
Groundwater Impact Assessment

Proposed Commercial Development

6-8 Julius Avenue, North Ryde NSW

Prepared for ISPT Pty Ltd

Project 223059.00

19 June 2025

Document History

Details

Project No.	223059.00
Document Title	Groundwater Impact Assessment
Site Address	6-8 Julius Avenue, North Ryde NSW
Report Prepared For	ISPT Pty Ltd
Filename	233059.00.R.002.Rev1

Status and Review

Status	Prepared by	Reviewed by	Date issued
Revision 0	Joshua Miller	Scott Easton	22 May 2025
Revision 1	Joshua Miller	Scott Easton	19 June 2025

Distribution of Copies

Status	Issued to
Revision 0	Dan D'Ambrosio, ISPT Pty Ltd
Revision 1	Dan D'Ambrosio, ISPT Pty Ltd

The undersigned, on behalf of Douglas Partners Pty Ltd, confirm that this document and all attached drawings, logs and test results have been checked and reviewed for errors, omissions and inaccuracies.

Signature

Date

Author		19 June 2025
Reviewer		19 June 2025

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Report on Groundwater Impact Assessment Proposed Commercial Development 6-8 Julius Avenue, North Ryde NSW

1. Introduction

This report prepared by Douglas Partners Pty Ltd (Douglas) presents the results of a Groundwater Impact Assessment (GIA) undertaken for a proposed commercial development at 6-8 Julius Avenue, North Ryde NSW (the site). The investigation was commissioned by email instructing Douglas to proceed dated 11 February 2025 from Dan D'Ambrosio on behalf of ISPT Pty Ltd and was undertaken in accordance with Douglas' proposal 233059.00.P.001.Rev1 dated 6 February 2025.

It is understood that the proposed development of the site includes the construction of a five-level data centre with basement structures with a finished floor slab at approximately RL 30 m. The site has been excavated to RL 36 m as part of a previous development scheme.

A geotechnical investigation (Douglas, 2025a) and a detailed site (contamination) investigation (DSI) (Douglas, 2025b) were undertaken as part of the environmental impact statement (EIS) for the project's approval. This report must be read in conjunction with all appendices including the notes provided in Appendix A.

2. Site description

The site is located at 6-8 Julius Avenue, North Ryde within the Riverside Corporate Park (see Figure 1). The site is an irregular shaped block with an area of approximately 3 hectares bound by Julius Avenue to the north, private driveways of office developments on the east and west, and a walking track in Lane Cove National Park and Lane Cove River to the south. The site generally slopes towards the south-east.

The site has been excavated to RL 36 m for a previous development and currently consists of a sandstone platform over most of the site with cut sandstone rock faces along the northern and parts of the western and eastern boundaries.



Figure 1: Aerial of site, site boundary marked in red dashed line.

3. Hydrogeological setting

3.1 Geology

Reference to the Sydney 1:100 000 Series Geological Sheet (9130) indicates that the site is underlain by Hawkesbury Sandstone of Triassic Age (see Figure 2). Hawkesbury Sandstone typically comprises medium to coarse grained quartz sandstone with some shale and laminite bands or lenses.

Two major joint sets are present in the Sydney region trending approximately NNE (020°) and ESE (110°). NNE joints are typically continuous for up to about 150 m in length and about 15 m in height, are sub-vertically dipping and are typically spaced at 5 to 8 m horizontally. ESE joints are less common than NNE joints, typically less than 4 m long, strata-bound to 2 to 4 m vertically and spaced at 1 to 5 m or more.

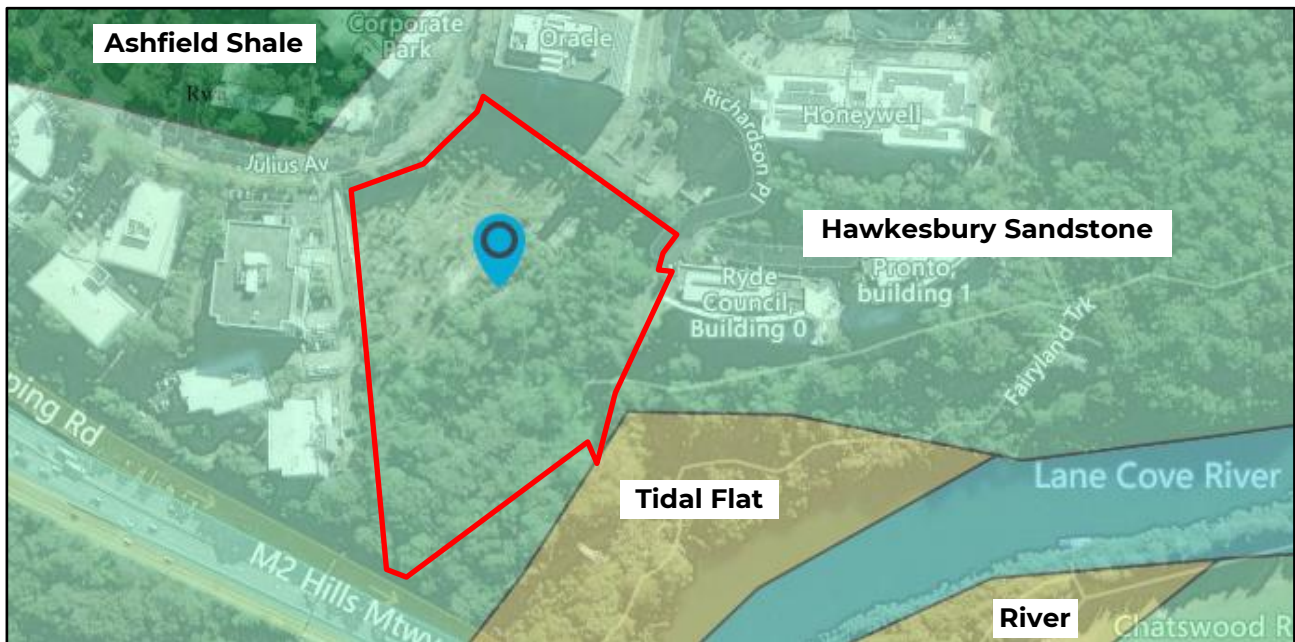


Figure 2: Excerpt of Sydney 1:100,000 Geological Series sheet, with site indicated with blue marker.

3.2 Hydrogeology and groundwater source

Based on the site's geology, it is expected that the rock units beneath the site have very low primary hydraulic conductivity and low secondary hydraulic conductivity. Groundwater would be located mostly within zones of secondary hydraulic conductivity, i.e. through any joints and other discontinuities in the rock mass. The groundwater table would be expected to follow the site's topography, flowing to the southeast.

The site is located within the Sydney Basin Central Groundwater Source and is subject to the Greater Metropolitan Region Groundwater Sources 2023 water sharing plan.

3.3 Surface water

The closest off-site water body is approximately 70 m south of the site (Lane Cove River). Surface water runoff from the site is expected to enter the Lane Cove River, either directly via overland flow or via the local stormwater system. An on-site detention (OSD) basin, appearing to have been cut into the sandstone bedrock, was present on the site at the time of fieldwork.

3.4 Groundwater receptors

There are no registered water bores within 500 m of the site. The expected receiving body of site groundwater is the Lane Cove River.

Based on the BoM GDE Atlas, mapped terrestrial GDEs are located within the subject site and the surrounding locality, as a part of the bushland bordering the Lane Cove River. These include:

- Coastal Sandstone Ridgetop Woodland, (within and nearby the site);
- Hinterland Sandstone Gully Forest (closest proximity 60 m southwest); and,
- Estuarine Mangrove Forest (closest proximity 400 m south of the site).

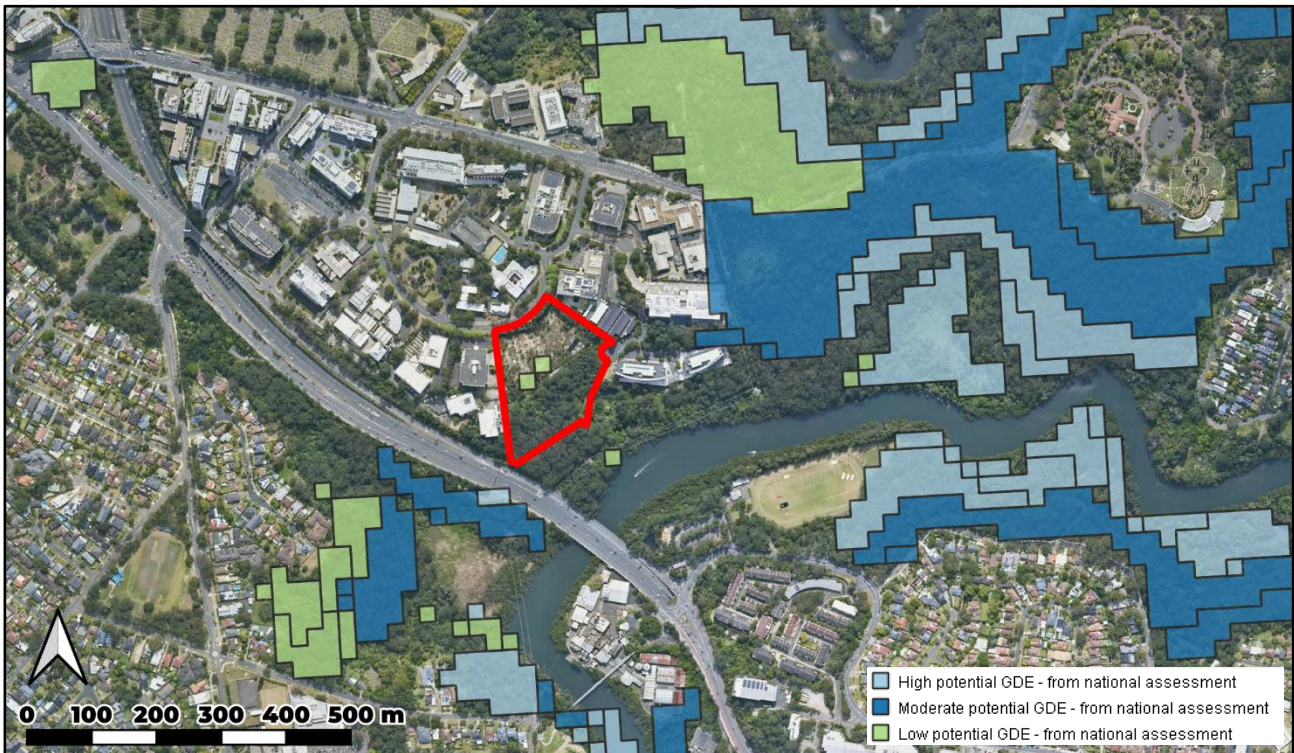


Figure 3: Mapped Groundwater Dependent Ecosystems (GDEs) near the site

3.5 Salinity

Reference to the Map of Salinity Potential in Western Sydney indicates the site is not situated within the map boundaries and is therefore not in an area with potential for dryland salinity.

3.6 Acid Sulphate Soils

Reference to 1:25,000 Acid Sulphate Soils (ASS) Risk map indicates the site is within an area of no known occurrence of ASS. The site is approximately 70 m northwest / upgradient from the nearest area mapped with a high probability of occurrence (the Lane Cove River sediments).

The critical elevation of the upper level of ASS occurrence is RL 1 m, indicating that the depth from the ground surface (RL 36 m) to the ASS layer is about 35 m or more metres depth. The potential for ASS to be present at the site is therefore considered to be low and it is not thought to present a constraint to the proposed development.

4. Field investigation

4.1 Geotechnical

Previous field work comprised five (5) boreholes (BHs 101, 102, 103, 105 and 106) drilled for geotechnical purposes and one (1) borehole (BH101A) solely for well installation purpose. The locations of the boreholes and wells are shown on Drawing 1 in Appendix B. The bores were drilled to depths between 9.55 m and 15.7 m using a Bobcat drilling rig.

The general sequence of materials encountered in the boreholes is summarised in Table 1.

Table 1: Summary of Top of Strata Levels at Each Borehole

Stratum	Top of Stratum Depth (m)				
	BH101	BH102	BH103	BH105	BH106
High Strength Sandstone	0.0 (RL 35.9)	0.0 (RL 35.9)	0.0 (RL 35.9)		
Medium Strength Sandstone	4.8 (RL 31.1)	-	-	0.0 (RL 35.9)	
Medium/High Strength Sandstone	-	-	-	-	0.0 (RL 36.0)
High Strength Sandstone	6.7 (RL 29.2)	-	-	11.0 (RL 24.9)	
End of Borehole	9.55 (RL 26.35)	10.0 (RL 25.9)	10.0 (RL 25.9)	15.71 (RL 20.19)	10.0 (RL 26.0)

Details of the subsurface conditions encountered in each borehole are given in the logs in Appendix C together with notes defining classification methods and descriptive terms. Photographs of the recovered core are also included. The geotechnical profile of the site in its current pre-excavated state can be summarised as shown in Table 2.

An inferred geological model of the subsurface profile at the site is provided in the form of interpreted geological cross-sections in Drawing 2, Appendix B.

Table 2: Geotechnical Model below Street Level and Proposed Basement

Unit	Material Description	Rock Mass Description	Reduced Level at Top of Stratum ¹ m AHD
1	Medium and High Strength Sandstone	Slightly to moderately weathered or fresh, zones of slightly fractured rock but mostly unbroken (Massive Sandstone)	More present towards the south of the excavated platform; from Surface ~RL 36
2	High Strength Sandstone	Slightly to moderately weathered or fresh, zones of slightly fractured rock but mostly unbroken (Massive Sandstone)	More present towards the North of the excavated platform; from Surface ~RL 36

The sandstone encountered in the boreholes can be described as massive (sparsely jointed rock). The recovered core was mostly unbroken with very occasional mostly sub-horizontal bedding planes and only one (1) subvertical joint logged. The few defects that were encountered in the boreholes are typical of the structural geological features of the Hawkesbury Sandstone.

Note that despite the lack of defects in the recovered core, joints predominantly striking north-south may still be encountered in the excavation.

Bedding planes in the rock core generally dipped at less than 15° from horizontal which is typical for the Hawkesbury Sandstone. No weak seams were encountered. Defect spacing typically ranged from 1.0 m to >5.0 m. The Rock Quality Designation (RQD) can be classified as excellent (i.e., 97% to 100%).

4.2 Groundwater

The use of water for rotary drilling and coring prevented observation of groundwater within the rock whilst drilling.

Groundwater monitoring wells were installed at BH101A, BH103 and BH106. BH101A was drilled adjacent to BH101 using a 96 mm rock roller drill bit to install a temporary groundwater observational well. Temporary groundwater observation wells were installed in BH103 and BH106 after the NMLC sized cored hole was reamed out to 96 mm.

The wells were constructed using 60 mm external diameter (50 mm internal diameter) Class 18 un-plasticised poly-vinyl (uPVC) casing. Slotted screen sections comprised 0.4 mm aperture, machine-slotted, Class 18 uPVC pipe, finished with a bottom cap. A durable single sized (poorly graded) quartzose sand filter was placed around the screened section and sealed with a minimum 4 m bentonite seal from the top of the sand filter to ground surface to reduce the chance of any surface water from entering the borehole. The wells were finished with a stick up of approximately 1.0 m above ground surface. The three wells were developed (purged dry of drilling contaminated water) and groundwater levels were manually taken using an electronic dip meter.

The wells were then used for groundwater sampling, hydraulic conductivity testing and long-term measurement of groundwater levels (refer to Appendix B for well locations and Appendix C for well construction details).

Groundwater level data was recorded using dataloggers in BH101A, BH103 and BH106 between 26 February 2025 and 19 May 2025. The collected data, shown with daily rainfall records obtained from Weather Station No. 66211 at Wahroonga (ref: Bureau of Meteorology Station, <http://www.bom.gov.au>), are provided in Plots 1 to 3 in Appendix D.

Well installation details are summarised in Table 3. Manual water level readings taken in the wells are summarised in Table 4.

Table 3: Summary of Well Installation Details

Borehole No.	Depth of Filter Zone	Rock Strata at Filter Zone
	Depth, m [Reduced Level, m]	
BH101A	4.5 – 9.0 [31.4 – 26.9]	Medium to slightly weathered, mostly unbroken medium and high strength sandstone
BH103	4.0 – 7.5 [31.9 – 28.4]	Fresh, unbroken high strength sandstone
BH106	4.5 – 9.0 [31.5 – 27.0]	Fresh, unbroken medium to high strength sandstone

Table 4: Standing Water Levels in Observation Wells

Borehole No.	Date	Surface RL (m, AHD)	Water Level Measurements in Wells	
			Depth (m, bgl)	Reduced Level (m, AHD)
BH101A	26/02/2025	RL 35.9	0.65	35.25
	21/03/2025		0.74	35.16
	19/05/2025		0.64	35.26
BH103	26/02/2025	RL 35.9	4.75	31.15
	21/03/2025		1.95	33.95
	19/05/2025		2.13	33.77
BH106	26/02/2025	RL 36.0	6.55	29.45
	21/03/2025		6.81	29.19
	19/05/2025		6.37	29.53

4.3 Hydraulic conductivity testing

Rising head permeability tests in BH101A, BH103, and BH106 were carried out on 26 February 2025 and again on 21 March 2025 to estimate the rock mass hydraulic conductivity

This involved removing water from the standpipe and measuring the change in water level with time. The interpreted hydraulic conductivities using Hvorslev's (1951) method are summarised in Table 5 with the calculations provided in Appendix E.

Table 5: Interpreted hydraulic conductivities

Borehole	Hydraulic Conductivity, k (m/s)	
	Test 1	Test 2
BH101A	6.8×10^{-9}	8.7×10^{-9}
BH103	3.8×10^{-10}	4.2×10^{-10}
BH106	1.3×10^{-9}	2.8×10^{-9}

5. Groundwater quality

5.1 Site assessment criteria (SAC)

The groundwater investigation levels (GIL) used for interpretation of the groundwater data (as a Tier 1 assessment) have been selected based on the potential risks posed from contamination sourced from the site to receptors at or down-gradient of the site, as identified by the conceptual site model (refer to Douglas DSI, 2025b). The receptors, exposure points and pathways are summarised in Table 6. The rationale for the selection of groundwater investigation levels is detailed in Table 7. Detailed screening levels for each analyte within the SAC are presented alongside the water quality laboratory results in Appendix F.

Table 6: Summary of potential receptors and potential risks

Receptor	Location	Exposure point	Exposure pathway
Surface water aquatic ecosystem	Down-gradient from site.	Receiving surface water body at the groundwater discharge point.	Exposure to contaminants.
Human recreation (e.g. swimming)	Down-gradient from site.	Receiving surface water body at the groundwater discharge point.	Ingestion / dermal absorption of contaminants during recreational activities (e.g. swimming).

Table 7: Groundwater investigation level rationale

Receptor / beneficial use	GIL	Source	Comments / rationale
Aquatic ecosystem	DGV	ANZG (2018)	Lane Cove River, estuarine / marine water 99% LOP for bioaccumulative contaminants 95% LOP for non-bioaccumulative contaminants
Aquatic ecosystem	DGV	HEPA (2025)	Lane Cove River, estuarine / marine water 99% LOP as recommended for potential bioaccumulation Screening values were only available for PFOS and PFOA at the time of this investigation.

Receptor / beneficial use	GIL	Source	Comments / rationale
Recreational waters	GV	NHMRC (2008)	Based on the NHMRC (2022) values x10 (lower limit of recommended 10-20x) to account for ingestion of water whilst undertaking recreational activities. PFAS GV adopted as per NHMRC guidance note

Notes: DGV- default guideline value; % LOP - percentage level of protection of species; HSL - health screening level; GV - guideline value; PQL – practical quantification limit.

5.2 Field results

Physical parameters were measured whilst sampling (where possible) and are summarised in Table 8. The dissolved oxygen levels indicated generally aerobic conditions. The pH was slightly acidic. The electrical conductivity values indicate a typical salinity as would be expected of groundwater within Hawkesbury Sandstone. Redox potential (mV) indicates slightly oxidising conditions. No light non-aqueous phase liquid (LNAPL) was observed whilst sampling.

Table 8: Summary of field parameters (groundwater and surface water)

Well / Sample ID	Temp. (°C)	DO (ppm)	EC (µS/cm)	pH	Redox (mV)	Turbidity (NTU)
BH101A (up-gradient)	20.6	6.32	775	4.20	456.3	29.62
BH106 (down-gradient)	Insufficient groundwater in well to obtain field parameters					

5.3 Laboratory results

As shown in Appendix E, recorded concentrations of potential contaminants in groundwater were within the SAC (soil vapour HSL, recreational land use and ANZG (2018) 95% (LOP) freshwater criteria) with the exception of those discussed below:

- Copper in sample 101A and its replicate sample at replicate at 0.004 mg/L and 0.003 mg/L respectively, exceeding 95% DGV of 0.0014 mg/L.
- Lead in sample 101A and its replicate at 0.012 mg/L and 0.011 mg/L respectively, exceeding the 95% DGV of 0.0034 mg/L.
- Zinc in all samples ranging between 0.027mg/L - 0.057 mg/L exceeding the 95% DGV of 0.008 mg/L.
- Nickel in sample 106 at 0.009 mg/L exceeding the 99% DGV of 0.008mg/L.

It should be noted that the above-mentioned concentrations, although measured in both groundwater wells, show a decrease in concentration from north to south (i.e. decreasing from up to down-gradient) and metal concentrations in soils at the site were not found to be significant. It is noted that the groundwater wells are screened in bedrock (below any fill) and that the concentrations of copper, nickel and zinc are likely associated with ambient regional conditions. The source of the recorded lead is unknown, but it could be ambient, from upgradient sites, or from previous site activities, noting the concentration recorded in sample from the upgradient well was marginally higher than in the sample from the down-gradient well.

TRH was detected in both test locations and the replicate sample. The concentrations were below the HSL for vapour intrusion into building for groundwater at depths of 2 m or more, although it is noted that groundwater was recorded shallower than 2 m in BH101A (recorded at 0.76 m bgl). However, given the expected construction requirements for the data centre (including high strength concrete slabs) it is considered that the likelihood of impact on future site users is low. No SAC are available for TRH for ecological impacts, and the recorded results are above expected background concentrations. This could potentially pose an unacceptable risk to the ecology of Lane Cove River, if groundwater were to be disposed to the stormwater network untreated.

BTEX, phenols, OCP, OPP, PAH and PCB were below the laboratory detection limit. and not considered to be of concern. However, PAH and BTEX should continue to be tested for even though these were not detected, as the construction process (i.e. leaking plant) and surface water ingress could impact the quality of construction dewatering requiring disposal.

6. Conceptual hydrogeological model

The geotechnical investigation identified that the site is generally underlain by fresh, unbroken, medium to high strength Hawkesbury Sandstone. Groundwater levels were steady throughout the monitoring period, ranging between 35 and 29 m AHD, sloping south-east following the nearby topography.

It is expected that water inputs to the ground profile beneath the site include:

- Rainfall infiltration on the site and surrounds, including water flowing downslope laterally through the natural soils and bedrock from areas of higher topography; and
- Possible anthropogenic recharge from seepage from nearby leaking water mains and / or stormwater pipes, garden irrigation etc.

It should be noted that groundwater levels are transient and fluctuate with climatic variations and other factors (e.g. adjacent basements). Therefore, the water levels will temporarily rise during periods of heavy or prolonged rainfall and fall during dry periods.

7. Groundwater inflow assessment

7.1 Methodology

Seepage modelling was undertaken to assess the potential inflow rates into the proposed basement during and after construction, as well as induced groundwater level changes in adjacent and surrounding areas.

A 2-dimensional (2D) numerical groundwater model was developed. The modelling was carried out using the 2D finite element hydrogeological software SEEP/W (a component of GeoStudio) developed by GEOSLOPE International Ltd. The transient conditions during construction dewatering and the long-term 'steady-state' flow to the 'drained' excavation were modelled in the analysis.

7.1.1 Model geometry

A cross section in the north-west to south-east direction intercepting the basement footprint was selected to run the 2D analysis. The cross section is presented in Figure 4.

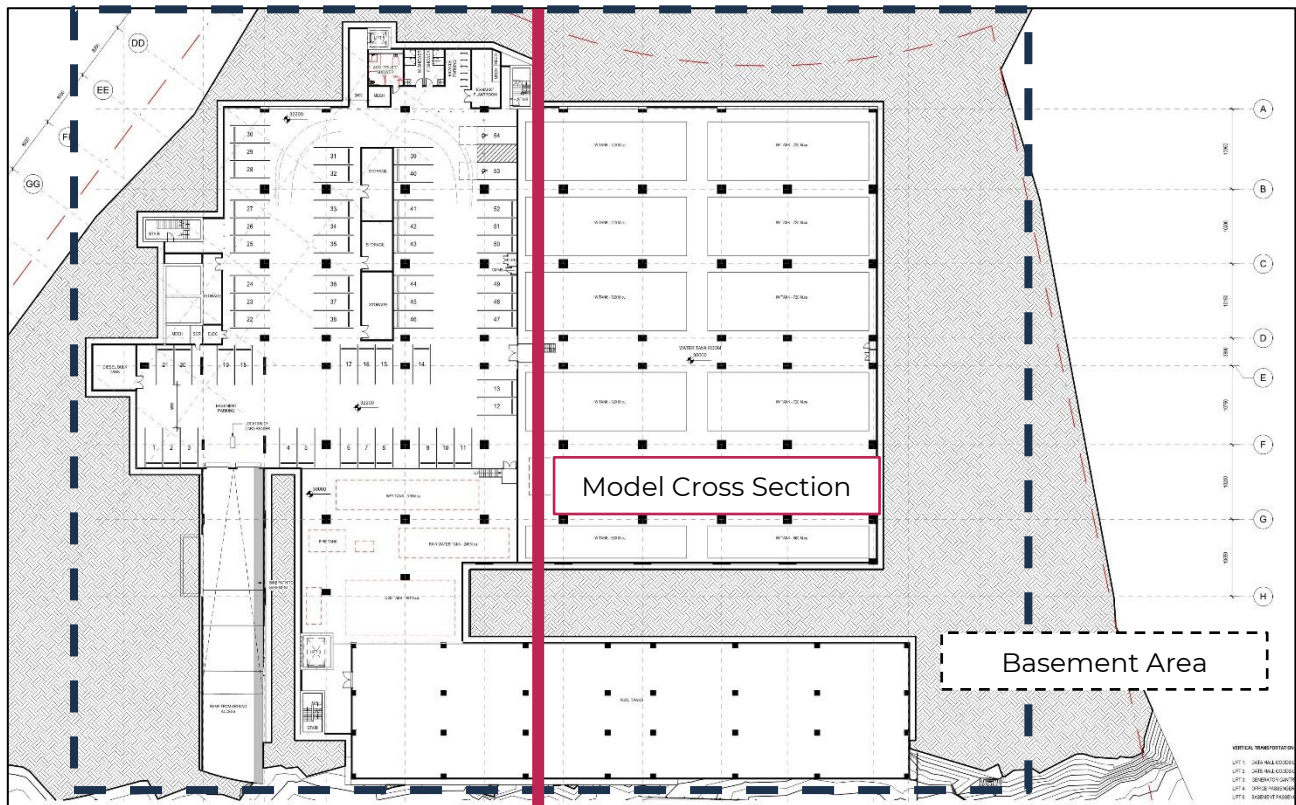


Table 9: Model layers and adopted hydraulic properties

Layer	Material	Saturated Kh (m/s)	Anisotropy Ratio (Kv/Kh)	Porosity (%)	Material Model Adopted
1	Sandstone	1.0×10^{-8}	0.3	10	Unsaturated / saturated

The average annual rainfall in Sydney is 1.2 m/year, however for modelling purposes, the infiltration rate into the site was assumed to be negligible due to the low permeability rock exposed from previous excavation. Rainfall recharge is instead represented in the model through the constant upstream head boundary condition, calibrated to 50 m AHD to replicate the groundwater levels observed within the site as shown on Figure 5.

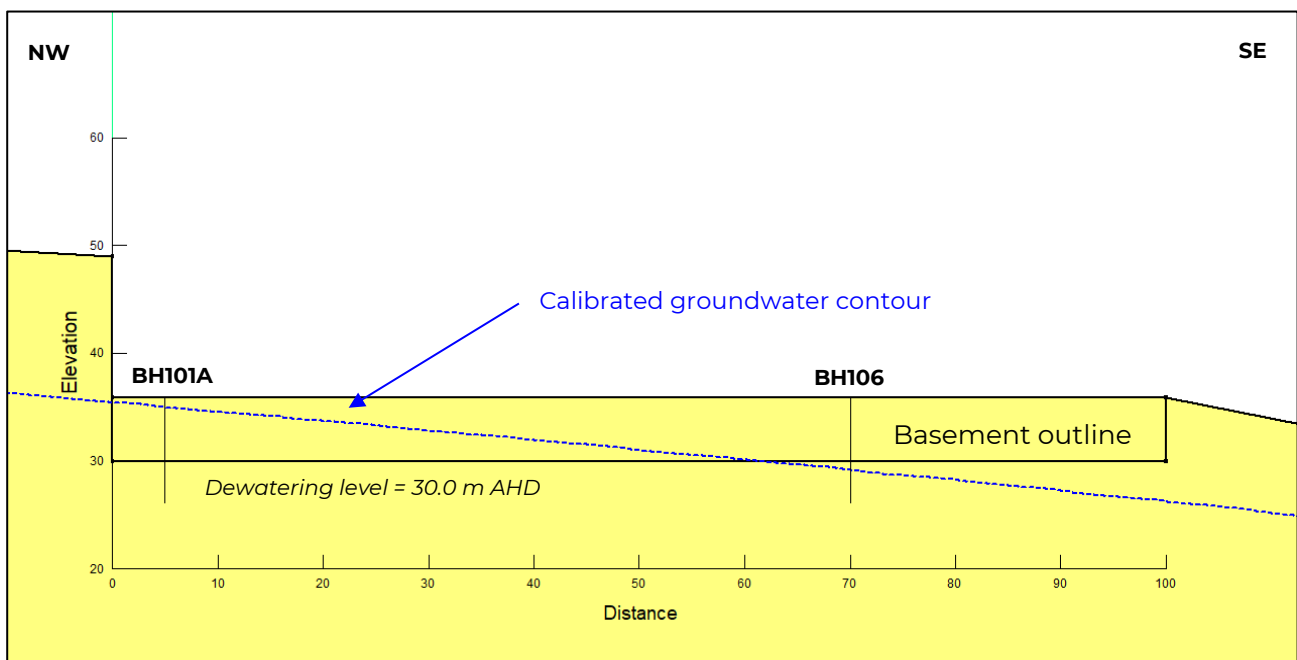


Figure 5: Model cross-section, showing calibrated groundwater contour

7.1.1 Basement design and dewatering

The basement walls and sub-floor drainage were simulated as 'Seepage Faces' in SEEP/W with zero hydraulic pressure head along the full perimeter. The proposed finished floor level for the basement is understood to vary from RL 32.2 to RL 30 m AHD. A dewatering level of 30 m AHD was used throughout the modelled basement area, which is considered conservative.

7.1.2 Simulation

To simulate the temporary dewatering required during construction, transient flow conditions were modelled in the analysis. For the purpose of the analysis, excavation was assumed to be undertaken in a single stage (i.e. instantaneously) and the subsequent temporary dewatering period was assumed to be up to one year, subdivided into multiple time intervals.

The analysis was also run under 'steady state' conditions to assess long term groundwater inflows (i.e. assuming permanent drained basement, after construction).

7.1.3 Sensitivity analyses

Sensitivity analyses were undertaken to assess the impact of intersecting more permeable ground conditions or shallower water table:

- **Sensitivity 1:** assuming the sandstone has a hydraulic conductivity one order of magnitude higher than under baseline conditions (i.e. 1.0×10^{-7} m/s).
- **Sensitivity 2:** assuming the water table is 2 m higher than the calibrated baseline water table.

7.2 Modelling results

7.2.1 Groundwater inflow

The inflow rates obtained from the modelling represent the estimated total rate of groundwater flowing into the excavation and the volume (per unit time) requiring extraction via the dewatering system, in order to dewater the basement during and after construction.

The estimated inflows from the analysis for the first year (i.e. during construction) and long term are summarised in:

- Table 10, for the base case scenarios as detailed in previous sections; and
- Table 11, for the sensitivity analysis.

Table 10: Simulated Inflow Results for Baseline Cases

Elapsed Time	Baseline case – predicted inflow	
	kL/day	Cumulative (ML)
1 day	3.2	0.00
3 days	0.9	0.01
7 days	0.8	0.01
14 days	0.8	0.02
21 days	0.8	0.02
30 days	0.7	0.03
60 days	0.7	0.05
90 days	0.7	0.07
180 days	0.7	0.13
365 days	0.7	0.26
Long term	kL/day	ML/year
	0.23	0.08

Table 11: Simulated Long Term Inflow Results for Sensitivity Cases

Long term inflow	Sensitivity 1 – higher k		Sensitivity 2 – higher GWL	
	kL/day	ML/year	kL/day	ML/year
	2.28	0.83	0.43	0.16

Notes: k: hydraulic conductivity; GWL: groundwater level

The results of the sensitivity cases for groundwater inflow analysis indicate that:

- Inflow increases will be relatively minor if higher permeability sandstone is intersected by the excavation; and,
- Inflow will increase after a short period of heavy rain, however this is anticipated to be most significant during the short-term.

It is noted that the precision to which the results are presented does not represent the accuracy of the predictions, the level of precision is provided to allow comparison of scenarios, the accuracy will be lower because of the inherent variability in key parameters such as hydraulic conductivity and recharge and results could range up to an order of magnitude.

The inflow rates presented above are predictions only and may vary significantly to the assumptions presented. The actual flow rate will only be known once the excavation is completed, and the inflow can be observed and measured. Appropriate planning should be put in place to monitor and compensate for greater variations in actual inflows.

7.2.2 Drawdown and settlement

The simulated lowered groundwater levels, or impact to the water table, outside the basement footprint over the long term are summarised in Table 12. The model results indicate a maximum drawdown close to the excavation of about 5.6 m, reducing to 2.3 m at a distance of 40 m from the excavation. As the groundwater drawdown is expected to occur within the Hawkesbury Sandstone, settlements on adjacent structures are expected to be negligible.

Table 12: Predictive model simulated drawdown

	Distance from Excavation					
	0 m	10 m	20 m	40 m	80 m	150 m
Drawdown Depth (m) Upstream	5.6	3.5	2.9	2.3	1.5	0.6
Drawdown Depth (m) Downstream	2.6	2.5	2.4	2.3	1.9	0.6

8. Impact assessment

8.1 Aquifer interference policy considerations

The NSW Aquifer Interference Policy (AIP) indicates that the term “aquifer” is commonly understood to mean a groundwater system that is sufficiently permeable to allow water to move within it, and which can yield productive volumes of groundwater. A groundwater system is defined as any type of saturated geological formation that can yield low or high volumes of water. However, for the purpose of the AIP, the term aquifer has the same meaning as groundwater system and includes low yielding and saline systems.

Table 1 in Section 3.2.1 of the AIP outlines minimal impact considerations. The AIP indicates that “if predicted impacts are less than the Level 1 minimal impact considerations, then these impacts will be considered as acceptable”. The following minimal impact considerations are outlined for less productive porous and fractured rock groundwater sources:

- Less than or equal to 10% cumulative variation in water table 40 m from any high priority GDE or high priority culturally significant site;
- A cumulative pressure head decline of no more than a 2 m at any water supply work; and
- Any change in groundwater quality should not lower the beneficial use category of the groundwater source beyond 40 m from the activity.

8.2 Risk assessment

An assessment of the potential effects of dewatering on neighbouring properties and groundwater receptors has been summarised in Table 13.

Table 13: Assessment of potential effects of dewatering

Item	Comment
Impacts on potential GDEs	The nearest high priority GDE is approximately 150 m south of the proposed excavation. Groundwater drawdown is predicted to be less than 1 metre at this distance and occur within the sandstone aquifer.
Water supply losses by neighbouring groundwater users	There are no registered groundwater bores within 500 m of the site.
Potential subsidence of neighbouring structures	Groundwater drawdown is predicted to occur within the sandstone. Therefore, risk of subsidence due to lowering of the water table is expected to be minimal.
Mounding of water upgradient of structure	As the basement is proposed to be drained, mounding of groundwater is not expected upgradient of the site.

9. Recommended groundwater management

A drained basement (i.e. non-hydrostatic) is considered suitable for this site due to the low inflows predicted, the site geology and the site topography. Drainage measures within the basement

walls and below the basement slab will be required to collect and store water inflows for periodic discharge.

This section outlines the proposed management strategy based on the preferred methodology for dewatering and disposal.

9.1 Groundwater inflow control

Based on the inflow assessment (Section 7.2.1), seepage inflows are expected to be low. These flows, both in the short and long term, should be readily controllable by pumping from sumps for discharge to the stormwater. Standard subfloor drainage systems should be sufficient to direct the seepage water into the sumps. It should be noted that seepage may temporarily increase following high rainfall events.

Appropriate planning should be in place to monitor and compensate for possible variations in the actual inflow rate. If higher inflows are encountered, grouting may be required to reduce the inflows.

9.2 Water quality control

Seepage water quality must be tested prior to discharge to the stormwater to prevent contamination and adverse impacts during and after construction.

The recommended methodology for water quality testing is as follows:

- Collection of water samples and quality control samples from seepage water stored in the sumps;
- Measurement of general groundwater physical parameters (EC, pH and temperature) prior to sampling using a calibrated water quality meter;
- Analysis of the samples on site by ISPT Pty Ltd for the analytes presented in Table 14 below; and
- Review and update of this water quality testing methodology as required.

Water quality sampling should be conducted in accordance with Geoscience Australia's Groundwater Sampling and Analysis – A Field Guide (Geoscience Australia 2009).

Quality assurance/quality control (QA/QC) procedures should be used to establish accurate, reliable and precise results. QA/QC procedures included: calibration of equipment, analyses of samples within holding times, keeping samples chilled and wearing gloves during sampling.

Table 14: Proposed suite of analytes for water quality monitoring

Category	Analytes
Field parameters	T, EC, pH, turbidity
Physical properties	TDS, TSS
Major ions	Calcium, magnesium, sodium, potassium, chloride, sulphate and alkalinity (total, carbonate and bicarbonate)
Metals (total and dissolved)	Arsenic, aluminium, cadmium, chromium, copper,

Category	Analytes
	iron, mercury, manganese, nickel, lead and zinc
Nutrients	Total nitrogen, total Kjeldahl nitrogen, nitrite, nitrate, ammonia, total phosphorus and reactive phosphorus
Organics	TRH / TPH, BTEX, phenols, PAH, VOC, oil and grease
Other	PFAS

Notes: EC: electrical conductivity | TDS: total dissolved solids | TSS: total suspended solids
 TRH: total recoverable hydrocarbons | TPH: total petroleum hydrocarbons
 BTEX: benzene, toluene, ethylbenzene and xylenes
 PAH: polycyclic aromatic hydrocarbons
 VOC: volatile organic compounds
 PFAS: per- and polyfluorinated substances

Water quality results should be compared to assessment criteria for each analytes. These assessment criteria would be selected based on baseline groundwater quality results and relevant guidelines.

9.3 Monitoring and reporting requirements

The following monitoring program and associated reporting is to be adopted until the end of excavation and construction works on-site. Groundwater level monitoring should be continued one month after construction.

Table 15: Monitoring and Reporting Requirements

Item	Monitoring requirements	Methodology
Visual inspection	No visible oil and grease, 'sheen' and / or no significant discolouration or odours. Inspections to be conducted from stored liquids in the intermediate flocculation tank.	Daily inspections (contractor). HOLD POINT - If any of the visual inspection signs are noted, then any discharge will be suspended until further analytical testing is completed.
Groundwater level monitoring	Groundwater level recording from the three monitoring wells to assess drawdown in the vicinity of the site. This requirement could be deleted if approved by relevant authorities given the expected minimal impact.	Continuous groundwater level monitoring using data logger recording at six-hourly intervals in monitoring wells in the vicinity of the site. Groundwater level monitoring is to be undertaken during construction and to be continued one month after cessation of dewatering. Quarterly manual groundwater level measurements in monitoring wells.
Water quality sampling and testing	Samples to be collected from the sumps for analysis of water parameters set out in Table 14.	Water quality testing is to be undertaken until the end of construction.

Item	Monitoring requirements	Methodology
		Water quality testing should be conducted either monthly or at a minimum before each discharge to stormwater event. Sample analysis will be conducted on site by ISPT Pty Ltd. Samples will be recorded using industry standard documentation, including the date, name and signature of sampler and sample ID. HOLD POINT – If seepage water concentrations exceed assessment criteria, then discharge is to be halted. Contingency strategy to be adopted. Physical parameters (temperature, pH, turbidity and electrical conductivity, oil and grease) may be monitored using suitable on-site probes / testing kits once correlations are established with analytical results. Inclusion of results in a final water quality monitoring report.
Quality control sampling	Collection of replicate samples to verify quality of laboratory results. Testing suite to include: • Metals (dissolved); • TRH; • BTEX; and • PAH.	During each sampling event. Samples will be recorded using industry standard COC documentation, including the date, sample ID, name and signature of sampler, and transportation records to the NATA accredited laboratory. Inclusion of results in a final water quality monitoring report
Quantity of groundwater inflows	Measurements of groundwater volumes contained in the sumps.	Weekly monitoring and recording of dewatering volumes. HOLD POINT - If dewatering volumes exceed 0.83 ML/year (i.e. the maximum inflow predicted from the groundwater modelling sensitivity scenario 2 presented in Section 7.2.1), construction will be halted to minimize inflows (e.g. grouting of exposed drained basement faces). Alternatively, approval for higher inflows up to 3ML/yr may be possible. Weekly reporting of volumes to the Environmental Consultant. Inclusion of results in a final water monitoring report

Item	Monitoring requirements	Methodology
Dewatering completion report	To be prepared by a suitably qualified consultant upon completion of all dewatering works. The summary report will incorporate the above information and: - Any on-site records kept by the contractor (e.g. visual observations, any unexpected finds records, etc.); - All analytical results (i.e. each batch of water disposed) compared to the adopted assessment criteria; - Quality control testing; - Record of dewatering volumes (i.e. for each discharge event); and - Comment on any unexpected finds or non-conformances, and / or otherwise if the dewatering works have complied with this DMP.	

Notes: Testing frequency, assessment criteria and analysis requirements may be reviewed in consultation with the Environmental Consultant based on ongoing results.

9.4 Personnel and responsibilities

Table 15 below outlines the proposed project personnel and relevant responsibilities as part of the management plan.

Table 16: Nominated Personnel and Responsibilities

Role	Organisation	Responsibilities
Site Manager / Contractor	ISPT Pty Ltd	Routine visual inspection. Monitoring / recording of discharge volumes. Maintaining any unexpected / contingency records.
Dewatering Contractor	TBC	Design / specification and ongoing maintenance of the dewatering system.
Geotechnical Consultant	Douglas Partners – 02 9809 0666	Groundwater level monitoring and review of disposal volumes. Assist in preparation of the dewatering completion report.
Environmental Consultant	Douglas Partners – 02 9809 0666	Water quality sampling (analysis using NATA accredited laboratories). Interim advice for each sampling event to confirm (or otherwise) compliance with discharge requirements. Quality control sampling. Assist in preparation of the dewatering completion report.

9.5 Contingency plan

As per Section 9.3, at any hold point if any non-conformance is encountered then dewatering will be suspended. The following general contingency plan will be enacted:

- Should water quality be deemed unsuitable for disposal, suspend dewatering and treat water prior to discharge to the ground;
- Should dewatering volumes be higher than predicted, suspend construction and undertake grouting to reduce groundwater inflows;
- Notify the Site Manager / Contractor and Environmental Consultant;
- Environmental Consultant to inspect the site / unexpected finds and collect additional water quality samples as advised;
- Off-site tankering may be adopted to meet disposal requirements; and
- Written confirmation by the Environmental Consultant that disposal may resume (e.g. upon receipt of laboratory results).

9.6 Approvals and licensing

9.6.1 Water Access License (WAL) and entitlements

Dewatering of groundwater for construction purposes constitutes an aquifer interference activity under the *Water Management Act 2000* and may require a Water Access Licence (WAL) and appropriate water entitlement units (share and extraction components), depending on the water source and proposed take.

The site is located within the Sydney Basin Central Groundwater Source and is subject to the Greater Metropolitan Region Groundwater Sources 2023 water sharing plan.

Groundwater modelling undertaken for the project predicts that groundwater inflow rates will be low (less than 1 ML/year estimated under baseline conditions). Results of the sensitivity scenarios also suggest results below 1 ML/year although higher flow rates could occur during prolonged wetter periods. These predictions are estimates based on the information available; actual flow rates may vary from these and will only be known once the excavation is complete and inflow rates can be measured.

Given that the predicted inflow is less than 3 ML/year, the proposed excavation may be eligible for a Water Access Licence exemption from WaterNSW. However, this will be subject to review and approval by WaterNSW.

9.6.2 Water Supply Works Approval (WSWA)

An approval to construct and operate a water supply work (e.g., dewatering system) is typically required under the *Water Management Act 2000*, unless exempt. For major projects, the WSWA is usually granted as part of the SSD approvals and does not require separate application.

10. Conclusion

The geotechnical investigation identified that the site is generally underlain by fresh, unbroken, medium to high strength Hawkesbury Sandstone. Three groundwater monitoring wells were installed for the project, BH101A, BH103, and BH106. Groundwater levels were steady throughout the monitoring period, ranging between 35 and 29 m AHD, sloping south-east following the nearby topography.

The proposed bulk excavation level for the development is understood to be RL 30 m AHD, and is therefore expected to intersect the groundwater table, which is likely to be associated with minor seepage along the top of the rock and through fractures in the rock.

From a geotechnical point of view, it is considered that a drained basement is feasible without any significant impact to surrounding properties. In addition, the use of a drained basement is not considered likely to influence any GDEs or groundwater supply works in accordance with the AIP minimal impact considerations.

Groundwater quality results suggested that some background metal and TRH concentrations exceed the adopted guideline values. Disposal criteria should be selected prior to dewatering based on background concentrations and relevant guideline values. Should disposal criteria be exceeded, treatment may be required prior to disposal. Long term disposal options for drained water should be considered.

Construction of a drained basement will be subject to review and approval from the DCCEEW and other relevant authorities.

11. References

- ANZECC. (2000). *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*. Australia New Zealand Environment Conservation Council.
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- Geoscience Australia. (2009). *Groundwater Sampling and Analysis - A Field Guide*. Commonwealth of Australia.
- Douglas Partners. (2025a). *Report on Geotechnical Investigation – Proposed Commercial Development* at 6-8 Julius Avenue, North Ryde NSW. Prepared for ISPT Pty Ltd. Reference 233059.00.R.001.Rev1.
- Douglas Partners. (2025b). *Report on Detailed Site (Contamination) Investigation - Proposed Commercial Development* at 6-8 Julius Avenue, North Ryde NSW. Prepared for ISPT Pty Ltd. Reference 233059.01.R.001.Rev1.
- NSW DPE. (2021). *Minimum requirements for building site groundwater investigations and reporting*.
- NSW DPE. (2022). *Guidelines for Groundwater documentation for SSD/SSI projects. Technical guideline*.
- NSW DPI – Water. (2013). *Aquifer Interference Policy: NSW Policy for Managing the Impacts of Groundwater Extraction*.

12. Limitations

Douglas Partners Pty Ltd (Douglas) has prepared this report for this project at 6-8 Julius Avenue, North Ryde NSW in line with Douglas' proposal dated 6 February 2025 and acceptance received from Dan D'Ambrosio of ISPT Pty Ltd dated 11 February 2025. The work was carried out under Douglas' Engagement Terms. This report is provided for the exclusive use of ISPT Pty Ltd for this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of Douglas, does so entirely at its own risk and without recourse to Douglas for any loss or damage. In preparing this report Douglas has necessarily relied upon information provided by the client and/or their agents.

The results provided in the report are indicative of the sub-surface conditions on the site only at the specific sampling and/or testing locations, and then only to the depths investigated and at the time the work was carried out. Sub-surface conditions can change abruptly due to variable geological processes and also as a result of human influences. Such changes may occur after Douglas' field testing has been completed.

Douglas' advice is based upon the conditions encountered during this investigation. The accuracy of the advice provided by Douglas in this report may be affected by undetected variations in ground conditions across the site between and beyond the sampling and/or testing locations. The advice may also be limited by budget constraints imposed by others or by site accessibility.

The assessment of atypical safety hazards arising from this advice is restricted to the (geotechnical / environmental / groundwater) components set out in this report and based on known project conditions and stated design advice and assumptions. While some recommendations for safe controls may be provided, detailed 'safety in design' assessment is outside the current scope of this report and requires additional project data and assessment.

This report must be read in conjunction with all of the attached and should be kept in its entirety without separation of individual pages or sections. Douglas cannot be held responsible for interpretations or conclusions made by others unless they are supported by an expressed statement, interpretation, outcome or conclusion stated in this report.

This report, or sections from this report, should not be used as part of a specification for a project, without review and agreement by Douglas. This is because this report has been written as advice and opinion rather than instructions for construction.

Appendix A

About This Report

Introduction

These notes have been provided to amplify DP's report in regard to classification methods, field procedures and the comments section. Not all are necessarily relevant to all reports.

DP's reports are based on information gained from limited subsurface excavations and sampling, supplemented by knowledge of local geology and experience. For this reason, they must be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely.

Copyright

This report is the property of Douglas Partners Pty Ltd. The report may only be used for the purpose for which it was commissioned and in accordance with the Conditions of Engagement for the commission supplied at the time of proposal. Unauthorised use of this report in any form whatsoever is prohibited.

Borehole and Test Pit Logs

The borehole and test pit logs presented in this report are an engineering and/or geological interpretation of the subsurface conditions, and their reliability will depend to some extent on frequency of sampling and the method of drilling or excavation. Ideally, continuous undisturbed sampling or core drilling will provide the most reliable assessment, but this is not always practicable or possible to justify on economic grounds. In any case the boreholes and test pits represent only a very small sample of the total subsurface profile.

Interpretation of the information and its application to design and construction should therefore take into account the spacing of boreholes or pits, the frequency of sampling, and the possibility of other than 'straight line' variations between the test locations.

Groundwater

Where groundwater levels are measured in boreholes there are several potential problems, namely:

- In low permeability soils groundwater may enter the hole very slowly or perhaps not at all during the time the hole is left open;
- A localised, perched water table may lead to an erroneous indication of the true water table;
- Water table levels will vary from time to time with seasons or recent weather changes. They may not be the same at

the time of construction as are indicated in the report; and

- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water measurements are to be made.

More reliable measurements can be made by installing standpipes which are read at intervals over several days, or perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from a perched water table.

Reports

The report has been prepared by qualified personnel, is based on the information obtained from field and laboratory testing, and has been undertaken to current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal, the information and interpretation may not be relevant if the design proposal is changed. If this happens, DP will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface conditions, discussion of geotechnical and environmental aspects, and recommendations or suggestions for design and construction. However, DP cannot always anticipate or assume responsibility for:

- Unexpected variations in ground conditions. The potential for this will depend partly on borehole or pit spacing and sampling frequency;
- Changes in policy or interpretations of policy by statutory authorities; or
- The actions of contractors responding to commercial pressures.

If these occur, DP will be pleased to assist with investigations or advice to resolve the matter.

continued next page

About this Report

Site Anomalies

In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, DP requests that it be immediately notified. Most problems are much more readily resolved when conditions are exposed rather than at some later stage, well after the event.

Information for Contractual Purposes

Where information obtained from this report is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. DP would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

Site Inspection

The company will always be pleased to provide engineering inspection services for geotechnical and environmental aspects of work to which this report is related. This could range from a site visit to confirm that conditions exposed are as expected, to full time engineering presence on site.

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Introduction to Terminology, Symbols and Abbreviations

Douglas Partners' reports, investigation logs, and other correspondence may use terminology which has quantitative or qualitative connotations. To remove ambiguity or uncertainty surrounding the use of such terms, the following sets of notes pages may be attached Douglas Partners' reports, depending on the work performed and conditions encountered:

- Soil Descriptions;
- Rock Descriptions; and
- Sampling, insitu testing, and drilling methodologies

In addition to these pages, the following notes generally apply to most documents.

Abbreviation Codes

Site conditions may also be presented in a number of different formats, such as investigation logs, field mapping, or as a written summary. In some of these formats textual or symbolic terminology may be presented using textual abbreviation codes or graphic symbols, and, where commonly used, these are listed alongside the terminology definition. For ease of identification in these note pages, textual codes are presented in these notes in the following style **XW**. Code usage conforms with the following guidelines:

- Textual codes are case insensitive, although herein they are generally presented in upper case; and
- Textual codes are contextual (i.e. the same or similar combinations of characters may be used in different contexts with different meanings (for example `PL` is used for plastic limit in the context of soil moisture condition, as well as in `PL(A)` for point load test result in the testing results column)).

Data Integrity Codes

Subsurface investigation data recorded by Douglas Partners is generally managed in a highly structured database environment, where records "span" between a top and bottom depth interval. Depth interval "gaps" between records are considered to introduce ambiguity, and, where appropriate, our practice guidelines may require contiguous data sets. Recording meaningful data is not always appropriate (for example assigning a "strength" to a concrete pavement) and the following codes may be used to maintain contiguity in such circumstances.

Term	Description	Abbreviation Code
Core loss	No core recovery	KL
Unknown	Information was not available to allow classification of the property. For example, when auguring in loose, saturated sand auger cuttings may not be returned.	UK
No data	Information required to allow classification of the property was not available. For example, if drilling is commenced from the base of a hole predrilled by others	ND
Not Applicable	Derivation of the properties not appropriate or beyond the scope of the investigation. For example, providing a description of the strength of a concrete pavement	NA

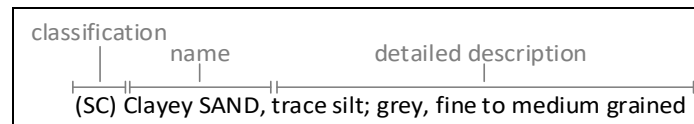
Graphic Symbols

Douglas Partners' logs contain a "graphic" column which provides a pictorial representation of the basic composition of the material. The symbols used are directly representing the material name stated in the adjacent "Description of Strata" column, and as such no specific graphic symbology legend has been provided in these notes.

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Introduction

All materials which are not considered to be “in-situ rock” are described in general accordance with the soil description model of AS 1726-2017 Part 6.1.3, and can be broken down into the following description structure:



The “classification” comprises a two character “group symbol” providing a general summary of dominant soil characteristics. The “name” summarises the particle sizes within the soil which most influence its behaviour. The detailed description presents more information about composition, condition, structure, and origin of the soil.

Classification, naming and description of soils require the relative proportion of particles of different sizes within the whole soil mixture to be considered.

Particle size designation and Behaviour Model

Solid particles within a soil are differentiated on the basis of size.

The engineering behaviour properties of a soil can subsequently be modelled to be either “fine grained” (also known as “cohesive” behaviour) or “coarse grained” (“non cohesive” behaviour), depending on the relative proportion of fine or coarse fractions in the soil mixture.

Particle Size Designation	Particle Size (mm)	Behaviour Model	
		Behaviour	Approximate Dry Mass
Boulder	>200	Excluded from particle behaviour model as “oversize”	
Cobble	63 - 200		
Gravel ¹	2.36 - 63	Coarse	>65%
Sand ¹	0.075 - 2.36		
Silt	0.002 - 0.075	Fine	>35%
Clay	<0.002		

¹ – refer grain size subdivision descriptions below

The behaviour model boundaries defined above are not precise, and the material behaviour should be assumed from the name given to the material (which considers the particle fraction which dominates the behaviour, refer “component proportions” below), rather than strict observance of the proportions of particle sizes. For example, if a material is named a “Sandy CLAY”, this is indicative that the material exhibits fine grained behaviour, even if the dry mass of coarse grained material may exceed 65%.

Component proportions

The relative proportion of the dry mass of each particle size fraction is assessed to be a “primary”, “secondary”, or “minor” component of the soil mixture, depending on its influence over the soil behaviour.

Component Proportion Designation	Definition ¹	Relative Proportion	
		In Fine Grained Soil	In Coarse Grained Soil
Primary	The component (particle size designation, refer above) which dominates the engineering behaviour of the soil	The clay/silt component with the greater proportion	The sand/gravel component with the greater proportion
Secondary	Any component which is not the primary, but is significant to the engineering properties of the soil	Any component with greater than 30% proportion	Any granular component with greater than 30%; or Any fine component with greater than 12%
Minor ²	Present in the soil, but not significant to its engineering properties	All other components	All other components

¹ As defined in AS1726-2017 6.1.4.4

² In the detailed material description, minor components are split into two further sub-categories. Refer “identification of minor components” below.

Composite Materials

In certain situations, a lithology description may describe more than one material, for example, collectively describing a layer of interbedded sand and clay. In such a scenario, the two materials would be described independently, with the names preceded or followed by a statement describing the arrangement by which the materials co-exist. For example, “INTERBEDDED Silty CLAY AND SAND”.

Classification

The soil classification comprises a two character group symbol. The first character identifies the primary component. The second character identifies either the grading or presence of fines in a coarse grained soil, or the plasticity in a fine grained soil. Refer AS1726-2017 6.1.6 for further clarification.

Soil Name

For most soils, the name is derived with the primary component included as the noun (in upper case), preceded by any secondary components stated in an adjective form. In this way, the soil name also describes the general composition and indicates the dominant behaviour of the material.

Component ¹	Prominence in Soil Name
Primary	Noun (eg "CLAY")
Secondary	Adjective modifier (eg "Sandy")
Minor	No influence

¹ – for determination of component proportions, refer component proportions on previous page

For materials which cannot be disaggregated, or which are not comprised of rock or mineral fragments, the names "ORGANIC MATTER" or "ARTIFICIAL MATERIAL" may be used, in accordance with AS1726-2017 Table 14.

Commercial or colloquial names are not used for the soil name where a component derived name is possible (for example "Gravelly SAND" rather than "CRACKER DUST").

Materials of "fill" or "topsoil" origin are generally assigned a name derived from the primary/secondary component (where appropriate). In log descriptions this is preceded by uppercase "FILL" or "TOPSOIL". Origin uncertainty is indicated in the description by the characters (?), with the degree of uncertainty described (using the terms "probably" or "possibly" in the origin column, or at the end of the description).

Identification of minor components

Minor components are identified in the soil description immediately following the soil name. The minor component fraction is usually preceded with a term indicating the relative proportion of the component.

Minor Component Proportion Term	Relative Proportion	
	In Fine Grained Soil	In Coarse Grained Soil
With	All fractions: 15-30%	Clay/silt: 5-12% sand/gravel: 15-30%
Trace	All fractions: 0-15%	Clay/silt: 0-5% sand/gravel: 0-15%

The terms "with" and "trace" generally apply only to gravel or fine particle fractions. Where cobbles/boulders are encountered in minor proportions (generally less than about 12%) the term "occasional" may be used. This term describes the sporadic distribution of the material within the confines of the investigation excavation only, and there may be considerable variation in proportion over a wider area which is difficult to factually characterise due to the relative size of the particles and the investigation methods.

Soil Composition

Plasticity

Descriptive Term	Laboratory liquid limit range	
	Silt	Clay
Non-plastic materials	Not applicable	Not applicable
Low plasticity	≤50	≤35
Medium plasticity	Not applicable	>35 and ≤50
High plasticity	>50	>50

Note, Plasticity descriptions generally describe the plasticity behaviour of the whole of the fine grained soil, not individual fine grained fractions.

Grain Size

Type	Particle size (mm)	
	Gravel	Sand
Gravel	Coarse	19 - 63
	Medium	6.7 - 19
	Fine	2.36 - 6.7
Sand	Coarse	0.6 - 2.36
	Medium	0.21 - 0.6
	Fine	0.075 - 0.21

Grading

Grading Term	Particle size (mm)
Well	A good representation of all particle sizes
Poorly	An excess or deficiency of particular sizes within the specified range
Uniformly	Essentially of one size
Gap	A deficiency of a particular size or size range within the total range

Note, AS1726-2017 provides terminology for additional attributes not listed here.

Soil Condition

Moisture

The moisture condition of soils is assessed relative to the plastic limit for fine grained soils, while for coarse grained soils it is assessed based on the appearance and feel of the material. The moisture condition of a material is considered to be independent of stratigraphy (although commonly these are related), and this data is presented in its own column on logs.

Applicability	Term	Tactile Assessment	Abbreviation code
Fine	Dry of plastic limit	Hard and friable or powdery	w<PL
	Near plastic limit	Can be moulded	w=PL
	Wet of plastic limit	Water residue remains on hands when handling	w>PL
	Near liquid limit	"oozes" when agitated	w=LL
	Wet of liquid limit	"oozes"	w>LL
Coarse	Dry	Non-cohesive and free running	D
	Moist	Feels cool, darkened in colour, particles may stick together	M
	Wet	Feels cool, darkened in colour, particles may stick together, free water forms when handling	W

The abbreviation code **NDF**, meaning "not-assessable due to drilling fluid use" may also be used.

Note, observations relating to free ground water or drilling fluids are provided independent of soil moisture condition.

Consistency/Density/Compaction/Cementation/Extremely Weathered Material

These concepts give an indication of how the material may respond to applied forces (when considered in conjunction with other attributes of the soil). This behaviour can vary independent of the composition of the material, and on logs these are described in an independent column and are generally mutually exclusive (i.e it is inappropriate to describe both consistency and compaction at the same time). The method by which the behaviour is described depends on the behaviour model and other characteristics of the soil as follows:

- In fine grained soils, the "consistency" describes the ease with which the soil can be remoulded, and is generally correlated against the materials undrained shear strength;
- In granular materials, the relative density describes how tightly packed the particles are, and is generally correlated against the density index;
- In anthropogenically modified materials, the compaction of the material is described qualitatively;
- In cemented soils (both natural and anthropogenic), the cemented "strength" is described qualitatively, relative to the difficulty with which the material is disaggregated; and
- In soils of extremely weathered material origin, the engineering behaviour may be governed by relic rock features, and expected behaviour needs to be assessed based the overall material description.

Quantitative engineering performance of these materials may be determined by laboratory testing or estimated by correlated field tests (for example penetration or shear vane testing). In some cases, performance may be assessed by tactile or other subjective methods, in which case investigation logs will show the estimated value enclosed in round brackets, for example **(VS)**.

Consistency (fine grained soils)

Consistency Term	Tactile Assessment	Undrained Shear Strength (kPa)	Abbreviation Code
Very soft	Extrudes between fingers when squeezed	<12	VS
Soft	Mouldable with light finger pressure	>12 - ≤25	S
Firm	Mouldable with strong finger pressure	>25 - ≤50	F
Stiff	Cannot be moulded by fingers	>50 - ≤100	St
Very stiff	Indented by thumbnail	>100 - ≤200	VSt
Hard	Indented by thumbnail with difficulty	>200	H
Friable	Easily crumbled or broken into small pieces by hand	-	Fr

Relative Density (coarse grained soils)

Relative Density Term	Density Index	Abbreviation Code
Very loose	<15	VL
Loose	>15 - ≤35	L
Medium dense	>35 - ≤65	MD
Dense	>65 - ≤85	D
Very dense	>85	VD

Note, tactile assessment of relative density is difficult, and generally requires penetration testing, hence a tactile assessment guide is not provided.

Soil Descriptions

Terminology
Symbols
Abbreviations

Compaction (anthropogenically modified soil)

Compaction Term	Abbreviation Code
Well compacted	WC
Poorly compacted	PC
Moderately compacted	MC
Variably compacted	VC

Cementation (natural and anthropogenic)

Cementation Term	Abbreviation Code
Moderately cemented	MOD
Weakly cemented	WEK

Extremely Weathered Material

AS1726-2017 considers weathered material to be soil if the unconfined compressive strength is less than 0.6 MPa (i.e. less than very low strength rock). These materials may be identified as “extremely weathered material” in reports and by the abbreviation code **XWM** on log sheets. This identification is not correlated to any specific qualitative or quantitative behaviour, and the engineering properties of this material must therefore be assessed according to engineering principles with reference to any relic rock structure, fabric, or texture described in the description.

Soil Origin

Term	Description	Abbreviation Code
Residual	Derived from in-situ weathering of the underlying rock	RS
Extremely weathered material	Formed from in-situ weathering of geological formations. Has strength of less than ‘very low’ as per as1726 but retains the structure or fabric of the parent rock.	XWM
Alluvial	Deposited by streams and rivers	ALV
Estuarine	Deposited in coastal estuaries	EST
Marine	Deposited in a marine environment	MAR
Lacustrine	Deposited in freshwater lakes	LAC
Aeolian	Carried and deposited by wind	AEO
Colluvial	Soil and rock debris transported down slopes by gravity	COL
Slopewash	Thin layers of soil and rock debris gradually and slowly deposited by gravity and possibly water	SW
Topsoil	Mantle of surface soil, often with high levels of organic material	TOP
Fill	Any material which has been moved by man	FILL
Littoral	Deposited on the lake or seashore	LIT
Unidentifiable	Not able to be identified	UID

Cobbles and Boulders

The presence of particles considered to be “oversize” may be described using one of the following strategies:

- Oversize encountered in a minor proportion (when considered relative to the wider area) are noted in the soil description; or
- Where a significant proportion of oversize is encountered, the cobbles/boulders are described independent of the soil description, in a similar manner to composite soils (described above) but qualified with “MIXTURE OF”.

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Rock Strength

Rock strength is defined by the unconfined compressive strength, and it refers to the strength of the rock substance and not the strength of the overall rock mass, which may be considerably weaker due to defects.

The Point Load Strength Index $I_{s(50)}$ is commonly used to provide an estimate of the rock strength and site specific correlations should be developed to allow UCS values to be determined. The point load strength test procedure is described by Australian Standard AS4133.4.1-2007. The terms used to describe rock strength are as follows:

Strength Term	Unconfined Compressive Strength (MPa)	Point Load Index ¹ $I_{s(50)}$ MPa	Abbreviation Code
Very low	0.6 - 2	0.03 - 0.1	VL
Low	2 - 6	0.1 - 0.3	L
Medium	6 - 20	0.3 - 1.0	M
High	20 - 60	1 - 3	H
Very high	60 - 200	3 - 10	VH
Extremely high	>200	>10	EH

¹ Rock strength classification is based on UCS. The UCS to $I_{s(50)}$ ratio varies significantly for different rock types and specific ratios may be required for each site. The point load Index ranges shown above are as suggested in AS1726 and should not be relied upon without supporting evidence.

The following abbreviation codes are used for soil layers or seams of material “within rock” but for which the equivalent UCS strength is less than 0.6 MPa.

Scenario	Abbreviation Code
The material encountered has an equivalent UCS strength of less than 0.6 MPa, and therefore is considered to be soil (as per Note 1 of Table 20 of AS 1726-2017). The properties of the material encountered over this interval are described in the “Description of Strata” and soil properties columns.	SOIL
The material encountered has an equivalent UCS strength of less than 0.6 MPa, and therefore is considered to be soil (as per Note 1 of Table 20 of AS 1726-2017). The prominence of the material is such that it can be considered to be a seam (as defined in Table 22 of AS1726-2017) and the properties of the material are described in the defect column.	SEAM

Degree of Weathering

The degree of weathering of rock is classified as follows:

Weathering Term	Description	Abbreviation Code
Residual Soil ¹	Material is weathered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are no longer visible, but the soil has not been significantly transported.	RS
Extremely weathered ¹	Material is weathered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are still visible	XW
Highly weathered	The whole of the rock material is discoloured, usually by iron staining or bleaching to the extent that the colour of the original rock is not recognisable. Rock strength is significantly changed by weathering. Some primary minerals have weathered to clay minerals. Porosity may be increased by leaching or may be decreased due to deposition of weathering products in pores.	HW
Moderately weathered	The whole of the rock material is discoloured, usually by iron staining or bleaching to the extent that the colour of the original rock is not recognisable but shows little or no change of strength from fresh rock.	MW
Slightly weathered	Rock is partially discoloured with staining or bleaching along joints but shows little or no change of strength from fresh rock.	SW
Fresh	No signs of decomposition or staining.	FR
Note: If HW and MW cannot be differentiated use DW (see below)		
Distinctly weathered	Rock strength usually changed by weathering. The rock may be highly discoloured, usually by iron staining. Porosity may be increased by leaching or may be decreased due to deposition of weathered products in pores.	DW

¹ The parent rock type, of which the residual/extremely weathered material is a derivative, will be stated in the description (where discernible).

Degree of Alteration

The degree of alteration of the rock material (physical or chemical changes caused by hot gasses or liquids at depth) is classified as follows:

Term	Description	Abbreviation Code
Extremely altered	Material is altered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are still visible.	XA
Highly altered	The whole of the rock material is discoloured, usually by staining or bleaching to the extent that the colour of the original rock is not recognisable. Rock strength is changed by alteration. Some primary minerals are altered to clay minerals. Porosity may be increased by leaching or may be decreased due to precipitation of secondary materials in pores.	HA
Moderately altered	The whole of the rock material is discoloured, usually by staining or bleaching to the extent that the colour of the original rock is not recognisable but shows little or no change of strength from fresh rock.	MA
Slightly altered	Rock is slightly discoloured but shows little or no change of strength from fresh rock	SA
Note: If HA and MA cannot be differentiated use DA (see below)		
Distinctly altered	Rock strength usually changed by alteration. The rock may be highly discoloured, usually by staining or bleaching. Porosity may be increased by leaching or may be decreased due to precipitation of secondary minerals in pores.	DA

Degree of Fracturing

The following descriptive classification apply to the spacing of natural occurring fractures in the rock mass. It includes bedding plane partings, joints and other defects, but excludes drilling breaks. These terms are generally not required on investigation logs where fracture spacing is presented as a histogram, and where used are presented in an unabbreviated format.

Term	Description
Fragmented	Fragments of <20 mm
Highly Fractured	Core lengths of 20-40 mm with occasional fragments
Fractured	Core lengths of 30-100 mm with occasional shorter and longer sections
Slightly Fractured	Core lengths of 300 mm or longer with occasional sections of 100-300 mm
Unbroken	Core contains very few fractures

Rock Quality Designation

The quality of the cored rock can be measured using the Rock Quality Designation (RQD) index, defined as:

$$RQD \% = \frac{\text{cumulative length of 'sound' core sections} > 100 \text{ mm long}}{\text{total drilled length of section being assessed}}$$

where 'sound' rock is assessed to be rock of low strength or stronger. The RQD applies only to natural fractures. If the core is broken by drilling or handling (i.e., drilling breaks) then the broken pieces are fitted back together and are not included in the calculation of RQD.

Stratification Spacing

These terms may be used to describe the spacing of bedding partings in sedimentary rocks. Where used, these terms are generally presented in an unabbreviated format

Term	Separation of Stratification Planes
Thinly laminated	< 6 mm
Laminated	6 mm to 20 mm
Very thinly bedded	20 mm to 60 mm
Thinly bedded	60 mm to 0.2 m
Medium bedded	0.2 m to 0.6 m
Thickly bedded	0.6 m to 2 m
Very thickly bedded	> 2 m

Rock Descriptions

Terminology
Symbols
Abbreviations

Defect Descriptions

Defect Type

Term	Abbreviation Code
Bedding plane	B
Infilled seam	IS
Cleavage	CV
Crushed zone	CZ
Decomposed seam	DS
Fault	F
Joint	JT
Lamination	LAM
Parting	P
Shear zone	SZ
Vein	VN
Drilling/handling break	DB , HB
Fracture	FC

Rock Defect Orientation

Term	Abbreviation Code
Horizontal	H
Vertical	V
Sub-horizontal	SH
Sub-vertical	SV

Rock Defect Coating

Term	Abbreviation Code
Clean	CN
Coating	CT
Healed	HE
Infilled	INF
Stained	SN
Tight	TI
Veneer	VNR

Rock Defect Infill

Term	Abbreviation Code
Calcite	CA
Carbonaceous	CBS
Clay	CLAY
Iron oxide	FE
Manganese	MN

intentionally blank

Rock Defect Shape/Planarity

Term	Abbreviation Code
Curved	CU
Irregular	IR
Planar	PR
Stepped	ST
Undulating	UN

Rock Defect Roughness

Term	Abbreviation Code
Polished	PO
Rough	RF
Slickensided	SL
Smooth	SM
Very rough	VR

Defect Orientation

The inclination of defects is always measured from the perpendicular to the core axis.

intentionally blank



Sampling and Testing

A record of samples retained, and field testing performed is usually shown on a Douglas Partners' log with samples appearing to the left of a depth scale, and selected field and laboratory testing (including results, where relevant) appearing to the right of the scale, as illustrated below:

SAMPLE			DEPTH (m)	TESTING	
SAMPLE REMARKS	TYPE	INTERVAL		TEST TYPE	RESULTS AND REMARKS
	SPT		1.0 1.45	SPT	4,9,11 N=20

Sampling

The type or intended purpose for which a sample was taken is indicated by the following abbreviation codes.

Sample Type	Code
Auger sample	A
Bulk sample	B
Core sample	C
Disturbed sample	D
Sample from SPT test	SPT
Environmental sample	ES
Gas sample	G
Undisturbed tube sample	U ¹
Water sample	W
Piston sample	P
Core sample for unconfined compressive strength testing	UCS
Material Sample	MT

¹ – numeric suffixes indicate tube diameter/width in mm

The above codes only indicate that a sample was retained, and not that testing was scheduled or performed.

Field and Laboratory Testing

A record that field and laboratory testing was performed is indicated by the following abbreviation codes.

Test Type	Code
Pocket penetrometer (kPa)	PP
Photo ionisation detector (ppm)	PID
Standard Penetration Test x/y = x blows for y mm penetration HB = hammer bouncing HW = fell under weight of hammer	SPT
Shear vane (kPa)	V
Unconfined compressive strength, (MPa)	UCS

Field and laboratory testing (continued)

Test Type	Code
Point load test, (MPa), axial (A), diametric (D), irregular (I)	PLT(L)
Dynamic cone penetrometer, followed by blow count penetration increment in mm (cone tip, generally in accordance with AS1289.6.3.2)	DCP/150
Perth sand penetrometer, followed by blow count penetration increment in mm (flat tip, generally in accordance with AS1289.6.3.3)	PSP/150

Groundwater Observations

▷	seepage/inflow
▽	standing or observed water level
NFGWO	no free groundwater observed
OBS	observations obscured by drilling fluids

Drilling or Excavation Methods/Tools

The drilling/excavation methods used to perform the investigation may be shown either in a dedicated column down the left-hand edge of the log, or stated in the log footer. In some circumstances abbreviation codes may be used.

Method	Abbreviation Code
Toothed bucket	TB ¹
Mud/blade bucket	MB ¹
Ripping tyne/ripper	R
Rock breaker/hydraulic hammer	RB
Hand auger	HA ¹
NMLC series coring	NMLC
HMLC series coring	HMLC
NQ coring	NQ3
HQ coring	HQ3
PQ coring	PQ3
Push tube	PT ¹
Rock roller	RR ¹
Solid flight auger. Suffixes: /T = tungsten carbide tip, /V = v-shaped tip	AD ¹
Sonic drilling	SON ¹
Vibrocore	VC ¹
Wash bore (unspecified bit type)	WB ¹
Existing exposure	X
Hand tools (unspecified)	HAND
Predrilled	PD
Diatube	DT ¹
Hollow flight auger	HSA ¹
Vacuum excavation	VE

¹ – numeric suffixes indicate tool diameter/width in mm

Appendix B

Drawings



Location Plan

LEGEND:-

- Borehole Location and Number
- Groundwater Monitoring Wells
- Approximate Site Boundary
- Proposed Basement Outline

REV	DESCRIPTION/COMMENT	DATE	DRAWN BY
0	INITIAL ISSUE	18/06/2025	JST/EC
SCALE:			

Douglas
PARTNERS

OFFICE: SYDNEY
96-98 Hermitage Rd, West Ryde NSW 2114
(02) 9809 0666

CLIENT:
ISPT Pty Ltd

NOTE:

- Base image from MetroMap (Dated 27.01.2025)
- Proposed Basement Outline adapted from Greenbox, Drawing 100101, Issue 8 (Dated 09.05.2025)

COORDINATE REFERENCE SYSTEM:GDA2020 / MGA ZONE 56

PROJECT NAME:
Proposed Data Centre Development

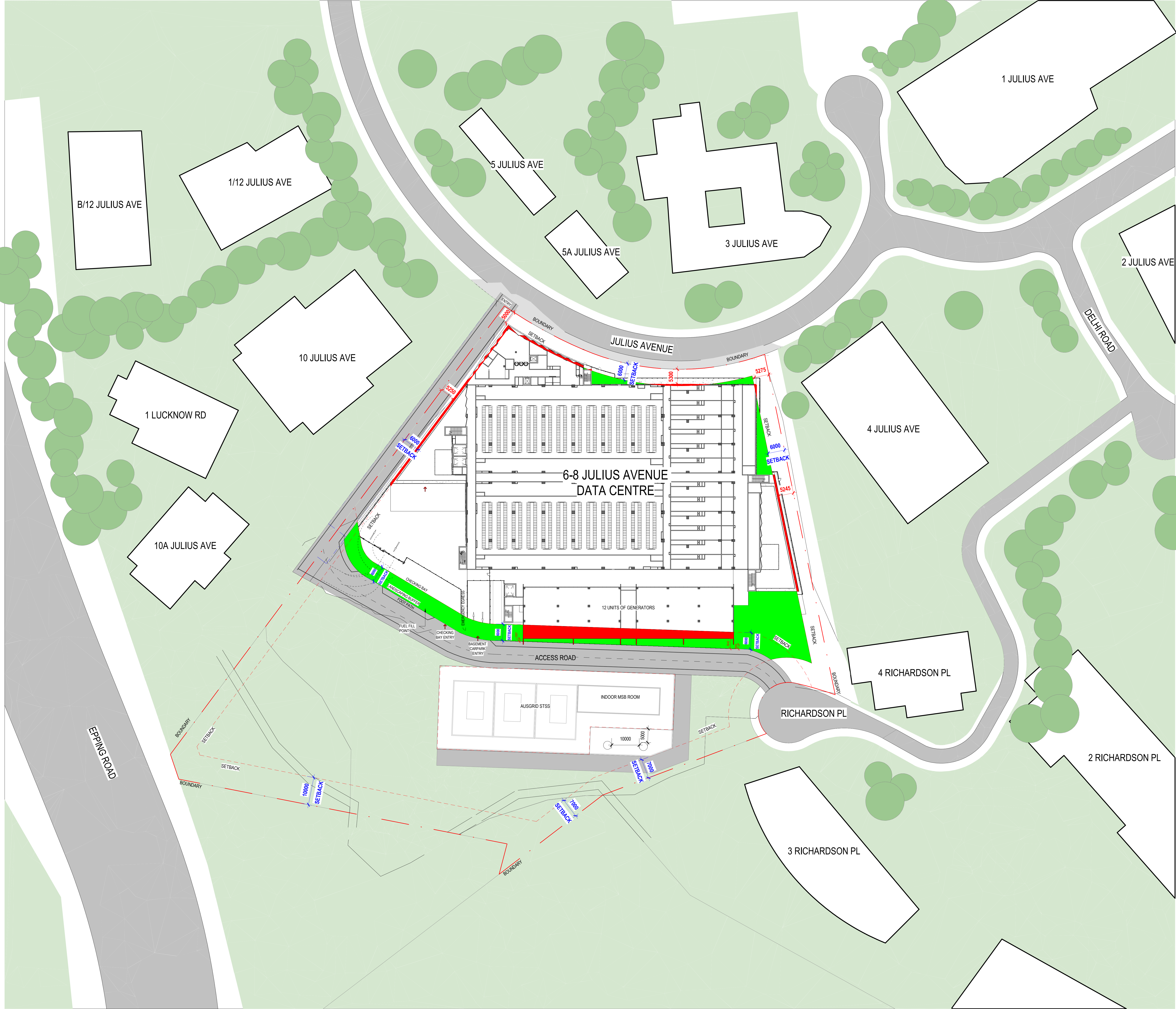
PROJECT ADDRESS:
6-8 Julius Avenue, North Ryde

DRAWING TITLE:
TEST LOCATION PLAN

PROJECT No:
233059.00

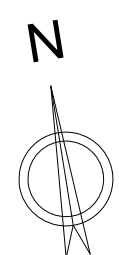
DRAWING No:
1

REVISION:
0



1 SITE PLAN
1:500

LEGEND
ENCROACHING ZONE
COMPLIANT ZONE



Issue	Date	Description
1	2023.06.11	FOR INFORMATION
2	2023.06.18	RESPOND TO LOA

Notes

Key Plan

Project Manager



Construction Manager

Client



+61 2 8069 8000
LEVEL 12
68 PITT STREET
SYDNEY NSW 2000 AUSTRALIA

GREENBOX ARCHITECTURE PTY LTD
ABN: 79 139 779 098
ISO 9001 CERTIFIED QUALITY SYSTEM

- Use written dimensions only
- Do not scale from drawing
- Contractors shall confirm all dimensions on-site prior to commencing any work or producing any shop drawings
- All materials to be used in accordance with the manufacturer's specifications and instructions and shall comply with the relevant Australian Standards
- Copyright of this drawing and design remain the property of Greenbox Architecture Pty Ltd
- Nominated Architect - Gerard Page: NSW reg No.7247, Vic reg No.17864, QLD reg No.4536

Client

ISPT

Project
JULIUS AVENUE DATA CENTRE
6-8 JULIUS AVE
NORTH RYDE NSW

Scale

1:500

Drawn By

AI

Checked By

ML

Approved By

AO

Job Number

240089

Sheet

AO

Project Status

PRELIMINARY

Drawing Title

SITE PLAN SETBACK

Drawing Number

ASK103

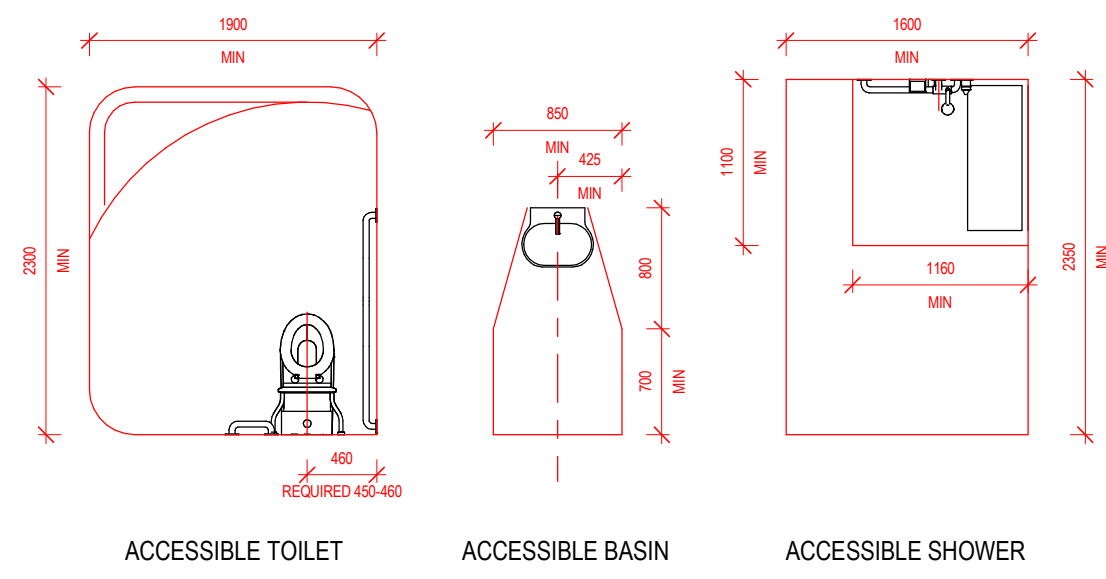
Issue

2

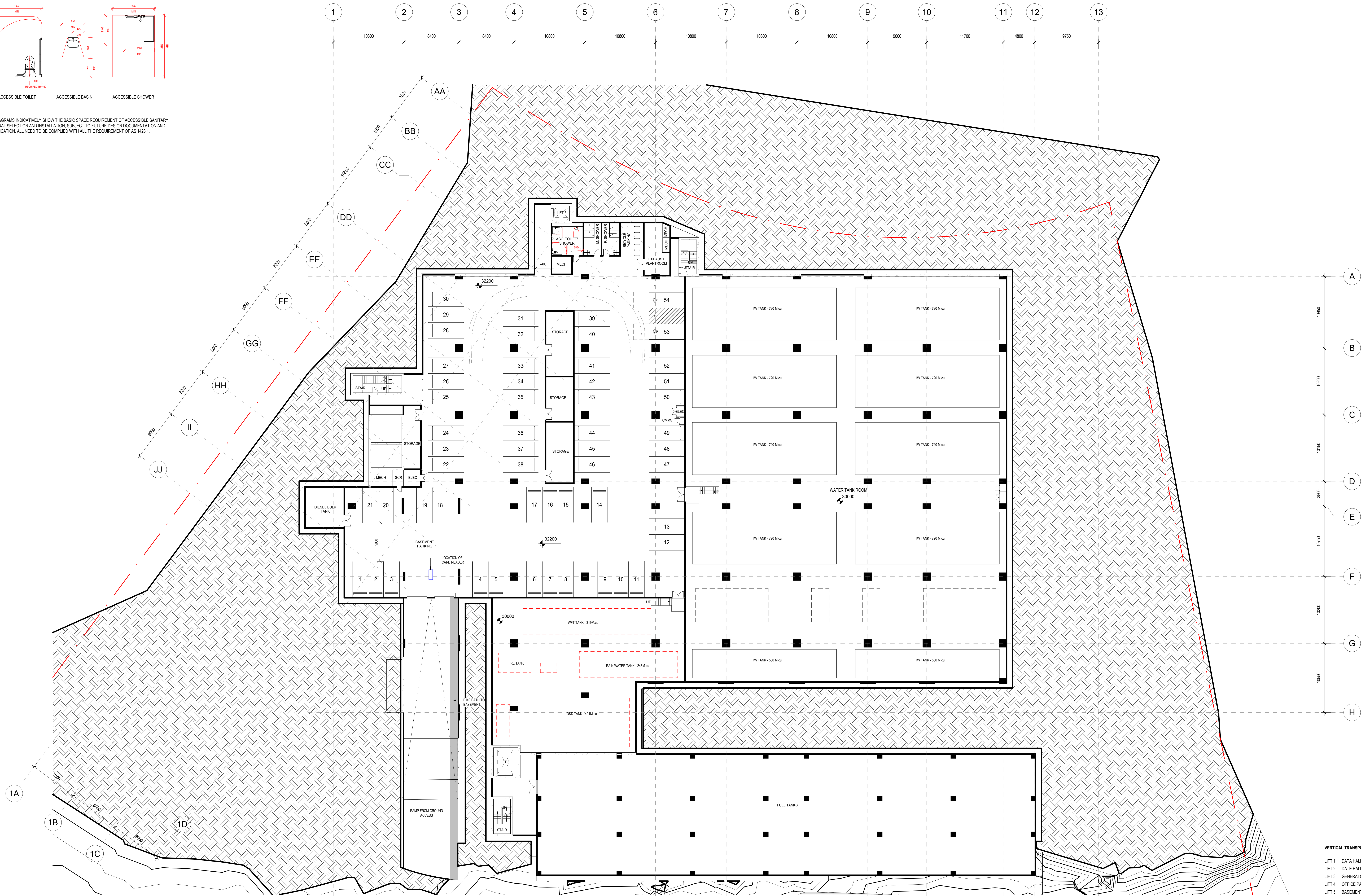
Scale Bar

1:500

0 5 10 15 25m



NOTE:
THE DIAGRAMS INDICATIVELY SHOW THE BASIC SPACE REQUIREMENT OF ACCESSIBLE SANITARY.
FOR FINAL SELECTION AND INSTALLATION, SUBJECT TO FUTURE DESIGN DOCUMENTATION AND
SPECIFICATION ALL NEED TO BE COMPLIED WITH ALL THE REQUIREMENT OF AS 1428.1.



1 BASEMENT PLAN
1:200

VERTICAL TRANSPORTATION LEGEND
LIFT 1: DATA HALL GOODS LIFT, MRL 1
LIFT 2: DATA HALL GOODS LIFT, MRL 2
LIFT 3: GENERATOR GALLERY GOODS LIFT, MRL 3
LIFT 4: OFFICE PASSENGER LIFT, MRL 4
LIFT 5: BASEMENT PASSENGER LIFT, MRL 5



Issue	Date	Description
1	2023.02.13	FOR INFORMATION
2	2023.02.26	FOR INFORMATION
3	2023.03.13	FOR INFORMATION
4	2023.03.13	FOR INFORMATION
5	2023.03.20	FOR INFORMATION
6	2023.04.11	FOR INFORMATION
7	2023.05.07	FOR INFORMATION
8	2023.05.09	ISSUE FOR DESIGN

Notes

Key Plan

Project Manager



Construction Manager

Client



Greenbox

+61 2 8069 8000
LEVEL 12
68 PITT STREET
SYDNEY NSW 2000 AUSTRALIA

GREENBOX ARCHITECTURE PTY LTD
ABN: 79 139 779 098
ISO 9001 CERTIFIED QUALITY SYSTEM

- Use written dimensions only
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- Nominated Architect - Gerard Page NSW reg No 7247, Vic reg No 17864, QLD reg No 4536

Client

ISPT

Project
JULIUS AVENUE DATA CENTRE
6-8 JULIUS AVE
NORTH RYDE NSW

Scale

As Indicated

Drawn By

AD

Checked By

ML

Approved By

AD

Job Number

240089

Sheet

As Indicated

Scale Bar

1:200

Project Status

PRELIMINARY

Drawing Title

BASEMENT PLAN

Drawing Number

100101

Issue

8

- NOTES:
- THESE NOTES AND LEGEND (IF SHOWN) FORM PART OF THE PLAN AND SURVEY AND MUST REMAIN WITH THE PLAN IN ANY REPRODUCTION IN WHOLE OR PART.
 - THE CAD FILE USES METRES AS ITS BASE UNIT AND IS IN A "GROUND" COORDINATE SYSTEM. IF THE SURVEY IS STATED AS MGA, ANY POINT IN THE FILE WILL BE AN APPROXIMATE MGA COORDINATE.
 - SOME SYMBOLS REPRESENTING PHYSICAL STRUCTURES SUCH AS POWER POLES AND PITS ARE DIAGRAMMATIC ONLY AND DO NOT NECESSARILY REPRESENT THE ACTUAL SIZE AND EXTENT OF THESE FEATURES.
 - THE SURVEY INFORMATION SHOWN HERE WAS PREPARED FOR A SPECIFIC PURPOSE FOR THE CLIENT SHOWN. THIS INFORMATION IS NOT INTENDED TO BE USED FOR ANY OTHER PURPOSE OR BY ANYONE NOT AUTHORISED BY THIS CLIENT.
 - BOUNDARY DIMENSIONS AND AREAS HAVE BEEN DETERMINED BY CURRENT CADASTRAL SURVEY AND THE BOUNDARY AND EASEMENT LINES IN THE ELECTRONIC FILE HAVE BEEN INCLUDED USING THOSE SURVEYED DIMENSIONS. THE TITLE DIMENSIONS SHOWN ON THE HARD COPY PLAN TAKE PRECEDENCE OVER THE LINES IN THE ELECTRONIC FILE.
 - THE TITLE/S TO THE SUBJECT LAND HAS BEEN REVIEWED AND THE POSITION OF ALL EASEMENTS AFFECTING THE LAND ARE SHOWN. THE TERMS OF ANY EASEMENT, RESTRICTION ON THE USE OF LAND OR COVENANT AFFECTING THE LAND HAVE NOT BEEN INVESTIGATED. LEASES AND OTHER NOTATIONS MAY ALSO EXIST WHICH AFFECT THE LAND.
 - UNDERGROUND SERVICES OTHER THAN THOSE SHOWN HAVE NOT BEEN INVESTIGATED.
PRIOR TO DEMOLITION, EXCAVATION OR CONSTRUCTION WORK ON THE SITE, THE RELEVANT SERVICE AUTHORITY SHOULD BE CONTACTED TO ESTABLISH DETAILED LOCATION AND DEPTH.
 - THIS SURVEY IS LIMITED TO IMPROVEMENTS AND OTHER DETAIL WHICH WERE VISIBLE AND ACCESSIBLE AT THE TIME OF SURVEY. THE LOCATION OF DETAIL SUCH AS PRIVATE UNDERGROUND SERVICE LINES AND BUILDING FOUNDATIONS WITHIN THE SITE IS UNKNOWN.
 - THE COORDINATES WITHIN THIS DRAWING RELATE TO THE DATUM SHOWN IN THE TITLE BLOCK. REFER TO A REGISTERED LAND SURVEYOR FOR FURTHER CLARIFICATION. CAUTION SHOULD BE TAKEN WHEN IMPORTING INFORMATION OBTAINED FROM OTHER SUB-CONSULTANTS OR SOURCES TO ENSURE THAT THE DATA IS ON A MATCHING COORDINATE SYSTEM.
 - CONTOURS SHOWN HEREON DEPICT THE GENERAL TOPOGRAPHY ONLY. EXCEPT AT SPOT LEVELS SHOWN, THEY DO NOT NECESSARILY REPRESENT THE EXACT LEVEL AT ANY PARTICULAR POINT.
 - CONTOUR INTERVAL 0.5m
 - ANY GUTTER, RIDGE, ROOF AND WINDOW DETAILS AND LEVELS SHOWN HAVE BEEN OBTAINED VIA INDIRECT SURVEY METHODS WHERE VISIBLE FROM GROUND LEVEL AND ARE SHOWN ON THIS PLAN IN THEIR APPROXIMATE LOCATION FOR THE PURPOSE OF GENERAL SITE ANALYSIS ONLY.
 - ANY TREE CANOPIES, TRUNK DIAMETERS AND HEIGHTS SHOWN ARE APPROXIMATE ONLY AND SHOULD BE VERIFIED BY FURTHER SURVEY WORKS IF CRITICAL TO DESIGN OR SITE ANALYSIS.
 - SMALL TREES, SHRUBS, GARDEN FEATURES, PATHWAYS AND OTHER MINOR DETAIL MAY NOT BE SHOWN ON THIS PLAN, FOR THE PURPOSES OF THIS SURVEY.
 - PRIOR TO ANY CONSTRUCTION WORKS BEING UNDERTAKEN, BOUNDARIES SHOULD BE MARKED

ORIGIN OF LEVELS: SSM 102264
E 3328077.251
N 6258713.319
R.L. 47.000 (AHD)

LEGEND:

- PAR PARAPET
PP POWER POLE
RF ROOF
RDG RIDGE
SIC SEWER INSPECTION COVER
TG TOP OF GUTTER
TK TOP OF KERB
TOG TOP OF GRATE
TW TOP OF WALL
TF TOP OF FENCE
VER VERANDAH
US UNDERSIDE OF BUILDING
SL DRAINAGE PIT SURFACE LEVEL
INV DRAINAGE PIT INVERT LEVEL
WH WINDOW HEAD
WS WINDOW SILL

- Comms Pit/Manhole
Drainage Manhole
Drainage Grated Pit
Drainage Kerb Inlet Pit
Electrical Power Pole
Gas Meter
Miscellaneous Manhole
Sewer Vent
Sign Post
Tree (Canopy spread, trunk diameter, Height)
Trees (April 2005)

- Water Meter
Water Tap
Water Hydrant
Water Stop Valve

- Brick Walls
Stone Walls
Bottom of Bank
Top of Bank

SITE CONSISTS OF AREAS THAT ARE HEAVILY VEGETATED WITH THICK FOLIAGE WHERE R.L.'S HAVE NOT BEEN SHOWN. AREA IS INACCESSIBLE DUE TO DENSE VEGETATION. TREES SHOWN GREY COMPILED FROM SURVEY INFORMATION OBTAINED FROM DUNLOP THORPE SURVEY PLAN 12389 (DATED 12.4.2005). THE POSITION AND FEATURES OF THESE TREES HAVE NOT BEEN INVESTIGATED AND ARE FOR DIAGRAMMATIC PURPOSES ONLY. ONLY TREES WITH TRUNK DIAMETER >100MM AND HIGHER THAN 5 METRES HAVE BEEN MEASURED.

NOTATIONS SHOWN ON CERTIFICATE OF TITLE
LOT 8 D.P.1082131

AFFECTING THE LAND:

- EASEMENT FOR RECREATIONAL PURPOSES (JOGGING TRACK) DESIGNATED (A6) (DP1003588)
- EASEMENT FOR DRAINAGE 2.5 METRES WIDE DESIGNATED (G6) (DP1003588)
- RIGHT OF CARRIAGEWAY VARIABLE WIDTH DESIGNATED (ER6) (DP1003588)
- RIGHT OF CARRIAGEWAY 4 METRES WIDE DESIGNATED (Z6E) AND (Y) (DP1003588)
- RIGHT OF CARRIAGEWAY 4 METRES WIDE DESIGNATED (X7) (DP1003588)
- EASEMENT FOR OVERHEAD MAINS DESIGNATED (E06) (DP1003588)

APPURTENANT TO LAND
(NOT ALL APPURTENANT EASEMENTS SHOWN)

- RIGHT OF CARRIAGEWAY 7 METRES WIDE DESIGNATED (Y6E) (DP1003588)
- EASEMENT FOR DRAINAGE 2.5 METRES WIDE DESIGNATED (G6) (DP1003588)
- EASEMENT FOR RECREATIONAL PURPOSES (JOGGING TRACK) DESIGNATED (A6) (DP1003588)
- EASEMENT FOR DRAINAGE VARIABLE WIDTH DESIGNATED (S6) (DP1003588)
- RIGHT OF CARRIAGEWAY AND EASEMENT FOR SERVICES 7 METRES WIDE DESIGNATED (K6) (DP1003588)
- RIGHT OF CARRIAGEWAY 7.85 METRES WIDE AND VARIABLE DESIGNATED (X6E) (DP1003588)
- EASEMENT FOR DRAINAGE 7.85 METRES WIDE AND VARIABLE DESIGNATED (J6) AND (X) (DP1003588)
- EASEMENT FOR SERVICES 3 METRES WIDE AND VARIABLE DESIGNATED (YY6) AND (X)(DP1003588)
- EASEMENT FOR SERVICES 3 METRES WIDE AND VARIABLE (YY6) (DP1003588)

THE TERMS AND LOCATIONS OF COVENANTS & RESTRICTIONS HAVE NOT BEEN INVESTIGATED.

VER	BY	AMENDMENTS	DATE
A	J.G.	INITIAL ISSUE	16.12.24
B			
C			
D			
E			
F			
G			

- THE POSITION OF SERVICES SHOWN ON THIS DRAWING ARE INDICATIVE ONLY AND HAVE BEEN PLOTTED FROM PLANS AND DRAWINGS SUPPLIED BY RELEVANT AUTHORITIES.
- SERVICE AUTHORITY PITS, MANHOLES, POLES, MARKER POSTS, ETC., WHERE SIGHTED AT TIME OF SURVEY, HAVE BEEN LOCATED. THE SURVEY DOES NOT INCLUDE INVESTIGATION OR LOCATION OF UNDERGROUND INFRASTRUCTURE.
- SERVICES INFORMATION SHOWN ON THIS DRAWING HAS BEEN OBTAINED THROUGH A BEFORE YOU DIG AUSTRALIA SEARCH AND IS VALID FOR THE PERIOD OF TIME FROM THE DATE OF ISSUE NOMINATED BY THE AUTHORITY.
- PRIOR TO ANY DEMOLITION, EXCAVATION OR CONSTRUCTION ON OR ADJACENT TO THE SITE IT IS THE RESPONSIBILITY OF THE DEVELOPER AND CONTRACTORS TO APPLY FOR AND OBTAIN UP TO DATE PLANS THROUGH A NEW BEFORE YOU DIG AUSTRALIA SEARCH AND TO CONTACT ALL THE RELEVANT AUTHORITIES TO ESTABLISH AND CONFIRM THE DETAILED LOCATION AND DEPTH OF ALL UNDERGROUND SERVICES.



CLIENT:

Logic Projects Co.
c/o Dan D'Ambrosio



Beveridge Williams
Land Development Consultants
Registered Surveyors

Sydney (02) 9283 6677

www.beveridgewilliams.com.au

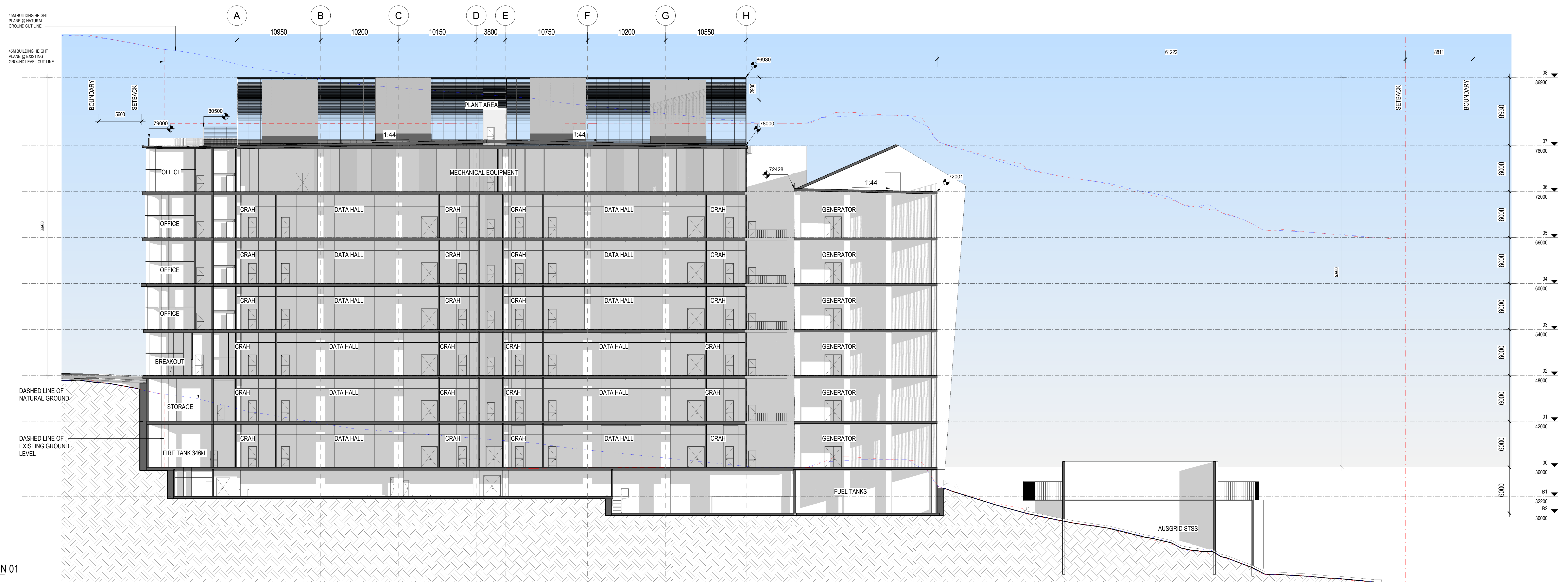
DETAILS:

DETAIL SURVEY PLAN FOR
DEVELOPMENT APPLICATION PURPOSES
LOT 89 DP 1082131
6-8 JULIUS AVENUE, NORTH RYDE

ORIGINAL SHEET SIZE
A1
SCALE 1:600
CAD REFERENCE: 2402997-DET-001-A
0 12 24 36
SCALE ON ORIGINAL DRAWING AT 1:600

SURVEYOR:	A.G.
DRAWN:	J.T.
CHECKED:	J.G.
SURVEY DATE:	25.11.2024
VERTICAL DATUM:	AHD
HORIZONTAL DATUM:	MGA

PROJECT No.	2402997
DRAWING REF.	DET-001
VERSION	A
SHEET	1 OF 6

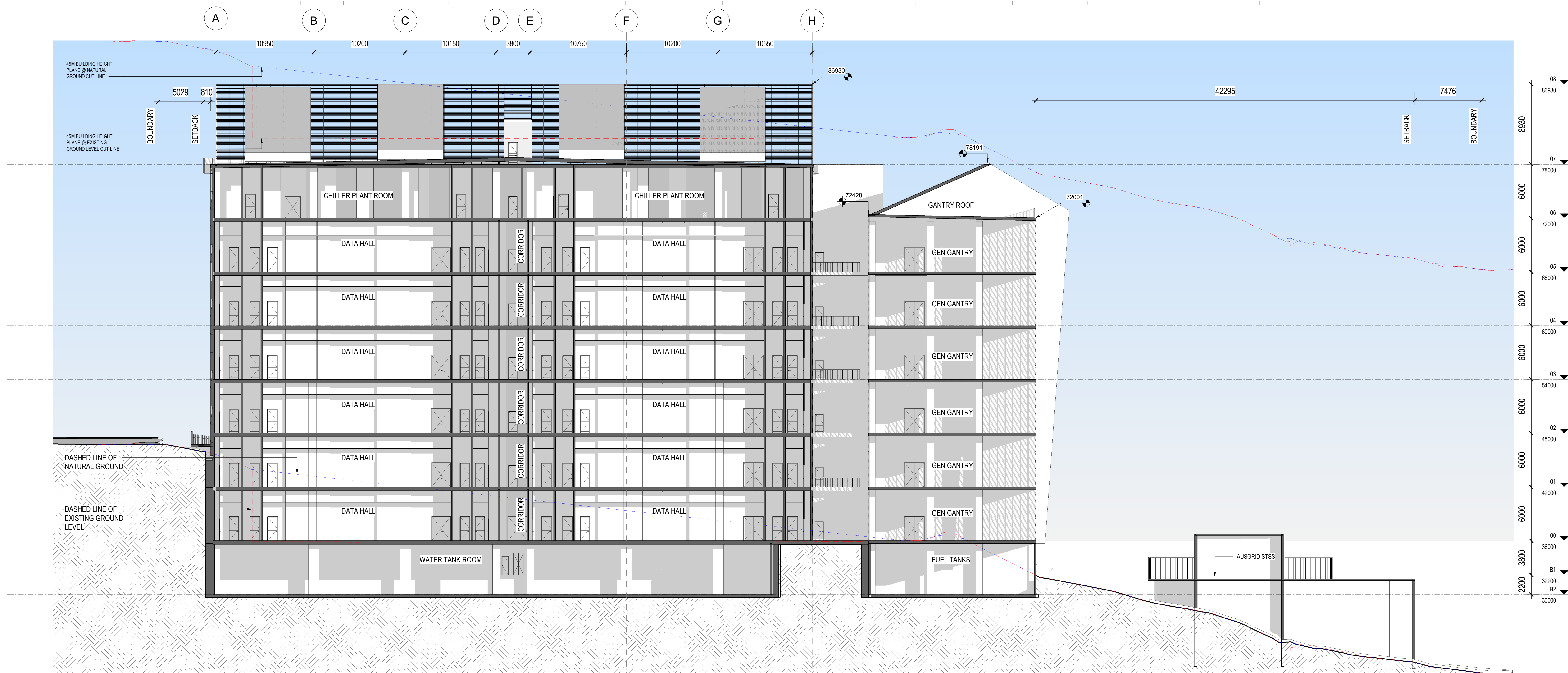


A0	Issue	Date	Description	Notes	Key Plan	Project Manager 	Client 	 451 2 8069 8000 LEVEL 22 68 PITT STREET SYDNEY NSW 2000 AUSTRALIA GREENBOX ARCHITECTURE PTY LTD ABN: 70 130 779 098 ISO 9001 CERTIFIED QUALITY SYSTEM	• Use written dimensions only • Do not scale from drawing • Contractors shall confirm all dimensions on-site prior to commencing any work or producing any shop drawings • All materials to be used in accordance with the manufacturer's specifications and instructions and shall comply with the relevant Australian Standards • Copyright of this drawing and design remain the property of Greenbox Architecture Pty Ltd • Nominated Architect - General Page NSW reg No 7247, Vc reg No 17664, QLD reg No 4538	Client ISPT	Scale 1:200	Sheet A0	Scale Bar 1 200 0 1 2 3 5 10m
	1	2025-02-14	FOR INFORMATION							Drawn By AI	Project Status PRELIMINARY		
	2	2025-02-17	FOR INFORMATION							Checked By ML	Drawing Title BUILDING SECTION - SHEET 01		
	3	2025-02-06	FOR INFORMATION							Approved By AO			
	4	2025-03-13	FOR INFORMATION										
	5	2025-03-28	FOR INFORMATION										
	6	2025-03-31	FOR INFORMATION										
	7	2025-04-11	FOR INFORMATION										
	8	2025-05-09	ISSUE FOR SCOA										
	9	2025-04-18	RESPOND TO TGA										
					Construction Manager					Job Number 240089	Drawing Number 200001	Issue 9	





1 DA BUILDING SECTION 04
1: 200



2 DA BUILDING SECTION 03
1: 200

Issue	Date	Description
1	2023.04.11	FOR INFORMATION
2	2023.05.09	ISSUE FOR SSDA
3	2023.06.18	RESPOND TO TOA

Notes

Key Plan

Project Manager
logic
Construction Manager

Client
ISPT

Greenbox
+61 2 8069 8000 LEVEL 12 68 PITT STREET SYDNEY NSW 2000 AUSTRALIA
GREENBOX ARCHITECTURE PTY LTD ABN: 79 139 779 098 ISO 9001 CERTIFIED QUALITY SYSTEM

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--

Client ISPT
Project JULIUS AVENUE DATA CENTRE 6-8 JULIUS AVE NORTH RYDE NSW

Scale 1: 200	Scale Bar 0 1 2 3 5 10m
Sheet A0	Project Status PRELIMINARY
Checked By ML	Drawing Title BUILDING SECTION - SHEET 03
Approved By AO	Drawing Number 200003
Job Number 240089	Issue 3

Appendix C

Borehole Logs

BOREHOLE LOG

CLIENT: ISPT Pty Ltd
PROJECT: Proposed Data Centre Development
LOCATION: 6-8 Julius Avenue, North Ryde, NSW

SURFACE LEVEL: 35.9 AHD
COORDINATE: E:328051.4, N:6258683.1
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH101
PROJECT No: 233059.00
DATE: 17/02/25
SHEET: 1 of 1

[illegible]

Generated with CORE-GS by Geroc - Rock Log

NOTES: (1) Soil origin is "probable" unless otherwise stated.

PLANT: Bobcat

OPERATOR: Groundtest (JJ)

LOGGED: E Benajmin

METHOD: RR to 0.79m, then NMLC to 9.55m

CASING: Uncased

REMARKS:

Refer to explanatory notes for symbol and abbreviation definitions



CORE PHOTO LOG

CLIENT: ISPT Pty Ltd
PROJECT: Proposed Data Centre Development
LOCATION: 6-8 Julius Avenue, North Ryde, NSW

SURFACE LEVEL: 35.9 AHD
COORDINATE: E:328051.4, N:6258683.1
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH101
PROJECT No: 233059.00
DATE: 17/02/25
SHEET: 1 of 1



0.79-5.00 m depth



5.00-9.55 m depth

WELL INSTALLATION LOG

CLIENT: ISPT Pty Ltd
PROJECT: Proposed Data Centre Development
LOCATION: 6-8 Julius Avenue, North Ryde, NSW

SURFACE LEVEL: 35.9 AHD
COORDINATE: E:328051.6, N:6258684.7
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH101A
PROJECT No: 233059.00
DATE: 19/02/25
SHEET: 1 of 1

CONDITIONS ENCOUNTERED				WELL INSTALLATION		
GROUNDWATER	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	BACKFILL	DIAGRAM	WELL DETAILS
▼ 26/02/25 35 34 33 32 31 30 29 28 27 26	1 2 3 4 5 6 7 8 9	SANDSTONE: see BH101 for detailed geotechnical information.		Bentonite		Plain screen
						1
						2
						3
						4
				4.50m		5
				Sand		6
						7
						8
				9.00m		
		Borehole discontinued at 9.00m depth. target depth reached.				
NOTES: #Soil origin is "probable" unless otherwise stated. #Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.						

PLANT: Bobcat
METHOD: RR to 9m
REMARKS: Well has 1.0m stick up - hole drilled for well installation.

OPERATOR: Groundtest (JJ)
LOGGED: E Benjamin
CASING: Nil



BOREHOLE LOG

CLIENT: ISPT Pty Ltd
PROJECT: Proposed Data Centre Development
LOCATION: 6-8 Julius Avenue, North Ryde, NSW

SURFACE LEVEL: 35.9 AHD
COORDINATE: E:328100.5, N:6258671.0
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH102
PROJECT No: 233059.00
DATE: 17/02/25
SHEET: 1 of 2

CONDITIONS ENCOUNTERED											SAMPLE			TESTING		
GROUNDWATER	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	WEATH.	DEPTH (m)	STRENGTH	RECOVERY (%)	RQD	FRACTURE SPACING (m)	DEFECTS & REMARKS	SAMPLE REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
	0.68	SANDSTONE: fine to medium grained, pale grey, inferred from surface and cuttings		SW possibly	0.68	(H)									PLT	PL(A)=1.2MPa
	1	SANDSTONE: pale grey, medium grained, very thickly bedded with distinct crossbedding, <1% carbonaceous flecks; unbroken. Hawkesbury Sandstone												1	PLT	PL(A)=1.7MPa
	2						100	100						2	PLT	PL(A)=1.9MPa
	3													3		
	4													4	PLT	PL(A)=1.4MPa
	5			FR		H	100	100						5	PLT	PL(A)=1.1MPa
	6													6	PLT	PL(A)=1.4MPa
	7													7	PLT	PL(A)=1.0MPa
	8						100	100						8	PLT	PL(A)=1.4MPa
	9													9	PLT	PL(A)=1.3MPa
	10	Borehole discontinued at 10.00m depth. target depth reached.								734m B 0-5°, PR, CN, RF					PLT	PL(A)=1.2MPa

NOTES: #Soil origin is "probable" unless otherwise stated.

PLANT: Bobcat
METHOD: RR to 0.68m, then NMLC to 10m
REMARKS:

OPERATOR: Groundtest (JJ)

LOGGED: R Fernando
CASING: Uncased

Refer to explanatory notes for symbol and abbreviation definitions



CORE PHOTO LOG

CLIENT: ISPT Pty Ltd

PROJECT: Proposed Data Centre Development

LOCATION: 6-8 Julius Avenue, North Ryde, NSW

SURFACE LEVEL: 35.9 AHD

COORDINATE: E:328100.5, N:6258671.0

DATUM/GRID: MGA2020 Zone 56

DIP/AZIMUTH: 90°/---°

LOCATION ID: BH102

PROJECT No: 233059.00

DATE: 17/02/25

SHEET: 1 of 1



0.68-5.00 m depth



5.00-10.00 m depth

BOREHOLE LOG

CLIENT: ISPT Pty Ltd
PROJECT: Proposed Data Centre Development
LOCATION: 6-8 Julius Avenue, North Ryde, NSW

SURFACE LEVEL: 35.9 AHD
COORDINATE: E:328115.3, N:6258723.0
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH103
PROJECT No: 233059.00
DATE: 18/02/25
SHEET: 1 of 2

CONDITIONS ENCOUNTERED										SAMPLE				TESTING								
GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	SOIL STRENGTH (where encountered)	SOIL MOISTURE	GRAPHIC	WEATH.	DEPTH (m)	STRENGTH	RECOVERY (%)	RQD	FRACTURE SPACING (m)	DEFECTS & REMARKS	SAMPLE REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS	BACKFILL	WELL PIPE	
							RS XW H DW LW SW FR															
		0.75	SANDSTONE: fine to medium grained, pale orange and grey, inferred from surface and cuttings				MW possibly	0.75	(H)									1	PLT	PL(A)=1.2MPa		
		1	SANDSTONE: pale grey and orange-brown, medium grained, very thickly bedded with distinct crossbedding, <1% carbonaceous flecks; slightly fractured then unbroken. Hawkesbury Sandstone										1.19m: EW, 10mm 1.31m: EW, 5mm									
		2					MW to SW			100	99							2	PLT	PL(A)=1.7MPa	Bentonite	
		3																3	PLT	PL(A)=1.9MPa		
		4	From 4.00m: pale grey					4.00										4	PLT	PL(A)=1.4MPa		
	26.02/25	5							H	100	100							5	PLT	PL(A)=1.1MPa		
		6																6	PLT	PL(A)=1.4MPa	Sand	
		7					FR											7	PLT	PL(A)=1.2MPa		
		8								100	100							8	PLT	PL(A)=1.5MPa		
		9																9	PLT	PL(A)=1.6MPa	Bentonite	
		10	Borehole discontinued at 10.00m depth. target depth reached.																			
NOTES: [#] Soil origin is "probable" unless otherwise stated.																						

NOTES: #Soil origin is "probable" unless otherwise stated.

PLANT: Bobcat
METHOD: RR to 0.75m, then NMLC to 10m
REMARKS: RR to 8.0m after target depth reached for well installation. Well has 1.0m stick up.

OPERATOR: Groundtest (JJ)

LOGGED: L Straney
CASING: Uncased

Refer to explanatory notes for symbol and abbreviation definitions

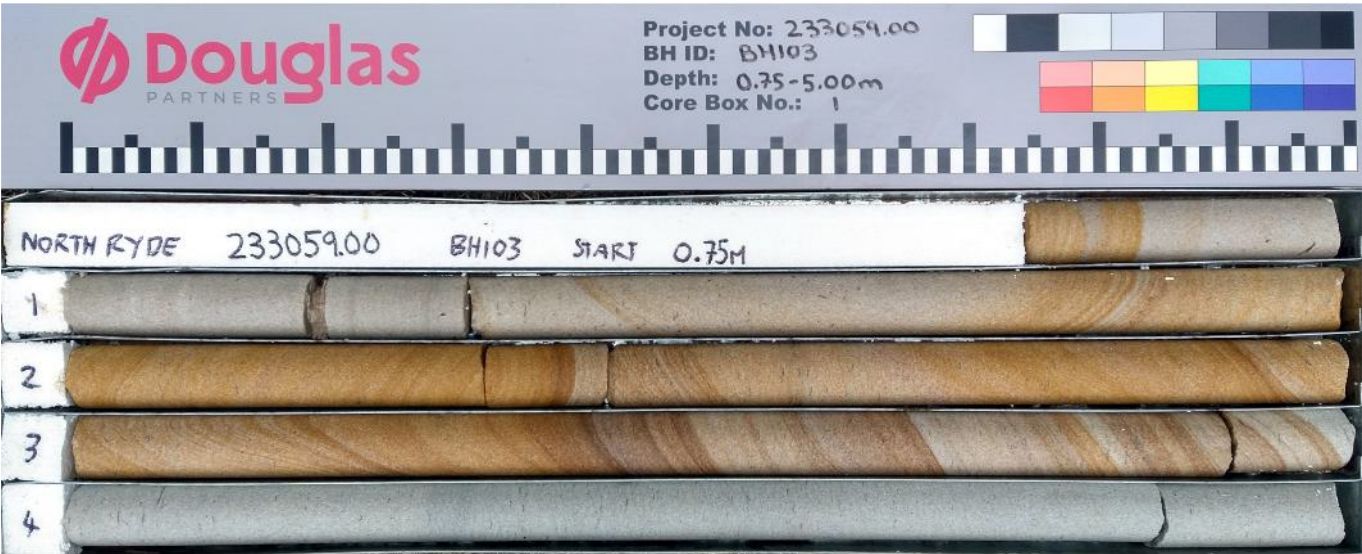


CORE PHOTO LOG

CLIENT: ISPT Pty Ltd
PROJECT: Proposed Data Centre Development
LOCATION: 6-8 Julius Avenue, North Ryde, NSW

SURFACE LEVEL: 35.9 AHD
COORDINATE: E:328115.3, N:6258723.0
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH103
PROJECT No: 233059.00
DATE: 18/02/25
SHEET: 1 of 1



0.75-5.00 m depth



5.00-10.00 m depth

BOREHOLE LOG

CLIENT: ISPT Pty Ltd
PROJECT: Proposed Data Centre Development
LOCATION: 6-8 Julius Avenue, North Ryde, NSW

SURFACE LEVEL: 35.9 AHD
COORDINATE: E:328057.3, N:6258630.1
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH105
PROJECT No: 233059.00
DATE: 14/02/25
SHEET: 1 of 2

CONDITIONS ENCOUNTERED											SAMPLE			TESTING		
GROUNDWATER	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	WEATH.	DEPTH (m)	STRENGTH	RECOVERY (%)	RQD	FRACTURE SPACING (m)	DEFECTS & REMARKS	SAMPLE REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
	0.66	SANDSTONE: fine to medium grained, pale orange and grey, inferred from surface and cuttings		SW possibly	0.66	(M)										
	1	SANDSTONE: pale orange and grey, medium grained, thickly bedded with distinct crossbedding; slightly fractured. Hawkesbury Sandstone		SW												
	2						100	97		210m: B, 0-10°, PR, CN, RF					PLT	PL(A)=0.81MPa
	3															
	3.72			MW to MW	2.95					3.29m: B 0°, PR, CN, RF					PLT	PL(A)=0.67MPa
	4	SANDSTONE: pale grey, medium grained, massive; unbroken. Hawkesbury Sandstone			3.72					3.48m: B, 0-5°, PR, CN, RF						
	5						100	99		3.62m: B 0°, PR, CN, RF					PLT	PL(A)=0.81MPa
	6															
	7			FR						6.82m: B, 0°, PR, CN, RF					PLT	PL(A)=0.70MPa
	8						100	100							PLT	PL(A)=0.90MPa
	9														PLT	PL(A)=0.93MPa
	10															
	11														PLT	PL(A)=0.88MPa
	12															
	13														PLT	PL(A)=0.72MPa
	14															
	15														PLT	PL(A)=0.75MPa
	16						100	90								

NOTES: #Soil origin is "probable" unless otherwise stated.

PLANT: Bobcat
METHOD: RR to 0.66m, then NMLC to 15.71m
REMARKS:

OPERATOR: Groundtest (JJ)

LOGGED: R Fernando
CASING: Uncased

BOREHOLE LOG

CLIENT: ISPT Pty Ltd
PROJECT: Proposed Data Centre Development
LOCATION: 6-8 Julius Avenue, North Ryde, NSW

SURFACE LEVEL: 35.9 AHD
COORDINATE: E:328057.3, N:6258630.1
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH105
PROJECT No: 233059.00
DATE: 14/02/25
SHEET: 2 of 2

CONDITIONS ENCOUNTERED													SAMPLE			TESTING				
GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	SOIL STRENGTH (where encountered)	SOIL MOISTURE	GRAPHIC	WEATH.	DEPTH (m)	STRENGTH	RECOVERY (%)	RQD	FRACTURE SPACING (m)	DEFECTS & REMARKS	SAMPLE REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS	
							RS XW LW HW NW SW FR		VL L M H VH											
		25	[CONT] SANDSTONE: pale grey, medium grained, massive; unbroken. Hawkesbury Sandstone						M									11	PLT	PL(A)=1.1MPa
		24						11.00		100	90							12	PLT	PL(A)=1.2MPa
		23					FR											13	PLT	PL(A)=0.93MPa
		13.00	SANDSTONE: pale grey, medium grained, very thickly bedded, with carbonaceous flecks and 5-15mm ø siltstone clasts; unbroken. Hawkesbury Sandstone						H											
		22								100	100							14	PLT	PL(A)=1.3MPa
		21																15	PLT	PL(A)=1.1MPa
			15.56m: siltstone band 20mm																	PLT — PL(A)=1.0MPa
		20	Borehole discontinued at 15.71m depth. target depth reached.																	
		19																		
		18																		
		17																		
		16																		

NOTES: [#]Soil origin is "probable" unless otherwise stated.

NOTES: #Soil origin is "probable" unless otherwise stated.

PLANT: Bobcat
METHOD: RR to 0.66m, then NMLC to 15.71m
REMARKS:

OPERATOR: Groundtest (JJ)

LOGGED: R Fernando
CASING: Uncased

CORE PHOTO LOG

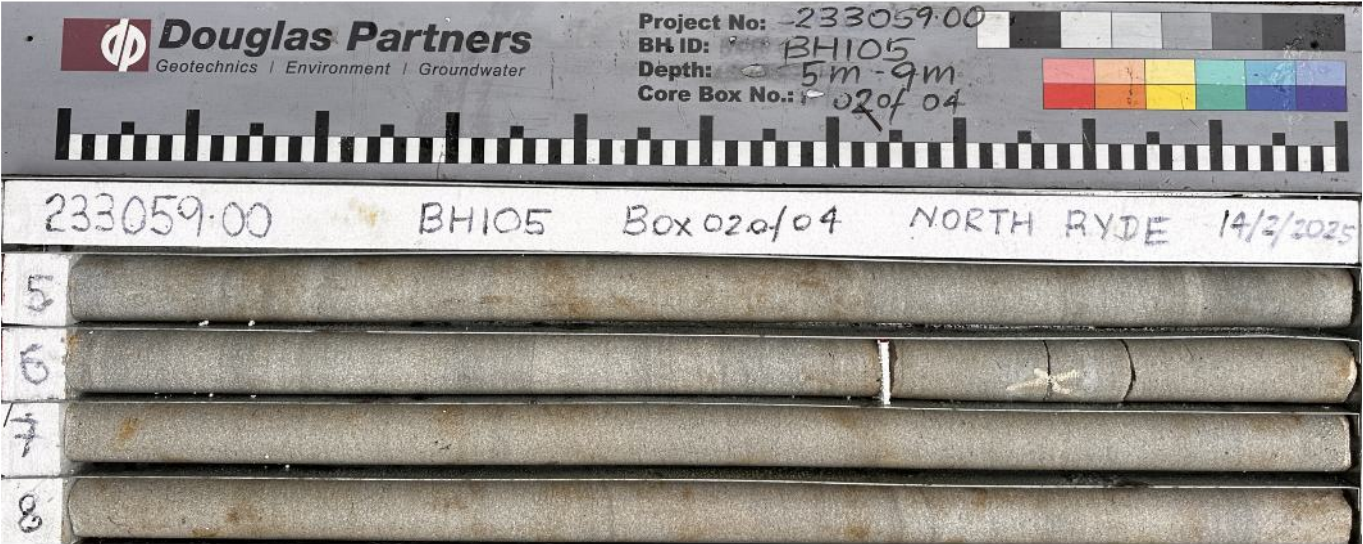
CLIENT: ISPT Pty Ltd
PROJECT: Proposed Data Centre Development
LOCATION: 6-8 Julius Avenue, North Ryde, NSW

SURFACE LEVEL: 35.9 AHD
COORDINATE: E:328057.3, N:6258630.1
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH105
PROJECT No: 233059.00
DATE: 14/02/25
SHEET: 1 of 2



0.66-5.00 m depth



5.00-9.00 m depth

CORE PHOTO LOG

CLIENT: ISPT Pty Ltd
PROJECT: Proposed Data Centre Development
LOCATION: 6-8 Julius Avenue, North Ryde, NSW

SURFACE LEVEL: 35.9 AHD
COORDINATE: E:328057.3, N:6258630.1
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH105
PROJECT No: 233059.00
DATE: 14/02/25
SHEET: 2 of 2



9.00-13.00 m depth



13.00-15.71 m depth

BOREHOLE LOG

CLIENT: ISPT Pty Ltd
PROJECT: Proposed Data Centre Development
LOCATION: 6-8 Julius Avenue, North Ryde, NSW

SURFACE LEVEL: 36.0 AHD
COORDINATE: E:328100.8, N:6258638.2
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH106
PROJECT No: 233059.00
DATE: 19/02/25
SHEET: 1 of 2

CONDITIONS ENCOUNTERED										SAMPLE				TESTING					
GROUNDWATER	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	WEATH.	DEPTH (m)	STRENGTH	RECOVERY (%)	RQD	FRACTURE SPACING (m)	DEFECTS & REMARKS	SAMPLE REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS	BACKFILL	WELL PIPE	
	0.68	SANDSTONE: fine to medium grained, pale orange and grey, inferred from surface and cuttings		FR possibly	0.68	(M) (H)				0.68m: All breaks are handling and drilling breaks									
	1	SANDSTONE: pale grey, medium grained, very thickly bedded, <1% carbonaceous flecks; unbroken. Hawkesbury Sandstone		FR			100	100							1	PLT	PL(A)=0.70MPa	Bentonite	
															1	PLT	PL(A)=0.76MPa		
	2														2	PLT	PL(A)=1.1MPa		
	3	3.64m-4.12m: orange-brown and pale grey, distinct bedding		MW											3	PLT	PL(A)=0.63MPa	Bentonite	
	4														4	PLT	PL(A)=0.99MPa		
	5														5	PLT	PL(A)=0.94MPa		
	6								100		100				6	PLT	PL(A)=1.1MPa		
	7														7	PLT	PL(A)=0.86MPa		
	8			FR			100	100							8	PLT	PL(A)=0.73MPa	Bentonite	
	9													9	PLT	PL(A)=1.1MPa			
		Borehole discontinued at 10.00m depth. target depth reached.													PLT	PL(A)=0.90MPa			

NOTES: #Soil origin is "probable" unless otherwise stated.

PLANT: Bobcat

OPERATOR: Groundtest (JJ)

LOGGED: E Vega

METHOD: RR to 0.68m, then NMLC to 10m

CASING: Uncased

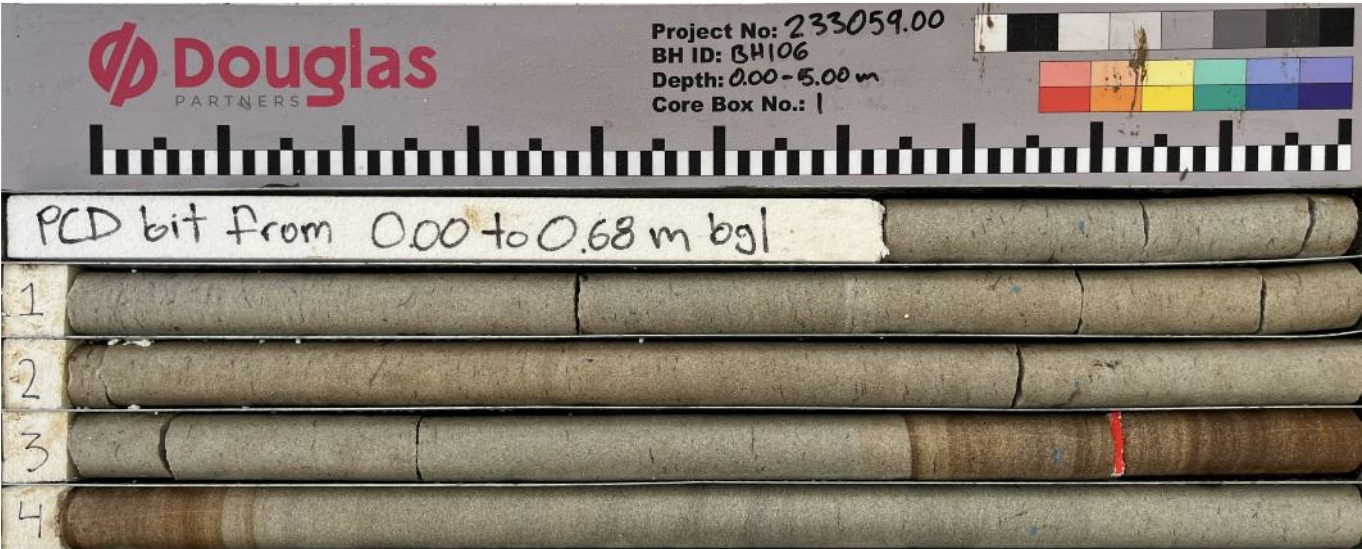
REMARKS: RR to 9.0m after target depth reached for well installation. Well has 1.0m stick up.

CORE PHOTO LOG

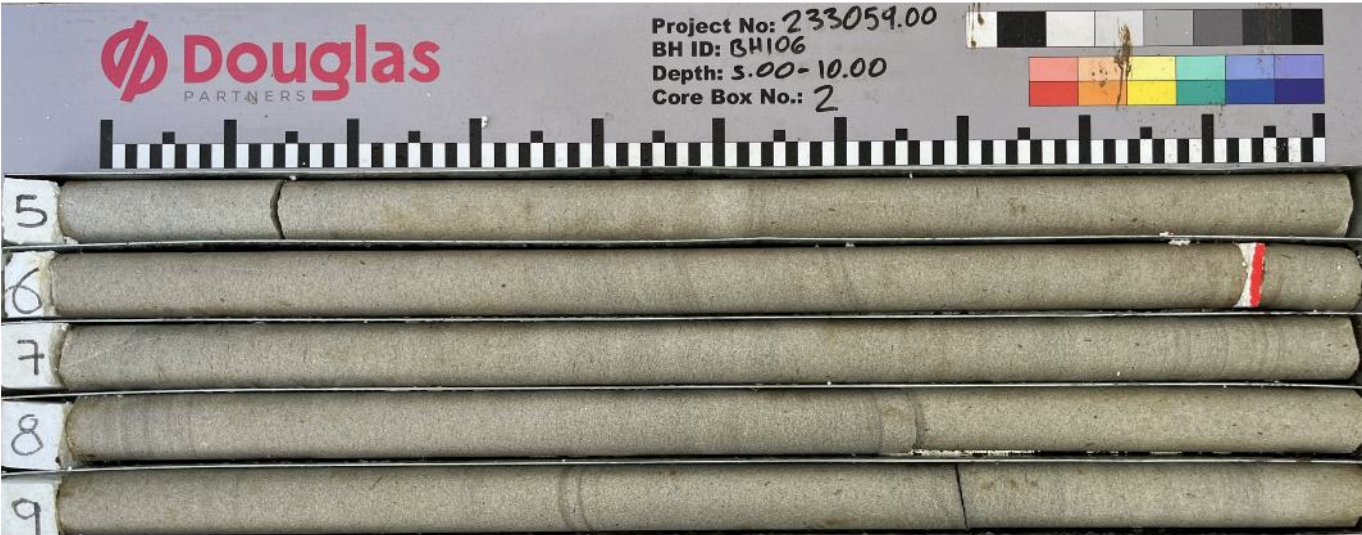
CLIENT: ISPT Pty Ltd
PROJECT: Proposed Data Centre Development
LOCATION: 6-8 Julius Avenue, North Ryde, NSW

SURFACE LEVEL: 36.0 AHD
COORDINATE: E:328100.8, N:6258638.2
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH106
PROJECT No: 233059.00
DATE: 19/02/25
SHEET: 1 of 1



0.68-5.00 m depth

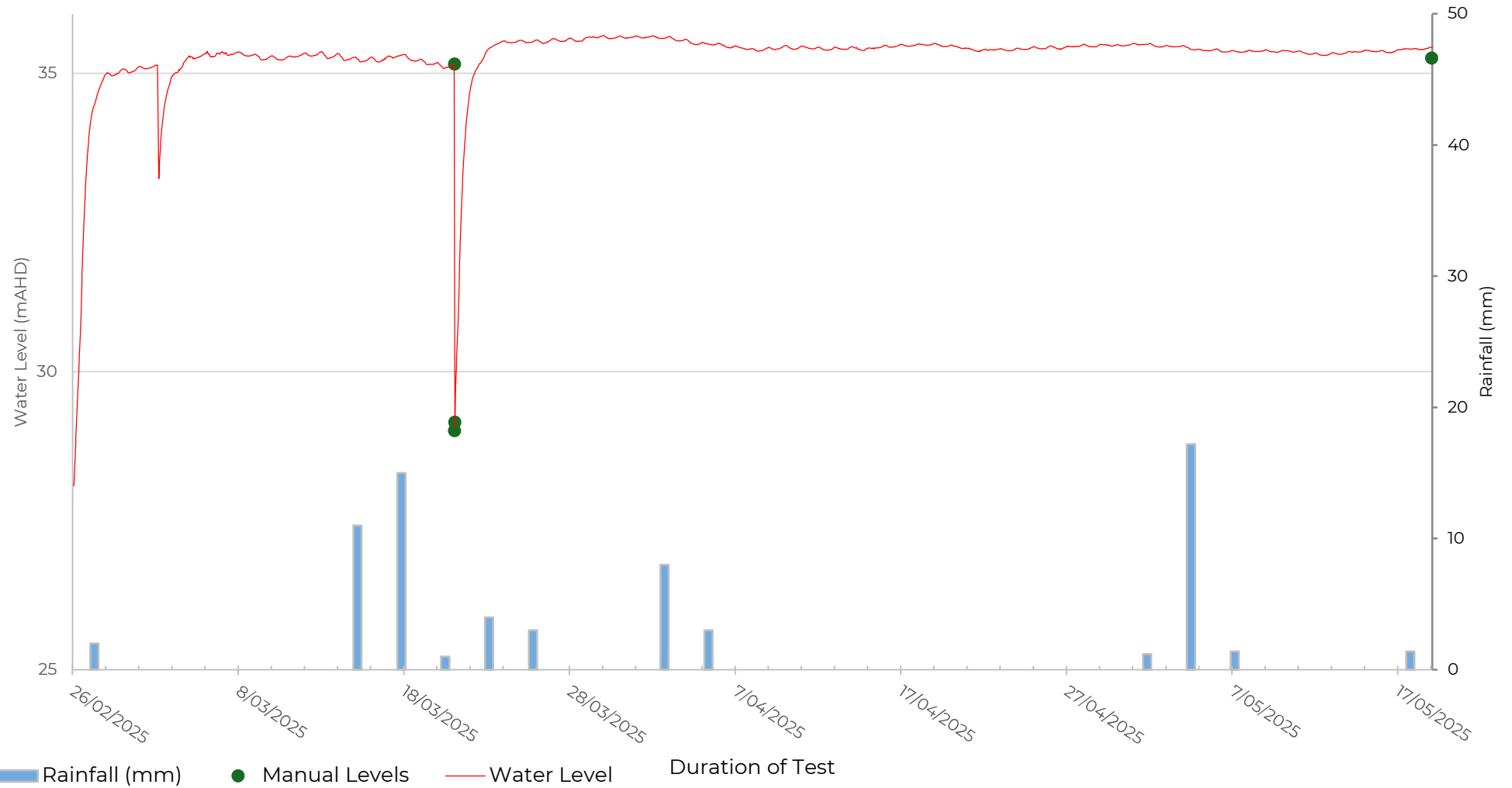


5.00-10.00 m depth

Appendix D

Groundwater Monitoring Hydrographs

BH101A Groundwater Monitoring



GROUND
EXPERTISE

Borehole:

BH101A

**Well Depth:
(mBGL)**

9

From:

26/02/2025

Drawn:

ECB

Project:

207317.03

**Surface RL:
(mAHD)**

35.9

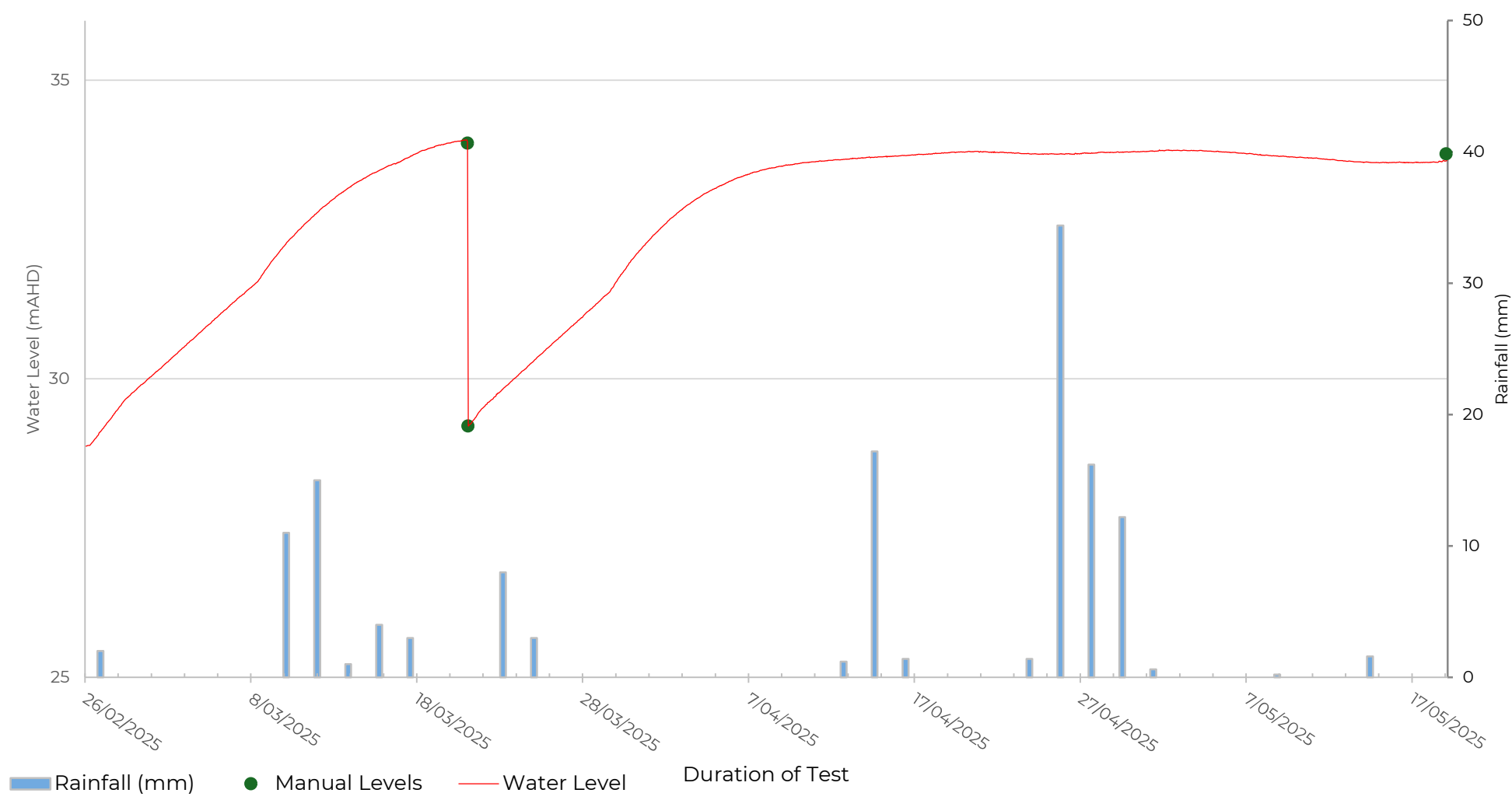
To:

19/05/025

Checked:

HB

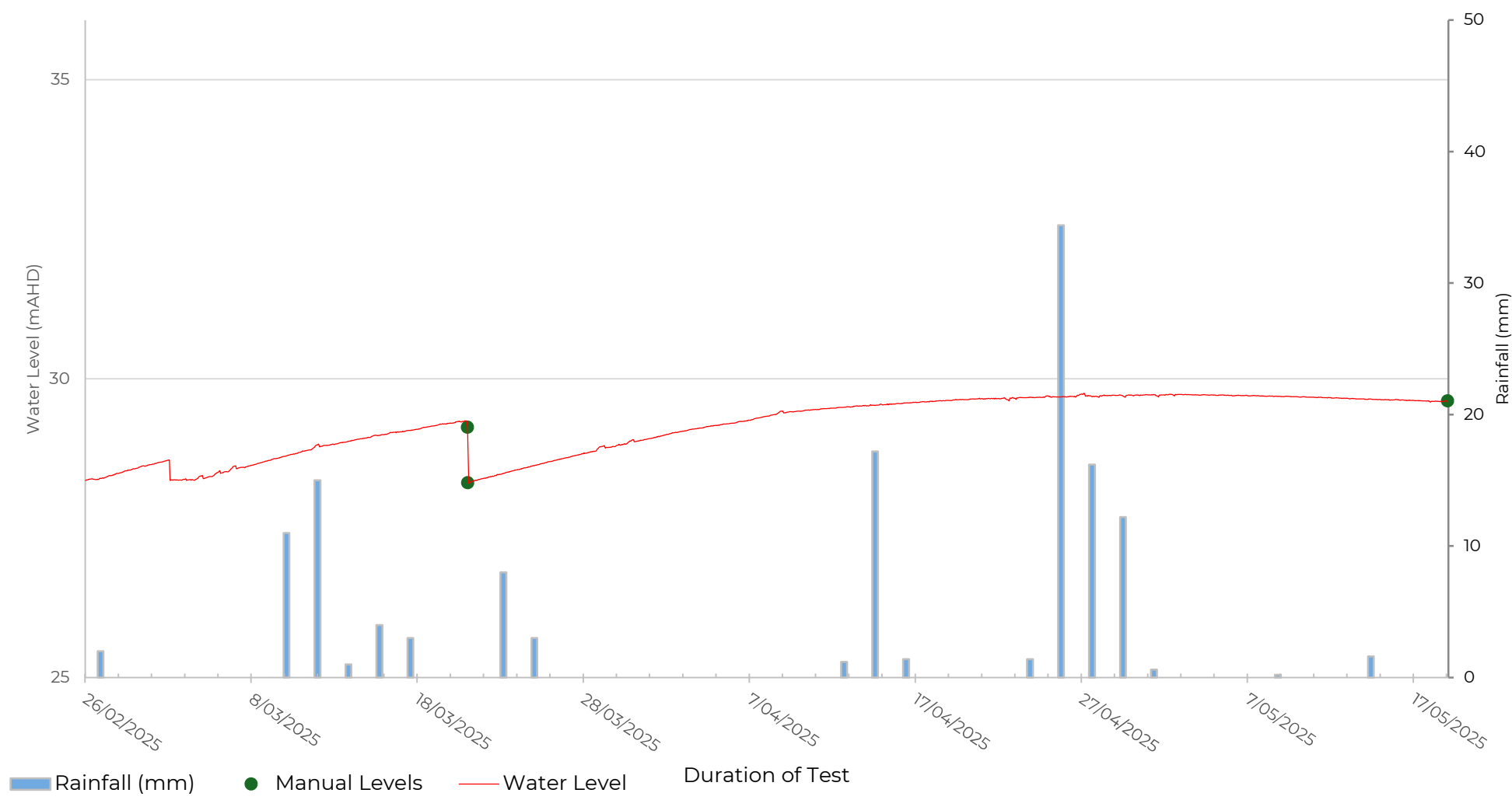
BH103 Groundwater Monitoring



GROUND
EXPERTISE

Borehole:	Well Depth: (mBGL)	From:	Drawn:
BH103	7.5	26/02/2025	ECB
Project:	Surface RL: (mAHD)	To:	Checked:
207317.03	35.9	25/05/2025	HB

BH106 Groundwater Monitoring



 GROUND EXPERTISE	Borehole:	Well Depth: (mBGL)	From:	Drawn:
	BH106	9	26/02/2025	ECB
	Project:	Surface RL: (mAHD)	To:	Checked:
	207317.03	36	19/05/2025	HB

Appendix E

Hydraulic Conductivity Testing

Permeability Testing - Rising Head Test Report

[illegible]

Permeability Testing - Rising Head Test Report

[illegible]

Permeability Testing - Rising Head Test Report

[illegible]

Permeability Testing - Rising Head Test Report

[illegible]

Permeability Testing - Rising Head Test Report

[illegible]

Permeability Testing - Rising Head Test Report

[illegible]

Appendix F

Groundwater Laboratory Results



Table I2: Summary of Results of Water Analysis

		Metals & Metalloids - Dissolved								TRH				BTEx						PAH								OCP	OPP	PCB
		Total Arsenic	Cadmium	Total Chromium	Copper	Lead	Mercury (inorganic)	Nickel	Zinc	F1 (C6-C10)-BTEx)	F2 (>C10-C16 (ess Naphthalene)	F3 (>C16-C34)	F4 (>C34-C40)	Benzene	Toluene	Ethylbenzene	o-Xylene	m+p-Xylene	Total Xylenes	Acenaphthene	Anthracene	Naphthalene	Benzo(a)pyrene (BaP)	Fluoranthene	Phenanthrene	Sum of detected PAH	Sum of detected OCP	Sum of detected Opp	Sum of detected PCB	
	PQL	1	0.1	1	1	1	0.05	1	1	10	50	100	100	1	1	1	1	2	1	0.1	0.1	1	0.1	0.1	0.1	0.1	0.001	0.004	0.01	
NHMRC (2012) Recreation		100	20	500	20,000	100	10	200	30,000					10	8,000	3,000			6,000				0.1							
NEPC (2013) HSL 2-4m (coarse grained soils)										6,000	NL			5,000	NL	NL			NL			NL								
ANZG (2018) 95% LOP Marine		24 / 13	0.7	4.4	1.3	4.4	0.1	7	8					500	180	80	350	75		0.01	0.01	50	0.1	1	0.6					
Sample ID	Sample Date	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	
101A	03/03/25	<1	<0.1	2	4	12	<0.05	5	56	<10	67	<100	<100	<1	<1	<1	<1	<2	<1	<0.1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.001	<0.004	<0.01	
BD1/20250303	03/03/25	<1	<0.1	2	3	11	<0.05	4	55	<10	120	<100	<100	<1	<1	<1	<1	<2	<1	<0.1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	-	-	-	
106	03/03/25	1	<0.1	<1	<1	<1	<0.05	9	27	<10	180	<100	<100	<1	<1	<1	<1	<2	<1	<0.1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.001	<0.004	<0.01	

Notes:

- No criterion / not defined / not tested / not applicable
- * QA/QC replicate of sample listed directly below the primary sample
- NL Not limiting
- PQL Practical quantitation limit

Shaded cell is exceedance of guideline value

Where one or more guideline value is exceeded, the cell is shaded to the colour of the highest guideline value exceeded

NEPC (2013) National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013), health screening level Sand 2-4m

ANZG (2018) Australian and New Zealand Guidelines for Fresh and Marine Water Quality, 95% level of protection of species for Marine aquatic ecosystems [NB: 99% level of protection adopted for bioaccumulative chemicals]

NHMRC (2008) Guidelines for Managing Risk in Recreational Water

ANZG (2018) Australian and New Zealand Guidelines for Fresh and Marine Water Quality, orange text is 'unknown' level of protection

Underlining of ANZG (2018) criteria indicates a criteria with an 'unknown' level of protection.

ANZG (2018) DGV adopted for most conservative species of following analytes: DGV for xylene (m) adopted for xylene (m+p); DGV for CrVI adopted for total chromium; DGV for AsV adopted for total arsenic

ANZG (2018) DGV adopted for aluminium in freshwater is for receiving waters with pH >6.5. For receiving waters with pH <6.5 suitability of the more conservative, low reliability DGV of unknown LOP should be considered

ANZG (2018) Ammonia DGV is pH and temperature dependant. DGV for a pH of 8 provided in table.

Groundwater (GW) Field Sheet

Project and Bore Installation Details						
Project Name / Site Location					Project Number	
Well Construction Details	Well ID	101A	Drilling Method		Hole Diameter (m)	
	Well Depth (m bgl)		Screened (m bgl)		Stick Up (m)	
Survey Information	Easting		Northing		Elevation RL	
GW Level During Drilling		m bgl				
Contaminants/Comments						

Well Development Details

Date / Time / Weather Conditions				Purged By	
Purge Method / Equipment					
Product observed / Thickness		mm	Confirmed with Bailer? (Y / N)		
GW Level (pre-purge)		m bgl	Observed Well Depth		m bgl
Height of Water Column (H)		m bgl	Estimated Bore Volume*		L
GW Level (post-purge)		m bgl	Total Volume Purged**		L
Appearance/Comments					

Sampling Details

Sampling Details					
Date / Time / Weather Conditions	10:11 am 3/3/25 sunny			Sampled By	mw
Sampling Method / Equipment	Perripump				
WQM Model	VS1		WQM Calibration Date	28/2/25	
Product observed / Thickness		mm	Confirmed with Bailer? (Y / N)	N/ Interface	
GW Level (pre-micropurge)	0.76	m bgl	Observed Well Depth	9.00	m bgl
Height of Water Column	7.24	m bgl	Estimated Bore Volume*	26 - 30L	L
GW Level (post sample)		m bgl	Total Volume of Micro-Purged		L

Water Quality Parameters

[illegible]

Notes:

#	Considered stabilised if three DO values are less than 0.5 mg/L
---	---

^a Considered stabilised if three Turbidity values are less than 5 NTU

Sample Details

Sampling Depth (rationale)		m bgl,	
Sample Observations (e.g. colour, sediment, sheen, odour)			
Sample ID	101A + B01/20250303		
QAQC Samples	Replicate		Triplicate
Sample Containers	Amber glass		Plastic
Quantity / Preservation / Filtration	Metals (F/UF) (HNO3)		Phenols/COD/NH3 (H2SO4)
	Ferrous/Ferric Iron (HCl)		Cyanides/Chromium (NaOH)
Comments			

*Estimated Well Volume = H * F

Std. Drilling Diameter (m)~

NMLC (0.075)

HQ (0.096)

PQ (0.1226)

SEA (0.125)

HEA (0.194)

****Purge Target: min. 3 well volumes**

Factor (F):

2.8

3.7

5.2

5.4

11.1

Groundwater (GW) Field Sheet

Project and Bore Installation Details						
Project Name / Site Location					Project Number	
Well Construction Details	Well ID		Drilling Method		Hole Diameter (m)~	
	Well Depth (m bgl)		Screened (m bgl)		Stick Up (m)	1.00 from surface
Survey Information	Easting		Northing		Elevation RL	
GW Level During Drilling		m bgl				
Contaminants/Comments						

Well Development Details				
Date / Time / Weather Conditions				Purged By
Purge Method / Equipment	Developed from geo			
Product observed / Thickness		mm	Confirmed with Bailer? (Y / N)	
GW Level (pre-purge)		m bgl	Observed Well Depth	m bgl
Height of Water Column (H)		m bgl	Estimated Bore Volume*	L
GW Level (post-purge)		m bgl	Total Volume Purged**	L
Appearance/Comments				

Sampling Details				
Date / Time / Weather Conditions	9:30 3/5/25 Overcast		Sampled By	MW
Sampling Method / Equipment	Perrypump			
WQM Model	YS1	WQM Calibration Date	28/2/24	
Product observed / Thickness	NL	mm	Confirmed with Bailer? (Y / N)	N / interface
GW Level (pre-micropurge)	7.47	m bgl	Observed Well Depth	8.00 m bgl
Height of Water Column	0.53	m bgl	Estimated Bore Volume*	~1.96 L
GW Level (post sample)	Dry	m bgl	Total Volume of Micro-Purged	2-3 L

[illegible]

Sample Details						
Sampling Depth (rationale)	2.5-8m		m bgl,			
Sample Observations (e.g. colour, sediment, sheen, odour)	clear, no sheen, no odour					
Sample ID	106					
QAQC Samples	Replicate		Triplicate		Other	
Sample Containers	Amber glass		Plastic		PFAS (no teflon)	
Quantity / Preservation / Filtration	Metals (F/UF) (HNO3)		Phenols/COD/NH3 (H2SO4)		Vials (HCl)	
	Ferrous/Ferric Iron (HCl)		Cyanides/Chromium (NaOH)		Other	
Comments						

*Estimated Well Volume = H * F	Std. Drilling Diameter (m)	NMLC (0.075)	HQ (0.096)	PQ (0.1226)	SFA (0.125)	HFA (0.194)
**Purge Target: min. 3 well volumes	Factor (F):	2.8	3.7	5.2	5.4	11.1

Project No: 233059.01	Suburb: North Ryde	To: Envirolab Services
Project Manager: Joel James-Hall	Order Number:	Sampler: NW
Email: joel.james-hall@douglaspartners.com.au		Attn: Sample Receipt
Turnaround time: ☒ Standard ☐ 72 hour ☐ 48 hour ☐ 24 hour ☐ Same day		(02) 9910 6200 samplereceipt@envirolab.com

Prior Storage:
☒ Fridge
 ☐ Freezer
 ☒ Esky
 ☐ Shelf
 Do samples contain 'potential' HBM?
☐ No
 ☐ Yes (If YES, then handle, transport and store in accordance with FPM HAZID)

Lab ID	Sample ID			Date Sampled	Sample Type	Container Type	Analytes										Notes/ Preservation/ Additional Requirements
	Location / Other ID	Depth From	Depth To		S - soil W - water M - Material	G - glass P - plastic	Combo8L	Combo 3L	Combo8_an	PFAS (short suite)	Combo 3	BTEX					
1	101A	-	-	3/03/25	W	G,P	x										trace level, OCP, OPP, PCB
2	106	-	-	3/03/25	W	G,P	x										trace level, OCP, OPP, PCB
3	BD1/20250303	-	-	3/03/25	W	G,P		x									
4	BH13	0	0.1	3/03/25	S	G,P			x								
5	BH14	0	0.1	3/03/25	S	G,P			x	x							
6	BH15	0	0.1	3/03/25	S	G,P			x								
7	BD1/20250303	-	-	3/03/25	S	G,P				x							
8	Trip spike	-	-	3/03/25	W	G						x					
9	Trip blank	-	-	3/03/25	W	G						x					
10	Trip blank				S												
11	Trip spike				S												



EnviroLab
Chatswood NSW 2067
Ph: (02) 9910 6200

Job No: 374632

Date Received: 3/3/25

Time Received: 1815

Received By: ST

Temp: Cool/Ambient

Cooling: Ice/icepack

Security: Intact/Broken/None



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

Job No: 574632
 Date Received: 3/3/25
 Time Received: 1815
 Received By: ST
 Temp: Cool Ambient
 Cooling: Icepack
 Security: Intact/Broken/None

Metals to analyse:		LAB RECEIPT	
Number of samples in container:	Transported to laboratory by:	Lab Ref. No: 574632	
Send results to: Douglas Partners Pty Ltd		Received by: Shawn Tok	
Address:	Phone:	Date & Time: 3/3/25 1815	
Relinquished by:	Date:	Signed:	Signed: [Signature]

SAMPLE RECEIPT ADVICE

Client Details

Client	Douglas Partners Pty Ltd
Attention	Joel James-Hall

Sample Login Details

Your reference	233059.01, North Ryde
Envirolab Reference	374632
Date Sample Received	03/03/2025
Date Instructions Received	04/03/2025
Date Results Expected to be Reported	11/03/2025

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	5 Water, 4 Soil
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	3
Cooling Method	Ice
Sampling Date Provided	YES

Comments

Samples #10 and #11 - Received extra samples, confirmed with client to disregard samples.

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	Phone: 02 9910 6200
Fax: 02 9910 6201	Fax: 02 9910 6201
Email: ahie@envirolab.com.au	Email: jhurst@envirolab.com.au

Analysis Underway, details on the following page:

Sample ID	VTRH(C6-C10)/BTEXN in Water	svTRH (C10-C40) in Water	PAHs in Water	OCs in Water - Trace Level	OP in water LL ANZECCF/ADWG	PCBs in Water - Trace Level	Total Phenolics in Water	HM in water - dissolved	VTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Organochlorine Pesticides in soil	Organophosphorus Pesticides in Soil	PCBs in Soil	Misc Soil - Inorg	Acid Extractable metals in soil	Asbestos ID - soils NEPM	PFAS in Soils Short
101A	✓	✓	✓	✓	✓	✓	✓	✓										
106	✓	✓	✓	✓	✓	✓	✓	✓										
BD1/20250303	✓	✓	✓					✓										
BH13-0-0.1									✓	✓	✓	✓	✓	✓	✓	✓	✓	
BH14-0-0.1									✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
BH15-0-0.1									✓	✓	✓	✓	✓	✓	✓	✓	✓	
BD1/20250303									✓	✓	✓					✓		
Trip Spike	✓																	
Trip Blank	✓																	

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.

Requests for longer term sample storage must be received in writing.

Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.

TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

CERTIFICATE OF ANALYSIS 374632

Client Details

Client	Douglas Partners Pty Ltd
Attention	Joel James-Hall
Address	96 Hermitage Rd, West Ryde, NSW, 2114

Sample Details

Your Reference	<u>233059.01, North Ryde</u>
Number of Samples	5 Water, 4 Soil
Date samples received	03/03/2025
Date completed instructions received	04/03/2025

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.

Please refer to the last page of this report for any comments relating to the results.

Report Details

Date results requested by	11/03/2025
Date of Issue	11/03/2025
NATA Accreditation Number 2901. This document shall not be reproduced except in full.	
Accredited for compliance with ISO/IEC 17025 - Testing. Tests not covered by NATA are denoted with *	

Asbestos Approved By

Analysed by Asbestos Approved Analyst: Nyovan Moonean
 Authorised by Asbestos Approved Signatory: Lucy Zhu

Authorised By

Nancy Zhang, Laboratory Manager

Results Approved By

Diego Bigolin, Inorganics Supervisor
 Dragana Tomas, Senior Chemist
 Giovanni Agosti, Group Technical Manager
 Lucy Zhu, Asbestos Supervisor
 Phalak Inthakesone, Organics Development Manager, Sydney
 Steven Luong, Senior Chemist
 Timothy Toll, Senior Chemist

vTRH(C6-C10)/BTEXN in Water

Our Reference		374632-1	374632-2	374632-3	374632-8	374632-9
Your Reference	UNITS	101A	106	BD1/20250303	Trip Spike	Trip Blank
Depth		-	-	-	-	-
Date Sampled		03/03/2025	03/03/2025	03/03/2025	03/03/2025	03/03/2025
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	09/03/2025	09/03/2025	09/03/2025	09/03/2025	09/03/2025
Date analysed	-	10/03/2025	10/03/2025	10/03/2025	10/03/2025	10/03/2025
TRH C ₆ - C ₉	µg/L	<10	<10	<10	[NA]	<10
TRH C ₆ - C ₁₀	µg/L	<10	<10	<10	[NA]	<10
TRH C ₆ - C ₁₀ less BTEX (F1)	µg/L	<10	<10	<10	[NA]	<10
Benzene	µg/L	<1	<1	<1	110%	<1
Toluene	µg/L	<1	<1	<1	109%	<1
Ethylbenzene	µg/L	<1	<1	<1	112%	<1
m+p-xylene	µg/L	<2	<2	<2	114%	<2
o-xylene	µg/L	<1	<1	<1	115%	<1
Naphthalene	µg/L	<1	<1	<1	[NA]	<1
Surrogate Dibromofluoromethane	%	102	100	103	100	102
Surrogate Toluene-d8	%	101	100	101	100	101
Surrogate 4-Bromofluorobenzene	%	98	98	100	100	98

svTRH (C10-C40) in Water				
Our Reference		374632-1	374632-2	374632-3
Your Reference	UNITS	101A	106	BD1/20250303
Depth		-	-	-
Date Sampled		03/03/2025	03/03/2025	03/03/2025
Type of sample		Water	Water	Water
Date extracted	-	05/03/2025	05/03/2025	05/03/2025
Date analysed	-	06/03/2025	06/03/2025	06/03/2025
TRH C ₁₀ - C ₁₄	µg/L	58	170	110
TRH C ₁₅ - C ₂₈	µg/L	<100	<100	<100
TRH C ₂₉ - C ₃₆	µg/L	<100	<100	<100
Total +ve TRH (C10-C36)	µg/L	60	170	110
TRH >C ₁₀ - C ₁₆	µg/L	67	180	120
TRH >C ₁₀ - C ₁₆ less Naphthalene (F2)	µg/L	67	180	120
TRH >C ₁₆ - C ₃₄	µg/L	<100	<100	<100
TRH >C ₃₄ - C ₄₀	µg/L	<100	<100	<100
Total +ve TRH (>C10-C40)	µg/L	70	180	120
Surrogate o-Terphenyl	%	100	106	94

PAHs in Water				
Our Reference		374632-1	374632-2	374632-3
Your Reference	UNITS	101A	106	BD1/20250303
Depth		-	-	-
Date Sampled		03/03/2025	03/03/2025	03/03/2025
Type of sample		Water	Water	Water
Date extracted	-	05/03/2025	05/03/2025	05/03/2025
Date analysed	-	10/03/2025	10/03/2025	05/03/2025
Naphthalene	µg/L	<0.1	<0.1	<0.1
Acenaphthylene	µg/L	<0.1	<0.1	<0.1
Acenaphthene	µg/L	<0.1	<0.1	<0.1
Fluorene	µg/L	<0.1	<0.1	<0.1
Phenanthrene	µg/L	<0.1	<0.1	<0.1
Anthracene	µg/L	<0.1	<0.1	<0.1
Fluoranthene	µg/L	<0.1	<0.1	<0.1
Pyrene	µg/L	<0.1	<0.1	<0.1
Benzo(a)anthracene	µg/L	<0.1	<0.1	<0.1
Chrysene	µg/L	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	µg/L	<0.2	<0.2	<0.2
Benzo(a)pyrene	µg/L	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	µg/L	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	µg/L	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	µg/L	<0.1	<0.1	<0.1
Benzo(a)pyrene TEQ	µg/L	<0.5	<0.5	<0.5
Total +ve PAH's	µg/L	<0.1	<0.1	<0.1
Surrogate <i>p</i> -Terphenyl-d14	%	109	110	107

OCPs in Water - Trace Level			
Our Reference		374632-1	374632-2
Your Reference	UNITS	101A	106
Depth		-	-
Date Sampled		03/03/2025	03/03/2025
Type of sample		Water	Water
Date extracted	-	05/03/2025	05/03/2025
Date analysed	-	10/03/2025	10/03/2025
alpha-BHC	µg/L	<0.001	<0.001
HCB	µg/L	<0.001	<0.001
beta-BHC	µg/L	<0.001	<0.001
gamma-BHC	µg/L	<0.001	<0.001
Heptachlor	µg/L	<0.001	<0.001
delta-BHC	µg/L	<0.001	<0.001
Aldrin	µg/L	<0.001	<0.001
Heptachlor Epoxide	µg/L	<0.001	<0.001
gamma-Chlordane	µg/L	<0.001	<0.001
alpha-Chlordane	µg/L	<0.001	<0.001
Endosulfan I	µg/L	<0.002	<0.002
pp-DDE	µg/L	<0.001	<0.001
Dieldrin	µg/L	<0.001	<0.001
Endrin	µg/L	<0.001	<0.001
Endosulfan II	µg/L	<0.002	<0.002
pp-DDD	µg/L	<0.001	<0.001
Endrin Aldehyde	µg/L	<0.001	<0.001
pp-DDT	µg/L	<0.001	<0.001
Endosulfan Sulphate	µg/L	<0.001	<0.001
Methoxychlor	µg/L	<0.001	<0.001
Surrogate 4-Chloro-3-NBTF	%	116	111

OP in water LL ANZECCF/ADWG			
Our Reference		374632-1	374632-2
Your Reference	UNITS	101A	106
Depth		-	-
Date Sampled		03/03/2025	03/03/2025
Type of sample		Water	Water
Date extracted	-	05/03/2025	05/03/2025
Date analysed	-	10/03/2025	10/03/2025
Dichlorvos	µg/L	<0.05	<0.05
Mevinphos	µg/L	<0.05	<0.05
Phorate	µg/L	<0.05	<0.05
Dimethoate	µg/L	<0.1	<0.1
Diazinon	µg/L	<0.01	<0.01
Disulfoton	µg/L	<0.05	<0.05
Chlorpyrifos-methyl	µg/L	<0.05	<0.05
Parathion-Methyl	µg/L	<0.05	<0.05
Ronnel	µg/L	<0.05	<0.05
Fenitrothion	µg/L	<0.05	<0.05
Malathion	µg/L	<0.05	<0.05
Chlorpyrifos	µg/L	<0.009	<0.009
Fenthion	µg/L	<0.05	<0.05
Parathion	µg/L	<0.004	<0.004
Bromophos ethyl	µg/L	<0.05	<0.05
Methidathion	µg/L	<0.05	<0.05
Fenamiphos	µg/L	<0.05	<0.05
Ethion	µg/L	<0.05	<0.05
Phosalone	µg/L	<0.05	<0.05
Azinphos-methyl (Guthion)	µg/L	<0.02	<0.02
Coumaphos	µg/L	<0.05	<0.05
Surrogate 4-Chloro-3-NBTF	%	116	111

PCBs in Water - Trace Level			
Our Reference		374632-1	374632-2
Your Reference	UNITS	101A	106
Depth		-	-
Date Sampled		03/03/2025	03/03/2025
Type of sample		Water	Water
Date extracted	-	05/03/2025	05/03/2025
Date analysed	-	10/03/2025	10/03/2025
Aroclor 1016	µg/L	<0.01	<0.01
Aroclor 1221	µg/L	<0.01	<0.01
Aroclor 1232	µg/L	<0.01	<0.01
Aroclor 1242	µg/L	<0.01	<0.01
Aroclor 1248	µg/L	<0.01	<0.01
Aroclor 1254	µg/L	<0.01	<0.01
Aroclor 1260	µg/L	<0.01	<0.01
Surrogate 2-Fluorobiphenyl	%	97	95

Total Phenolics in Water			
Our Reference	UNITS	374632-1	374632-2
Your Reference		101A	106
Depth		-	-
Date Sampled		03/03/2025	03/03/2025
Type of sample		Water	Water
Date extracted	-	05/03/2025	05/03/2025
Date analysed	-	05/03/2025	05/03/2025
Total Phenolics (as Phenol)	mg/L	<0.05	<0.05

HM in water - dissolved				
Our Reference		374632-1	374632-2	374632-3
Your Reference	UNITS	101A	106	BD1/20250303
Depth		-	-	-
Date Sampled		03/03/2025	03/03/2025	03/03/2025
Type of sample		Water	Water	Water
Date prepared	-	05/03/2025	05/03/2025	05/03/2025
Date analysed	-	05/03/2025	05/03/2025	05/03/2025
Arsenic-Dissolved	µg/L	<1	1	<1
Cadmium-Dissolved	µg/L	<0.1	<0.1	<0.1
Chromium-Dissolved	µg/L	2	<1	2
Copper-Dissolved	µg/L	4	<1	3
Lead-Dissolved	µg/L	12	<1	11
Mercury-Dissolved	µg/L	<0.05	<0.05	<0.05
Nickel-Dissolved	µg/L	5	9	4
Zinc-Dissolved	µg/L	56	27	55

vTRH(C6-C10)/BTEXN in Soil					
Our Reference		374632-4	374632-5	374632-6	374632-7
Your Reference	UNITS	BH13	BH14	BH15	BD1/20250303
Depth		0-0.1	0-0.1	0-0.1	-
Date Sampled		03/03/2025	03/03/2025	03/03/2025	03/03/2025
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	05/03/2025	05/03/2025	05/03/2025	05/03/2025
Date analysed	-	07/03/2025	07/03/2025	07/03/2025	07/03/2025
TRH C ₆ - C ₉	mg/kg	<25	<25	<25	<25
TRH C ₆ - C ₁₀	mg/kg	<25	<25	<25	<25
vTRH C ₆ - C ₁₀ less BTEX (F1)	mg/kg	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1
Naphthalene	mg/kg	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	105	102	86	88

svTRH (C10-C40) in Soil					
Our Reference		374632-4	374632-5	374632-6	374632-7
Your Reference	UNITS	BH13	BH14	BH15	BD1/20250303
Depth		0-0.1	0-0.1	0-0.1	-
Date Sampled		03/03/2025	03/03/2025	03/03/2025	03/03/2025
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	05/03/2025	05/03/2025	05/03/2025	05/03/2025
Date analysed	-	06/03/2025	06/03/2025	06/03/2025	06/03/2025
TRH C ₁₀ - C ₁₄	mg/kg	<50	<50	<50	<50
TRH C ₁₅ - C ₂₈	mg/kg	<100	<100	<100	<100
TRH C ₂₉ - C ₃₆	mg/kg	<100	<100	<100	<100
Total +ve TRH (C10-C36)	mg/kg	<50	<50	<50	<50
TRH >C ₁₀ -C ₁₆	mg/kg	<50	<50	<50	<50
TRH >C ₁₀ -C ₁₆ less Naphthalene (F2)	mg/kg	<50	<50	<50	<50
TRH >C ₁₆ -C ₃₄	mg/kg	<100	<100	<100	<100
TRH >C ₃₄ -C ₄₀	mg/kg	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50
Surrogate o-Terphenyl	%	81	92	81	80

PAHs in Soil					
Our Reference		374632-4	374632-5	374632-6	374632-7
Your Reference	UNITS	BH13	BH14	BH15	BD1/20250303
Depth		0-0.1	0-0.1	0-0.1	-
Date Sampled		03/03/2025	03/03/2025	03/03/2025	03/03/2025
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	05/03/2025	05/03/2025	05/03/2025	05/03/2025
Date analysed	-	05/03/2025	05/03/2025	05/03/2025	05/03/2025
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5
Surrogate <i>p</i> -Terphenyl-d14	%	101	105	99	101

Organochlorine Pesticides in soil				
Our Reference		374632-4	374632-5	374632-6
Your Reference	UNITS	BH13	BH14	BH15
Depth		0-0.1	0-0.1	0-0.1
Date Sampled		03/03/2025	03/03/2025	03/03/2025
Type of sample		Soil	Soil	Soil
Date extracted	-	05/03/2025	05/03/2025	05/03/2025
Date analysed	-	05/03/2025	05/03/2025	05/03/2025
alpha-BHC	mg/kg	<0.1	<0.1	<0.1
HCB	mg/kg	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1
Mirex	mg/kg	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1
Total Positive Aldrin+Dieldrin	mg/kg	<0.1	<0.1	<0.1
Surrogate 4-Chloro-3-NBTF	%	109	114	109

Organophosphorus Pesticides in Soil				
Our Reference		374632-4	374632-5	374632-6
Your Reference	UNITS	BH13	BH14	BH15
Depth		0-0.1	0-0.1	0-0.1
Date Sampled		03/03/2025	03/03/2025	03/03/2025
Type of sample		Soil	Soil	Soil
Date extracted	-	05/03/2025	05/03/2025	05/03/2025
Date analysed	-	05/03/2025	05/03/2025	05/03/2025
Dichlorvos	mg/kg	<0.1	<0.1	<0.1
Mevinphos	mg/kg	<0.1	<0.1	<0.1
Phorate	mg/kg	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1
Disulfoton	mg/kg	<0.1	<0.1	<0.1
Chlorpyrifos-methyl	mg/kg	<0.1	<0.1	<0.1
Parathion-Methyl	mg/kg	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1
Fenthion	mg/kg	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1
Methidathion	mg/kg	<0.1	<0.1	<0.1
Fenamiphos	mg/kg	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1
Phosalone	mg/kg	<0.1	<0.1	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1
Coumaphos	mg/kg	<0.1	<0.1	<0.1
Surrogate 4-Chloro-3-NBTF	%	109	114	109

PCBs in Soil				
Our Reference		374632-4	374632-5	374632-6
Your Reference	UNITS	BH13	BH14	BH15
Depth		0-0.1	0-0.1	0-0.1
Date Sampled		03/03/2025	03/03/2025	03/03/2025
Type of sample		Soil	Soil	Soil
Date extracted	-	05/03/2025	05/03/2025	05/03/2025
Date analysed	-	05/03/2025	05/03/2025	05/03/2025
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1
Surrogate 2-Fluorobiphenyl	%	93	97	96

Misc Soil - Inorg				
Our Reference		374632-4	374632-5	374632-6
Your Reference	UNITS	BH13	BH14	BH15
Depth		0-0.1	0-0.1	0-0.1
Date Sampled		03/03/2025	03/03/2025	03/03/2025
Type of sample		Soil	Soil	Soil
Date prepared	-	05/03/2025	05/03/2025	05/03/2025
Date analysed	-	05/03/2025	05/03/2025	05/03/2025
Total Phenolics (as Phenol)	mg/kg	<5	<5	<5

Acid Extractable metals in soil					
Our Reference		374632-4	374632-5	374632-6	374632-7
Your Reference	UNITS	BH13	BH14	BH15	BD1/20250303
Depth		0-0.1	0-0.1	0-0.1	-
Date Sampled		03/03/2025	03/03/2025	03/03/2025	03/03/2025
Type of sample		Soil	Soil	Soil	Soil
Date prepared	-	05/03/2025	05/03/2025	05/03/2025	05/03/2025
Date analysed	-	05/03/2025	05/03/2025	05/03/2025	05/03/2025
Arsenic	mg/kg	<4	<4	<4	<4
Cadmium	mg/kg	0.6	<0.4	<0.4	1
Chromium	mg/kg	9	4	11	11
Copper	mg/kg	11	4	7	18
Lead	mg/kg	51	20	19	88
Mercury	mg/kg	<0.1	<0.1	<0.1	0.2
Nickel	mg/kg	9	3	4	15
Zinc	mg/kg	120	34	37	190

Moisture					
Our Reference		374632-4	374632-5	374632-6	374632-7
Your Reference	UNITS	BH13	BH14	BH15	BD1/20250303
Depth		0-0.1	0-0.1	0-0.1	-
Date Sampled		03/03/2025	03/03/2025	03/03/2025	03/03/2025
Type of sample		Soil	Soil	Soil	Soil
Date prepared	-	05/03/2025	05/03/2025	05/03/2025	05/03/2025
Date analysed	-	06/03/2025	06/03/2025	06/03/2025	06/03/2025
Moisture	%	5.8	2.1	6.1	6.0

Asbestos ID - soils NEPM				
Our Reference		374632-4	374632-5	374632-6
Your Reference	UNITS	BH13	BH14	BH15
Depth		0-0.1	0-0.1	0-0.1
Date Sampled		03/03/2025	03/03/2025	03/03/2025
Type of sample		Soil	Soil	Soil
Date analysed	-	10/03/2025	10/03/2025	10/03/2025
Sample mass tested	g	564.48	757.98	720.88
Sample Description	-	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected
Total Asbestos ^{#1}	g/kg	<0.1	<0.1	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected
ACM >7mm Estimation*	g	—	—	—
FA and AF Estimation*	g	—	—	—
FA and AF Estimation*#2	%(w/w)	<0.001	<0.001	<0.001
Asbestos comments	-	Nil	Nil	Nil

PFAS in Soils Short		
Our Reference		374632-5
Your Reference	UNITS	BH14
Depth		0-0.1
Date Sampled		03/03/2025
Type of sample		Soil
Date prepared	-	05/03/2025
Date analysed	-	05/03/2025
Perfluorobutanesulfonic acid	µg/kg	<0.1
Perfluorohexanesulfonic acid - PFHxS	µg/kg	<0.1
Perfluorooctanesulfonic acid PFOS	µg/kg	0.2
Perfluorooctanoic acid PFOA	µg/kg	0.1
6:2 FTS	µg/kg	<0.1
8:2 FTS	µg/kg	<0.2
Surrogate ¹³ C ₈ PFOS	%	98
Surrogate ¹³ C ₂ PFOA	%	99
Extracted ISTD ¹³ C ₃ PFBS	%	98
Extracted ISTD ¹⁸ O ₂ PFHxS	%	102
Extracted ISTD ¹³ C ₄ PFOS	%	98
Extracted ISTD ¹³ C ₄ PFOA	%	101
Extracted ISTD ¹³ C ₂ 6:2FTS	%	97
Extracted ISTD ¹³ C ₂ 8:2FTS	%	109
Total Positive PFHxS & PFOS	µg/kg	0.2
Total Positive PFOS & PFOA	µg/kg	0.3
Total Positive PFAS	µg/kg	0.3

Method ID	Methodology Summary
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.
ASB-001	Asbestos ID - Identification of asbestos in soil samples using Polarised Light Microscopy and Dispersion Staining Techniques. Minimum 500mL soil sample was analysed as recommended by "National Environment Protection (Assessment of site contamination) Measure, Schedule B1 and "The Guidelines from the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia - May 2009" with a reporting limit of 0.1g/kg (0.01% w/w) as per Australian Standard AS4964-2004. Results reported denoted with * are outside our scope of NATA accreditation. NOTE#1 Total Asbestos g/kg was analysed and reported as per Australian Standard AS4964 (This is the sum of ACM >7mm, <7mm and FA/AF relative to the sample mass tested) NOTE#2 The screening level of 0.001% w/w asbestos in soil for FA and AF only applies where the FA and AF are able to be quantified by gravimetric procedures. This screening level is not applicable to free fibres. Estimation = Estimated asbestos weight Results reported with "--" is equivalent to no visible asbestos identified using Polarised Light microscopy and Dispersion Staining Techniques.
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Inorg-031	Total Phenolics by segmented flow analyser (in line distillation with colourimetric finish). Solids are extracted in a caustic media prior to analysis.
Metals-020	Determination of various metals by ICP-AES. Total Phosphate determined stoichiometrically from Phosphorus (assumed to be present as Phosphate). Where salts (oxides, chlorides etc.) are calculated from the element concentration stoichiometrically there is no guarantee that the salt form is completely soluble in the acids used in the preparation.

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-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. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-021/022/025	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD and/or GC-MS/GC-MSMS.
Org-021/022/025	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD and/or GC-MS/GC-MSMS. Note, the Total +ve PCBs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PCBs" is simply a sum of the positive individual PCBs.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS.
Org-022/025	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-MS/GC-MSMS. Note, the Total +ve reported DDD+DDE+DDT PQL is reflective of the lowest individual PQL and is therefore simply a sum of the positive individually report DDD+DDE+DDT.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013.

Method ID	Methodology Summary
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS and/or GC-MS/MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'EQ PQL' values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'EQ zero' values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'EQ half PQL' values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs.
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.
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)-BTX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
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)-BTX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.
Org-029	Soil samples are extracted with basified Methanol. Waters and soil extracts are directly injected and/or concentrated/extracted using SPE. TCLPs/ASLP leachates are centrifuged, the supernatant is then analysed (including amendment with solvent) - as per the option in AS4439.3. Analysis is undertaken with LC-MS/MS. PFAS results include the sum of branched and linear isomers where applicable. Please note that PFAS results are corrected for Extracted Internal Standards (QSM 5.4 Table B-15 terminology), which are mass labelled analytes added prior to sample preparation to assess matrix effects and verify processing of the sample. PFAS analytes without a commercially available mass labelled analogue are corrected vs a closely eluting mass labelled PFAS compound. Surrogates are also reported, in this context they are mass labelled PFAS compounds added prior to extraction but are used as monitoring compounds only (not used for result correction). Envicarb (or similar) is used discretionally to remove interfering matrix components. Please contact the laboratory if estimates of Measurement Uncertainty are required as per WA DER.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Water					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			09/03/2025	2	09/03/2025	10/03/2025		09/03/2025	[NT]
Date analysed	-			10/03/2025	2	10/03/2025	11/03/2025		10/03/2025	[NT]
TRH C ₆ - C ₉	µg/L	10	Org-023	<10	2	<10	<10	0	101	[NT]
TRH C ₆ - C ₁₀	µg/L	10	Org-023	<10	2	<10	<10	0	101	[NT]
Benzene	µg/L	1	Org-023	<1	2	<1	<1	0	104	[NT]
Toluene	µg/L	1	Org-023	<1	2	<1	<1	0	102	[NT]
Ethylbenzene	µg/L	1	Org-023	<1	2	<1	<1	0	99	[NT]
m+p-xylene	µg/L	2	Org-023	<2	2	<2	<2	0	99	[NT]
o-xylene	µg/L	1	Org-023	<1	2	<1	<1	0	98	[NT]
Naphthalene	µg/L	1	Org-023	<1	2	<1	<1	0	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-023	101	2	100	99	1	102	[NT]
Surrogate Toluene-d8	%		Org-023	101	2	100	99	1	102	[NT]
Surrogate 4-Bromofluorobenzene	%		Org-023	100	2	98	98	0	102	[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	-			05/03/2025	[NT]	[NT]	[NT]	[NT]	05/03/2025	[NT]
Date analysed	-			06/03/2025	[NT]	[NT]	[NT]	[NT]	06/03/2025	[NT]
TRH C ₁₀ - C ₁₄	µg/L	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	132	[NT]
TRH C ₁₅ - C ₂₈	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	137	[NT]
TRH C ₂₉ - C ₃₆	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	129	[NT]
TRH >C ₁₀ - C ₁₆	µg/L	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	132	[NT]
TRH >C ₁₆ - C ₃₄	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	137	[NT]
TRH >C ₃₄ - C ₄₀	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	129	[NT]
Surrogate o-Terphenyl	%		Org-020	100	[NT]	[NT]	[NT]	[NT]	136	[NT]

QUALITY CONTROL: PAHs in Water					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W3	[NT]
Date extracted	-			05/03/2025	[NT]	[NT]	[NT]	[NT]	05/03/2025	[NT]
Date analysed	-			05/03/2025	[NT]	[NT]	[NT]	[NT]	05/03/2025	[NT]
Naphthalene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	77	[NT]
Acenaphthylene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Acenaphthene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	65	[NT]
Fluorene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	83	[NT]
Phenanthrene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	80	[NT]
Anthracene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluoranthene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	105	[NT]
Pyrene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	89	[NT]
Benzo(a)anthracene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chrysene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	99	[NT]
Benzo(b,j+k)fluoranthene	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(a)pyrene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	69	[NT]
Indeno(1,2,3-c,d)pyrene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibenzo(a,h)anthracene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(g,h,i)perylene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	98	[NT]	[NT]	[NT]	[NT]	88	[NT]

QUALITY CONTROL: OCPs in Water - Trace Level					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			05/03/2025	[NT]	[NT]	[NT]	[NT]	05/03/2025	[NT]
Date analysed	-			10/03/2025	[NT]	[NT]	[NT]	[NT]	10/03/2025	[NT]
alpha-BHC	µg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	96	[NT]
HCB	µg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
beta-BHC	µg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	88	[NT]
gamma-BHC	µg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Heptachlor	µg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	85	[NT]
delta-BHC	µg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aldrin	µg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	87	[NT]
Heptachlor Epoxide	µg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	113	[NT]
gamma-Chlordane	µg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
alpha-Chlordane	µg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endosulfan I	µg/L	0.002	Org-022/025	<0.002	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDE	µg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	93	[NT]
Dieldrin	µg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	102	[NT]
Endrin	µg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	108	[NT]
Endosulfan II	µg/L	0.002	Org-022/025	<0.002	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDD	µg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	95	[NT]
Endrin Aldehyde	µg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDT	µg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endosulfan Sulphate	µg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	95	[NT]
Methoxychlor	µg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate 4-Chloro-3-NBTF	%		Org-022/025	87	[NT]	[NT]	[NT]	[NT]	87	[NT]

QUALITY CONTROL: OP in water LL ANZECCF/ADWG					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			05/03/2025	[NT]	[NT]	[NT]	[NT]	05/03/2025	[NT]
Date analysed	-			10/03/2025	[NT]	[NT]	[NT]	[NT]	10/03/2025	[NT]
Dichlorvos	µg/L	0.05	Org-022/025	<0.05	[NT]	[NT]	[NT]	[NT]	90	[NT]
Mevinphos	µg/L	0.05	Org-022/025	<0.05	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Phorate	µg/L	0.05	Org-022/025	<0.05	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dimethoate	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Diazinon	µg/L	0.01	Org-022/025	<0.01	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Disulfoton	µg/L	0.05	Org-022/025	<0.05	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chlorpyrifos-methyl	µg/L	0.05	Org-022/025	<0.05	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Parathion-Methyl	µg/L	0.05	Org-022/025	<0.05	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Ronnel	µg/L	0.05	Org-022/025	<0.05	[NT]	[NT]	[NT]	[NT]	86	[NT]
Fenitrothion	µg/L	0.05	Org-022/025	<0.05	[NT]	[NT]	[NT]	[NT]	84	[NT]
Malathion	µg/L	0.05	Org-022/025	<0.05	[NT]	[NT]	[NT]	[NT]	105	[NT]
Chlorpyrifos	µg/L	0.009	Org-022/025	<0.009	[NT]	[NT]	[NT]	[NT]	102	[NT]
Fenthion	µg/L	0.05	Org-022/025	<0.05	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Parathion	µg/L	0.004	Org-022/025	<0.004	[NT]	[NT]	[NT]	[NT]	87	[NT]
Bromophos ethyl	µg/L	0.05	Org-022/025	<0.05	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Methidathion	µg/L	0.05	Org-022/025	<0.05	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fenamiphos	µg/L	0.05	Org-022/025	<0.05	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Ethion	µg/L	0.05	Org-022/025	<0.05	[NT]	[NT]	[NT]	[NT]	87	[NT]
Phosalone	µg/L	0.05	Org-022/025	<0.05	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Azinphos-methyl (Guthion)	µg/L	0.02	Org-022/025	<0.02	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Coumaphos	µg/L	0.05	Org-022/025	<0.05	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate 4-Chloro-3-NBTF	%		Org-022/025	87	[NT]	[NT]	[NT]	[NT]	86	[NT]

Client Reference: 233059.01, North Ryde

QUALITY CONTROL: PCBs in Water - Trace Level					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			05/03/2025	[NT]	[NT]	[NT]	[NT]	05/03/2025	[NT]
Date analysed	-			10/03/2025	[NT]	[NT]	[NT]	[NT]	10/03/2025	[NT]
Aroclor 1016	µg/L	0.01	Org-021/022/025	<0.01	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1221	µg/L	0.01	Org-021/022/025	<0.01	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1232	µg/L	0.01	Org-021/022/025	<0.01	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1242	µg/L	0.01	Org-021/022/025	<0.01	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1248	µg/L	0.01	Org-021/022/025	<0.01	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1254	µg/L	0.01	Org-021/022/025	<0.01	[NT]	[NT]	[NT]	[NT]	96	[NT]
Aroclor 1260	µg/L	0.01	Org-021/022/025	<0.01	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate 2-Fluorobiphenyl	%		Org-021/022/025	110	[NT]	[NT]	[NT]	[NT]	79	[NT]

QUALITY CONTROL: Total Phenolics in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	374632-1
Date extracted	-			05/03/2025	[NT]	[NT]	[NT]	[NT]	05/03/2025	05/03/2025
Date analysed	-			05/03/2025	[NT]	[NT]	[NT]	[NT]	05/03/2025	05/03/2025
Total Phenolics (as Phenol)	mg/L	0.05	Inorg-031	<0.05	[NT]	[NT]	[NT]	[NT]	96	93

Client Reference: 233059.01, North Ryde

QUALITY CONTROL: HM in water - dissolved						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W4	374632-2
Date prepared	-			05/03/2025	1	05/03/2025	05/03/2025		05/03/2025	05/03/2025
Date analysed	-			05/03/2025	1	05/03/2025	05/03/2025		05/03/2025	05/03/2025
Arsenic-Dissolved	µg/L	1	Metals-022	<1	1	<1	<1	0	106	97
Cadmium-Dissolved	µg/L	0.1	Metals-022	<0.1	1	<0.1	<0.1	0	102	101
Chromium-Dissolved	µg/L	1	Metals-022	<1	1	2	2	0	105	102
Copper-Dissolved	µg/L	1	Metals-022	<1	1	4	4	0	102	96
Lead-Dissolved	µg/L	1	Metals-022	<1	1	12	12	0	94	80
Mercury-Dissolved	µg/L	0.05	Metals-021	<0.05	1	<0.05	<0.05	0	98	81
Nickel-Dissolved	µg/L	1	Metals-022	<1	1	5	5	0	102	105
Zinc-Dissolved	µg/L	1	Metals-022	<1	1	56	59	5	99	125

Client Reference: 233059.01, North Ryde

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	374632-5
Date extracted	-			05/03/2025	[NT]	[NT]	[NT]	[NT]	05/03/2025	05/03/2025
Date analysed	-			07/03/2025	[NT]	[NT]	[NT]	[NT]	07/03/2025	07/03/2025
TRH C ₆ - C ₉	mg/kg	25	Org-023	<25	[NT]	[NT]	[NT]	[NT]	111	135
TRH C ₆ - C ₁₀	mg/kg	25	Org-023	<25	[NT]	[NT]	[NT]	[NT]	111	135
Benzene	mg/kg	0.2	Org-023	<0.2	[NT]	[NT]	[NT]	[NT]	116	138
Toluene	mg/kg	0.5	Org-023	<0.5	[NT]	[NT]	[NT]	[NT]	101	139
Ethylbenzene	mg/kg	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	110	134
m+p-xylene	mg/kg	2	Org-023	<2	[NT]	[NT]	[NT]	[NT]	115	140
o-Xylene	mg/kg	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	115	125
Naphthalene	mg/kg	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	92	[NT]	[NT]	[NT]	[NT]	94	114

QUALITY CONTROL: svTRH (C10-C40) in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	374632-5
Date extracted	-			05/03/2025	[NT]	[NT]	[NT]	[NT]	05/03/2025	05/03/2025
Date analysed	-			06/03/2025	[NT]	[NT]	[NT]	[NT]	06/03/2025	06/03/2025
TRH C ₁₀ - C ₁₄	mg/kg	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	90	85
TRH C ₁₅ - C ₂₈	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	81	82
TRH C ₂₉ - C ₃₆	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	86	90
TRH >C ₁₀ -C ₁₆	mg/kg	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	90	85
TRH >C ₁₆ -C ₃₄	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	81	82
TRH >C ₃₄ -C ₄₀	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	86	90
Surrogate o-Terphenyl	%		Org-020	94	[NT]	[NT]	[NT]	[NT]	122	92

QUALITY CONTROL: PAHs in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	374632-5
Date extracted	-			05/03/2025	[NT]	[NT]	[NT]	[NT]	05/03/2025	05/03/2025
Date analysed	-			05/03/2025	[NT]	[NT]	[NT]	[NT]	05/03/2025	05/03/2025
Naphthalene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	90	82
Acenaphthylene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	98	90
Fluorene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	88	80
Phenanthrene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	90	80
Anthracene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	88	78
Pyrene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	90	80
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	84	72
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	<0.05	[NT]	[NT]	[NT]	[NT]	110	94
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	102	[NT]	[NT]	[NT]	[NT]	106	99

QUALITY CONTROL: Organochlorine Pesticides in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	374632-5
Date extracted	-			05/03/2025	[NT]	[NT]	[NT]	[NT]	05/03/2025	05/03/2025
Date analysed	-			05/03/2025	[NT]	[NT]	[NT]	[NT]	05/03/2025	05/03/2025
alpha-BHC	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	98	88
HCB	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	98	88
gamma-BHC	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	92	88
delta-BHC	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	86	78
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	106	98
gamma-Chlordane	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	96	80
Dieldrin	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	106	96
Endrin	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	96	88
Endosulfan II	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	106	98
Endrin Aldehyde	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	110	106
Methoxychlor	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Mirex	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate 4-Chloro-3-NBTF	%		Org-022/025	110	[NT]	[NT]	[NT]	[NT]	114	108

QUALITY CONTROL: Organophosphorus Pesticides in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	374632-5
Date extracted	-			05/03/2025	[NT]	[NT]	[NT]	[NT]	05/03/2025	05/03/2025
Date analysed	-			05/03/2025	[NT]	[NT]	[NT]	[NT]	05/03/2025	05/03/2025
Dichlorvos	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	120	110
Mevinphos	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Phorate	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dimethoate	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Disulfoton	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chlorpyrifos-methyl	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Parathion-Methyl	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	100	92
Fenitrothion	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	130	118
Malathion	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	130	120
Chlorpyriphos	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	110	100
Fenthion	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Parathion	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	112	106
Bromophos-ethyl	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Methidathion	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fenamiphos	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Ethion	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	120	110
Phosalone	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Coumaphos	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate 4-Chloro-3-NBTF	%		Org-022/025	110	[NT]	[NT]	[NT]	[NT]	114	108

Client Reference: 233059.01, North Ryde

QUALITY CONTROL: PCBs in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	374632-5
Date extracted	-			05/03/2025	[NT]	[NT]	[NT]	[NT]	05/03/2025	05/03/2025
Date analysed	-			05/03/2025	[NT]	[NT]	[NT]	[NT]	05/03/2025	05/03/2025
Aroclor 1016	mg/kg	0.1	Org-021/022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021/022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021/022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021/022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021/022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021/022/025	<0.1	[NT]	[NT]	[NT]	[NT]	97	80
Aroclor 1260	mg/kg	0.1	Org-021/022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate 2-Fluorobiphenyl	%		Org-021/022/025	95	[NT]	[NT]	[NT]	[NT]	99	94

QUALITY CONTROL: Misc Soil - Inorg					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			05/03/2025	[NT]	[NT]	[NT]	[NT]	05/03/2025	[NT]
Date analysed	-			05/03/2025	[NT]	[NT]	[NT]	[NT]	05/03/2025	[NT]
Total Phenolics (as Phenol)	mg/kg	5	Inorg-031	<5	[NT]	[NT]	[NT]	[NT]	98	[NT]

Client Reference: 233059.01, North Ryde

QUALITY CONTROL: Acid Extractable metals in soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	374632-5
Date prepared	-			05/03/2025	[NT]	[NT]	[NT]	[NT]	05/03/2025	05/03/2025
Date analysed	-			05/03/2025	[NT]	[NT]	[NT]	[NT]	05/03/2025	05/03/2025
Arsenic	mg/kg	4	Metals-020	<4	[NT]	[NT]	[NT]	[NT]	108	113
Cadmium	mg/kg	0.4	Metals-020	<0.4	[NT]	[NT]	[NT]	[NT]	98	104
Chromium	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	98	105
Copper	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	93	100
Lead	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	99	105
Mercury	mg/kg	0.1	Metals-021	<0.1	[NT]	[NT]	[NT]	[NT]	102	104
Nickel	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	99	103
Zinc	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	101	107

QUALITY CONTROL: PFAS in Soils Short					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	374632-5
Date prepared	-			05/03/2025	[NT]	[NT]	[NT]	[NT]	05/03/2025	05/03/2025
Date analysed	-			05/03/2025	[NT]	[NT]	[NT]	[NT]	05/03/2025	05/03/2025
Perfluorobutanesulfonic acid	µg/kg	0.1	Org-029	<0.1	[NT]	[NT]	[NT]	[NT]	95	95
Perfluorohexanesulfonic acid - PFHxS	µg/kg	0.1	Org-029	<0.1	[NT]	[NT]	[NT]	[NT]	95	97
Perfluorooctanesulfonic acid PFOS	µg/kg	0.1	Org-029	<0.1	[NT]	[NT]	[NT]	[NT]	97	99
Perfluorooctanoic acid PFOA	µg/kg	0.1	Org-029	<0.1	[NT]	[NT]	[NT]	[NT]	97	96
6:2 FTS	µg/kg	0.1	Org-029	<0.1	[NT]	[NT]	[NT]	[NT]	96	94
8:2 FTS	µg/kg	0.2	Org-029	<0.2	[NT]	[NT]	[NT]	[NT]	96	95
Surrogate ¹³ C ₈ PFOS	%		Org-029	99	[NT]	[NT]	[NT]	[NT]	98	101
Surrogate ¹³ C ₂ PFOA	%		Org-029	98	[NT]	[NT]	[NT]	[NT]	100	99
Extracted ISTD ¹³ C ₃ PFBS	%		Org-029	106	[NT]	[NT]	[NT]	[NT]	99	93
Extracted ISTD ¹⁸ O ₂ PFHxS	%		Org-029	104	[NT]	[NT]	[NT]	[NT]	103	98
Extracted ISTD ¹³ C ₄ PFOS	%		Org-029	103	[NT]	[NT]	[NT]	[NT]	103	98
Extracted ISTD ¹³ C ₄ PFOA	%		Org-029	102	[NT]	[NT]	[NT]	[NT]	101	97
Extracted ISTD ¹³ C ₂ 6:2FTS	%		Org-029	102	[NT]	[NT]	[NT]	[NT]	100	96
Extracted ISTD ¹³ C ₂ 8:2FTS	%		Org-029	107	[NT]	[NT]	[NT]	[NT]	109	109

Result Definitions

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

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.
Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.	
The recommended maximums for analytes in urine are taken from "2018 TLVs and BEIs", as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.	
Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2	

Laboratory Acceptance Criteria

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

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

Spikes for Physical and Aggregate Tests are not applicable.

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

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

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

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

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

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

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

Measurement Uncertainty estimates are available for most tests upon request.

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

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

Report Comments

Asbestos-ID in soil: NEPM

This report is consistent with the reporting recommendations in the National Environment Protection (Assessment of Site Contamination) Measure, Schedule B1, May 2013. This is reported outside our scope of NATA accreditation.

Appendix H

Responses to checklist at Appendix E of the
Guidelines for Groundwater Documentation for
SSD/SSI Projects

Project setting (If any 'no' answers are recorded, then proponent to provide explanation)	
Scope of the project described (including construction, operation and closure)?	☒ Yes ☐ No
Location of project clearly identified (address and real property description, and/or lot and plan information)?	☒ Yes ☐ No
Environmental setting described (including topography, climate, the location of surface water features, biodiversity values and land use)?	☒ Yes ☐ No
Appreciation of regional and local geological setting clearly stated?	☒ Yes ☐ No
Geological structural features potentially affecting groundwater behaviour identified?	☒ Yes ☐ No
Will any project related excavation remain above the water table?	☒ Yes ☐ No
Have baseline groundwater field investigations been conducted and report provided?	☒ Yes ☐ No
Have the relevant Water Sharing Plans and relevant water sources been identified?	☒ Yes ☐ No
Has the proponent consulted with the local community, local Aboriginal community, council, Department of Planning and Environment – Water, EPA, WaterNSW and Environment, Energy and Science group within the department (where relevant) to establish cultural and environmental values of the water sources? Not considered by this assessment	☒ Yes ☐ No
Receptors (If any 'no' answers are recorded, then proponent to provide explanation)	
Have mapped high priority groundwater dependent ecosystems, listed in the relevant Water Sharing Plans, been identified?	☒ Yes ☐ No
Has the proponent reviewed the GDE Atlas to identify any other mapped potential groundwater dependent ecosystems in the project area?	☒ Yes ☐ No

Has the proponent identified other potential groundwater dependent ecosystems out of other technical specialist analysis? Have the technical specialists used outputs from the GIA for their ecological assessment?	☒ Yes ☐ No N/A
Have considered and identified potential culturally significant sites listed in the relevant Water Sharing Plans been identified?	☒ Yes ☐ No N/A
Has the proponent identified third-party users in the vicinity that might be impacted identified (Registered/unregistered)?	☒ Yes ☐ No
Groundwater investigations and groundwater impact assessment (If any 'no' answers are recorded, then proponent to provide explanation)	
Groundwater elevation and flow	
Are monitoring bore locations and depths provided and appropriate based on depth and scale of proposed development?	☒ Yes ☐ No
Are measurements recorded at a frequency suitable to detect potential changes (EIS or post-approval)?	☒ Yes ☐ No
Has a bore census of existing third-party bores in the project area been completed?	☒ Yes ☐ No
Is the groundwater baseline provided sufficient (~~AIP requires 2 years~~)? N/A	☒ Yes ☐ No
Has the proponent assessed vertical gradients between overlying water sources?	☒ Yes ☐ No N/A
Has the proponent provided water table elevation and potentiometric surface contour plans for water sources pre-development (including consideration of wet/winter and summer/dry seasonal variations), supported by points labelled with measured groundwater elevation?	☒ Yes ☐ No
Has the proponent provided evidence of spatial and temporal assessment of groundwater elevation and flow (that is, vertical and lateral with time and seasons)?	☒ Yes ☐ No

Hydraulic properties	
Has the proponent conducted hydraulic tests at various locations across the project area? For example, slug tests, pumping tests, packer tests, core tests.	☒ Yes ☐ No
Has the proponent conducted a literature review of potential hydraulic properties for the water sources in the project area? For example, other projects in the area or textbook values.	☒ Yes ☐ No
Groundwater quality	
Has the proponent included sufficient spatial & temporal variation in groundwater quality data?	☒ Yes ☐ No
Was the potential for cross contamination of aquifers assessed sufficiently?	☒ Yes ☐ No
Is the baseline groundwater quality defined and described sufficiently with respect to the cultural and environmental values and the development?	☒ Yes ☐ No
Is quality assurance data provided?	☒ Yes ☐ No
Conceptual hydrogeological model	
Has the proponent described the hydrostratigraphic units in the project area?	☒ Yes ☐ No
Has the proponent assessed and described potential surface water-groundwater interaction?	☒ Yes ☐ No
Has the proponent considered existing water use in the area?	☒ Yes ☐ No
Has the proponent provided a graphical representation of the conceptual hydrogeological model (cross-section or three dimensional block model) to show hydrostratigraphy and other groundwater processes described above?	☒ Yes ☐ No
Has the proponent provided a graphical representation of potential groundwater dependence of GDEs within the project area?	☒ Yes ☐ No

Impact assessment (If any 'no' answers are recorded, then proponent to provide explanation)	
Is the assessment methodology commensurate with the risk and as agreed with the department's Water division? For example, analytical model versus simple numerical model vs complex numerical model?	☒ Yes ☐ No
Has the proponent completed the Aquifer Interference Assessment Framework form?	☒ Yes ☐ No
Has the proponent assessed the predicted impacts against the Aquifer Interference Policy "minimal impact considerations"?	☒ Yes ☐ No
Has the proponent assessed the predicted impacts during construction, operations and post-development?	☒ Yes ☐ No
Have the potential impacts from changes in water quality, water quantity, aquifer integrity and biological integrity of groundwater dependent ecosystems been identified and quantified?	☒ Yes ☐ No
Has the proponent assessed the potential presence of acid sulfate soils?	☒ Yes ☐ No
Has the proponent assessed the potential for generation of acid metalliferous drainage?	~~☐ Yes ☐ No~~ N/A
Has the proponent documented the predicted annual water take (per water source) on an annual basis?	☒ Yes ☐ No
Has the proponent documented the licensing pathway proposed to secure the required water entitlement for water access licence(s) for the predicted take?	☒ Yes ☐ No
Has the proponent assessed impacts on the groundwater dependent ecosystems and culturally significant sites in accordance with the Aquifer Interference Policy considerations?	☒ Yes ☐ No

Management and mitigation measures (If any 'no' answers are recorded, then proponent to provide explanation)	
Are the documented management and mitigation measures practical and measurable?	☒ Yes ☐ No
Has the proponent documented the approach to the proposed monitoring program during construction and operations?	☒ Yes ☐ No
Water management plans (If any 'no' answers are recorded, then proponent to provide explanation)	
Are the documented management and mitigation measures practical and measurable?	☒ Yes ☐ No
Does it include a review and summary of groundwater baseline data?	☒ Yes ☐ No
Has the proponent documented the approach to the proposed monitoring program during construction and operations?	☒ Yes ☐ No
Has the proponent described the methods for measuring take?	☒ Yes ☐ No
Is trigger level management applied to the correct locations?	☒ Yes ☐ No
Are trigger levels set at points that will provide timely action?	☒ Yes ☐ No
Are response actions described that will address exceedances?	☒ Yes ☐ No
Has trend analysis of monitoring data been conducted using statistical approach?	☒ Yes ☐ No
Has the proponent documented a commitment to review and verify model predictions from the EIS stage (during the project development)?	☒ Yes ☐ No

Compliance reporting (If any 'no' answers are recorded, then proponent to provide explanation)	
Has the proponent reported and assessed monitoring trends with a comparison to predictions made in the EIS stage?	☐ Yes ☐ No
Were any trigger levels exceeded during the reporting period?	☐ Yes ☐ No
Has the proponent conducted a holistic assessment of water quality and quantity when reviewing monitoring data and assessing impacts?	☐ Yes ☐ No
Has the proponent reported water take volumes (per water source) for the reporting period (ideally in a table format)?	☐ Yes ☐ No
Has the proponent compared the actual take to the take predicted as part of the EIS? Does this trigger a requirement to obtain additional water entitlement?	☐ Yes ☐ No
Are observations from other technical discipline compliance reporting considered in the water reporting? For example, implication of subsidence or ecological monitoring?	☐ Yes ☐ No