-	1	3	-	1	8	1
002	BH102M-1	10	5	3	1	9	1	-	21	1
003	BH106M-1	-	-	-	1	3	-	1	8	1
004	BH109M-1	10	5	3	1	9	1	-	21	1
005	BH112M-1	-	-	-	1	3	-	1	8	1
006	QD1	-	-	-	1	-	-	-	7	-
007	QR1	-	-	-	1	-	-	-	7	-

CONTINUED OVERLEAF

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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

SE283681

CLIENT DETAILS

Client EI AUSTRALIA

Project E26442 Danks & Young street Waterloo

SUMMARY OF ANALYSIS

No.	Sample ID	Ammonia Nitrogen by Discrete Analyser	Calculation of Anion-Cation Balance	E. coli and Thermotolerant coliforms in Water (CFU)	Enterococci in Water	Filterable Reactive Phosphorus (FRP)	Forms of Carbon	Nitrite in Water	Redox Potential (Eh) in water	TKN Kjeldahl Digestion by Discrete Analyser	Total Phosphorus by Kjeldahl Digestion DA in
002	BH102M-1	1	4	3	3	1	1	2	2	2	1
004	BH109M-1	1	4	3	3	1	1	2	2	2	1

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 .

Appendix H – QA/QC Assessment

Data Quality Objectives

In accordance with the NEPC (2013) *Schedule B2 Guideline on Site Characterisation* and the USEPA (2006) *Data Quality Assessment*, the seven step process described **Table H-** was applied, so that the appropriate levels of data quantity and quality needed for the specific requirements of the GME could be achieved.

Table H-1 Summary of GME Data Quality Objectives

DQO Step	Details
1. State the Problem Summarise the problem that will require environmental data.	This GME was required to characterise the baseline groundwater conditions of the site, and inform the design of a treatment system for the water to be extracted during the dewatering period.
2. Identify the Goal of the Study (Identify the decisions) Identify the decisions that need to be made.	What is the quality of local groundwater? What parameters will require monitoring and/or treatment during dewatering?
3. Identify Information Inputs (Identify inputs to decision) Identify the information needed to support any decision.	Inputs to the decision making process included: • The proposed development and land use; • Review of the previous investigations; • National and EPA guidelines; • Observations during groundwater sampling; and • Laboratory analytical results for the groundwater samples.
4. Define the Boundaries of the Study Specify the spatial and temporal aspects of the media that the data must represent to support decision.	Lateral – The proposed development (basement) area. Vertical – Groundwater table. Temporal – The results are valid for the day samples were collected and remain so as long as no changes occur in regards to site use, and contamination (if present) does not migrate onto the site from off-site sources.
5. Develop a Decision Rule Make a single statement that describes a logical basis for the GME.	The decision rule for the GME was: If the concentration of a COPC in the groundwater exceeded the adopted criteria, then determine the need to treat the water extracted during the dewatering works.
6. Specify Performance or Acceptance Criteria (Specify limits on decision errors) Specify the decision-maker's acceptable limits on decision errors, which are used to establish performance goals for limiting uncertainties in the data.	Specific limits for this GME were in accordance with National and EPA guidance, appropriate indicators of data quality and standard procedures for field sampling and handling. Concentrations for the COPCs that were below criteria indicated no treatment of extracted water needed. Concentrations for the COPCs that exceeded the adopted criteria indicated treatment of extracted water during dewatering would be prudent.
7. Develop the Detailed Plan for Obtaining Data (Optimise the design for obtaining data) Identify the most resource-effective sampling and analysis design for the GME and satisfy the DQOs.	In order to identify the most resource-effective sampling and analysis design and satisfy the DQOs: • A total of 3 groundwater monitoring wells were gauged and sampled to assess groundwater quality at the site. • Laboratory analysis of three samples for COPCs. • A review of the results was undertaken.

QA/QC

QA/QC was maintained during the GME according to the measures and DQIs outlined in **Table H-2**.

Table H-2 Data Quality Indicators

QA/QC Component	Data Quality Indicator(s)
Precision A quantitative measure of the variability (or reproducibility) of data	Data precision was assessed by reviewing the performance of blind field duplicate samples, through calculation of relative percentage differences (RPD). Data precision was deemed acceptable if RPDs were found to be less than 30%. RPDs that exceeded this range were considered acceptable where: • Results were less than 10 times the limits of reporting (LOR); • Results were less than 20 times the LOR and the RPD was <50%; or • Heterogeneous materials or volatile compounds were encountered.
Accuracy A quantitative measure of the closeness of reported data to the “true” value	Data accuracy was assessed through the analysis of: • Split field duplicate sample sets; • Field and method blanks; • Matrix spike sample sets; and • Laboratory control samples.
Representativeness The confidence (expressed qualitatively) that data are representative of each medium present onsite	To ensure the data produced by the laboratory were representative of conditions encountered in the field, the following measures were taken: • Blank samples run in parallel with field samples, to confirm there were no unacceptable instances of laboratory artefacts; • Review of RPD values for field and laboratory duplicates to provide an indication that the samples were generally homogeneous, with no unacceptable instances of significant sample matrix heterogeneities; • The appropriateness of sample collection methodologies, including handling, storage, and preservation, was assessed to ensure/confirm there was minimal opportunity for sample interference or degradation (i.e. volatile loss during transport due to incorrect preservation / transport methods).
Completeness A measure of the amount of useable data from a data collection activity	Analytical data sets acquired during the GME were evaluated as complete upon confirmation that: • Standard operating procedures (SOPs) for sampling protocols were adhered to; and • Copies of all chain of custody (COC) documentation were included and found to be properly completed. It could therefore be considered whether the proportion of “useable data” was sufficient for the purposes of the GME.
Comparability The confidence (expressed qualitatively) that data were equivalent for each sampling and analytical event	Issues of comparability were reduced through adherence to SOPs and regulator-endorsed or published guidelines and standards. In addition, the data were collected by experienced samplers and NATA-accredited laboratory methodologies were employed.

Quality Assurance / Quality Control Program

Quality assurance comprises an assessment of the reliability of the field procedures and laboratory results, in accordance with the SAQP. A summary of the project QA/QC measures incorporated into this report is presented in **Table H-3**.

Table H-3 Summary of Project QA/QC Measures

Task	Description	Comments
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 supervised by a suitably qualified and experienced scientist or engineer.	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
Transport	Samples were stored in a chilled cooler box and transported to the laboratories. To ensure the integrity of the samples from collection to receipt by the analytical laboratory, samples were sent by courier to the laboratories under 'chain of custody' describing sample preservation and transport duration.	Yes
Trip Blanks	Trip Blank samples were to be prepared and analysed by the primary laboratory for BTEX. Analytical results be below the laboratory LOR.	One laboratory-prepared trip blank sample was analysed for BTEX during groundwater testing. The results were reported below the laboratory LOR, indicating that sample transport acceptable.
Trip Spikes	Trip spike samples were to be prepared and analysed by the primary laboratory for BTEX. Analytical results (recoveries) to be 70-130%.	One laboratory-prepared trip spike sample was analysed for BTEX, the results of which were reported within the DQI It was therefore concluded that satisfactory sample transport and handling conditions were achieved.

Task	Description	Comments
Duplicates	Field duplicate samples were analysed as follows: ▪ intra-laboratory duplicate samples at a rate of 1 in 20 primary samples (as per NEPM); and ▪ inter-laboratory duplicate samples at a rate of 1 in 20 primary samples (as per NEPM). ▪ 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.	The required sampling density of 1 duplicate per 20 samples was achieved. Field duplicates and calculated RPD values are presented in **Table H-7** at the end of this Appendix. Copper was found to be outside of DQI within the Intra and inter-laboratory duplicate. TRH (F1) and BTEX (Ethylbenzene) were found to be outside of DQI within the inter-laboratory duplicate However, the variabilities were considered acceptable, with the analytes concentration being less than 10 times the LORs and the Inter-laboratory within acceptable RPD levels. Copies of laboratory reports are included in **Appendix G**.
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.	Practical Quantitation Limits for all tested parameters during the GME are presented in summary tables in **Appendix F.**
Holding Times	Holding times are the maximum permissible elapsed time in days from the collection of the sample to its extraction and/or analysis.	Assessment of holding times was undertaken by the laboratory. An extraction date exceeded (Dissolved Oxygen by Membrane Electrode, E. coli, Total and Faecal (Thermotolerant) coliforms, Enterococci, pH, Redox Potential (Eh) and Turbidity) and analysis date (Dissolved Oxygen by Membrane Electrode, Nitrite, pH, Redox Potential (Eh) and Turbidity). Deemed minor non-conformance, with negligible effects on data use for interpretative purposes.
Method Blanks	The method blank contains the reagents used to prepare the sample for analysis. The purpose of this procedure is to identify contamination in the reagent materials and assess potential bias in the sample analysis. The DQI is no detectable contamination.	Assessment of method blanks was undertaken by the laboratory.

Task	Description	Comments
Laboratory Duplicates	Laboratory duplicates are field samples from a given batch, selected at random (a frequency of 1 per 10 samples), that are analysed a number of times, to assess the precision of the analytical method.	Assessment of laboratory duplicates was undertaken by the laboratory.
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. Laboratory control samples should be performed on a frequency of 1 per 20 samples or at least one per analytical run.	Assessment of laboratory control standards was undertaken by the laboratory.
Matrix Spikes	Matrix spikes are field samples to which a predetermined amount of analyte is added. Recovery of the addition should be 70-130%.	Assessment of matrix spikes was undertaken by the laboratory.
Surrogates	Surrogates provide a means of checking no significant analyte loss. Recoveries should be 70-130%.	Assessment of surrogate spikes was undertaken by the laboratory. Surrogate Spike RPD outside of acceptable range for VOCs and Volatile Petroleum Hydrocarbons in Water in groundwater samples. Minor non-conformance, with negligible effects on data use for interpretative purposes
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 duplicates collected during the works are identified in **Table H-4**.

Table H-4 Field Duplicates

Matrix	Primary Sample	Intra-Lab Duplicate (Primary Lab)	Inter-Lab Duplicate (Secondary Lab)
Groundwater	BH102M-1	QD1	QT1

A summary of the field QA/QC is presented in **Table H-5**.

Table H-5 Field Data Quality Indicators

DQI	Item	Conformance
Precision Measure of the variability (or reproducibility) of data.	SOPs appropriate and complied with	**Yes**
Accuracy Quantitative measure of the closeness of reported data to the true values.	SOPs appropriate and complied with	**Yes**
	Calibration of instruments against known standards	**Yes**
Representativeness Confidence the data are representative of each media present on the site.	Appropriate media sampled according to SAQP	**Yes**
	Each media identified in SAQP sampled	**Yes**
Completeness Percentage of useable data from sampling episode (set).	Each critical location sampled	**Yes**
	SAQP appropriate and complied with	**Yes**
	Appropriate number of field duplicate samples taken	**Yes**
	Experienced sampler	**Yes**
	Field documentation correct	**Yes**
Comparability Confidence [expressed qualitatively] that data are equivalent for each sampling and analytical event.	Same sampling method used on each occasion	**Yes**
	Experienced sampler	**Yes**
	Same type of samples collected (filtered, size)	**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 and SOPs, which were devised with reference to industry-approved guidelines. Appropriate QC measures were integrated into each sampling event and the DQI were met, or if not, the minor non-conformances had negligible effects on the data use for interpretative purposes.

All samples, including field QC samples, were transported to the primary and secondary laboratories under chilled 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. Copies of these were included in **Appendix G**. EI considered the field QA/QC program carried out during the GME to be appropriate.

Laboratory QA/QC

A summary of the laboratory QA/QC is presented in **Table H-6**.

Table H-6 Laboratory QA/QC

DQI	Item	Conformance
Completeness A measure of the amount of useable data (expressed as %) from a data	All critical samples analysed according to SAQP and proposal	**Yes**
	All analytes analysed according to SAQP in proposal	**Yes**
	Appropriate methods and LORs	**Yes**

DQI	Item	Conformance
collection activity	Sample documentation complete	**Yes**
	Sample holding times complied with	**Part**
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 LORs (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 blanks	**Yes**
	Analysis of method blanks	**Yes**
	Analysis of matrix spikes	**Yes**
	Analysis of surrogate	**Part**
	Analysis of laboratory control samples	**Yes**

Conclusion for the Laboratory QA/QC

The 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 DQI 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 GME to be appropriate.

Summary of Project QA/QC

The project DQOs specified in **Section 6.3**, **Table 6-1** were considered to have been achieved. The adopted QA/QC program ensured that the data collated during the GME were accurate, precise and representative of the site conditions. It was therefore considered that the data were reliable and that the results could be used for DMP interpretative purposes.

Appendix I – WaterNSW Dewatering Completion Report Form

Clear form Print

Application to surrender a water supply work approval

Please refer to the accompanying guide to the Application to surrender a water supply work approval under *Section 108 of the Water Management Act 2000 (WMA)*.

What you need to do

Before filling in this form, applicants are advised to read the guide for an application to surrender a water supply work approval, which has step-by-step instructions on each section.

Please complete the form with a black/blue ink pen and use BLOCK letters. You can also type directly in this form. Once completed, please print and sign the form.

Submit your application form

- by post to **WaterNSW, PO Box 398, Parramatta NSW 2124**, or
- email a scanned copy to Customer.Helpdesk@waternsw.com.au

If there is not enough space in the form, please attach additional pages to the back of the form.

WaterNSW customers are encouraged to book a phone appointment with us to discuss your water licensing enquiries. Visit waternsw.com.au/licensing

Section A: Water supply work approval to be surrendered

Complete this section with the details of the water supply work approval to be surrendered and the date of surrender (must be the date the application is submitted or a future date). An example of a type of work can be a bore, dam or a pump.

A1 Water supply work approval number	A2 Date to be surrendered
A3 Type of work to be surrendered	
A4 Reason for surrender	

Section B: Water supply work approval holder/s details

List ALL holders of the water supply work approval that is to be surrendered and all holders must sign the declaration (Section F). See the guide for further information. If there are more than four holders, photocopy/print additional copies of Section B complete it and attach it to this form. Please note that applications submitted via email must include the email addresses of all listed applicants.

Holder

B1 Title (Mr, Mrs, Ms)	B2 Surname	
B3 Given name(s)		
B4 Company/corporation name *(if applicable)*		
B5 ACN *(if applicable)*	B6 ABN *(if you do not hold an ACN and are an organisation incorporated in NSW you must provide an ABN and a copy of your certificate of incorporation)*	
B7 Position held *(if applicable)*		
B8 Name of company representative *(if applicable)*		
B9 Postal address		
B10 Suburb	B11 State	B12 Postcode
B13 Phone	B14 Mobile phone	
B15 Email		

Additional holder (if applicable)

B16 Title (Mr, Mrs, Ms)	B17 Surname	
B18 Given name(s)		
B19 Company/corporation name *(if applicable)*		
B20 ACN *(if applicable)*	B21 ABN *(if you do not hold an ACN and are an organisation incorporated in NSW you must provide an ABN and a copy of your certificate of incorporation)*	
B22 Position held *(if applicable)*		
B23 Name of company representative *(if applicable)*		
B24 Postal address		
B25 Suburb	B26 State	B27 Postcode
B28 Phone	B29 Mobile phone	
B30 Email		

Additional holder (if applicable)

B31 Title (Mr, Mrs, Ms)	B32 Surname	
B33 Given name(s)		
B34 Company/corporation name *(if applicable)*		
B35 ACN *(if applicable)*	B36 ABN *(if you do not hold an ACN and are an organisation incorporated in NSW you must provide an ABN and a copy of your certificate of incorporation)*	
B37 Position held *(if applicable)*		
B38 Name of company representative *(if applicable)*		
B39 Postal address		
B40 Suburb	B41 State	B42 Postcode
B43 Phone	B44 Mobile phone	
B45 Email		

Section C: Nominated contact person

Note: If there is only one holder, you do not need to complete this section. If there are multiple holders and this section has not been completed, WaterNSW will assume the first holder listed on the form is the nominated contact person.

If a third party is acting on behalf of the water supply work approval holders and they are to be considered the nominated contact, their details must be provided below.

C1 Title (Mr, Mrs, Ms)	C2 Surname	
C3 Given name(s)		
C4 Company/corporation name *(if applicable)*		
C5 ACN *(if applicable)*	C6 ABN *(if you do not hold an ACN and are an organisation incorporated in NSW you must provide an ABN and a copy of your certificate of incorporation)*	
C7 Position held *(if applicable)*		
C8 Name of company representative *(if applicable)*		
C9 Postal address		
C10 Suburb	C11 State	C12 Postcode
C13 Phone	C14 Mobile phone	
C15 Email		

Listing a nominated contact person assists us in processing your application where there are multiple holders. We may need to contact the nominated contact person to discuss the details contained in your application. In addition, any request for additional information about your application will be sent to the nominated contact person. Any information provided by the nominated contact person will be relied upon by WaterNSW in considering this application. A delay in responding to any such request may result in your application being further delayed or refused.

The rights and liabilities arising in relation to this application is shared by all applicants and not limited to the nominated contact person. Any changes to any details of an application for a surrender (except for minor changes to contact details of an applicant) or withdrawal of the application must be in writing and signed and dated by all holders. Further, the Notice of decision issued in relation to your application will be sent to all applicants.

Section D: Nominated water access licence

Provide details below of any water access licences attached to this water supply work approval. If there is a nominated water access licence and you wish to continue to take water using this water access licence another water supply work will need to be nominated. To nominate a new water supply work approval use this form.

Nominated water access licence

D1 Nominated water access licence number

Section E: Decommission of water supply works

To surrender a water supply work approval the work/s must be unable to be used to take water unless it is exempt. For further information on exemptions, visit waternsw.com.au/approvals and scroll down to the section on exceptions. Refer to the guide for surrender an approval for information on the action to be taken for decommissioning different types of works.

For bores

All constructed bores have been approved for decommissioning (where required under the Water Sharing Plan (WSP), or relevant information provided. All bores are to be decommissioned in line with the minimum construction requirement for water bores in Australia.

Note: A Bore Construction Report (previously known as a 'Form A') is to be lodged for all decommissioned bores. I/We, the applicant/s, understand and acknowledge that.

Please tick which is applicable.

- ☐ Bore has not been constructed
- ☐ Bore unable to be located on property and statutory declaration provided
- ☐ Bore has been constructed and decommissioned in line with the requirements outlined in the guide to the application and a Bore construction report (Form A) has been submitted by the Driller

Other works

For all other constructed water supply work approvals **including pumps, pipes and dam**, the work has been decommissioned unless exempt. Please tick which is applicable.

- ☐ Work/s have not been constructed
- ☐ Constructed work/s have been decommissioned
- ☐ Constructed works are exempt from requiring an approval

What specific exemption are you claiming? (Please provide justification for the works in their current shape/form/capacity or advise of any proposed modifications).

Section F: Declaration of application

- Each applicant should sign Section F.
- If there are more than two applicants, photocopy/print multiple copies of the entire form after Sections A to E have been completed (before anyone signs Section F).

Section F must be fully completed and signed by each holder of the water supply work approval that is being surrendered. If it is not fully completed, WaterNSW will return the application to the applicant/s as an invalid application. Please refer to the accompanying guide for surrendering a water supply work approval.

If there are multiple holders, please ensure that you retain signed copies of the completed application form for your records. It is an offence, under section 344 of the *Water Management Act 2000*, to make a statement that you know to be false or misleading in, or in connection with, this application. I/We, the undersigned applicants, acknowledge and agree:

1. that I/we apply to surrender the water supply work approval as described in this application and all works included on the approval have been decommissioned unless exempt.
2. that this application will be determined in accordance with the *Water Management Act 2000* and any associated regulations or guidelines as in force from time to time, and that no right or entitlement shall arise pending determination of this application.
3. that the authorised contact person (where applicable) has my permission to act for and on my behalf in relation to any aspect of this application unless otherwise notified by us, and that WaterNSW will rely on information provided by the authorised contact person in its consideration of this application.
4. that the authorised contact person (where applicable) has my permission to act for and on my behalf in relation to any aspect of this application unless otherwise notified by us, and that WaterNSW will rely on information provided by the authorised contact person in its consideration of this application.
5. that all information contained in this application is accurate, true and complete in every detail and that the State will rely on such information.
6. that I/we have read and understood the information contained in the WaterNSW privacy statement (below).
7. that by entering a mobile phone number and/or email address, you consent to WaterNSW communicating with you electronically in relation to this application. Unless you indicate otherwise, all correspondence will be sent via email or SMS.
8. that WaterNSW may collect, use, and disclose my personal information as outlined in the WaterNSW privacy statement (below) and I consent to WaterNSW collecting, using and disclosing my personal information in accordance with the WaterNSW privacy statement.
9. that I/we consent to WaterNSW sharing my personal information with NSW Government agencies or State-Owned Corporations from time to time.
10. that the State does not provide any legal, financial, or technical advice in connection with this application and that any such advice, if required, is to be obtained independently.
11. that details about any approval arising out of this application will be recorded in the publicly available Water Register pursuant to the *Water Management Act 2000*.

12. that if this application is incomplete, it will not be accepted; and that more information may be requested if it is considered that it would be relevant to the consideration of this application.

I/We, the undersigned, apply for an approval described above for the nature and purpose specified in the application. I/We state that the information provided for the purpose of this application is accurate and true.

For applications made by individuals:

Name	Signature	Date
Name	Signature	Date
Name	Signature	Date
Name	Signature	Date

For applications made by a corporation:

Executed for and on behalf of the applicant in accordance with section 127 of the *Corporations Act 2001 (Cth)* (if a company) or by its duly authorised officer (for other types of corporations):

Name of corporation			
ACN *(if applicable)*	ABN (*If you do not hold an ACN and are an organisation incorporated in NSW you must provide an ABN.)*		
Position of signatory *(Tick the appropriate box)*	☐ company director	☐ sole director	
	☐ duly authorised officer	☐ company secretary	
Name of signatory	Signature	Date	
Position of signatory *(Tick the appropriate box)*	☐ company director	☐ sole director	
	☐ duly authorised officer	☐ company secretary	
Name of signatory	Signature	Date	

Privacy statement

The personal information you provide on this form will be used and protected in accordance with WaterNSW Privacy policy. It is being collected by WaterNSW and will be used for purposes related to assessing and processing your application, or in connection with the operation of any approval granted, or for research-related purposes such as customer surveys. It may be used from time to time to contact you about services WaterNSW provides.

WaterNSW will not disclose your personal information to anybody else unless authorised by law. The provision of this information is voluntary. However, if you choose not to provide the requested information, we will not be able to process your application. 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 our website at waternsw.com.au

If an approval is granted, the *Water Management Act 2000* requires that various details relating to the approval are to be recorded in the Register of Water Approvals kept by the Minister. Information recorded in the register is publicly available.

Offences and penalties

It is an offence, under section 344 of the *Water Management Act 2000*, to make a statement that you know to be false or misleading in, or in connection with, this application.

A corporation found guilty of an offence against section 344 is liable to a penalty not exceeding $2.002 million. An individual found guilty of an offence against section 344 is liable to a penalty not exceeding $500,500. An access licence or approval may be suspended or cancelled under the *Water Management Act 2000* in certain circumstances. These include if the holder of the licence or approval is convicted of an offence under that Act.

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).