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BRADFIELD CORPORATION PTY LTD

Geotechnical Investigation

135 Badgerys Creek Road, Bradfield NSW

E26733.G03_Rev0
25 September 2025

Document Control

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1. Introduction

1.1 Background

At the request of Creative Vision on behalf of Bradfield Corporation Pty Ltd (the Client), EI Australia (EI) has carried out a Geotechnical Investigation (GI) for the proposed development at 135 Badgerys Creek Road, Bradfield NSW (the site).

This GI report has been prepared to provide advice and recommendations in support of a State Significant Development Application (SSDA) to the Department of Planning, Housing and Infrastructure (DPHI), and to assist in the preparation of designs for the proposed development.

An intrusive geotechnical investigation has been carried out at the site in accordance with the agreed scope of works outlined in EI's proposal referenced P23065.5, dated 1 April 2025.

1.2 Proposed Development

The following relevant documents, supplied by the Client, were used to assist with the preparation of this GI report:

- Architectural plans prepared by Plus Architecture – Job No. 20799, Drawing Nos. DA-10B1 to 10B3, and DA-1000 to 1012, 110, 120, 200 to 204, dated on 6 March 2025; and
- Site survey plan prepared by SDG – Referenced 9165, revision B 94, dated on 8 August 2024.

The proposed development will seek consent for the redevelopment of the site, comprising:

- Enabling works including vegetation removal and earthworks;
- The construction of three buildings, comprising:
  - Residential use, including approximately 400 apartment units;
  - Hotel use, including approximately 450 hotel rooms;
  - Commercial use, including supermarket, food and drink and other commercial uses;
  - Medical centre use;
  - Childcare centre use;
- Construction of two basement structures, including approximately 800 carparking spaces;
- Public domain upgrades, including:
  - Construction of an internal road;
  - A public plaza;
- Rehabilitation and augmentation of the existing riparian corridor;
- Landscaping embellishments on the ground level and within the built form; and
- Services augmentation as required.

Refer to the Environmental Impact Statement for a detailed summary of the proposed development.

Based on the provided documents, EI understands that the proposed development involves:

- Excavation is planned for three detached two-level basements, comprising:
  - Stage 1 basement underlying the hotel and childcare towards the eastern boundary;
  - Stage 2 basement underlying commercial and residential buildings towards the centre of the site; and

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

1.3 Objectives

The objective of the GI was to assess site surface and subsurface conditions at six (6) borehole locations, and to provide geotechnical advice and recommendations to assist in the design of the proposed development.

In accordance with section 4.39 of the Environmental Planning & Assessment Act 1979 (EP&A Act), Secretary's Environmental Assessment Requirements (SEARs) for SSD-77458970 were issued on 30 January 2025. This GI report has been prepared to respond to the relevant issued Secretary's Environmental Assessment Requirements (SEARS), specifically the requirements set out in **Table 1-1** below.

Table 1-1 Summary of SEARs addressed

SEARs Requirement	Response / Location in report
13 Ground and Groundwater Conditions (partial)	
▪ Assess potential impacts on soil resources and related infrastructure and riparian lands on and near the site and including soil erosion.	▪ Sections 2, 3, 4 and 5 of this report
▪ Where required provide a Groundwater Impact Assessment in accordance with relevant Groundwater Guidelines. If the proposed development is on land identified as having high salinity or acid sulfate soil potential in an EPI provide a Salinity Management Plan or Acid Sulfate Soil Management Plan that includes appropriate management measures and strategies.	▪ Further details provided in separate reports: ‣ Groundwater assessment in E26733.E16; ‣ Salinity assessment in E26733.G17; ‣ Acid sulfate soils management in E26733.E14.

1.4 Regulatory Framework

The following legislation and guidelines were considered during the preparation of this Geotechnical Investigation:

- Legislation
  - Design and Building Practitioners Act 2020
  - Liverpool Local Environmental Plan 2008;

- Liverpool Development Control Plan 2008;
- Minimum requirements for building site groundwater investigations and reporting, Department of Planning and Environment (DPE), dated October 2022
- NSW Aquifer Interference Policy (NSW Office of Water, 2012)
- Water Management Act 2000 (Water Act)
- Work Health and Safety Act 2011 (WHS Act) and associated regulations and codes of practice

- Guidelines
  - AS1726:2017, Geotechnical Site Investigations
  - AS 1170.4:2024 Earthquake actions in Australia
  - Safe Work NSW Excavation Work Code of Practice, dated January 2020
  - Regulated Design Guidelines for Design Practitioners, dated July 2023

1.5 Methodology and Scope of Works

The scope of works and fieldwork methodology for the GI included:

- Preparation of a Work Health and Safety Plan;
- Review of relevant soil and geological maps for the project area;
- Site walkover inspection by a Geotechnical Engineer to assess topographical features and site conditions;
- Scanning of proposed borehole locations for buried conductive services using a licensed service locator with reference to Before You Dig Australia (BYDA) plans;
- Auger drilling of six (6) boreholes (BH1M, BH2M, BH3M, BH4, BH5M, and BH6M) by a track-mounted drill rig using solid flight augers equipped with a 'Tungsten-Carbide' (T-C) bit to depths as shown in **Table 1-2**. Following refusal on bedrock, the boreholes were continued using NMLC diamond coring techniques to the termination depths also shown in **Table 1-2.** Borehole logs and rock core photographs are presented in **Appendix A**.

Table 1-2 Augering and Rock Coring Depths

Borehole ID	Surface RL (m AHD)	Augering		Rock Coring	
		Depth (m)	RL (m AHD)	Depth (m)	RL (m AHD)
BH1M	80.30	3.00	77.30	10.91	69.39
BH2M	79.70	2.50	77.20	12.91	66.79
BH3M	76.80	3.02	73.78	21.97	54.83
BH4	77.10	3.50	73.60	12.11	64.99
BH5M	80.70	3.20	77.50	12.16	68.54
BH6M	78.70	3.10	75.60	12.00	66.70

- Standard Penetration Testing (SPT) was carried out (as per AS 1289.6.3.1-2004), at regular intervals, during auger drilling of the boreholes to assess soil strength/relative densities.
- Measurements of groundwater seepage/levels, where possible, in the augered sections of the boreholes during and shortly after completion of auger drilling;

  - The strength of the bedrock in the augered sections of the boreholes was assessed by observation of the auger penetration resistance using a T-C drill bit and examination of the recovered rock cuttings. It should be noted that rock strengths assessed from augered boreholes are approximate and strength variances can be expected.
  - The approximate surface levels shown on the borehole logs were interpolated from spot levels shown on the supplied survey plan. Approximate borehole locations are shown on the attached **Figure 2** and **Figure 3**;
  - Northing and easting data are presented in the detailed borehole logs in **Appendix A**.
- Five (5) boreholes (BH1M, BH2M, BH3M, BH5M, and BH6M) were converted into groundwater monitoring wells to allow for further groundwater monitoring. The standpipe piezometers were bailed dry following installation to develop the wells.
  - Rising head permeability tests were carried out within the five (5) installed monitoring wells (BH1M, BH2M, BH3M, BH5M, and BH6M) about one week after installation to determine the groundwater inflows of the surrounding screened material;
- Borehole BH4 was backfilled with drilling spoils and capped with concrete upon completion;
- Soil and rock samples were sent to STS Geotechnics Pty Ltd (STS) and SGS Australia (SGS), which are National Australian Testing Authority (NATA) accredited laboratories, for testing and storage.
- Preparation of this GI report.

EI's Geotechnical Engineer was present full-time onsite to set out the borehole locations, direct the testing and sampling, log the subsurface conditions and record groundwater levels.

1.6 Constraints

The GI was limited by the intent of the investigation and available design information at the time of the investigation. The discussions and advice presented in this report are intended to assist in the preparation of design for the proposed development and to address the SEARs conditions in support of the SSDA.

Further geotechnical inspections should be carried out during construction to confirm the geotechnical and groundwater models, and the design parameters provided in this report.

2. Site Description

2.1 Site Description and Identification

The site identification details and associated information are presented in **Table 2-1** below while the site locality is shown on the attached **Figure 1**. A satellite image of the site is presented in **Plate 1** below.

Table 2-1 Summary of Site Information

Information	Detail
Street Address	135 Badgerys Creek Road, Bradfield NSW
Lot and Deposited Plan (DP) Identification	Lot 7 in DP 243457
Site Area	The site area is approximately 2.02 ha (based on the provided survey plan referenced above).
Brief Site Description	At the time of our investigation, the site comprised cleared agricultural land with some large trees particular near the eastern and south-western site boundaries. A farm dam is located near the centre of the site, filling from runoff typically from the north and north-west. The site is located approximately 250m to the future Bradfield Metro Station and 4km to the Western Sydney Airport. It shares a western frontage with Badgerys Creek Road. The eastern boundary of the site adjoins the State government-led Bradfield City Centre which is set to be a vibrant 24/7 global city, driving advancements in industry and will support 10,000 more homes and 20,000 new jobs in Western Sydney. As defined by the Aerotropolis Precinct Plan, the site is located within the Aerotropolis Core Precinct which is envisioned as an attractive place for workers, residents, and visitors. The Aerotropolis Core Precinct will leverage the positive economic impact of the adjacent Western Sydney Airport and Bradfield City Centre. It will attract business hubs, research and development, professional services, and creative industries in addition to providing residential development within walking distance of the Bradfield Metro station and proximity to blue and green infrastructure.

Plate 1 Satellite image of the site (Metro Maps, image dated 3 September 2024)

2.2 Local Land Use

The site is situated within an area of agriculture and commercial use, adjacent to the new Bradfield City Centre, and part of the Western Sydney Airport Aerotropolis. Current uses on surrounding land at the time of our presence on site are described in **Table 2-2** below. For the purpose of this report, the site boundary adjacent to Badgerys Creek Road shall be adopted as the western site boundary.

Table 2-2 Summary of Local Land Use

Direction Relative to Site	Land Use Description
North	Property No. 145 Badgerys Creek Road, a semi-agricultural property with a single-storey residential house set back more than 40m from the common site boundary. A farm dam is located within the centre of the property set back about 8m from the common site boundary. Beyond are similar semi-agricultural properties with residential houses.
East	Bradfield City Centre, currently under construction, comprising Bradfield Metro Station with twin underground metro tunnels running roughly north to south, surrounded by mostly cleared agricultural land and stripped areas with earthworks and construction currently underway. The metro station and lines are part of the Western Sydney Airport metro railway and are Sydney Metro assets. The metro facilities are set back over 200m from the site.
South	Property No. 125 Badgerys Creek Road, a semi-agricultural property with a single-storey residential house set back about 2m from the common site boundary. The farm dam which is present within the site extends directly onto No. 125 Badgerys Creek Road. Beyond are similar semi-agricultural properties with residential houses.
West	Badgerys Creek Road, a two lane, asphalt-paved road in poor condition. Badgerys Creek Road is classified as a Regional Road and may be co-managed with TfNSW. Beyond are properties for agricultural and commercial or industrial uses, and some semi-agricultural properties with residential houses.

2.3 Regional Setting

The site topography and geological information for the locality is summarised in **Table 2-3**.

Table 2-3 Topographic and Geological Information

Attribute	Description
Topography	The site is located on gentle sloping to undulating topography within the Cumberland Plain area. The site is moderately dipping due to the central drainage line running from the western side of the northern site boundary towards the near centre of the southern boundary, with high points at the opposite eastern and western site boundaries both reaching to RL 81.0m AHD from the central low of RL 75.0m AHD.
Soil Landscape	Information on regional soil-landscape conditions, referenced from the eSPADE spatial viewer application (corresponding to the Penrith 9030 Soil Landscape Series Sheet), indicates the site comprises the Blacktown (bt) unit. The Blacktown (bt) unit is described as a residual forming soil on broad, gently undulating rises over Wianamatta Group shales. Soils are shallow to moderately deep (>1m) and comprise medium to highly plastic, mottled residual soils. Relevant limitations include moderately to highly reactive subsoil, low permeability, and localised salinity or sodicity.

Attribute	Description
Regional Geology	Information on regional sub-surface conditions, referenced from the NSW Seamless Geology dataset (Colquhoun et al., 2024, corresponding to the Sydney 1:100,000 Geological Series Sheet) indicates the site to be underlain by Bringelly Shale (Twib), which consists of shale, carbonaceous claystone, claystone, laminate, fine to medium grained lithic sandstone, and rare coal and tuff. A dyke or vein is indicated to be present about 300m to the north-west of the site, trending about 140°/ 320°. Alluvial Floodplain Deposits (Q_af) are present beyond the site toward Badgerys Creek and South Creek/Wianamatta and their tributaries. Minor alluvial deposits or alluvial eroded soils may be present at the site.

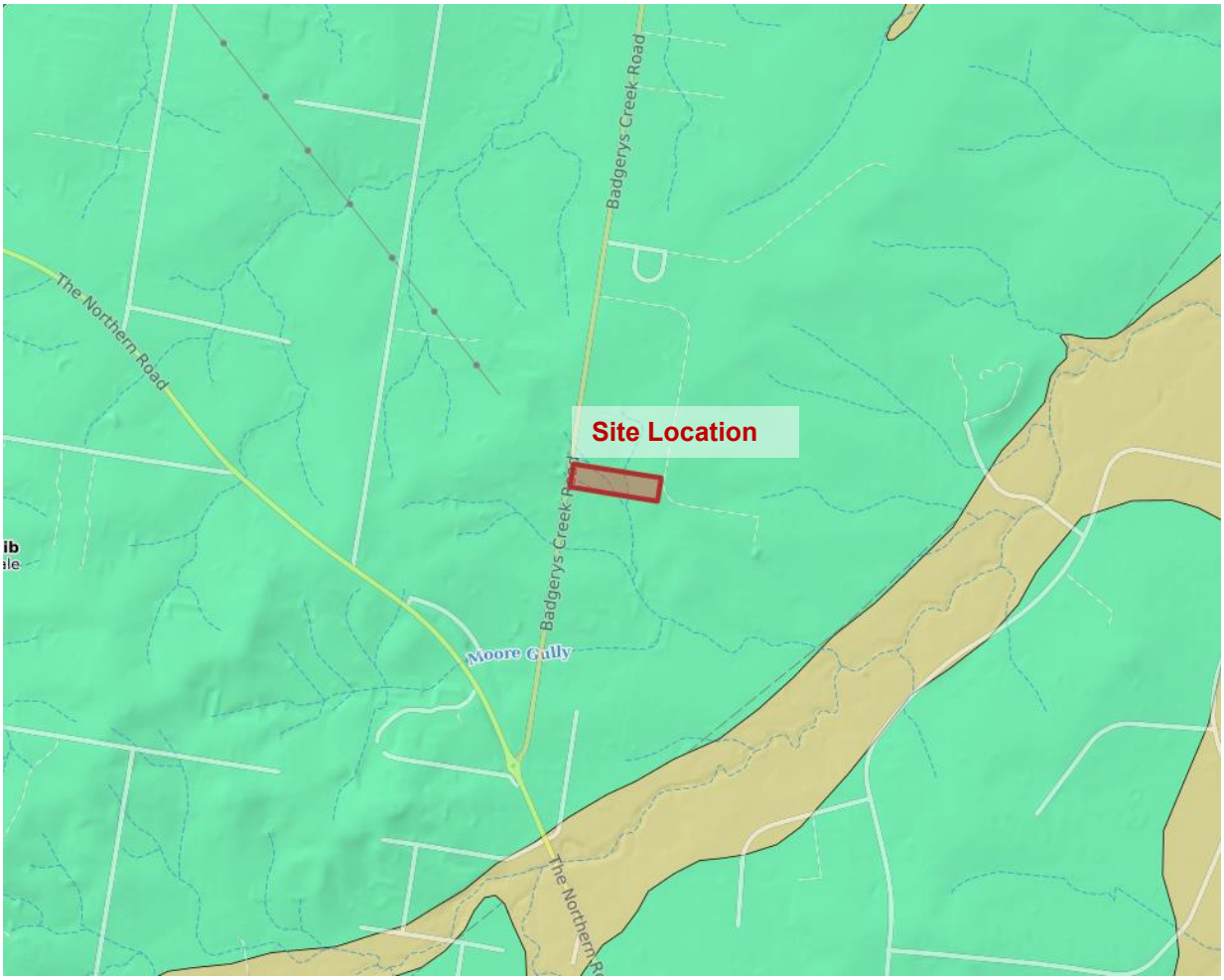


Plate 2 Excerpt of regional geological map showing location of site

Legend:

Bringelly Shale (Twib)		Shale, carbonaceous claystone, claystone, laminate, fine to medium grained lithic sandstone, and rare coal and tuff.
Alluvial Floodplain Deposits (Q_af)		Silt, very fine- to medium-grained lithic to quartz-rich sand, clay.
Dyke or vein		Geological structural feature.

3. Investigation Results

3.1 Stratigraphy

For the development of a site-specific geotechnical model, the stratigraphy observed in the GI has been grouped into five geotechnical units. A summary of the subsurface conditions across the site, interpreted from the assessment results, is presented in **Table 3-1** below. A summary of the depth and elevation of the units observed in each borehole is provided in **Table 3-2** below.

More detailed descriptions of subsurface conditions at each borehole location are available on the borehole logs presented in **Appendix A**. The details of the methods of soil and rock classifications, explanatory notes and abbreviations adopted on the borehole logs are also in **Appendix A**.

Table 3-1 Summary of Subsurface Conditions

Unit	Material [2]	Depth to Top of Unit (m BEGL) [1]	RL of Top of Unit (m AHD) [1]	Observed Thickness (m)	Comments
1	Topsoil	Surface	76.80 to 80.70	0.10 to 1.85	Medium plasticity Silty CLAY, with rootlets and organic matter. Increased thickness due to sedimentation and vegetation within the drainage line.
2	Residual Soil	0.10 to 1.85	74.95 to 80.60	0.65 to 1.55	Low to medium plasticity, stiff to hard silty CLAY with trace ironstone gravels, grading into weathered siltstone with depth. SPT values ranged from 19 to refusal indicated by hammer bounce;
3	Extremely Weathered (XW) Siltstone	0.80 to 2.50	74.30 to 79.50	0.52 to 2.20	Extremely to distinctly weathered, soil to very low strength SILTSTONE. Where rock core was collected in BH4 and BH5M, it indicated frequent bedding partings and weathered clay seams.
4	Distinctly Weathered (DW) Siltstone	2.50 to 3.76	73.34 to 77.30	1.29 to 4.30	Distinctly weathered, low strength SILTSTONE, with occasional bands of medium to high strength. Frequent bedding partings and weathered clay seams observed in all boreholes. Sub-vertical jointing observed in BH2M causing the excessive breakage observed.
5	Slightly Weathered to Fresh (SW-FR) Siltstone	5.05 to 7.32	69.48 to 74.43	- [3]	Slightly weathered to fresh, medium to high strength SILTSTONE, with occasional thick to very thick sandstone beds, and frequent disturbed bedding or bioturbation throughout. Occasional bedding partings and sub-vertical jointing, with jointing more frequent in BH1M, BH2M, and BH3M.

Note 1 Approximate depth and level at the time of our assessment. Depths and levels may vary across the site.
Note 2 For more detailed descriptions of the subsurface conditions, reference should be made to the borehole logs attached to **Appendix A**.
Note 3 Observed up to termination depth in all boreholes.

Table 3-2 Depth and Elevation to Top of Units in Borehole

Unit	Material	Depth to Top of Unit (m BEGL) *RL to Top of Unit [m AHD]*					
		BH1M	BH2M	BH3M	BH4	BH5M	BH6M
1	Topsoil	0.00 *[80.30]*	0.00 *[79.70]*	0.00 *[76.80]*	0.00 *[77.10]*	0.00 *[80.70]*	0.00 *[78.70]*
2	Residual Soil	0.10 *[80.20]*	0.15 *[79.55]*	1.85 *[74.95]*	0.65 *[76.45]*	0.10 *[80.60]*	0.10 *[78.60]*
3	XW Siltstone	0.80 *[79.50]*	1.70 *[78.00]*	2.50 *[74.30]*	1.80 *[75.30]*	1.50 *[79.20]*	1.20 *[77.50]*
4	DW Siltstone	3.00 *[77.30]*	2.50 *[77.20]*	3.02 *[73.78]*	3.76 *[73.34]*	3.58 *[77.12]*	3.07 *[75.63]*
5	SW-FR Siltstone	5.87 *[74.43]*	6.49 *[73.21]*	7.32 *[69.48]*	5.05 *[72.05]*	6.77 *[73.93]*	6.25 *[72.45]*

A dyke or vein is shown in the regional geological mapping outside of the site to the northwest, and trends northwest-southeast. No specific information on the dyke or vein identified in the regional geological mapping is available.

While the dyke is not expected to intersect the site, they are typically associated with additional jointing within the host rock (siltstone bedrock) which can lead to poorer rock quality than otherwise expected in the vicinity of the dyke intrusion. The degree of fracturing observed in BH1M and BH2M, not present in the other boreholes, may potentially be associated with a nearby geological feature such as a dyke.

3.2 Groundwater Observations

Following completion of auger drilling, the boreholes were left open and free standing, and groundwater levels were then measured within the boreholes after a period of about 30 minutes. No groundwater or significant inflow was observed during or after auger drilling of the boreholes. We note that the groundwater levels may not have become evident or stabilised in the augered boreholes within the limited observation period.

Water circulation during coring within the boreholes prevented further observations of groundwater levels within the boreholes.

Following the completion of drilling, groundwater monitoring wells were installed in five (5) boreholes (BH1M, BH2M, BH3M, BH5M, and BH6M) to the depths shown in **Table 3-3**, and bailed dry following installation to develop the wells.

Table 3-3 Monitoring Well Installation Details

Borehole ID	Top of Screened Section		Well Termination Depth		Screened Material
	Depth (m BEGL)	RL (m AHD)	Depth (m BEGL)	RL (m AHD)	
BH1M	7.9	72.4	10.9	69.4	SW-FR Siltstone
BH2M	3.6	76.1	6.6	73.1	DW-SW Siltstone
BH3M	3.2	73.3	6.2	70.3	DW Siltstone
BH5M	6.1	74.6	12.1	68.6	DW-FR Siltstone

Borehole ID	Top of Screened Section		Well Termination Depth		Screened Material
BH6M	6.1	72.6	9.1	69.6	SW-FR Siltstone

EI revisited the site on 6 and 8 May 2025 to carry out water quality sampling and groundwater permeability testing, with the groundwater levels measured within the monitoring wells as indicated in **Table 3-4** below.

Table 3-4 Groundwater Measurements Within the Monitoring Wells

Borehole ID	Groundwater Levels		
	Measurement Date	m BEGL	RL (m AHD)
BH1M	6/05/2025	4.58	75.72
	8/05/2025	4.66	75.64
BH2M	6/05/2025	4.44	75.27
	8/05/2025	5.36	74.34
BH3M	6/05/2025	1.52	75.28
	8/05/2025	1.62	75.18
BH5M	6/05/2025	6.36	74.34
	8/05/2025	7.43	73.27
BH6M	6/05/2025	4.19	74.51
	8/05/2025	5.25	73.45

Generally, the groundwater water levels were observed to drop by between 0.08 m and 1.07 m between the two groundwater measuring events on the 6 and 8 May 2025.

EI note that at the time of well installation (23 to 28 April 2025), approximately 49.2 mm of rainfall was received in the area, based on climate data from the nearby '*Badgerys Creek AWS*' weather station (Station No. 067108). Between 23 April 2025 and 2 May 2025, approximately 65 mm of rainfall was received in the region. No rainfall was recorded during the follow up site visits (6 and 8 May 2025). The reductions in groundwater levels measured by EI may reflect response conditions following a period of high rainfall.

3.2.1 Permeability Testing

Rising Head Permeability Tests were completed on 8 May 2025 in each of the installed monitoring wells (BH1M, BH2M, BH3M, BH5M, and BH6M). The following procedure was adopted:

- The groundwater level within the well was initially recorded;
- The well was purged using an electrical groundwater pump;
- The rising groundwater level within the temporary well was measured at various time intervals over a period of one hour.

The results were then used to estimate the permeability of the screened siltstone bedrock of each well using the Hvorslev Method based on the borehole geometry. The initial inflows were high, which then quickly tapered off to lower inflows. The estimated permeability of the siltstone bedrock ranges from 1 x 10^{-6} m/s to 3 x 10^{-8} m/s.

3.3 Laboratory Test Results

3.3.1 Soil Testing

Seventeen (17) soil samples were selected for laboratory testing to assess the following:

- Atterberg Limits and Linear Shrinkage;
- Soil aggressivity (pH, chloride and sulfate content and electrical conductivity);
- Soil Salinity (salinity and sodicity exposure parameters).

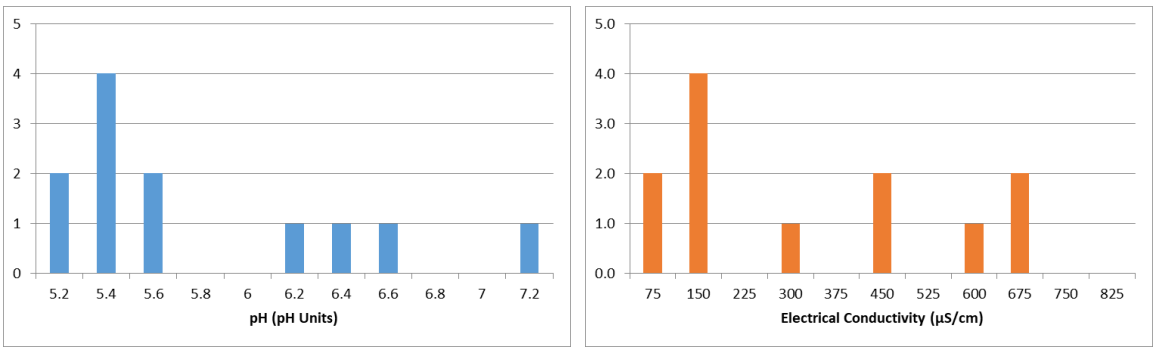
A summary of the Atterberg Limits and Linear Shrinkage test results is provided in **Table 3-5**. The Soil aggressivity test results are presented in charts in **Plate 3** below. Soil salinity test results are presented and discussed in the Salinity Management Plan (SMP, E26733.G17). Laboratory test certificates are presented in **Appendix B**.

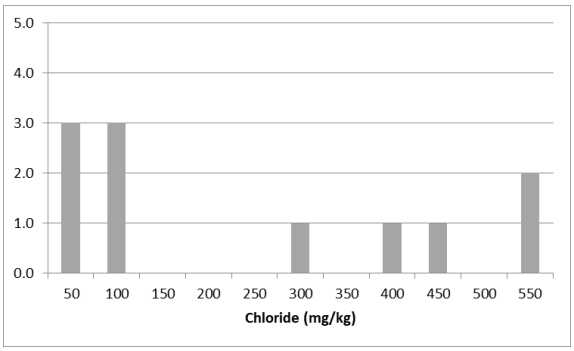
Table 3-5 Atterberg Limits and Linear Shrinkage Test Results

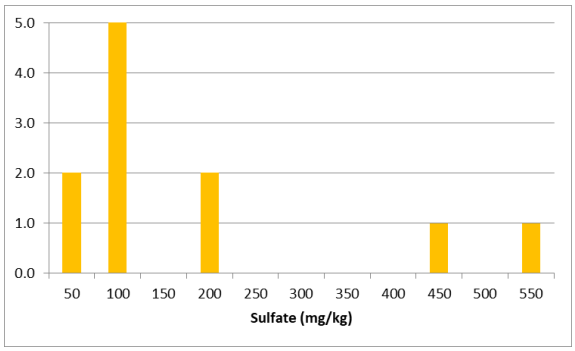
Test / Sample ID	BH1M_ 0.5-0.95	BH2M_ 1.5-1.95	BH3M_ 0.7-0.95	BH4_ 1.5-1.95	BH6M_ 0.5-0.95
Unit	2 Residual Soil	2 Residual Soil / 3 XW Siltstone	1 Topsoil	2 Residual Soil / 3 XW Siltstone	2 Residual Soil
Material [1]	CLAY	CLAY	CLAY	CLAY	CLAY
Atterberg Limits					
Moisture Content (%)	14.9	10.8	18.2	13.9	18.4
Liquid Limit (%)	63	52	53	42	62
Plastic Limit (%)	25	25	23	21	25
Plasticity Index (%)	38	27	30	21	37
Linear Shrinkage (%)	17.5	15.0	12.0	11.5	17.0

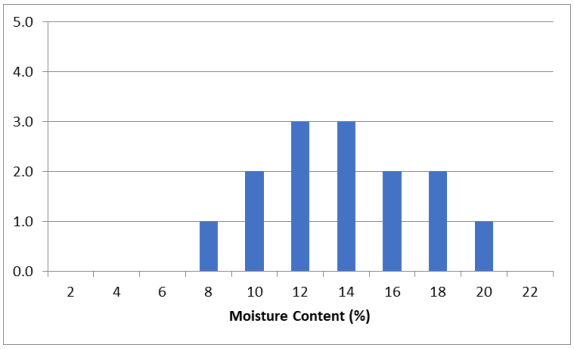
Note 1 More detailed descriptions of the subsurface conditions at each borehole location are available on the borehole logs presented in **Appendix A**.

Plate 3 Plots of Soil Aggressivity Test Results









The Atterberg Limits result on the selected Topsoil sample indicates it to be of high plasticity (CH). The Atterberg Limits result on the selected Residual Soil samples indicates it to be of medium to high plasticity (CI-CH). Using the Atterberg Limits and Linear Shrinkage results, the tested Residual Soil samples were assessed to have moderate to high shrink-swell potential.

The assessment indicated low permeability soil was present above the groundwater table. In accordance with Tables 6.4.2(C) and 6.5.2(C) of AS 2159:2009 'Piling – Design and Installation', the results of the pH, chloride and sulfate content, and electrical conductivity of the soil provided the following exposure classifications:

- Exposure Condition B;
- 'Mild' for buried concrete structural elements; and
- 'Mild' for buried steel structural elements.

3.3.2 Rock Testing

Twenty-nine (29) selected rock core samples were tested by STS Geotechnics Pty Ltd to estimate the Point Load Strength Index (Is_{50}) values to assist with rock strength assessment. The results of the testing are presented in the laboratory test reports (**Appendix B**) and reproduced on the attached borehole logs (**Appendix A**).

The point load strength index tests correlated reasonably well with our field assessments of the rock strength. A summary of the Point Load Strength Index testing for each of the materials identified during drilling works in presented in **Table 3-6** below, along with the derived Unconfined Compressive Strength (UCS) values inferred for each material type.

Table 3-6 Point Load Strength Index Results

Material	Locations	Depth Range (m BEGL)	$Is_{(50)}$ Range (MPa)	Failure Type	Derived UCS Range (MPa)
DW Siltstone	All	3.15 to 6.48	0.15 to 0.87 [1]	Rock Mass	2.40 to 13.92
SW-FR Siltstone	All	6.44 to 20.19	0.23 to 1.20	Rock Mass	3.68 to 19.20

Note 1 Test in borehole BH3M at depth 5.50m has been excluded from these results as it has intersected an existing joint plane. Test returned an Is_{50} value of 0.034 or a derived UCS of about 0.54 MPa.

4. Recommendations

4.1 Geotechnical Considerations

Based on the results of the assessment, we consider the following to be the main geotechnical considerations for the proposed development:

- Site preparation;
- Potential presence of a geological feature;
- Rock excavation and vibration;
- Groundwater within the depth of the excavation;
- Basement excavation and retention;
- Presence of sensitive assets (TfNSW, Sydney Water, Sydney Metro);
- Foundation design for building loads.

4.2 Dilapidation Surveys

Prior to excavation and construction, we recommend that detailed dilapidation surveys be carried out on all structures and infrastructures surrounding the site that falls within the zone of influence of the excavation to allow assessment of the recommended vibration limits. The zone of influence of the excavation is defined by a distance back from the excavation perimeter of twice the total depth of the excavation.

The reports would provide a record of existing conditions prior to commencement of the work. A copy of each report should be provided to the adjoining property owner who should be asked to confirm that it represents a fair assessment of existing conditions. The reports should be carefully reviewed prior to demolition and construction.

4.3 Site Preparation

In areas of proposed pavements or structures outside of the basement footprints, vegetation and trees (including their root balls) should be removed and all grass, topsoil, root affected soils, and any deleterious fill or contaminated soil should be stripped. Based on the results of the investigation, topsoil/root affected soil should be stripped to a nominal depth.

Stripped topsoil and root affected soils should be stockpiled separately as they are considered unsuitable for re-use as engineered fill.

We note that it is difficult to accurately assess the depth of topsoil and root affected soils in a 100mm diameter borehole. If considered to be an important contractual issue, we recommend that a number of shallow test pits be excavated across the site to more accurately confirm the topsoil/root affected soil stripping depth or alternatively a geotechnical inspection could be carried out after initial stripping to confirm the depth.

The design of new pavements would depend on subgrade preparation, subgrade drainage, the nature and composition of fill excavated or imported to the site, as well as vehicle loadings and use. Various alternative types of construction could be used for the pavements. Concrete construction would undoubtedly be the best in areas where heavy vehicles manoeuvre such as trucks turning and manoeuvring. Flexible pavements may have a lower initial cost, but maintenance will be higher. These factors should be considered when making the final choice.

Specific site investigation for pavement design should be carried out prior to construction, to allow relevant testing and design parameter derivation along the proposed road alignments.

4.4 Potential Presence of a Geological Feature

As indicated in the degree of fracturing observed in boreholes BH1M and BH2M on the western side of the site and the associated high permeability values within these boreholes, the dyke or vein as mapped in the regional geology may affect the site.

Extrapolating the alignment of the geotechnical feature indicates it may intersect the south-west corner of the site. Where dykes or host rock affect by geological intrusive features is encountered, the stability of the excavation will be negatively affected and additional shoring measures such as closely spaced contiguous pile walls may be required. Foundations or piles may need to be placed outside the zone of influence and or bridge the dyke depending on the required load capacity.

Even if the dyke does not intersect the site, a high degree of fracturing in the bedrock should be allowed for on the western side near the proposed Stage 3 basement, and increasing towards the south-west site corner. This increased fracturing will also negatively affect the excavation stability.

No intrusive geological features were encountered during the investigation, however we note that vertical features such as dykes may not be encountered by typical borehole drilling. Inclined boreholes (drilling at an angle of about 60°) may be used to identify such features. If found, optimised geotechnical parameters for the feature can be provided and structural options can be selected early in the design process.

4.5 Excavation Methodology

4.5.1 Excavation Assessment

Prior to any excavation commencing, we recommend that reference be made to the Safe Work NSW Excavation Work Code of Practice, dated January 2020.

EI assumes that the proposed development will require a BEL of between RL 68.5m and 69.7m AHD for the respective basements, or an excavation depth of between about 5.5m and 11.5m BEGL. Locally deeper excavations for footings, service trenches, crane pads, and lifts overrun pits may be required.

Based on the borehole logs, the proposed basement excavations will therefore extend through all units as outlined in **Table 3-1** above. As such, an engineered retention system must be installed prior to excavation commencing to support the soil profile (Unit 1 and Unit 2) and the siltstone bedrock (Unit 3, Unit 4, and Unit 5).

Topsoil (Unit 1) and Residual Soil (Unit 2) could be excavated using buckets of standard hydraulic excavators, particularly if fitted with ‘Tiger Teeth’ for excavations in Extremely Weathered Siltstone (Unit 3). Excavation of Distinctly Weathered to Fresh Siltstone (Unit 4 and Unit 5) may present hard or heavy ripping, or ‘hard rock’ excavation conditions. Ripping would require a high capacity and heavy excavators for effective production. Wear and tear should also be allowed for. The use of smaller size of excavator will result in lower productivity and higher wear and tear, and this should be allowed for. Alternatively, hydraulic rock breakers, rock saws, ripping hooks or rotary grinders could be used, though productivity would be lower and equipment wear increased, and this should be allowed for.

Should rock hammers be used for the excavation of the bedrock, excavation should commence away from the adjoining structures and the transmitted vibrations monitored to assess how close the hammer can operate to the adjoining structures while maintaining transmitted vibrations within acceptable limits. To fall within these limits, we recommend that the size of rock hammers do not exceed a medium sized rock hammer, say 900 kg, and be trialled prior to use. The transmitted vibrations from rock hammers should be measured to determine how close each individual hammer can operate to the adjoining buildings.

The vibration measurements can be carried out using either an attended or an unattended vibration monitoring system. An unattended vibration monitoring system must be fitted with an

alarm in the form of a strobe light or siren or alerts sent directly to the site supervisor to make the plant operator aware immediately when the vibration limit is exceeded. The vibration monitor must be set to trigger the alarm when the overall Peak Particle Velocity (PPV) exceeds set limits outlined by a vibration monitoring plan. Reference should be made to **Appendix C** for a guide to acceptable limits of transmitted vibrations.

If it is found that the transmitted vibrations by the use of rock hammers are unacceptable, then it would be necessary to change to a smaller excavator with a smaller rock hammer, or to a rotary grinder, rock saws, jackhammers, ripping hooks, chemical rock splitting and milling machines. Although these are likely to be less productive, they would reduce or possibly eliminate risks of damage to adjoining properties through vibration effects transmitted via the ground. Such equipment would also be required for detailed excavation, such as footings or service trenches, and for trimming of faces. Final trimming of faces may also be completed using a grinder attachment rather than a rock breaker in order to assist in limiting vibrations. The use of rotary grinders generally generates dust and this may be supressed by spraying with water.

To assist in reducing vibrations and over-break of the siltstone, we recommend that initial saw cutting of the excavation perimeters through the bedrock may be provided using rock saw attachments fitted to the excavator. Rock sawing of the excavation perimeter has several advantages as it often reduces the need for rock bolting as the cut faces generally remain more stable and require a lower level of rock support than hammer cut excavations, ground vibrations from rock saws are minimal and the saw cuts will provide a slight increase in buffer distance for use of rock hammers. However, the effectiveness of such approach must be confirmed by the results of vibration monitoring.

Also, there is a potential for poorly oriented defects within the excavated bedrock to result in localised rock slide/topple failure with potential impact to the work site or the adjacent structures. However through selection of suitable excavation equipment, geotechnical inspections and mapping during the excavation works along with the installation of support measures as determined necessary by the inspections, the risk from the proposed works can be maintained within ‘Acceptable’ levels. In addition, we recommend that only excavation contractors with appropriate insurances and experience on similar projects be used. The contractor should also be provided with a copy of this report to make their own judgement on the most appropriate excavation equipment.

Groundwater seepage monitoring should be carried out during bulk excavation works and prior to finalising the design of a pump out facility. Outlets into the stormwater system will require Council approval.

Furthermore, any existing buried services, which run below the site, will require diversion prior to the commencement of excavation or alternatively be temporarily supported during excavation, subject to permission or other instructions from the relevant service authorities. Enquiries should also be made for further information and details, such as invert levels, on the buried services.

4.5.2 Excavation Monitoring

Consideration should be made to the impact of the proposed development upon neighbouring structures, roadways, and services/utilities. Basement excavation retention systems should be designed so as to limit lateral deflections.

Contractors should also consider the following limits associated with carrying out excavation and construction activities:

- Limit lateral deflection of temporary or permanent retaining structures;
- Limit vertical settlements of ground surface at common property boundaries and services easement; and
- Limit Peak Particle Velocities (PPV) from vibrations, caused by construction equipment or excavation, experienced by any nearby structures and services.

Monitoring of deflections of retaining structures and surface settlements should be carried out by a registered surveyor at agreed points along the excavation boundaries and along existing building foundations / services / pavements and other structures located within or near the zone of influence of the excavation. Owners of existing services adjacent to the site should be consulted to assess appropriate deflection limits for their infrastructures. Measurements should be taken in the following sequence:

- Before commencing installation of retaining structures where appropriate to determine the baseline readings. Two independent sets of measurements must be taken confirming measurement consistency;
- After installation of the retaining structures, but before commencement of excavation;
- After excavation to the first row of supports or anchors, but prior to installation of these supports or anchors (if required);
- After excavation to any subsequent rows of supports or anchors, but prior to installation of these supports or anchors (if required);
- After excavation to the base of the excavation;
- After de-stressing and removal of any rows of supports or anchors; and
- One month after completion of the permanent retaining structure or after three consecutive measurements not less than a week apart showing no further movements, whichever is the latter.

Appendix C has been attached for consideration, which provides guideline levels of vibration velocity for evaluating the effects of vibration in structures, based on the *German Standard DIN 4150 – Part 3: 2016-12*. The limits presented in this standard are generally considered to be conservative. It is recommended for future excavation works carried out at the site, a vibration monitoring plan be collated prior to any excavation works, and the implementation of vibration monitoring during the excavation works.

4.6 Groundwater Considerations

Groundwater was observed in all monitoring wells as detailed in **Table 3-4**, all of which are above the assumed BEL of RL 68.5m and 69.7m AHD.

EI note that the measured groundwater levels are typically within the Distinctly Weathered Siltstone (Unit 4), and this is likely to be perched groundwater. At the lower elevations of the site, the groundwater level is higher and within the Residual Soil (Unit 2) as measured in BH3M, and is likely from water infiltration from the farm dam and drainage line leading to this dam.

Hence, we expect some minor seepage inflows into the excavation along the soil/rock interface and through any defects within the bedrock (such as jointing, and bedding planes, etc.), particularly following a period of heavy rainfall, and localised moderate seepage inflows around the excavation perimeter where it approaches the north-south running drainage line.

The pump-out tests indicate the permeability within the siltstone bedrock is relatively high. To confirm the estimated yearly groundwater take, Groundwater Seepage Analysis (GSA) should be conducted prior to the finalisation of the shoring and basement design such that groundwater inflows into the excavation can be estimated and designed accordingly. Should predicted inflow values from the GSA be manageable, seepage during construction and for permanent groundwater control would be able to be controlled by a conventional sump and pump system.

Ahead of undertaking long-term groundwater monitoring and a GSA, and in consideration of measured groundwater levels typically being within the bedrock, it is preliminarily recommended that the basements can be designed as a drained basement. Pursuant to the findings of the GSA and long-term groundwater level monitoring to determine the fluctuations in groundwater levels, there may be a potential that a tanked basement should be considered.

If the findings conclude a drained basement is feasible, than for the long-term design drainage should be provided behind all basement retaining walls, around the perimeter of the basement and below the basement slab. The completed excavation should be inspected by the hydraulic engineer to confirm that adequate drainage has been allowed for. Drainage should be connected to the sump-and-pump system and discharging into the stormwater system. The permanent groundwater control system should take into account any possible soluble substances in the groundwater which may dictate whether or not groundwater can be pumped into the stormwater system. The design of drainage and pump systems should take the above issues into account along with careful ongoing inspections and maintenance programs.

Council and WaterNSW normally do not allow permanent dewatering and the basement may be required to be designed as a tanked structure. Reference should be made to Department of Planning and Environment (DPE) guidelines "*Minimum requirements for building site groundwater investigation and reporting*", dated October 2022, for the required investigations, monitoring, testing, and analysis if a drained basement is desired.

4.7 Excavation Retention

4.7.1 Support Systems

From a geotechnical perspective, it is critical to maintain the stability of all adjacent structures and infrastructures during demolition, excavation, and construction works.

Based on the provided architectural plans, the proposed basement outline has a minimum setback of none to 6m from the northern site boundary, about 10m from the western boundary, 3m from the southern boundary, and no setback from the eastern boundary.

Based on the depth of the proposed excavation, the encountered subsurface conditions, and limited setbacks, temporary batters are not recommended for the full depth of the excavation at this site. Temporary batters of limited depth in the upper portion of the excavation could be considered, where space allows for it.

Temporary batters of no steeper than the safe angles shown in **Table 4-1** below, should be used within the Topsoil (Unit 1), Residual Soil (Unit 2), and Extremely Weathered to Fresh Siltstone (Unit 3 to Unit 5). Given there is insufficient space around the full extent of the proposed basement for temporary batters, interaction with the shored parts of the excavation will need to be considered to ensure continued stability. When considering the available space for temporary batters, the required working space during construction should also be considered as plant and equipment will not be able to be placed on the batters.

Table 4-1 Temporary batter safe slope angles

Material	Safe Batter Angle
Topsoil (Unit 1) and Residual soils (Unit 2)	1.5H : 1V (~30°)
Extremely Weathered Siltstone (Unit 3) to Distinctly Weathered Siltstone (Unit 4)	1H : 1V (~45°)
Slightly Weathered to Fresh Siltstone (Unit 4)	1H : 2V (~65°)

The temporary batters at the above angles should remain stable provided that all surcharge loads, including construction loads, are kept at a distance of at least 2h (where 'h' is the height of the batter in metres) from the crest of the batter and above the groundwater table. If steeper batters are to be used, then these must be supported by shotcrete and soil nail system designed by a suitable structural or geotechnical engineer. The stability of these batters can be assessed using computer slope stability analysis software such as Slope/W. We can complete such analysis, if commissioned to do so.

Where batters are used, the space between the batters and the permanent retaining walls will need to be carefully backfilled to reduce future settlement of the backfill. Only light compaction

equipment should be used for compaction behind retaining walls so that excessive lateral pressures are not placed on the walls. This will require the backfill to be placed in thin layers, say 100mm loose thickness, appropriate to the compaction equipment being used. The compaction specification for the backfill will depend on whether paving or structures are to be supported on the fill. If the fill is to support paved areas it should be compacted to a density of at least 98% of Standard Maximum Dry Density (SMDD) for granular fill materials, but if it is only to support landscaped areas of lower compaction specification, say 95% of SMDD, may be appropriate, provided the risk of future settlement and maintenance can be accepted. An alternative for backfill would also be to use a uniform granular material, wrapped in a geofabric. Appropriate subsurface drainage should be installed to mitigate against the buildup of hydrostatic pressures behind the retaining wall.

Where space for temporary batters is not available or are used only in the upper portion, a suitable retention system will be required to be installed prior to commencement of excavation for the support of the entire depth of the excavation. For this site, we consider that an anchored and/or propped soldier pile wall with reinforced shotcrete panels in between the piles, installed below the BEL to be the most suitable. Anchors/ props and shotcrete must be installed progressively as excavation proceeds. Where permission for the installation of anchors beneath existing properties is not granted, internal props or bracing may be required.

Where dykes or host rock affected by dykes is encountered, additional stabilisation measures may be required, including closer spacing between piles or contiguous pile walls. Following installation of full depth retention system, excavation should be inspected by a geotechnical engineer at no more than 1.5m drops to assess the stability of the supported rock mass between the piles.

The existence of significant horizontal in-situ stresses in bedrock, particularly in the Sydney basin, is well established. The release of such stresses during the basement excavation may cause adverse impact on the stability of the excavation faces and thus increase the movements. Monitoring of several deep excavations within sandstone and shale in the Sydney region indicates that the lateral displacement at the top of the excavation is generally between 0.5mm to 2mm per meter depth of excavation. As the maximum depth of excavation into siltstone is of about 11m, a lateral deflection at the crest of the excavation between 5mm to 22mm can be expected which will reduce in a stepped fashion to zero at the bulk excavation level. Monitoring of the lateral movement as the excavation progresses is recommended. An assessment of such movements and their impact can be carried out using finite element software such as PLAXIS.

For the construction of shoring piles, bored piles are considered to be suitable for this site. Tremie pumps may be required where high groundwater seepage inflows are present during the drilling of the bored piles. Relatively large capacity piling rigs will be required for drilling through the Distinctly Weathered to Fresh Siltstone (Unit 4 to Unit 5). The proposed pile locations should take into account the presence of buried services. Further advice should be sought from prospective piling contractors who should be provided with a copy of this report.

4.7.2 Excavation Adjacent to TfNSW, Sydney Water, or Sydney Metro Assets

Should Badgerys Creek Road be a TfNSW asset, or any Sydney Metro asset fall within the zone of influence of the excavation, reference should be made to the Transport for NSW (TfNSW) Technical Direction – Geotechnology GTD 2020/001, Version No. 01, dated on 2 July 2020, with regards to excavation/shoring adjacent to Badgerys Creek Road and the Bradfield Metro Station area. This document outlines requirements for excavations adjacent to TfNSW infrastructure and includes the level of geotechnical investigation required, dilapidation surveying, instrumentation and monitoring during construction, trigger levels and contingency plans.

Reference should also be made to the Sydney Water procedure D0001870 Specialist Engineering Assessment, Version No. 1, dated 19 February 2021, with regards to the building works adjacent to water line which pass adjacent to the western site boundary.

Instrumentation (e.g. inclinometers) and monitoring is typically required where the excavation exceeds 3m in height (for cantilevered shoring walls) or 6m in height (for anchored or propped shoring walls). A geotechnical monitoring plan may be required by asset owners prior to construction for this site.

We assume for the purpose of this GI that the proposed basement BEL requires excavation depths of 11.0m BEGL at the western and eastern site boundaries, adjacent to the sensitive assets. Therefore, unless the excavation will be deeper than that assumed, it is not expected to trigger TfNSW GTD requirements for Badergeys Creek Road or the Sydney Water asset. It is unclear the extent of assets owned or managed by Sydney Metro within the Bradfield Metro Station/ City Centre area.

4.7.3 Retaining Wall Design Parameters

The following parameters may be used for static design of temporary and permanent retaining walls at the subject site. EI note that the below parameters, particularly with determining lateral earth pressures, are for preliminary planning purposes. We recommend that detailed analysis such as the use of finite element analysis software be used to design retaining walls.

- Conventional free-standing cantilever walls which support areas where movement is of little concern (i.e. where only gardens or open areas are to be retained), may be designed using a triangular lateral earth pressure distribution and an 'active' earth pressure coefficient, K_a, as shown in **Table 4-1**;
- Cantilevered walls, where the tops of which are restrained by the floor slabs of the permanent structure or which support movement sensitive elements, should be designed using a triangular lateral earth pressure distribution and an 'at rest' earth pressure coefficient, K_o, as shown in **Table 4-1**.
- For progressively anchored or propped walls where minor movements can be tolerated (provided there are no buried movement sensitive services), we recommend the use of a trapezoidal earth pressure distribution of 5H kPa for soil, where H is the retained height in meters. These pressures should be assumed to be uniform over the central 50% of the support system, tapering to nil at top and bottom;
- For progressively anchored or propped walls which support areas which are highly sensitive to movement (such as areas where movement sensitive structures or infrastructures or buried services are located in close proximity), we recommend the use of a trapezoidal earth pressure distribution of 8H kPa for soil, where 'H' is the retained height in meters. These pressures should be assumed to be uniform over the central 50% of the support system, tapering to nil at top and bottom;
- All surcharge loading affecting the walls (including from construction equipment, construction loads, adjacent high level footings, etc.) should be adopted in the retaining wall design as an additional surcharge using an 'at rest' earth pressure coefficient, K_o.
- The retaining walls should be designed as drained and measures are to be taken to provide complete and permanent drainage behind the walls. Strip drains protected with a non-woven geotextile fabric should be used behind the reinforced shotcrete infill panels for soldier pile walls. Alternatively, for the contiguous pile walls, weepholes comprising 20mm diameter, slotted PVC pipes installed into holes or gaps between adjacent piles at 1.2m centres (horizontal and vertical), may be used. The embedded pipes must, however, be wrapped with a non-woven geotextile fabric (such as Bidim A34) to act as a filter against subsoil erosion;
- For piles embedded into Slightly Weathered to Fresh Siltstone (Unit 5) or better, the allowable lateral toe resistance values outlined in **Table 4-2** below may be adopted. These values assume excavation is not carried out within the zone of influence of the wall toe and the rock does not contain adverse defects etc. The upper 0.3m depth of the socket should not be taken into account to allow for tolerance and disturbance effects during excavation.

- If temporary anchors extend beyond the site boundaries, then permission from the neighbouring properties would need to be obtained prior to installation. Also, the presence of neighbouring basements and/or services and their levels must be confirmed prior to finalising anchor design**.**
- Anchors should have their bond length within Distinctly Weathered Siltstone (Unit 4) or better. For the design of anchors bonded into Unit 4 or better, the allowable bond stress value outlined in **Table 4-2** below may be used, subject to the following conditions:
  - Anchor bond lengths of at least 3m behind the 'active' zone of the excavation (taken as a 45 degree zone above the base of the excavation) is provided;
  - Overall stability, including anchor group interaction, is satisfied;
  - All anchors should be proof loaded to at least 1.3 times the design working load before locking off at about 80% of their working load. Such proof loading is to be witnessed by an engineer independent of the anchoring contractor. Lift-off tests should be carried out on at least 10% of the anchors 24 to 48 hours following locking off to confirm that the anchors are holding their load. Usually anchors are commissioned on design and construct basis so that failure of anchors to hold their load does not then become a contractual issue. We recommend that only experienced contractors be considered for anchor design, specification, and installation with appropriate insurances;
  - If permanent anchors are to be used, these must have appropriate corrosion provisions for longevity.

Table 4-2 Geotechnical Design Parameters

Material [1]		Unit 1 Topsoil	Unit 2 Residual Soil	Unit 3 XW Siltstone	Unit 4 DW Siltstone	Unit 5 SW to FR Siltstone
RL of Top of Unit (m AHD) [2]		76.80 to 80.70	74.95 to 80.60	74.30 to 79.50	73.34 to 77.30	69.48 to 74.43
Bulk Unit Weight (kN/m^3)		16	18	22	24	24
Friction Angle, ϕ' (°)		20	25	15	25	35
Effective Cohesion, c' (kPa)		5	15	40	90	150
Young's Modulus, E' (MPa)		10	20	50	100	200
Poisson's Ratio, v		0.3	0.3	0.3	0.25	0.25
Earth Pressure Coefficients	At rest, K_o [3]	0.66	0.58	0.74	-	-
	Active, K_a [3]	0.49	0.41	0.59	-	-
	Passive, K_p [3]	2.04	2.46	1.70	-	-
Allowable Bearing Pressure (kPa) [5,6]		-	-	700	1000	3500
Allowable Shaft Adhesion (kPa) [4, 5]	in Compression	-	-	70	100	350
	in Uplift	-	-	35	50	175
Allowable Bond Stress (kPa) [7]		-	-	-	175	250
Earthquake Site Risk Classification		AS 1170.4:2007 indicates earthquake subsoil Class B_e.(Rock) AS 1170.4:2007 indicates the hazard factor (z) for Sydney is 0.08.				

Note 1 More detailed descriptions of subsurface conditions are available on the borehole logs in **Appendix A**.

Note 2 Approximate levels of top of unit at the time of our investigation. Levels may vary across the site.

Note 3 Earth pressures are provided on the assumption that the ground behind the retaining walls is horizontal.

Note 4 Side adhesion values given assume there is intimate contact between the pile and foundation material and should achieve a clean socket roughness category R2 or better. Design engineer to check both 'piston pull-out' and 'cone liftout' mechanics in accordance with AS4678 Earth Retaining Structures.

Note 5 To adopt these parameters we have assumed that:

a. Footings have a nominal socket of at least 0.3m, into the relevant founding material;
b. For piles, there is intimate contact between the pile and foundation material (a clean socket roughness category of R2 or better);
c. Potential soil and groundwater aggressivity will be considered in the design of piles and footings;
d. Piles should be drilled in the presence of a Geotechnical Engineer prior to pile construction to verify that ground conditions meet design assumptions. Where groundwater ingress is encountered during pile excavation, concrete is to be placed as soon as possible upon completion of pile excavation. Pile excavations should be pumped dry of water prior to pouring concrete, or alternatively a tremmie system could be used;
e. The bases of all pile, pad and strip footing excavations are cleaned of loose and softened material and water is pumped out prior to placement of concrete;
f. The concrete is poured on the same day as drilling, inspection, and cleaning.

Note 6 The allowable bearing pressures given above are based on serviceability criteria of settlements at the footing base/pile toe of less than or equal to 1% of the minimum footing dimension (or pile diameter).

Note 7 Anchor design values must, in accordance AS 4678 Earth Retaining Structures, be proof tested. Further advice on retaining wall design including for anchors is provided in **Section 4.7.3**.

4.8 Foundations

Following basement excavation to bulk excavation levels, we expect that Slightly Weathered Siltstone (Unit 5) will be exposed at BEL of RL 68.5m and 69.7m AHD.

The aggressivity of natural soils and groundwater (if encountered) should be taken into consideration in the design to assess exposure classification to steel and concrete structures.

4.8.1 Shallow Footings in Rock

It is recommended that all footings for the building be founded within the siltstone bedrock of similar strength to provide uniform support and reduce the potential for differential settlements.

Shallow spread footings comprising pad or strip footings founded in the respective material units may be designed as follows:

- Within XW Siltstone (Unit 3) may be preliminarily designed for an allowable bearing capacity of 700kPa, based on serviceability;
- Within DW Siltstone (Unit 4) may be preliminarily designed for an allowable bearing capacity of 1,000kPa, based on serviceability;
- Within SW-FR Siltstone (Unit 5) may be preliminarily designed for an allowable bearing capacity of 3,500kPa, based on serviceability.

Where footings are proposed outside the basement footprint, they should be founded below the zone of influence of the basement excavation to avoid imposing surcharge loads to the shoring walls. Piles may be required to achieve this. The zone of influence of the basement excavation is defined as a plane projected from the toe of the excavation face upwards into the excavation face at 45 degrees from horizontal to meet the ground surface.

Given the shallow depth to bedrock and moderate to high shrink-swell potential of the Residual Soil (Unit 2), we do not recommend any structures to be founded within Unit 1 or Unit 2 soils.

Geotechnical inspections of foundations are recommended to determine that the required bearing capacity has been achieved and to determine any variations that may occur between the boreholes and inspected locations.

4.8.2 Pile Footings

Alternatively, the proposed development may be supported on deep foundations, such as piles, founded into the respective bedrock material units.

For piles founded in the respective material units, these must be embedded a minimum of 0.5m into this material, and may be designed as follows:

- Within XW Siltstone (Unit 3) may be designed for a maximum allowable bearing capacity of 700kPa;
- Within DW Siltstone (Unit 4) may be designed for a maximum allowable bearing capacity of 1,000kPa;
- Within SW-FR Siltstone (Unit 5) may be designed for a maximum allowable bearing capacity of 3,500kPa.

The allowable shaft adhesion in siltstone bedrock may be designed as 10% of the allowable bearing pressure (or 5% for uplift) for the socket length in excess of 0.5m.

At least the initial drilling of piles should be completed in the presence of a geotechnical engineer to verify that ground conditions meet design assumptions.

Bored piles are considered to be suitable for this site. Concrete must be poured on the same day as drilling, inspection, and placement of reinforcement. Where groundwater ingress is encountered during pile excavation, concrete is to be placed as soon as possible upon completion of pile excavation. Pile excavations should be pumped dry of water prior to pouring concrete, or alternatively a tremmie system could be used. The use of a cleaning bucket is

recommended to remove drill cuttings and debris from the base of pile holes prior to concrete placement. Placement of concrete from the base of the bored pile using a tremie pipe is recommended. Large capacity piling rigs will be required for drilling through the Distinctly Weathered to Fresh Siltstone (Unit 4 and Unit 5). Where considerable groundwater ingress is anticipated or where there is a risk of sidewall collapse, the use of temporary liners or permanent casing should be considered. Further advice should be sought from prospective piling contractors who should be provided with a copy of this report.

4.9 Basement Floor Slab

Following bulk excavations for the proposed basement, SW-FR Siltstone bedrock (Unit 5) is expected to be exposed at the basement floor BEL.

Following the removal of all loose and softened materials, we recommend that underfloor drainage be provided and should comprise a strong, durable, single sized washed aggregate such as ‘blue metal gravel’. Joints in the concrete floor slab should be designed to accommodate shear forces but not bending moments by using dowelled and keyed joints. The basement floor slab should be isolated from columns. The completed excavation should be inspected by the hydraulic engineer to confirm the extent of the drainage required.

In addition, a system of sub-soil drains comprising a durable single sized aggregate with perforated drains/pipes leading to sumps should be provided. The basement floor slab should be isolated from columns.

Permission may need to be obtained from Council and WaterNSW for any permanent discharge of seepage into the drainage system. Given the subsurface conditions, we expect that seepage volumes would be low and within acceptable limits manageable by drainage systems. However, if permission for discharge is not obtained, the basement may need to be designed as a tanked basement.

5. Conculsion

This report has been prepared to assist in the design of the proposed development, the geotechnical advice and recommendations presented should be read in full. Further consultation should be undertaken throughout the design process to ensure the measures are implemented as intended and to address site or design specific geotechnical issues. Further geotechnical inspections should be carried out during construction to confirm the geotechnical and groundwater models, and the design parameters provided in this report.

A summary of the mitigation measures described in this report is presented in **Table 5-1** below.

Table 5-1 Summary of Mitigation Measures

ID	Mitigation Measure
Design Phase	
D1	Soil and groundwater aggressivity, including salinity and sodicity, must be considered in the design of the proposed development.
D2	Impacts of excavation on neighbouring structures/infrastructure should be considered in design, with appropriate measure as required undertaken specific to the asset.
D3	Excavation retention must be designed in accordance with the recommendations provided in this report for the support of the excavation.
D4	Design of excavation retention should consider for the possibility of a potential geological feature, or poor ground conditions due to a feature.
D5	Below ground structures must account for groundwater seepage and required waterproofing or dewatering controls, and hydraulic design to minimise or account for water pressure.
D6	Foundations must be designed in accordance with the recommendations provided in this report for the support of the proposed development.
Construction Phase	
C1	Dilapidation reports of structures and infrastructure within the zone of influence should be prepared prior to undertaking any demolition, excavation, or construction works on site.
C2	A geotechnical and hydrogeological monitoring plan or similar should be prepared to set out the required monitoring during excavation, including the required instrumentation and monitoring, trigger levels, and contingency plans.
C3	In areas of pavements or structures outside of the basement footprints, vegetation and trees (including their root balls) should be removed and all grass, topsoil, root affected soils, and any deleterious fill or contaminated soil should be stripped.
C4	Appropriate excavation equipment for the expected ground conditions should be selected.
C5	Excavation retention must be installed progressively as excavation proceeds to ensure safety and stability of the excavation. Inspection and testing of retention measures must be undertaken in accordance with the design of the shoring system and the excavation monitoring plan.
C6	Appropriate approvals or licences must be held prior to undertaking any construction dewatering.

6. Further Geotechnical Inputs

Below is a summary of the recommended additional work that needs to be carried out:

- Review of the assessment and recommendations presented in this report following availability of further details of the proposed works, and updating as required as a separate engagement;
- At least one (1) inclined borehole (drilled at an angle of about 60°) with downhole imaging may be undertaken within the south-west site corner, to identify any possible vertical geological feature and assess the potential area of influence within the host rock.
- Additional site investigation in the form of large diameter auger drilling or test pits for collection of compaction and CBR samples to inform the pavement design, if required.
- If directed by Sydney Metro or any other asset owners, carry out specialist engineering assessment, further geotechnical investigations, monitoring equipment installs and/or subsequent monitoring;
- Dilapidation surveys;
- Stability assessment of temporary batters using computer modelling, if required;
- Design of working platforms (if required) for construction plant by an experienced and qualified geotechnical engineer;
- Classification of all excavated material transported off site;
- Witnessing installation of support measures and proof-testing of anchors (if required).
- Geotechnical inspections of all new footings/piles by an experienced geotechnical professional before concrete or steel are placed to verify their bearing capacity and the in-situ nature of the founding strata; and
- Ongoing monitoring of groundwater inflows into the bulk excavation;

We recommend that a meeting be held after initial structural design has been completed to confirm that our recommendations have been correctly interpreted. We also recommend a meeting at the commencement of construction to discuss the primary geotechnical issues and inspection requirements.

7. Statement of Limitations

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

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

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

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

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

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

We draw your attention to the document "Important Information", which is included in **Appendix D** of this report. The statements presented in this document are intended to advise you of what your realistic expectations of this report should be. The document is not intended to reduce the level of responsibility accepted by EI, but rather to ensure that all parties who may rely on this report are aware of the responsibilities each assumes in so doing.

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

References

AS1289.6.3.1:2004, *Methods of Testing Soils for Engineering Purposes*, Standards Australia.

AS1726:2017, *Geotechnical Site Investigations*, Standards Australia.

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Abbreviations

AHD	Australian Height Datum
AS	Australian Standard
BEL	Bulk Excavation Level
BEGL	Below Existing Ground Level
BH	Borehole
BYDA	Before You Dig Australia
CBR	California Bearing Ratio
DP	Deposited Plan
EI	EI Australia
FFL	Finished Floor Level
GI	Geotechnical Investigation
NATA	National Association of Testing Authorities, Australia
PPV	Peak Particle Velocity
RL	Reduced Level
SPT	Standard Penetration Test
T-C	Tungsten-Carbide
TfNSW	Transport for NSW
UCS	Unconfined Compressive Strength

Figures

Derwent Road

Badgerys Creek Road

BRADFIELD

Bradfield Railway Station

Derwent

The Northern Road

Badgerys Creek Road

Moore-Gully

Moore-Gully

0 150 300 450 600 m

LEGEND **Note: All locations are approximate**

Site Boundary

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

Drawn:	G.B.
Approved:	J.B.
Date:	22/09/2025

Bradfield Corporation Pty Ltd

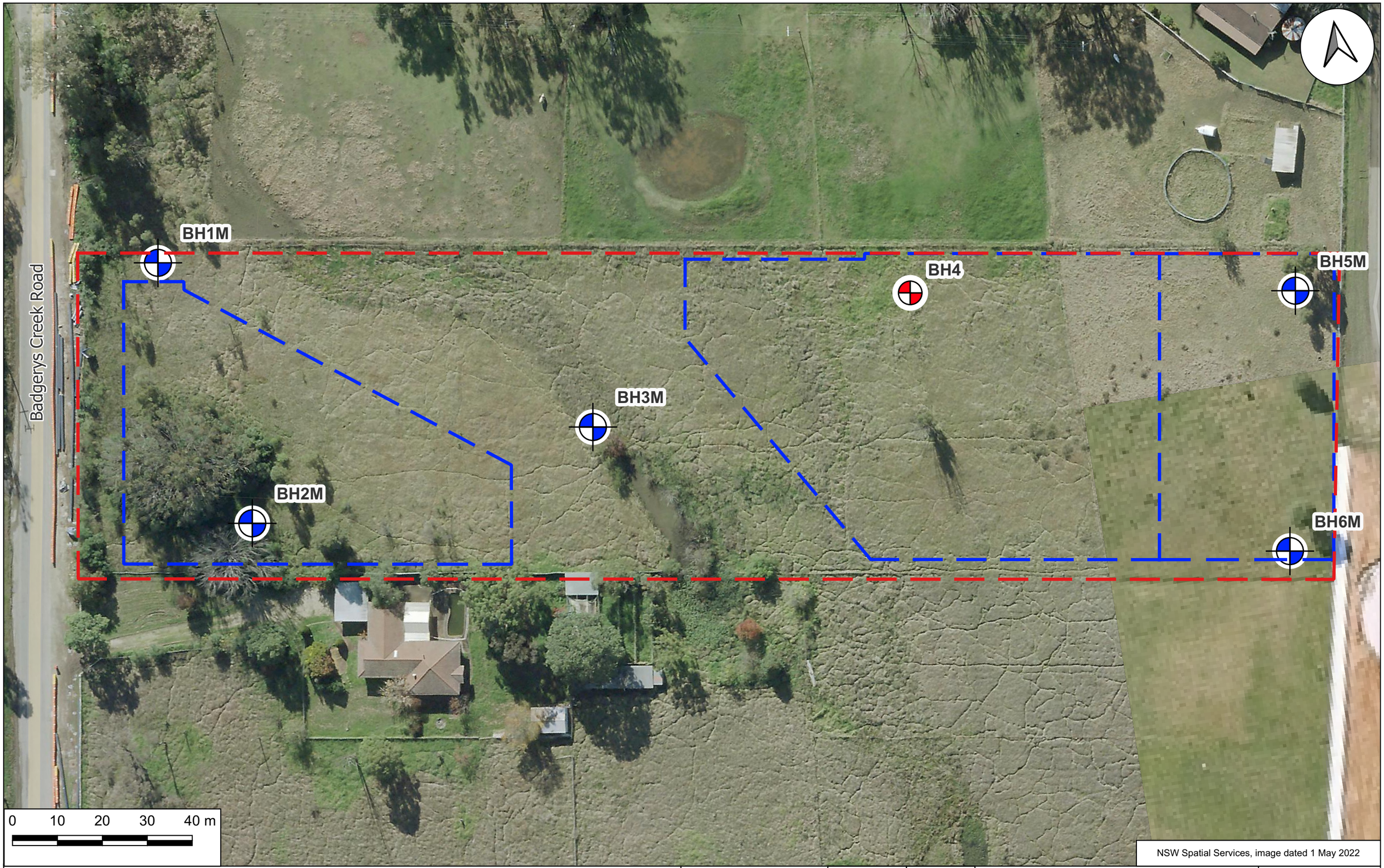
Geotechnical Investigation

135 Badgerys Creek Road, Bradfield NSW

Site Locality Plan

Figure: 1

Project: E26733.G03



NSW Spatial Services, image dated 1 May 2022

LEGEND Note: Areas are approximate

- Site Boundary
- Borehole
- Groundwater Monitoring Well

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

Drawn:	G.B.
Approved:	J.B.
Date:	22/09/2025

Bradfield Corporation Pty Ltd

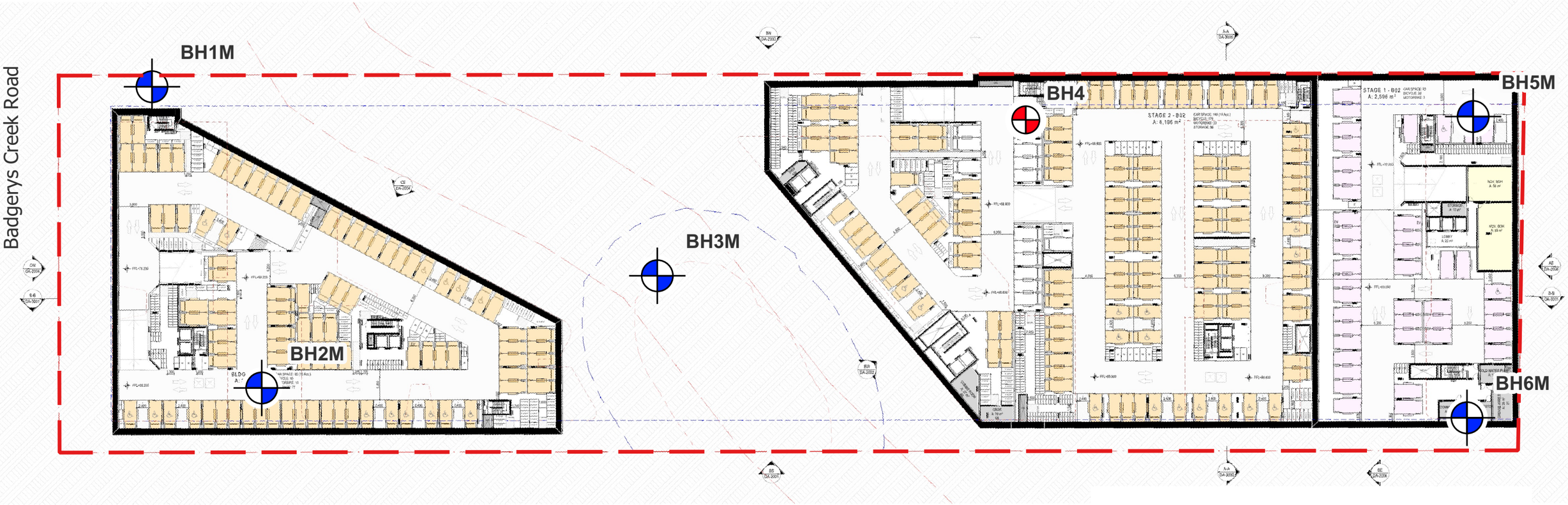
Geotechnical Investigation

135 Badgerys Creek Road, Bradfield NSW

Borehole Location Plan

Figure: 2

Project: E26733.G03



DA10B3 [03] GENERAL FLOOR PLAN - BASEMENT 02, (19/09/2025)

LEGEND Note: Areas are approximate

- Site Boundary
- Borehole
- Groundwater Monitoring Well

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

Drawn:	G.B.
Approved:	J.B.
Date:	22/09/2025

Bradfield Corporation Pty Ltd

Geotechnical Investigation

135 Badgerys Creek Road, Bradfield NSW

Borehole Location and Proposed Basement Layout

Figure: 3

Project: E26733.G03

Appendix A Borehole Logs And Explanatory Notes

BOREHOLE LOG

BH ID: BH1M

Location	135 Badgerys Creek Road, Bradfield NSW			**Started**	23 April 2025
Client	Creative Vision			**Completed**	23 April 2025
Job No.	E26733.G03			**Logged By**	GB **Date** 23 April 2025
Sheets	1 of 3			**Review By**	JB **Date** 23 June 2025
Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈80.30 m (AHD)	**Northing**	6244091.0000 (MGA 2020 Zone 56)
Plant	Comacchio Geo 205	**Inclination**	90°	**Easting**	290122.0000 (MGA 2020 Zone 56)

METHOD	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	SAMPLE RECOVERY	DEPTH (m)	GRAPHIC LOG	RL (m AHD)	MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY / REL. DENSITY	MATERIAL ORIGIN & OBSERVATIONS
AD/T	GWNE	BH1M_0.5-0.95 SPT 0.50-0.95 7,9,15 N=24		0 0.00 0.10		80.30 80.20	TOPSOIL: Silty CLAY: medium plasticity, dark brown, with rootlets, no odour odour CLAY: low plasticity, dark red, no odour odour	M ≈ PL M < PL	- VSt	TOPSOIL RESIDUAL SOIL
		BH1M_1.50-1.94 SPT 1.50-1.79 2,16/140 mm N=R		0.80 1 2 2.30 3		79.50 78.00 77.30	SILTSTONE: pale brown-grey, extremely weathered, soil to very low strength, with pale grey clay seams From 2.30m, very low to low strength			BEDROCK
				3.00 4 5 6 7 8 9 10			*Log continued on next page.*			

BOREHOLE CORE LOG

BH ID: BH1M

Location	135 Badgerys Creek Road, Bradfield NSW			**Started**	23 April 2025
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Job No.	E26733.G03			**Logged By**	GB **Date** 23 April 2025
Sheets	2 of 3			**Review By**	JB **Date** 23 June 2025
Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈80.30 m (AHD)	**Northing**	6244091.0000 (MGA 2020 Zone 56)
Plant	Comacchio Geo 205	**Inclination**	90°	**Easting**	290122.0000 (MGA 2020 Zone 56)

METHOD	Flush Return	TCR %	RQD %	DEPTH (m)	RL (m AHD)	MATERIAL DESCRIPTION	WEATHERING	ESTIMATED STRENGTH Is(50) ▼ - Axial ▽ - Diametral	DISCONTINUITIES & ADDITIONAL DATA	FRACTURE SPACING
				0		*Log continued from previous page.*				
				1						
				2						
NMLC	90%	100	16	3		SILTSTONE: brown to dark grey, thinly to medium bedded, iron stained	DW		3.01: JT 20° PR SM CL 3.06: BP 0-10° PR SM CL VN 3.09-3.11: JT 10-20° PR SM CL X3 3.17: BP 0° PR SM CL VN 3.21: JT 0-10° UN SM CL 3.23: BP 0° PR SM CL VN 3.25-3.47: JT 10-50° PR SM CL Infilled 3.35: XWS 0° PR SM CL Infilled 3.45: XWS 0° PR SM CL Infilled 3.49-3.56: BP 0-10° PR SM FE VN 3.61-3.63: XWS 10° PR SM CL Infilled 3.69: XWS 10° PR SM CL Infilled 3.74: BP 10° PR SM FE VN 3.82: BP 0° PR SM FE VN 3.91: BP 10° PR SM CL VN 3.97: BP 10° PR SM CL VN 4.12-4.15: XWS 0° PR SM CL Infilled 4.19: BP 0-15° UN SM FE VN 4.29: BP 0-10° UN SM CL 4.36: BP 10° PR SM CL 4.37-4.41: XWS 10° PR SM CL Infilled 4.46-4.47: XWS 10° PR SM CL Infilled 4.50: JT 70° PR SM FE VN 4.65: BP 0° PR CM CL VN 4.68: JT 30° PR SM CL 4.74-4.75: XWS 0° PR SM CL Infilled 4.77-4.78: XWS 10° PL SM CL Infilled 4.89: JT 80° PR SM FE SN X2 4.97: HB 5.03: JT 80° PR SM FE SN 5.11: BP 10° PR SM FE VN 5.32-5.56: BP 0-10° UN RO GC Infilled 5.66: BP 10° PR RO GC Infilled 5.87: JT 20° PR RO FE/CL Infilled 5.98: BP 0° PR SM FE VN 6.07: DB 6.08-6.97: DB scarring from above gravels 6.81: BP 10° PR SM CL Infilled 6.87-6.91: CS 0-20° PR RO GC Infilled 7.20: BP 10° UN RO FE VN 7.22: BP 10° UN RO FE VN 7.65: BP 10° PR RO FE VN 7.95: BP 10° PR RO FE VN 7.98: HB 8.09: BP 0° PR RO FE VN 8.25: JT 80° PR RO FE/QZ Infilled 8.26: BP 20° PR RO FE VN 8.38: JT 80° ST RO CL 8.54-8.74: JT 30-90° ST RO CL 8.73: DB 9.01: HB 9.03-9.04: XWS 0° PR SM CL Infilled 9.09: BP 0° PR SM CL VN 9.16-9.19: XWS 0° PR SM CL Infilled 9.27: BP 0° PR CM CN 9.93: BP 10° PR SM CN	30 100 300 1000 3000
				4						
				5						
				5.31	74.99	From 5.31m, with bands of sand/gravel, medium sand to fine gravel size, sub-rounded, bands up to 60mm thick, iron indurated				
				5.81	74.49	SILTSTONE: dark grey, indistinctly thinly bedded, trace mudstone/carbonaceous inclusions or laminations, up to 20mm in size				
				6						
	70%	100	89	6.98	73.32	From 6.98m to 7.14m, bioturbation burrow				
				7.20	73.10	SANDSTONE: pale grey to grey, fine to medium grained, very thinly to thinly bedded, occasional bioturbation or disturbed bedding	FR			
				8						
	40%	100	90	8.26	72.04	SILTSTONE: dark grey, laminated to very thinly bedded, occasional bioturbation or disturbed bedding				
				9						
				10						

BOREHOLE CORE LOG

BH ID: BH1M

Location	135 Badgerys Creek Road, Bradfield NSW			**Started**	23 April 2025		
Client	Creative Vision			**Completed**	23 April 2025		
Job No.	E26733.G03			**Logged By**	GB	**Date**	23 April 2025
Sheets	3 of 3			**Review By**	JB	**Date**	23 June 2025
Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈80.30 m (AHD)	**Northing**	6244091.0000 (MGA 2020 Zone 56)		
Plant	Comacchio Geo 205	**Inclination**	90°	**Easting**	290122.0000 (MGA 2020 Zone 56)		

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

MONITORING WELL LOG

BH ID: BH1M

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

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

BACKFILL DETAILS	STANDPIPE DETAILS
	Well Stickup =0.86m (RL 81.16m)
Grout 0.00m - 5.50m	
	-0.86m - 7.91m PVC casing (50mm Ø)
Bentonite 5.50m - 6.50m	
Sand 6.50m - 10.91m	
	7.91m - 10.91m PVC screen (50mm Ø)

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

MONITORING WELL LOG

BH ID: BH1M

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

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

CORE PHOTOGRAPH OF BOREHOLE: BH1M

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

BOREHOLE LOG

BH ID: BH2M

Location	135 Badgerys Creek Road, Bradfield NSW			**Started**	23 April 2025
Client	Creative Vision			**Completed**	24 April 2025
Job No.	E26733.G03			**Logged By**	GB **Date** 24 April 2025
Sheets	1 of 3			**Review By**	JB **Date** 23 June 2025
Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈79.70 m (AHD)	**Northing**	6244031.0000 (MGA 2020 Zone 56)
Plant	Comacchio Geo 205	**Inclination**	90°	**Easting**	290135.0000 (MGA 2020 Zone 56)

METHOD	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	SAMPLE RECOVERY	DEPTH (m)	GRAPHIC LOG	RL (m AHD)	MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY / REL. DENSITY	MATERIAL ORIGIN & OBSERVATIONS
AD/T	GWNE	BH2M_0.50-0.95 SPT 0.50-0.95 5,7,12 N=19		0.00 0.15 0.60 1		79.70 79.55 79.10	TOPSOIL: Silty CLAY: medium plasticity, dark brown, with rootlets, no odour odour CLAY: low plasticity, dark red, trace rootlets, no odour odour From 0.60m, pale grey mottled dark red	M ≈ PL M < PL	- VSt	TOPSOIL RESIDUAL SOIL
		BH2M_1.50-1.86 SPT 1.50-1.86 8,16,10/60 mm N=R		1.70 2		78.00	SILTSTONE: brown-grey to dark grey and dark red, extremely weathered, soil to very low strength			BEDROCK
				2.50 3 4 5 6 7 8 9 10		77.20	*Log continued on next page.*			

BOREHOLE CORE LOG

BH ID: BH2M

Location	135 Badgerys Creek Road, Bradfield NSW			**Started**	23 April 2025
Client	Creative Vision			**Completed**	24 April 2025
Job No.	E26733.G03			**Logged By**	GB **Date** 24 April 2025
Sheets	2 of 3			**Review By**	JB **Date** 23 June 2025
Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈79.70 m (AHD)	**Northing**	6244031.0000 (MGA 2020 Zone 56)
Plant	Comacchio Geo 205	**Inclination**	90°	**Easting**	290135.0000 (MGA 2020 Zone 56)

METHOD	Flush Return	TCR %	RQD %	DEPTH (m)	RL (m AHD)	MATERIAL DESCRIPTION	WEATHERING	ESTIMATED STRENGTH Is(50) ▼ - Axial ▽ - Diametral	DISCONTINUITIES & ADDITIONAL DATA	FRACTURE SPACING
				0		*Log continued from previous page.*				
NMLC	70%	100	47	3		SILTSTONE: dark grey, laminated to very thinly bedded, iron stained	DW	▼	2.56: BP 0° PR SM FE SN 2.57: JT 40° PR SM FE SN X2 2.65: BP 0° PR SM FE SN 2.67: JT 30° PR SM FE SN 2.76: DB 2.82: DB 2.89: BP 0° PR SM FE VN 2.98: BP 0° PR SM FE SN 3.06: JT 40° PR SM CN 3.13: JT 10° PR SM CN 3.34: DB 3.45-4.69: JT 80-90° PR SM FE VN breakage along joint obscures further defects 3.47: BP 10° PR SM FE VN	
	20%	100	39	5					4.47: JT 60° CU SM FE VN 4.73-4.78: CS 0-40° IR SM GC Infilled 4.83: JT 30° PR SM FE VN 4.92: BP 10° PR SM FE VN 4.94-5.08: JT 80-90° PR SM FE VN 5.12: JT 30° PR SM FE VN 5.25-5.28: XWS 0° PR SM GC Infilled 5.36: JT 50° PR RO GC Infilled 5.57: BP 0-10° PR SM GR Infilled 5.70-5.72: XWS 0° PR SM GC Infilled 5.75: JT 30-80° CU SM CN 5.84-6.29: JT 80-90° PR SN FE VN	
				5.09	74.61	From 5.09m to 5.32m, with bands of sand/gravel, medium sand to fine gravel size, sub-rounded, bands up to 60mm thick				
				5.32	74.38	From 5.32m to 5.57m, with sand, fine grained, grey to dark grey				
				5.72	73.98	SILTSTONE: dark grey, indistinctly thinly bedded, trace iron staining				
				5.98	73.77	From 5.93m to 5.93m, gravel inclusions, medium size, sub-rounded	SW			
	70%	100	88	6.36	73.34	SILTSTONE: grey to dark grey, indistinctly laminated to thinly bedded, with fine grained sand, occasional bioturbation or disturbed bedding	FR	▼	6.14: JT 80° PR SM FE VN 6.32-6.35: DB 6.37: JT 80-90° CU SM QZ VN 6.40: DB 6.47: JT 70° IR SM QZ VN 6.48: BP 0° PR SM CN 6.97-7.07: JT 80° PR SM QZ VN 7.06-8.38: JT 80-90° PR SM QZ VN 7.33: XWS 0° PR SM GC Infilled 7.81: BP 0° PR SM CN 8.24-8.32: XWS 0-20° PR SM GC Infilled 8.41-8.49: XWS 0-20° PR SM GC Infilled 8.59: BP 0° PR SM CL VN 8.91: BP 10° PR CN CL VN 8.98: HB 9.03: BP 0° PR SN CL VN 9.22: DB	
	80%			9.52	70.18	NO CORE: 90mm thick				
				9.61	70.09	SILTSTONE: as above			9.62: DB 9.66: HB	
				10						

BOREHOLE CORE LOG

BH ID: BH2M

Location	135 Badgerys Creek Road, Bradfield NSW			**Started**	23 April 2025
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Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈79.70 m (AHD)	**Northing**	6244031.0000 (MGA 2020 Zone 56)
Plant	Comacchio Geo 205	**Inclination**	90°	**Easting**	290135.0000 (MGA 2020 Zone 56)

METHOD	Flush Return	TCR %	RQD %	DEPTH (m)	GRAPHIC LOG	RL (m AHD)	MATERIAL DESCRIPTION	WEATHERING	ESTIMATED STRENGTH Is(50) ▼ - Axial ▽ - Diametral (VL 0-1, L 0-3, M 1, H 3, VH 10, EH)	DISCONTINUITIES & ADDITIONAL DATA	FRACTURE SPACING (30, 100, 300, 1000, 3000)
	80%	97	92	11			SILTSTONE: as above			10.05: HB 10.37: BP 0° PR SM CN 10.68: BP 10° PR SM CN 10.72: BP 0° PR SM CL VN 10.78: BP 0° PR SM CL VN 10.91: JT 30° PR SM CL VN 10.97: HB 11.07: DB	
				11.07		68.63	From 11.07m to 11.07m, gravel inclusions, medium size, rounded				
				11.78		67.92	From 11.78m to 11.83m, gravel inclusions, medium size, rounded			11.79: DB	
				12		67.51	Terminated at 12.19m. Target depth reached.				
				13							
				14							
				15							
				16							
				17							
				18							
				19							
				20							

MONITORING WELL LOG

BH ID: BH2M

Location	135 Badgerys Creek Road, Bradfield NSW			**Started**	23 April 2025	
Client	Creative Vision			**Completed**	24 April 2025	
Job No.	E26733.G03			**Logged By**	GB	**Date** 24 April 2025
Sheets	1 of 2			**Review By**	JB	**Date** 23 June 2025
Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈79.70 m (AHD)	**Northing**	6244031.0000 (MGA 2020 Zone 56)	
Plant	Comacchio Geo 205	**Inclination**	90°	**Easting**	290135.0000 (MGA 2020 Zone 56)	

WATER	SAMPLES & FIELD TESTS	DEPTH (m)	RL (m AHD)	MATERIAL DESCRIPTION	MOISTURE CONDITION
GWNE	BH2M_0.50-0.95 SPT 0.50-0.95 5,7,12 N=19	0.00 0.15	79.70 79.55	TOPSOIL: Silty CLAY: medium plasticity, dark brown, with rootlets, no odour odour CLAY: low plasticity, dark red, trace rootlets, no odour odour	M < PL
		0.60	79.10	From 0.60m, pale grey mottled dark red	M < PL
	BH2M_1.50-1.86 SPT 1.50-1.86 8,16,10/60 mm N=R	1.70	78.00	SILTSTONE: brown-grey to dark grey and dark red, extremely weathered, soil to very low strength	
70%		2.50	77.20	SILTSTONE: dark grey, laminated to very thinly bedded, iron stained	
20%		5.09	74.61	From 5.09m to 5.32m, with bands of sand/gravel, medium sand to fine gravel size, sub-rounded, bands up to 60mm thick	
		5.32	74.38	From 5.32m to 5.57m, with sand, fine grained, grey to dark grey	
		5.72	73.98	SILTSTONE: dark grey, indistinctly thinly bedded, trace iron staining	
		5.93	73.77	From 5.93m to 5.93m, gravel inclusions, medium size, sub-rounded	
70%		6.36	73.34	SILTSTONE: grey to dark grey, indistinctly laminated to thinly bedded, with fine grained sand, occasional bioturbation or disturbed bedding	
80%		9.52	70.18	NO CORE: 90mm thick	
		9.61	70.09	SILTSTONE: as above	

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

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

MONITORING WELL LOG

BH ID: BH2M

Location	135 Badgerys Creek Road, Bradfield NSW			**Started**	23 April 2025
Client	Creative Vision			**Completed**	24 April 2025
Job No.	E26733.G03			**Logged By**	GB **Date** 24 April 2025
Sheets	2 of 2			**Review By**	JB **Date** 23 June 2025
Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈79.70 m (AHD)	**Northing**	6244031.0000 (MGA 2020 Zone 56)
Plant	Comacchio Geo 205	**Inclination**	90°	**Easting**	290135.0000 (MGA 2020 Zone 56)

WATER	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG	RL (m AHD)	MATERIAL DESCRIPTION	MOISTURE CONDITION	BACKFILL DETAILS	STANDPIPE DETAILS
80%		11		68.63	SILTSTONE: as above		7.50m - 12.19m	
		11.07			From 11.07m to 11.07m, gravel inclusions, medium size, rounded			
		11.78		67.92	From 11.78m to 11.83m, gravel inclusions, medium size, rounded			
		12		67.51	Terminated at 12.19m. Target depth reached.			
		13						
		14						
		15						
		16						
		17						
		18						
		19						
		20						

CORE PHOTOGRAPH OF BOREHOLE: BH2M

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

BOREHOLE LOG

BH ID: BH3M

Location	135 Badgerys Creek Road, Bradfield NSW			**Started**	24 April 2025
Client	Creative Vision			**Completed**	28 April 2025
Job No.	E26733.G03			**Logged By**	GB **Date** 28 April 2025
Sheets	1 of 4			**Review By**	JB **Date** 23 June 2025
Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈76.80 m (AHD)	**Northing**	6244042.0000 (MGA 2020 Zone 56)
Plant	Comacchio Geo 205	**Inclination**	90°	**Easting**	290213.0000 (MGA 2020 Zone 56)

METHOD	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	SAMPLE RECOVERY	DEPTH (m)	GRAPHIC LOG	RL (m AHD)	MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY / REL. DENSITY	MATERIAL ORIGIN & OBSERVATIONS
AD/T	GWNE	BH3M_0.50-0.95 SPT 0.50-0.95 3,3,6 N=9		0 0.00		76.80	TOPSOIL: Silty CLAY: low to medium plasticity, dark brown, with rootlets, no odour odour	M ≈ PL	-	TOPSOIL
				0.70 1		76.10	CLAY: low to medium plasticity, dark red mottled grey, trace rootlets, no odour odour			
		BH3M_1.50-1.95 SPT 1.50-1.95 2,3,4 N=7		1.20		75.60	CLAY: low plasticity, red-brown, trace sand/gravel, medium sand to fine gravel size, rounded, trace rootlets, occasional charcoal pieces, fine to medium size, no odour odour	M < PL	F - St	
				1.85 2		74.95	CLAY: low plasticity, pale grey mottled pale yellow-brown, trace iron indurated nodules, fine to medium gravel size, dark red, no odour odour		VSt	RESIDUAL SOIL
				2.50		74.30	SILTSTONE: grey to pale brown, extremely weathered, soil to very low strength			BEDROCK
		BH3M_3.00-3.05 SPT 3.00-3.05 10/50 mm N=R		3 3.02		73.78	*Log continued on next page.*			
				4						
				5						
				6						
				7						
				8						
				9						
				10						

BOREHOLE CORE LOG

BH ID: BH3M

Location	135 Badgerys Creek Road, Bradfield NSW			**Started**	24 April 2025
Client	Creative Vision			**Completed**	28 April 2025
Job No.	E26733.G03			**Logged By**	GB **Date** 28 April 2025
Sheets	2 of 4			**Review By**	JB **Date** 23 June 2025
Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈76.80 m (AHD)	**Northing**	6244042.0000 (MGA 2020 Zone 56)
Plant	Comacchio Geo 205	**Inclination**	90°	**Easting**	290213.0000 (MGA 2020 Zone 56)

METHOD	Flush Return	TCR %	RQD %	DEPTH (m)	GRAPHIC LOG	RL (m AHD)	MATERIAL DESCRIPTION	WEATHERING	ESTIMATED STRENGTH Is(50) ▼ - Axial ▽ - Diametral (VL 0-1, L 0-3, M 1, H 3, VH 10, EH)	DISCONTINUITIES & ADDITIONAL DATA	FRACTURE SPACING (30, 100, 300, 1000, 3000)
				0			*Log continued from previous page.*				
				1							
				2							
				3			SILTSTONE: dark grey-brown, laminated to very thinly bedded, iron stained, occasional gravel inclusions, fine gravel size, sub-rounded			3.06: XWS 0° PR SM CL Infilled 3.07: JT 20° PR SM FE VN 3.15: BP 0° PR SM FE VN 3.17: XWS 10° PR SM CL Infilled 3.21: JT 80-90° CU SM FE VN 3.27-3.38: BP 0-10° PR SM FE VN X6 3.45-3.62: BP 0-10° PR SM FE VN X7 3.64: JT 40° PR SM FE VN 3.78: JT 20° PR SM FE CN 3.86: BP 0° PR SM FE VN 4.14-4.16: BP 0° PR SM FE VN X2 4.22: BP 10° PR SM FE VN 4.25: BP 0° PR SM FE VN 4.34: JT 30° PR SM FE VN 4.45: HB 4.74: HB	
		100	45	4							
				4.41		72.39	From 4.41m to 4.73m, with gravel inclusions				
	100%			5				DW			
		96	50	5.81		70.99	From 5.81m to 5.93m, bands of gravel, fine gravel size, bands up to 50mm thick			5.02: BP 10° PR SM CL Infilled 5.09: JT 20° PR SM FE VN 5.15: BP 0° PR SM FE VN 5.60: XWS 0° PR SM CL Infilled 5.63: BP 0° IR RO FE VN 5.73: BP 10° PR RO FE VN 5.81: BP 0-10° PR RO FE VN 5.85-5.88: XWS 0-10° PR SM GC Infilled 5.93: BP 0° PR RO FE VN 5.98: JT 30° PR SM FE VN 6.09: HB 6.16: JT 50° PR SM FE VN 6.60: JT 30° PR SM FE VN 6.82-6.84: DB crushed seam	
				5.98		70.87	SILTSTONE: dark grey, laminated to very thinly bedded, with fine grained sand, trace iron staining, occasional bioturbation or disturbed bedding				
				7		69.81	NO CORE: 10mm thick				
				7.00		69.80	SILTSTONE: dark grey, laminated to very thinly bedded, with fine grained sand, trace gravel inclusions, fine to medium size, rounded, occasional bioturbation or disturbed bedding			7.16: JT 60° PR RO GC Infilled 7.29: DB 7.32: BP 0-10° PR SM CL VN 7.52: BP 0-10° PR SM CL VN 7.78: DB 7.94: BP 0-10° PR SN CL Infilled 7.99: DB 8.09: HB 8.20: HB 8.34: HB 8.38: HB 8.44: BP 0° PR SM CL VN 8.72-8.76: XWS 0° PR SM CL Infilled 8.82: JT 80-90° CU SM CL Infilled 8.87-9.15: XWS 0° PR SM CL Infilled	
	90%	100	75	8				SW			
				9							
				9.15		67.65	SANDSTONE: grey, fine to medium grained, laminated to thinly bedded, occasional bioturbation or disturbed bedding			9.47: JT 50° PR SM CL Infilled 9.68: HB bioturbation	
				10							

BOREHOLE CORE LOG

BH ID: BH3M

Location	135 Badgerys Creek Road, Bradfield NSW			**Started**	24 April 2025
Client	Creative Vision			**Completed**	28 April 2025
Job No.	E26733.G03			**Logged By**	GB **Date** 28 April 2025
Sheets	3 of 4			**Review By**	JB **Date** 23 June 2025
Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈76.80 m (AHD)	**Northing**	6244042.0000 (MGA 2020 Zone 56)
Plant	Comacchio Geo 205	**Inclination**	90°	**Easting**	290213.0000 (MGA 2020 Zone 56)

METHOD	Flush Return	TCR %	RQD %	DEPTH (m)	RL (m AHD)	MATERIAL DESCRIPTION	WEATHERING	DISCONTINUITIES & ADDITIONAL DATA
NMLC	90%	95	92	11.00	65.80	SANDSTONE: grey, fine to medium grained, laminated to thinly bedded, occasional bioturbation or disturbed bedding		10.19: DB 10.52: BP 0° PR RO CL VN 10.53: JT 70-90° CU RO CL 10.59: BP 0° PR RO CL VN 10.61: BP 0-10° UN RO CL VN
				11.76	65.04	SILTSTONE: dark grey, laminated to very thinly bedded, with fine grained sand, trace gravel inclusions, fine to medium size, rounded		11.07: DB 11.19: BP 0-10° CU RO CL 11.35: BP 0-10° UN RO CL VN 11.67: DB 11.91: HB 12.15: HB 12.28: BP 0° PR RO CL VN 12.81: BP 0-10° UN RO CL VN 12.95: DB
				12.97	63.83	From 11.76m, with bands of increased sand content, up to 220mm thick, and occasional bioturbation or disturbed bedding		
				13.10	63.70	NO CORE: 130mm thick		
	80%	100	88			SILTSTONE: grey to dark grey, laminated to thickly bedded with fine grained sandy SILSTONE beds, beds up to 300mm thick, occasional bioturbation or disturbed bedding	FR	13.19: BP 10° PR SM GC VN 13.25: DB 13.39: JT 60-90° IR SM GC Infilled 13.71: HB 13.96: HB 14.10: HB 14.28: HB 14.35: BP 0° PR SM CL VN 14.46: HB 14.57: BP 0-10° PR RO COAL VN 14.73-14.75: XWS 0° PR SM CL Infilled 15.08: JT 40° PR RO GC Infilled 15.62: HB 15.85: DB 15.88: DB 16.02: HB 16.08-16.15: JT 60-80° IR SM GC Infilled 16.26: DB 16.86: HB 16.95: HB 16.98: HB 17.07-17.34: JT 80-90° PR RO CL 17.63: DB 17.97-18.08: JT 80-90° PR RO CL 18.08: BP 0° PR RO CL VN 18.19: HB 18.28: HB 18.86: HB 18.95: HB 19.01: HB 19.10: DB 19.29: DB 19.51: BP 0-10° PR SM CL VN 19.53: DB
	30%	100	89					
	10%	100	80					

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

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

BOREHOLE CORE LOG

BH ID: BH3M

Location	135 Badgerys Creek Road, Bradfield NSW			**Started**	24 April 2025
Client	Creative Vision			**Completed**	28 April 2025
Job No.	E26733.G03			**Logged By**	GB **Date** 28 April 2025
Sheets	4 of 4			**Review By**	JB **Date** 23 June 2025
Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈76.80 m (AHD)	**Northing**	6244042.0000 (MGA 2020 Zone 56)
Plant	Comacchio Geo 205	**Inclination**	90°	**Easting**	290213.0000 (MGA 2020 Zone 56)

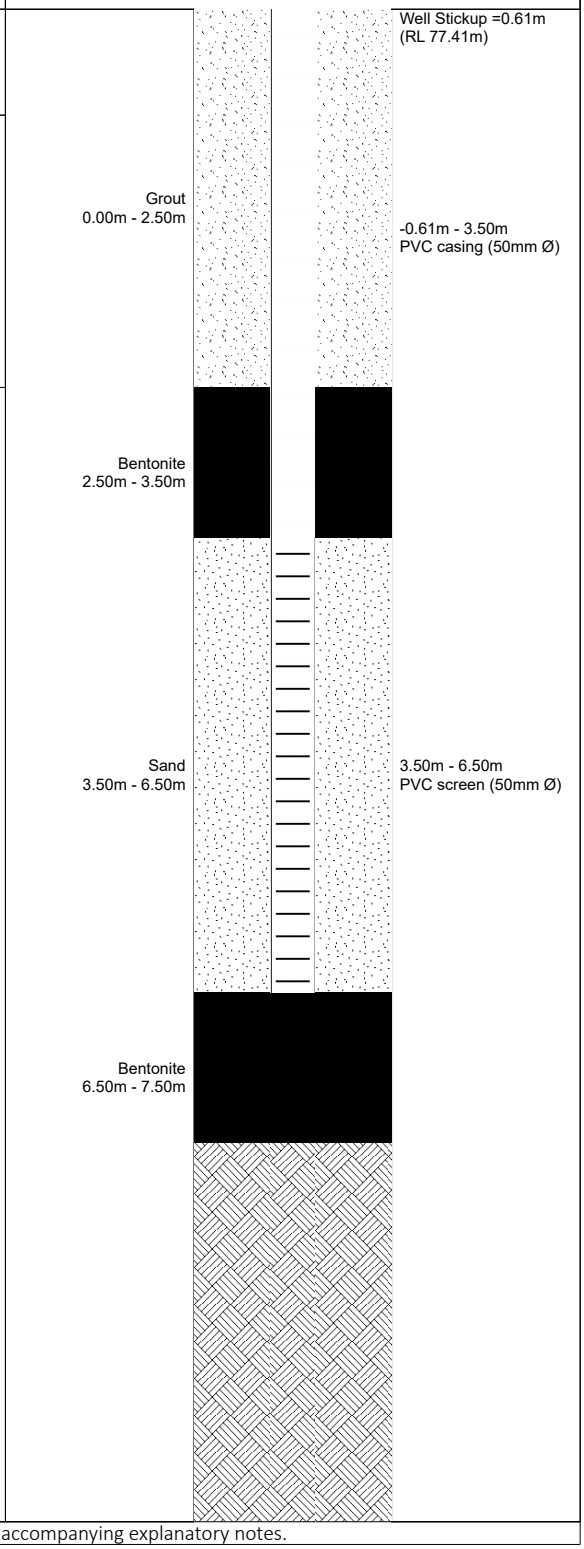
METHOD	Flush Return	TCR %	RQD %	DEPTH (m)	GRAPHIC LOG	RL (m AHD)	MATERIAL DESCRIPTION	WEATHERING	ESTIMATED STRENGTH Is(50) ▼ - Axial ▽ - Diametral (VL 0-1, L 0-3, M 1, H 3, VH 10, EH)	DISCONTINUITIES & ADDITIONAL DATA	FRACTURE SPACING (30, 100, 300, 1000, 3000)
	10%	100	100	21			SILTSTONE: grey to dark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

MONITORING WELL LOG

BH ID: BH3M

Location	135 Badgerys Creek Road, Bradfield NSW			**Started**	24 April 2025
Client	Creative Vision			**Completed**	28 April 2025
Job No.	E26733.G03			**Logged By**	GB **Date** 28 April 2025
Sheets	1 of 3			**Review By**	JB **Date** 23 June 2025
Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈76.80 m (AHD)	**Northing**	6244042.0000 (MGA 2020 Zone 56)
Plant	Comacchio Geo 205	**Inclination**	90°	**Easting**	290213.0000 (MGA 2020 Zone 56)

WATER	SAMPLES & FIELD TESTS	DEPTH (m)	RL (m AHD)	MATERIAL DESCRIPTION	MOISTURE CONDITION
GWNE	BH3M_0.50-0.95 SPT 0.50-0.95 3,3,6 N=9	0.00	76.80	TOPSOIL: Silty CLAY: low to medium plasticity, dark brown, with rootlets, no odour odour	M ≈ PL
		0.70	76.10	CLAY: low to medium plasticity, dark red mottled grey, trace rootlets, no odour odour	
	BH3M_1.50-1.95 SPT 1.50-1.95 2,3,4 N=7	1.20	75.60	CLAY: low plasticity, red-brown, trace sand/gravel, medium sand to fine gravel size, rounded, trace rootlets, occasional charcoal pieces, fine to medium size, no odour odour	M < PL
		1.85	74.95	CLAY: low plasticity, pale grey mottled pale yellow-brown, trace iron indurated nodules, fine to medium gravel size, dark red, no odour odour	
		2.50	74.30	SILTSTONE: grey to pale brown, extremely weathered, soil to very low strength	
100%	BH3M_3.00-3.05 SPT 3.00-3.05 10/50 mm N=R	3.02	73.78	SILTSTONE: dark grey-brown, laminated to very thinly bedded, iron stained, occasional gravel inclusions, fine gravel size, sub-rounded	
		4.41	72.39	From 4.41m to 4.73m, with gravel inclusions	
		5.81	70.99	From 5.81m to 5.93m, bands of gravel, fine gravel size, bands up to 50mm thick	
		5.93	70.87	SILTSTONE: dark grey, laminated to very thinly bedded, with fine grained sand, trace iron staining, occasional biorturbation or disturbed bedding	
		6.99	69.81	NO CORE: 10mm thick	
90%		7.00	69.80	SILTSTONE: dark grey, laminated to very thinly bedded, with fine grained sand, trace gravel inclusions, fine to medium size, rounded, occasional bioturbation or disturbed bedding	
		9.15	67.65	SANDSTONE: grey, fine to medium grained, laminated to thinly bedded, occasional bioturbation or disturbed bedding	



MONITORING WELL LOG

BH ID: BH3M

Location	135 Badgerys Creek Road, Bradfield NSW			**Started**	24 April 2025
Client	Creative Vision			**Completed**	28 April 2025
Job No.	E26733.G03			**Logged By**	GB **Date** 28 April 2025
Sheets	2 of 3			**Review By**	JB **Date** 23 June 2025
Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈76.80 m (AHD)	**Northing**	6244042.0000 (MGA 2020 Zone 56)
Plant	Comacchio Geo 205	**Inclination**	90°	**Easting**	290213.0000 (MGA 2020 Zone 56)

WATER	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG	RL (m AHD)	MATERIAL DESCRIPTION	MOISTURE CONDITION	BACKFILL DETAILS	STANDPIPE DETAILS
90%		11.00		65.80	SANDSTONE: grey, fine to medium grained, laminated to thinly bedded, occasional bioturbation or disturbed bedding			
		11.76		65.04	SILTSTONE: dark grey, laminated to very thinly bedded, with fine grained sand, trace gravel inclusions, fine to medium size, rounded			
		12.97		63.83	From 11.76m, with bands of increased sand content, up to 220mm thick, and occasional bioturbation or disturbed bedding			
		13.10		63.70	NO CORE: 130mm thick			
80%					SILTSTONE: grey to dark grey, laminated to thickly bedded with fine grained sandy SILSTONE beds, beds up to 300mm thick, occasional bioturbation or disturbed bedding		Cuttings 7.50m - 21.97m	
30%								
10%		20						

MONITORING WELL LOG

BH ID: BH3M

Location	135 Badgerys Creek Road, Bradfield NSW			**Started**	24 April 2025
Client	Creative Vision			**Completed**	28 April 2025
Job No.	E26733.G03			**Logged By**	GB **Date** 28 April 2025
Sheets	3 of 3			**Review By**	JB **Date** 23 June 2025
Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈76.80 m (AHD)	**Northing**	6244042.0000 (MGA 2020 Zone 56)
Plant	Comacchio Geo 205	**Inclination**	90°	**Easting**	290213.0000 (MGA 2020 Zone 56)

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

CORE PHOTOGRAPH OF BOREHOLE: BH3M

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

CORE PHOTOGRAPH OF BOREHOLE: BH3M

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

BOREHOLE LOG

BH ID: BH4

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

METHOD	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	SAMPLE RECOVERY	DEPTH (m)	GRAPHIC LOG	RL (m AHD)	MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY / REL. DENSITY	MATERIAL ORIGIN & OBSERVATIONS
AD/T	GWNE	BH4_0.50-0.95 SPT 0.50-0.95 3,9,14 N=23		0.00		77.10	TOPSOIL: SAND: fine to medium grained, dark brown, trace sub-angular to sub-rounded gravels with rootlets	M	-	TOPSOIL
				0.65		76.45	CLAY: low plasticity, dark red			RESIDUAL SOIL
		BH4_1.50-1.95 SPT 1.50-1.95 4,7,10 N=17		1						
				2				M < PL	VSt	
		BH4_3.00-3.01 SPT 3.00-3.01 4/10 mm N=R		3						
				3.50		73.60	*Log continued on next page.*			
				4						
				5						
				6						
				7						
				8						
				9						
				10						

BOREHOLE CORE LOG

BH ID: BH4

Location	135 Badgerys Creek Road, Bradfield NSW			**Started**	29 April 2025
Client	Creative Vision			**Completed**	29 April 2025
Job No.	E26733.G03			**Logged By**	JO **Date** 29 April 2025
Sheets	2 of 3			**Review By**	JB **Date** 23 June 2025
Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈77.10 m (AHD)	**Northing**	6244062.0000 (MGA 2020 Zone 56)
Plant	Comacchio Geo 205	**Inclination**	90°	**Easting**	290287.0000 (MGA 2020 Zone 56)

METHOD	Flush Return	TCR %	RQD %	DEPTH (m)	GRAPHIC LOG	RL (m AHD)	MATERIAL DESCRIPTION	WEATHERING	ESTIMATED STRENGTH Is(50) ▼ - Axial ▽ - Diametral	DISCONTINUITIES & ADDITIONAL DATA	FRACTURE SPACING
				0			*Log continued from previous page.*				
				1							
				2							
				3							
NMLC	90%	100	83	4			SILTSTONE: dark grey-brown, very thinly to thinly bedded, iron stained	MW		4.16: BP PR SM CN 4.24: BP PR SM CN 4.36: PR SM CN 4.38: PR SM CN	
				4.81		72.29	SILTSTONE: grey to dark grey, thinly to medium bedded			4.70: BP PR SM CN 4.78: BP PR SM CN	
				5						5.28: BP PR SM CN	
				6						5.96: PR SM CN	
		100	95	7				SW		7.13: BP PR SM CN 7.14: BP PR SM CN	
				8						7.69: BP PR SM CN 7.73: PR SM CN 7.82: BP PR SM CN 8.08: BP PR SM CN 8.19: BP PR SM CN	
				9						8.48: BP PR SM CN 8.82: BP PR SM CN 9.17: PR SM CN	
				9.34		67.76	From 9.34m, trace pebble or mudstone inclusions, up to 20mm in size			9.35: BP PR SM CN	
				10							

BOREHOLE CORE LOG

BH ID: BH4

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

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

CORE PHOTOGRAPH OF BOREHOLE: BH4

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

BOREHOLE LOG

BH ID: BH5M

Location	135 Badgerys Creek Road, Bradfield NSW			**Started**	29 April 2025
Client	Creative Vision			**Completed**	30 April 2025
Job No.	E26733.G03			**Logged By**	JO **Date** 30 April 2025
Sheets	1 of 3			**Review By**	JB **Date** 23 June 2025
Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈80.70 m (AHD)	**Northing**	6244051.0000 (MGA 2020 Zone 56)
Plant	Comacchio Geo 205	**Inclination**	90°	**Easting**	290372.0000 (MGA 2020 Zone 56)

METHOD	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	SAMPLE RECOVERY	DEPTH (m)	GRAPHIC LOG	RL (m AHD)	MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY / REL. DENSITY	MATERIAL ORIGIN & OBSERVATIONS
AD/T	GWNE	BH5M_0.50-0.95 SPT 0.50-0.95 5,5,7 N=12		0.00 0.10 1		80.70 80.60	TOPSOIL: Silty CLAY: medium plasticity, dark brown with rootlets Silty CLAY: medium plasticity, orange-brown	M > PL	- St	TOPSOIL RESIDUAL SOIL
		BH5M_1.50-1.95 SPT 1.50-1.95 3,7,12 N=19		1.50 2		79.20	From 1.50m, pale grey-orange	M ≈ PL	VSt	
		BH5M_3.00-3.18 SPT 3.00-3.18 14,6/30 mm HB N=R		3 3.20		77.50	*Log continued on next page.*			
				4 5 6 7 8 9 10						

BOREHOLE CORE LOG

BH ID: BH5M

Location	135 Badgerys Creek Road, Bradfield NSW			**Started**	29 April 2025
Client	Creative Vision			**Completed**	30 April 2025
Job No.	E26733.G03			**Logged By**	JO **Date** 30 April 2025
Sheets	2 of 3			**Review By**	JB **Date** 23 June 2025
Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈80.70 m (AHD)	**Northing**	6244051.0000 (MGA 2020 Zone 56)
Plant	Comacchio Geo 205	**Inclination**	90°	**Easting**	290372.0000 (MGA 2020 Zone 56)

METHOD	Flush Return	TCR %	RQD %	DEPTH (m)	GRAPHIC LOG	RL (m AHD)	MATERIAL DESCRIPTION	WEATHERING	ESTIMATED STRENGTH Is(50) ▼ - Axial ▽ - Diametral (VL 0-1, L 0-3, M 1, H 3, VH 10, EH)	DISCONTINUITIES & ADDITIONAL DATA	FRACTURE SPACING (30, 100, 300, 1000, 3000)
				0			*Log continued from previous page.*				
				1							
				2							
				3							
NMLC	90%	100	71	4			SILTSTONE: grey-brown, thinly to medium bedded, iron stained	MW		3.43: JT 90° PR SM CN 3.57: BP PR SM CN 3.59: BP PR SM CN 3.69: BP PR SM CN 3.81: BP PR SM CN 4.14: JT 30° PR SM CN 4.23: BP PR SM CN 4.32: BP PR SM CN 4.62: BP PR SM CN	
				5						5.08: BP PR SM CN 5.26: JT 90° PR SM CN 5.38: JT 40° PR SM CN 5.60: BP PR SM CN	
				6						6.08: BP PR SM CN 6.12: BP PR SM CN	
				6.27		74.43	From 6.27m, with fine grained sand				
		100	92	6.72		73.98	SILTSTONE: grey to dark grey, thinly to medium bedded			6.61: JT 45° PR SM CN 6.91: BP PR SM CN 7.09: JT 10° CU SM CN 7.25: BP PR SM CN 7.30: BP PR SM 7.34: BP PR SM CN 7.35: BP PR SM CN 7.58: BP PR SM CN 7.64: JT 45° PR SM CN	
				7							
				8				SW		8.19: BP PR SM CN 8.38: BP PR SM CN 8.40: BP PR SM CN 8.49: BP PR SM CN 8.77: BP PR SM CN	
				9						9.27: BP PR SM CN	
				9.49		71.21	From 9.49m, trace pebble or mudstone inclusions, up to 20mm in size, and occasional bioturbation or disturbed bedding				
				10						9.90: BP PR SM CN	

BOREHOLE CORE LOG

BH ID: BH5M

Location	135 Badgerys Creek Road, Bradfield NSW			**Started**	29 April 2025		
Client	Creative Vision			**Completed**	30 April 2025		
Job No.	E26733.G03			**Logged By**	JO	**Date**	30 April 2025
Sheets	3 of 3			**Review By**	JB	**Date**	23 June 2025
Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈80.70 m (AHD)	**Northing**	6244051.0000 (MGA 2020 Zone 56)		
Plant	Comacchio Geo 205	**Inclination**	90°	**Easting**	290372.0000 (MGA 2020 Zone 56)		

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

MONITORING WELL LOG

BH ID: BH5M

Location	135 Badgerys Creek Road, Bradfield NSW			**Started**	29 April 2025
Client	Creative Vision			**Completed**	30 April 2025
Job No.	E26733.G03			**Logged By**	JO **Date** 30 April 2025
Sheets	1 of 2			**Review By**	JB **Date** 23 June 2025
Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈80.70 m (AHD)	**Northing**	6244051.0000 (MGA 2020 Zone 56)
Plant	Comacchio Geo 205	**Inclination**	90°	**Easting**	290372.0000 (MGA 2020 Zone 56)

WATER	SAMPLES & FIELD TESTS	DEPTH (m)	RL (m AHD)	MATERIAL DESCRIPTION	MOISTURE CONDITION
		0.00	80.70	TOPSOIL: Silty CLAY: medium plasticity, dark brown with rootlets	M > PL
		0.10	80.60	Silty CLAY: medium plasticity, orange-brown	
	BH5M_0.50-0.95 SPT 0.50-0.95 5,5,7 N=12	1			
GWNE	BH5M_1.50-1.95 SPT 1.50-1.95 3,7,12 N=19	1.50	79.20	From 1.50m, pale grey-orange	M ≈ PL
		2			
	BH5M_3.00-3.18 SPT 3.00-3.18 14,6/30 mm HB N=R	3			
		3.20	77.50	SILTSTONE: grey-brown, thinly to medium bedded, iron stained	
		4			
		5			
		6			
90%		6.27	74.43	From 6.27m, with fine grained sand	
		6.72	73.98	SILTSTONE: grey to dark grey, thinly to medium bedded	
		7			
		8			
		9			
		9.49	71.21	From 9.49m, trace pebble or mudstone inclusions, up to 20mm in size, and occasional bioturbation or disturbed bedding	
		10			

BACKFILL DETAILS

Grout
0.00m - 5.00m

Bentonite
5.00m - 6.00m

Sand
6.00m - 12.16m

STANDPIPE DETAILS

Well Stickup =0.99m
(RL 81.69m)

-0.99m - 6.16m
PVC casing (50mm Ø)

6.16m - 12.16m
PVC screen (50mm Ø)

MONITORING WELL LOG

BH ID: BH5M

Location	135 Badgerys Creek Road, Bradfield NSW			**Started**	29 April 2025
Client	Creative Vision			**Completed**	30 April 2025
Job No.	E26733.G03			**Logged By**	JO **Date** 30 April 2025
Sheets	2 of 2			**Review By**	JB **Date** 23 June 2025
Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈80.70 m (AHD)	**Northing**	6244051.0000 (MGA 2020 Zone 56)
Plant	Comacchio Geo 205	**Inclination**	90°	**Easting**	290372.0000 (MGA 2020 Zone 56)

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

CORE PHOTOGRAPH OF BOREHOLE: BH5M

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

BOREHOLE LOG

BH ID: BH6M

Location	135 Badgerys Creek Road, Bradfield NSW			**Started**	30 April 2025
Client	Creative Vision			**Completed**	30 April 2025
Job No.	E26733.G03			**Logged By**	JO **Date** 30 April 2025
Sheets	1 of 3			**Review By**	JB **Date** 23 June 2025
Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈78.70 m (AHD)	**Northing**	6243994.0000 (MGA 2020 Zone 56)
Plant	Comacchio Geo 205	**Inclination**	90°	**Easting**	290363.0000 (MGA 2020 Zone 56)

METHOD	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	SAMPLE RECOVERY	DEPTH (m)	GRAPHIC LOG	RL (m AHD)	MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY / REL. DENSITY	MATERIAL ORIGIN & OBSERVATIONS
AD/T		BH6M_0.50-0.95 SPT 0.50-0.95 3,6,9 N=15		0.00 0.10		78.70 78.60	TOPSOIL: CLAY: low plasticity, dark brown trace rootlets CLAY: low to medium plasticity, orange-brown	M > PL	-	TOPSOIL RESIDUAL SOIL
		BH6M_1.50-1.95 SPT 1.50-1.95 5,9,24 HB N=33		1 2				M < PL	VSt	
		BH6M_3.00-3.10 SPT 3.00-3.10 13/100 mm HB N=R		3.00		75.70	*Log continued on next page.*			
				4 5 6 7 8 9 10						

BOREHOLE CORE LOG

BH ID: BH6M

Location	135 Badgerys Creek Road, Bradfield NSW			**Started**	30 April 2025
Client	Creative Vision			**Completed**	30 April 2025
Job No.	E26733.G03			**Logged By**	JO **Date** 30 April 2025
Sheets	2 of 3			**Review By**	JB **Date** 23 June 2025
Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈78.70 m (AHD)	**Northing**	6243994.0000 (MGA 2020 Zone 56)
Plant	Comacchio Geo 205	**Inclination**	90°	**Easting**	290363.0000 (MGA 2020 Zone 56)

METHOD	Flush Return	TCR %	RQD %	DEPTH (m)	GRAPHIC LOG	RL (m AHD)	MATERIAL DESCRIPTION	WEATHERING	ESTIMATED STRENGTH Is(50) ▼ - Axial ▽ - Diametral (VL 0-1, L 0-3, M 1, H 3, VH 10, EH)	DISCONTINUITIES & ADDITIONAL DATA	FRACTURE SPACING (30, 100, 300, 1000, 3000)
				0			*Log continued from previous page.*				
				1							
				2							
NMLC	90%	100	91	3			SILTSTONE: dark grey-brown, laminated to very thinly bedded	HW		3.03: BP PR SM CN 3.06: BP PR SM CN 3.14: JT 30° PR SM CN 3.22: JT 20° PR SM CN 3.50: BP PR SM CN 3.60: JT 30° PR SM CN 3.63: BP PR SM CN 3.68: BP PR SM CN 3.73: BP PR SM CN 3.89: BP PR SM CN 4.22: BP PR SM CN 4.30: BP PR SM CN	
				4							
				4.46		74.24	From 4.46m, with fine grained sand			4.68: BP PR SM CN 4.90: JT 20° PR SM CN 5.06: BP PR SM CN 5.28: BP PR SM CN	
				5							
		100	92	5.55		73.15	SANDSTONE: grey, laminated to thinly bedded, trace iron staining, occasional bioturbation or disturbed bedding	MW		5.66: BP PR SM CN 5.74: BP PR SM CN 5.89: BP PR SM CN 5.93: BP PR SM CN 6.05: BP PR SM CN 6.27: BP PR SM CN 6.58: BP PR SM 6.68: BP PR SM CN 6.75: BP PR SM CN 6.89: BP PR SM 7.03: BP PR SM CN 7.14: BP PR SM CN 7.24: BP PR SM CN 7.38: BP PR SM CN	
				6							
				7							
				7.83		70.87	From 7.83m, thinly to medium bedded, bioturbation and disturbed bedding absent			7.74: BP PR SM CN 7.83: BP PR SM CN 8.28: BP PR SM CN	
				8							
				8.67		70.03	SILTSTONE: dark grey-brown, laminated to thinly bedded, trace iron staining			8.67: BP PR SM CN	
				9						9.12: BP PR SM CN 9.30: JT 20° PR SM CN 9.59: JT 10° PR SM CN	
				9.88		68.82	From 9.88m, iron staining absent, occasional bioturbation or disturbed bedding			9.78: BP PR SM CN	
				10							

BOREHOLE CORE LOG

BH ID: BH6M

Location	135 Badgerys Creek Road, Bradfield NSW			**Started**	30 April 2025
Client	Creative Vision			**Completed**	30 April 2025
Job No.	E26733.G03			**Logged By**	JO **Date** 30 April 2025
Sheets	3 of 3			**Review By**	JB **Date** 23 June 2025
Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈78.70 m (AHD)	**Northing**	6243994.0000 (MGA 2020 Zone 56)
Plant	Comacchio Geo 205	**Inclination**	90°	**Easting**	290363.0000 (MGA 2020 Zone 56)

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

MONITORING WELL LOG

BH ID: BH6M

Location	135 Badgerys Creek Road, Bradfield NSW			**Started**	30 April 2025
Client	Creative Vision			**Completed**	30 April 2025
Job No.	E26733.G03			**Logged By**	JO **Date** 30 April 2025
Sheets	1 of 2			**Review By**	JB **Date** 23 June 2025
Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈78.70 m (AHD)	**Northing**	6243994.0000 (MGA 2020 Zone 56)
Plant	Comacchio Geo 205	**Inclination**	90°	**Easting**	290363.0000 (MGA 2020 Zone 56)

WATER	SAMPLES & FIELD TESTS	DEPTH (m)	RL (m AHD)	MATERIAL DESCRIPTION	MOISTURE CONDITION
		0.00	78.70	TOPSOIL: CLAY: low plasticity, dark brown trace rootlets	M > PL
		0.10	78.60	CLAY: low to medium plasticity, orange-brown	
	BH6M_0.50-0.95 SPT 0.50-0.95 3,6,9 N=15	1			
	BH6M_1.50-1.95 SPT 1.50-1.95 5,9,24 HB N=33	2			M < PL
	BH6M_3.00-3.10 SPT 3.00-3.10 13/100 mm HB N=R	3.00	75.70	SILTSTONE: dark grey-brown, laminated to very thinly bedded	
		4			
		4.46	74.24	From 4.46m, with fine grained sand	
		5			
90%		5.55	73.15	SANDSTONE: grey, laminated to thinly bedded, trace iron staining, occasional bioturbation or disturbed bedding	
		6			
		7			
		7.83	70.87	From 7.83m, thinly to medium bedded, bioturbation and disturbed bedding absent	
		8			
		8.67	70.03	SILTSTONE: dark grey-brown, laminated to thinly bedded, trace iron staining	
		9			
		9.88		From 9.88m, iron staining absent, occasional bioturbation or disturbed bedding	
		10			

BACKFILL DETAILS

Grout
0.00m - 5.00m

Bentonite
5.00m - 6.00m

Sand
6.00m - 12.00m

STANDPIPE DETAILS

Well Stickup =0.90m
(RL 79.60m)

-0.90m - 6.10m
PVC casing (50mm Ø)

6.10m - 9.10m
PVC screen (50mm Ø)

MONITORING WELL LOG

BH ID: BH6M

Location	135 Badgerys Creek Road, Bradfield NSW			**Started**	30 April 2025
Client	Creative Vision			**Completed**	30 April 2025
Job No.	E26733.G03			**Logged By**	JO **Date** 30 April 2025
Sheets	2 of 2			**Review By**	JB **Date** 23 June 2025
Drilling Contractor	Geosense Drilling Engineers	**Surface RL**	≈78.70 m (AHD)	**Northing**	6243994.0000 (MGA 2020 Zone 56)
Plant	Comacchio Geo 205	**Inclination**	90°	**Easting**	290363.0000 (MGA 2020 Zone 56)

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

CORE PHOTOGRAPH OF BOREHOLE: BH6M

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

EXPLANATION OF NOTES, ABBREVIATIONS & TERMS USED ON BOREHOLE AND TEST PIT LOGS

DRILLING/EXCAVATION METHOD

HA	Hand Auger	**ADH**	Hollow Auger	**NQ**	Diamond Core - 47 mm
DT	Diatube Coring	**RT**	Rotary Tricone bit	**NMLC**	Diamond Core - 52 mm
NDD	Non-destructive digging	**RAB**	Rotary Air Blast	**HQ**	Diamond Core - 63 mm
AD*	Auger Drilling	**RC**	Reverse Circulation	**HMLC**	Diamond Core - 63 mm
***V**	V-Bit	**PT**	Push Tube	**EX**	Tracked Hydraulic Excavator
***T**	TC-Bit, e.g. AD/T	**WB**	Washbore	**HAND**	Excavated by Hand Methods

PENETRATION RESISTANCE

L	**Low Resistance**	Rapid penetration/ excavation possible with little effort from equipment used.
M	**Medium Resistance**	Penetration/ excavation possible at an acceptable rate with moderate effort from equipment used.
H	**High Resistance**	Penetration/ excavation is possible but at a slow rate and requires significant effort from equipment used.
R	**Refusal/Practical Refusal**	No further progress possible without risk of damage or unacceptable wear to equipment used.

These assessments are subjective and are dependent on many factors, including equipment power and weight, condition of excavation or drilling tools and experience of the operator.

WATER

Standing Water Level — **Partial water loss**

Water Seepage — **Complete Water Loss**

GWNO	GROUNDWATER NOT OBSERVED - Observation of groundwater, whether present or not, was not possible due to drilling water, surface seepage or cave-in of the borehole/ test pit.
GWNE	GROUNDWATER NOT ENCOUNTERED - Borehole/ test pit was dry soon after excavation. However, groundwater could be present in less permeable strata. Inflow may have been observed had the borehole/ test pit been left open for a longer period.

SAMPLING AND TESTING

SPT	Standard Penetration Test to AS1289.6.3.1-2004
4,7,11 N=18	4,7,11 = Blows per 150mm. N = Blows per 300mm penetration following a 150mm seating drive
30/80mm	Where practical refusal occurs, the blows and penetration for that interval are reported, N is not reported
RW	Penetration occurred under the rod weight only, N<1
HW	Penetration occurred under the hammer and rod weight only, N<1
HB	Hammer double bouncing on anvil, N is not reported
Sampling	
DS	Disturbed Sample
ES	Sample for environmental testing
BDS	Bulk disturbed Sample
GS	Gas Sample
WS	Water Sample
U50	Thin walled tube sample - number indicates nominal sample diameter in millimetres
Testing	
FP	Field Permeability test over section noted
FVS	Field Vane Shear test expressed as uncorrected shear strength (sv= peak value, sr= residual value)
PID	Photoionisation Detector reading in ppm
PM	Pressuremeter test over section noted
PP	Pocket Penetrometer test expressed as instrument reading in kPa
WPT	Water Pressure tests
DCP	Dynamic Cone Penetrometer test
CPT	Static Cone Penetration test
CPTu	Static Cone Penetration test with pore pressure (u) measurement

GEOLOGICAL BOUNDARIES

———— = Observed Boundary (position known)

– – – – – – – – – – = Observed Boundary (position approximate)

– –?– –?– –?– – = Boundary (interpreted or inferred)

ROCK CORE RECOVERY

TCR=Total Core Recovery (%)

$$= \frac{\textit{Length of core recovered}}{\textit{Length of core run}} \times 100$$

RQD = Rock Quality Designation (%)

$$= \frac{\sum \textit{Axial lengths of core} > 100mm}{\textit{Length of core run}} \times 100$$

METHOD OF SOIL DESCRIPTION USED ON BOREHOLE AND TEST PIT LOGS

	FILL		ORGANIC SOILS (OL, OH or Pt)		CLAY (CL, CI or CH)
	COUBLES or BOULDERS		SILT (ML or MH)		SAND (SP or SW)
	GRAVEL (GP or GW)	Combinations of these basic symbols may be used to indicate mixed materials such as sandy clay			

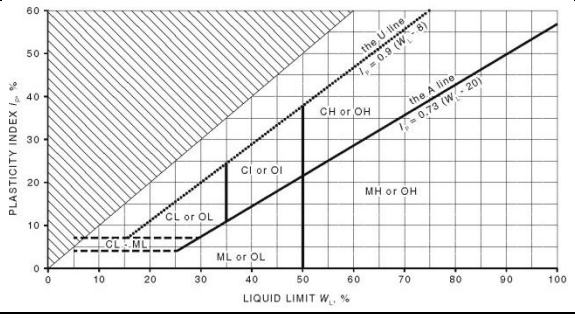
CLASSIFICATION AND INFERRED STRATIGRAPHY

Soil is broadly classified and described in Borehole and Test Pit Logs using the preferred method given in AS 1726:2017, Section 6.1 – Soil description and classification.

PARTICLE SIZE CHARACTERISTICS

Fraction	Components	Sub Division	Size mm
Oversize	BOULDERS		>200
	COBBLES		63 to 200
Coarse grained soil	GRAVEL	Coarse	19 to 63
		Medium	6.7 to 19
		Fine	2.36 to 6.7
	SAND	Coarse	0.6 to 2.36
		Medium	0.21 to 0.6
		Fine	0.075 to 0.21
Fine grained soil	SILT		0.002 to 0.075
	CLAY		<0.002

PLASTICITY PROPERTIES



GROUP SYMBOLS

Major Divisions		Symbol	Description
COARSE GRAINED SOILS More than 65% of soil excluding oversize fraction is greater than 0.075mm	GRAVEL More than 50% of coarse fraction is >2.36mm	GW	Well graded gravel and gravel-sand mixtures, little or no fines, no dry strength.
		GP	Poorly graded gravel and gravel-sand mixtures, little or no fines, no dry strength.
		GM	Silty gravel, gravel-sand-silt mixtures, zero to medium dry strength.
		GC	Clayey gravel, gravel-sand-clay mixtures, medium to high dry strength.
	SAND More than 50% of coarse fraction is <2.36 mm	SW	Well graded sand and gravelly sand, little or no fines, no dry strength.
		SP	Poorly graded sand and gravelly sand, little or no fines, no dry strength.
		SM	Silty sand, sand-silt mixtures, zero to medium dry strength.
		SC	Clayey sand, sandy-clay mixtures, medium to high dry strength.
FINE GRAINED SOILS More than 35% of soil excluding oversized fraction is less than 0.075mm	Liquid Limit less < 50%	ML	Inorganic silts of low plasticity, very fine sands, rock flour, silty or clayey fine sands, zero to medium dry strength.
		CL, CI	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, medium to high dry strength.
		OL	Organic silts and organic silty clays of low plasticity, low to medium dry strength.
	Liquid Limit > than 50%	MH	Inorganic silts of high plasticity, high to very high dry strength.
		CH	Inorganic clays of high plasticity, high to very high dry strength.
		OH	Organic clays of medium to high plasticity, medium to high dry strength.
Highly Organic soil		PT	Peat muck and other highly organic soils.

MOISTURE CONDITION

Symbol	Term	Description
D	Dry	Non- cohesive and free-running.
M	Moist	Soils feel cool, darkened in colour. Soil tends to stick together.
W	Wet	Soils feel cool, darkened in colour. Soil tends to stick together, free water forms when handling.

Moisture content of cohesive soils shall be described in relation to plastic limit (PL) or liquid limit (LL) for soils with higher moisture content as follows: Moist, dry of plastic limit (w < PL); Moist, near plastic limit (w ≈ PL); Moist, wet of plastic limit (w < PL); Wet, near liquid limit (w ≈ LL), Wet, wet of liquid limit (w > LL),

CONSISTENCY

Symbol	Term	Undrained Shear Strength (kPa)	SPT "N" #
VS	Very Soft	≤ 12	≤ 2
S	Soft	>12 to ≤ 25	>2 to ≤ 4
F	Firm	>25 to ≤ 50	>4 to 8
St	Stiff	>50 to ≤ 100	>8 to 15
VSt	Very Stiff	>100 to ≤ 200	>15 to 30
H	Hard	>200	>30
Fr	Friable	-	

DENSITY

Symbol	Term	Density Index %	SPT "N" #
VL	Very Loose	≤ 15	0 to 4
L	Loose	>15 to ≤ 35	4 to 10
MD	Medium Dense	>35 to ≤ 65	10 to 30
D	Dense	>65 to ≤ 85	30 to 50
VD	Very Dense	>85	Above 50

In the absence of test results, consistency and density may be assessed from correlations with the observed behaviour of the material.
SPT correlations are not stated in AS1726:2017, and may be subject to corrections for overburden pressure, moisture content of the soil, and equipment type.

MINOR COMPONENTS

Term	Assessment Guide	Proportion by Mass
Add 'Trace'	Presence just detectable by feel or eye but soil properties little or no different to general properties of primary component	Coarse grained soils: ≤ 5% Fine grained soil: ≤ 15%
Add 'With'	Presence easily detectable by feel or eye but soil properties little or no different to general properties of primary component	Coarse grained soils: 5 - 12% Fine grained soil: 15 - 30%
Prefix soil name	Presence easily detectable by feel or eye in conjunction with the general properties of primary component	Coarse grained soils: >12% Fine grained soil: >30%

TERMS FOR ROCK MATERIAL STRENGTH AND WEATHERING

CLASSIFICATION AND INFERRED STRATIGRAPHY

Rock is broadly classified and described in Borehole and Test Pit Logs using the preferred method given in AS1726 – 2017, Section 6.2 – Rock identification, description and classification.

ROCK MATERIAL STRENGTH CLASSIFICATION

Symbol	Term	Point Load Index, $Is_{(50)}$ (MPa) #	Field Guide
VL	Very Low	0.03 to 0.1	Material crumbles under firm blows with sharp end of pick; can be peeled with knife; too hard to cut a triaxial sample by hand. Pieces up to 30 mm can be broken by finger pressure.
L	Low	0.1 to 0.3	Easily scored with a knife; indentations 1 mm to 3 mm show in the specimen with firm blows of pick point; has dull sound under hammer. A piece of core 150 mm long by 50 mm diameter may be broken by hand. Sharp edges of core may be friable and break during handling.
M	Medium	0.3 to 1	Readily scored with a knife; a piece of core 150 mm long by 50 mm diameter can be broken by hand with difficulty.
H	High	1 to 3	A piece of core 150 mm long by 50 mm diameter cannot be broken by hand but can be broken with pick with a single firm blow; rock rings under hammer.
VH	Very High	3 to 10	Hand specimen breaks with pick after more than one blow; rock rings under hammer.
EH	Extremely High	>10	Specimen requires many blows with geological pick to break through intact material; rock rings under hammer.

 # Rock Strength Test Results

▼ Point Load Strength Index, $Is_{(50)}$, Axial test (MPa)

● Point Load Strength Index, $Is_{(50)}$, Diametral test (MPa)

Relationship between rock strength test result ($Is_{(50)}$) and unconfined compressive strength (UCS) will vary with rock type and strength, and should be determined on a site-specific basis. However UCS is typically 20 x $Is_{(50)}$.

ROCK MATERIAL WEATHERING CLASSIFICATION

Symbol		Term	Field Guide
RS		Residual Soil	Soil developed on extremely weathered rock; the mass structure and substance fabric are no longer evident; there is a large change in volume but the soil has not been significantly transported.
XW		Extremely Weathered	Rock is weathered to such an extent that it has soil properties - i.e. it either disintegrates or can be remoulded, in water.
DW	HW	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 weathering products in pores. In some environments it is convenient to subdivide into Highly Weathered and Moderately Weathered, with the degree of alteration typically less for MW.
	MW		
SW		Slightly Weathered	Rock slightly discoloured but shows little or no change of strength relative to fresh rock.
FR		Fresh	Rock shows no sign of decomposition or staining.

ABBREVIATIONS AND DESCRIPTIONS FOR ROCK MATERIAL AND DEFECTS

CLASSIFICATION AND INFERRED STRATIGRAPHY
Rock is broadly classified and described in Borehole and Test Pit Logs using the preferred method given in AS1726 – 2017, Section 6.2 – Rock identification, description and classification.

DETAILED ROCK DEFECT SPACING

Defect Spacing

Spacing/width (mm)	Descriptor	Symbol
<20	Extremely Close	EC
20-60	Very Close	VC
60-200	Close	C
200-600	Medium	M
600-2000	Wide	W
2000-6000	Very Wide	VW

Bedding Thickness (Stratification)

Term	Spacing (mm)
Thinly laminated	<6
Laminated	6 – 20
Very thinly bedded	20 – 60
Thinly bedded	60 – 200
Medium bedded	200 – 600
Thickly bedded	600 – 2,000
Very thickly bedded	> 2,000

ABBREVIATIONS AND DESCRIPTIONS FOR DEFECT TYPES

Defect Type	Abbr.	Description
Joint	JT	Surface of a fracture or parting, formed without displacement, across which the rock has little or no tensile strength. May be closed or filled by air, water or soil or rock substance, which acts as cement.
Bedding Parting	BP	Surface of fracture or parting, across which the rock has little or no tensile strength, parallel or sub-parallel to layering/ bedding. Bedding refers to the layering or stratification of a rock, indicating orientation during deposition, resulting in planar anisotropy in the rock material.
Contact	CO	The surface between two types or ages of rock.
Sheared Surface	SSU	A near planar, curved or undulating surface which is usually smooth, polished or slickensided.
Sheared Seam/ Zone (Fault)	SS/SZ	Seam or zone with roughly parallel almost planar boundaries of rock substance cut by closely spaced (often <50 mm) parallel and usually smooth or slickensided joints or cleavage planes.
Crushed Seam/ Zone (Fault)	CS/CZ	Seam or zone composed of disoriented usually angular fragments of the host rock substance, with roughly parallel near-planar boundaries. The brecciated fragments may be of clay, silt, sand or gravel sizes or mixtures of these.
Extremely Weathered Seam/ Zone	XWS/XWZ	Seam of soil substance, often with gradational boundaries, formed by weathering of the rock material in places.
Infilled Seam	IS	Seam of soil substance, usually clay or clayey, with very distinct roughly parallel boundaries, formed by soil migrating into joint or open cavity.
Vein	VN	Distinct sheet-like body of minerals crystallised within rock through typically open-space filling or crack-seal growth.

NOTE: Defects size of <100mm SS, CS and XWS. Defects size of >100mm SZ, CZ and XWZ.

ABBREVIATIONS AND DESCRIPTIONS FOR DEFECT SHAPE AND ROUGHNESS

Shape	Abbr.	Description	Roughness	Abbr.	Description
Planar	PR	Consistent orientation	Polished	POL	Shiny smooth surface
Curved	CU	Gradual change in orientation	Slickensided	SL	Grooved or striated surface, usually polished
Undulating	UN	Wavy surface	Smooth	SM	Smooth to touch. Few or no surface irregularities
Stepped	ST	One or more well defined steps	Rough	RO	Many small surface irregularities (amplitude generally <1mm). Feels like fine to coarse sandpaper
Irregular	IR	Many sharp changes in orientation	Very Rough	VR	Many large surface irregularities, amplitude generally >1mm. Feels like very coarse sandpaper

Orientation: **Vertical Boreholes –** The dip (inclination from horizontal) of the defect.
Inclined Boreholes – The inclination is measured as the acute angle to the core axis.

ABBREVIATIONS AND DESCRIPTIONS FOR DEFECT COATING

Coating	Abbr.	Description
Clean	CN	No visible coating or infilling
Stain	SN	No visible coating but surfaces are discoloured by staining, often limonite (orange-brown)
Veneer	VNR	A visible coating of soil or mineral substance, usually too thin to measure (< 1 mm); may be patchy

DEFECT APERTURE

Aperture	Abbr.	Description
Closed	CL	Closed.
Open	OP	Without any infill material.
Infilled	-	Soil or rock i.e. clay, silt, talc, pyrite, quartz, etc.

Appendix B Laboratory Certificates

STS GEOTECHNICS PTY LTD
CONSULTING GEOTECHNICAL ENGINEERS

STS Geotechnics Pty Ltd
14/1 Cowpasture Place, Wetherill Park NSW 2164
Phone: (02)9756 2166 | Email: enquiries@stsgeo.com.au

Moisture Content of Soil and Aggregate Samples

Project: E26738.G03 : 66-68 CROYDON STREET, CRONULLA NSW — Project No.: 31380

Client: EI AUSTRALIA — Report No.: 25/1435

Address: SUITE 6.01, 55 MILLER STREET, PYRMONT — Report Date: 21/05/2025

Test Method: AS1289.1289.2.1.1 — Page: 1 of 1

Sampling Procedure: Samples Supplied By Client (Not covered under NATA Scope of Accreditation)

STS / Sample No.	9816D-L/1	9816D-L/2	9816D-L/3	9816D-L/4	9816D-L/5	
Sample Location	BH01	BH02	BH03	BH4	BH6	
Material Description	Silty CLAY, red grey, trace Gravel	Silty CLAY, brown grey, trace Gravel	Silty CLAY, red grey, trace Gravel	Silty CLAY, red grey, trace Gravel	Silty CLAY, red grey, trace Gravel	
Depth (mm)	0.5 - 0.95	1.5 - 1.95	0.7 - 0.95	1.5 - 1.95	0.5 - 0.95	
Sample Date	23-30/4/25	23-30/4/25	23-30/4/25	23-30/4/25	23-30/4/25	
Moisture Content (%)	**14.9**	**10.8**	**18.2**	**13.9**	**18.4**	

Remarks:

Approved Signatory.....

Technician: SP

Mrigesh Tamang - Manager

STS GEOTECHNICS PTY LTD
CONSULTING GEOTECHNICAL ENGINEERS

STS Geotechnics Pty Ltd
14/1 Cowpasture Place, Wetherill Park NSW 2164
Phone: (02)9756 2166 | Email: enquiries@stsgeo.com.au

Atterberg Limits and Linear Shrinkage Report

Project: E26733.G03 : 135 BADGERYS CREEK ROAD, BRADFIELD NSW — Project No.: 31380

Client: EI AUSTRALIA — Report No.: 25/1434

Address: SUITE 6.01, 55 MILLER STREET, PYRMONT — Report Date: 21/05/2025

Test Method: AS 1289.3.3.1, 3.2.1, 3.1.2, 3.4.1 — Page: 1 of 1

Sampling Procedure: Samples Supplied By Client (Not covered under NATA Scope of Accreditation)

STS / Sample No.	9816D-L/1	9816D-L/2	9816D-L/3	9816D-L/4	9816D-L/5	
Sample Location	BH01	BH02	BH03	BH4	BH6	
Material Description	Silty CLAY, red grey, trace Gravel	Silty CLAY, brown grey, trace Gravel	Silty CLAY, red grey, trace Gravel	Silty CLAY, red grey, trace Gravel	Silty CLAY, red grey, trace Gravel	
Depth (m)	0.5 - 0.95	1.5 - 1.95	0.7 - 0.95	1.5 - 1.95	0.5 - 0.95	
Sample Date	23-30/4/25	23-30/4/25	23-30/4/25	23-30/4/25	23-30/4/25	
Sample History	Oven Dried	Oven Dried	Oven Dried	Oven Dried	Oven Dried	
Method of Preparation	Dry Sieve	Dry Sieve	Dry Sieve	Dry Sieve	Dry Sieve	
Liquid Limit (%)	**63**	**52**	**53**	**42**	**62**	
Plastic Limit (%)	**25**	**25**	**23**	**21**	**25**	
Plasticity Index	**38**	**27**	**30**	**21**	**37**	
Linear Shrinkage (%)	**17.5**	**15.0**	**12.0**	**11.5**	**17.0**	
Mould Size (mm)	127	127	127	127	127	
Crumbing	N	N	N	N	N	
Curling	Y	N	Y	Y	Y	

Remarks:

Approved Signatory..... .....

Technician: SP

Mrigesh Tamang - Manager

STS GEOTECHNICS PTY LTD
CONSULTING GEOTECHNICAL ENGINEERS

STS Geotechnics Pty Ltd
14/1 Cowpasture Place, Wetherill Park NSW 2164
Phone: (02)9756 2166 | Email: enquiries@stsgeo.com.au

Point Load Strength Index Report

Project: E26733.G03: 135 BADGERYS CREEK ROAD,BRADFIELD NSW
Client: EI AUSTRALIA PTY LTD
Address: SUITE 6.01, 55 MILLER STREET, PYRMONT NSW 2009
Test Method: AS 4133.4.1
Sampling Procedure: Samples Supplied By Client (Not covered under NATA Scope of Accreditation)

Project No.: 31380/9816D-L
Report No.: 25/1515
Report Date: 27/05/2025
Page: 1 of 1

Borehole / Sample No.	Depth (m)	Date Sampled	Date Tested	Test Type	Is (MPa)	$Is_{(50)}$ (MPa)	Rock Type	Failure Type	Moisture
BH1M	3.15	23/04/2025	27/05/2025	A	**0.76**	**0.77**	ST	3	M
BH1M	5.20	23/04/2025	27/05/2025	A	**0.23**	**0.23**	ST/YT	3	M
BH1M	6.44	23/04/2025	27/05/2025	A	**0.39**	**0.40**	ST/YT	3	M
BH1M	7.48	23/04/2025	27/05/2025	A	**0.71**	**0.71**	ST	3	M
BH2M	3.22	25/04/2025	27/05/2025	A	**0.62**	**0.61**	ST	3	M
BH2M	6.48	25/04/2025	27/05/2025	A	**0.20**	**0.20**	ST/YS	3	M
BH2M	9.37	25/04/2025	27/05/2025	A	**0.47**	**0.47**	ST/YS	3	M
BH2M	11.40	25/04/2025	27/05/2025	A	**0.35**	**0.34**	ST/YS	3	M
BH3M	3.67	25/04/2025	27/05/2025	A	**0.18**	**0.19**	ST/YS	3	M
BH3M	5.50	25/04/2025	27/05/2025	A	**0.033**	**0.034**	ST/YS	3	M
BH3M	8.65	25/04/2025	27/05/2025	A	**0.41**	**0.41**	ST/YS	3	M
BH3M	10.74	25/04/2025	27/05/2025	A	**0.51**	**0.51**	ST/YS	3	M
BH3M	12.12	25/04/2025	27/05/2025	A	**0.34**	**0.34**	ST/YS	3	M
BH3M	14.77	25/04/2025	27/05/2025	A	**0.5**	**0.5**	ST/YS	3	M
BH3M	17.39	25/04/2025	27/05/2025	A	**0.42**	**0.42**	ST/YS	3	M
BH3M	20.19	25/04/2025	27/05/2025	A	**0.62**	**0.63**	ST/YS	3	M
BH4	4.82	27/04/2025	27/05/2025	A	**0.15**	**0.15**	ST/YS	3	M
BH4	6.87	27/04/2025	27/05/2025	A	**0.23**	**0.23**	ST/YS	3	M
BH4	8.21	27/04/2025	27/05/2025	A	**0.45**	**0.44**	ST/YS	3	M
BH4	10.34	27/04/2025	27/05/2025	A	**0.46**	**0.47**	ST/YS	3	M
BH5M	3.88	28/04/2025	27/05/2025	A	**0.35**	**0.35**	ST	3	M
BH5M	4.53	28/04/2025	27/05/2025	A	**0.7**	**0.71**	ST	3	M
BH5M	5.56	28/04/2025	27/05/2025	A	**0.87**	**0.87**	ST	3	M
BH5M	6.88	28/04/2025	27/05/2025	A	**0.25**	**0.25**	ST	3	M
BH5M	7.90	26/04/2025	27/05/2025	A	**0.58**	**0.58**	ST	3	M

Failure Type
1 = Fracture through bedding or weak plane
2 = Fracture along bedding
3 = Fracture through rock mass
4 = Fracture influenced by natural defect or drilling
5 = Partial fracture or chip (invalid result)

Test Type
A = Axial
D = Diametrial
I = Irregular
C = Cube

Moisure Condition
W = Wet
M = Moist
D = Dry

Rock Type
SS = Sandstone
ST = Siltstone
SH = Shale
YS = Claystone
IG = Igneous

Remarks:

Approved Signatory.....

Technician: NL

Mrigesh Tamang - Manager

STS GEOTECHNICS PTY LTD
CONSULTING GEOTECHNICAL ENGINEERS

STS Geotechnics Pty Ltd
14/1 Cowpasture Place, Wetherill Park NSW 2164
Phone: (02)9756 2166 | Email: enquiries@stsgeo.com.au

Point Load Strength Index Report

Project: 135 BADGERYS CREEK ROAD,BRADFIELD NSW
Client: EI AUSTRALIA PTY LTD
Address: SUITE 6.01, 55 MILLER STREET, PYRMONT NSW 2009
Test Method: AS 4133.4.1
Sampling Procedure: Samples Supplied By Client (Not covered under NATA Scope of Accreditation)

Project No.: 31380/9816D-L
Report No.: 25/1515
Report Date: 27/05/2025
Page: 1 of 1

Borehole / Sample No.	Depth (m)	Date Sampled	Date Tested	Test Type	Is (MPa)	$Is_{(50)}$ (MPa)	Rock Type	Failure Type	Moisture
BH6M	4.78	29/04/2025	27/05/2025	A	**0.21**	**0.20**	ST	3	M
BH6M	6.48	29/04/2025	27/05/2025	A	**1.20**	**1.20**	ST	3	M
BH6M	8.16	29/04/2025	27/05/2025	A	**0.66**	**0.66**	ST	3	M
BH6M	10.25	29/04/2025	27/05/2025	A	**0.36**	**0.36**	ST	3	M

Failure Type
1 = Fracture through bedding or weak plane
2 = Fracture along bedding
3 = Fracture through rock mass
4 = Fracture influenced by natural defect or drilling
5 = Partial fracture or chip (invalid result)

Test Type
A = Axial
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I = Irregular
C = Cube

Moisure Condition
W = Wet
M = Moist
D = Dry

Rock Type
SS = Sandstone
ST = Siltstone
SH = Shale
YS = Claystone
IG = Igneous

Remarks:

Approved Signatory.....

Technician: NL

Mrigesh Tamang - Manager

ANALYTICAL REPORT

Accreditation No. 2562

CLIENT DETAILS

Contact	Gregory Briscoe
Client	EI AUSTRALIA
Address	SUITE 6.01 55 MILLER STREET PYRMONT NSW 2009
Telephone	61 2 95160722
Facsimile	(Not specified)
Email	Greg.Briscoe@eiaustralia.com.au
Project	**E26733 135 Badgerys Creek rd Bradfield N**
Order Number	**E26733**
Samples	21

LABORATORY DETAILS

Manager	Shane McDermott
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
SGS Reference	**SE282211A R0**
Date Received	9/5/2025
Date Reported	16/5/2025

COMMENTS

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

SIGNATORIES

Dong LIANG
Metals/Inorganics Team Leader

Shane MCDERMOTT
Laboratory Manager

Ying Ying ZHANG
Laboratory Technician

pH in soil (1:5) [AN101] Tested: 13/5/2025

PARAMETER	UOM	LOR	BH01_0.0-0.1 SOIL - 23/4/2025 SE282211A.001	BH01_0.3-0.4 SOIL - 23/4/2025 SE282211A.002	BH03_0.9-1.0 SOIL - 24/4/2025 SE282211A.005	BH02_0.5-0.95 SOIL - 23/4/2025 SE282211A.013	BH03_0.5-0.95 SOIL - 23/4/2025 SE282211A.014
pH	pH Units	0.1	**5.5**	**5.3**	**6.5**	**5.1**	**6.0**

PARAMETER	UOM	LOR	BH03_1.5 SOIL - 23/4/2025 SE282211A.015	BH04_3-3.01 SOIL - 23/4/2025 SE282211A.016	BH05_0.5-0.95 SOIL - 23/4/2025 SE282211A.017	BH05_1.5-1.95 SOIL - 23/4/2025 SE282211A.018	BH05_3.0-3.45 SOIL - 23/4/2025 SE282211A.019
pH	pH Units	0.1	**6.2**	**7.1**	**5.3**	**5.0**	**5.5**

PARAMETER	UOM	LOR	BH06_1.5-1.95 SOIL - 23/4/2025 SE282211A.020	BH01_1.5-1.95 SOIL - 23/4/2025 SE282211A.021
pH	pH Units	0.1	**5.3**	**5.2**

Conductivity and TDS by Calculation - Soil [AN106] Tested: 13/5/2025

PARAMETER	UOM	LOR	BH01_0.0-0.1 SOIL - 23/4/2025 SE282211A.001	BH01_0.3-0.4 SOIL - 23/4/2025 SE282211A.002	BH03_0.9-1.0 SOIL - 24/4/2025 SE282211A.005	BH02_0.5-0.95 SOIL - 23/4/2025 SE282211A.013	BH03_0.5-0.95 SOIL - 23/4/2025 SE282211A.014
Conductivity of Extract (1:5 dry sample basis)	µS/cm	1	35	120	110	440	61

PARAMETER	UOM	LOR	BH03_1.5 SOIL - 23/4/2025 SE282211A.015	BH04_3-3.01 SOIL - 23/4/2025 SE282211A.016	BH05_0.5-0.95 SOIL - 23/4/2025 SE282211A.017	BH05_1.5-1.95 SOIL - 23/4/2025 SE282211A.018	BH05_3.0-3.45 SOIL - 23/4/2025 SE282211A.019
Conductivity of Extract (1:5 dry sample basis)	µS/cm	1	260	120	120	610	640

PARAMETER	UOM	LOR	BH06_1.5-1.95 SOIL - 23/4/2025 SE282211A.020	BH01_1.5-1.95 SOIL - 23/4/2025 SE282211A.021
Conductivity of Extract (1:5 dry sample basis)	µS/cm	1	400	540

Exchangeable Cations and Cation Exchange Capacity (CEC/ESP/SAR) [AN122] Tested: 15/5/2025

PARAMETER	UOM	LOR	BH01_0.0-0.1 SOIL - 23/4/2025 SE282211A.001	BH01_0.3-0.4 SOIL - 23/4/2025 SE282211A.002	BH03_0.9-1.0 SOIL - 24/4/2025 SE282211A.005	BH05_0.5-0.95 SOIL - 23/4/2025 SE282211A.017	BH05_1.5-1.95 SOIL - 23/4/2025 SE282211A.018
Exchangeable Calcium, Ca	mg/kg	2	720	200	93	280	33
Exchangeable Calcium, Ca	meq/100g	0.01	3.6	0.99	0.46	1.4	0.17
Exchangeable Calcium Percentage*	%	0.1	39.0	7.6	3.9	13.2	1.0
Exchangeable Potassium, K	mg/kg	2	190	89	75	150	190
Exchangeable Potassium, K	meq/100g	0.01	0.50	0.23	0.19	0.39	0.47
Exchangeable Potassium Percentage*	%	0.1	5.4	1.7	1.6	3.6	2.9
Exchangeable Magnesium, Mg	mg/kg	2	590	1300	1100	970	1400
Exchangeable Magnesium, Mg	meq/100g	0.02	4.8	10	8.9	8.0	12
Exchangeable Magnesium Percentage*	%	0.1	52.1	79.6	74.7	75.1	73.2
Exchangeable Sodium, Na	mg/kg	2	76	330	540	200	850
Exchangeable Sodium, Na	meq/100g	0.01	0.33	1.4	2.4	0.85	3.7
Exchangeable Sodium Percentage*	%	0.1	3.6	11.0	19.8	8.0	22.9
Cation Exchange Capacity	meq/100g	0.02	9.2	13	12	11	16

PARAMETER	UOM	LOR	BH05_3.0-3.45 SOIL - 23/4/2025 SE282211A.019	BH01_1.5-1.95 SOIL - 23/4/2025 SE282211A.021
Exchangeable Calcium, Ca	mg/kg	2	19	9
Exchangeable Calcium, Ca	meq/100g	0.01	0.10	0.05
Exchangeable Calcium Percentage*	%	0.1	0.6	0.5
Exchangeable Potassium, K	mg/kg	2	180	110
Exchangeable Potassium, K	meq/100g	0.01	0.46	0.29
Exchangeable Potassium Percentage*	%	0.1	2.9	3.0
Exchangeable Magnesium, Mg	mg/kg	2	1400	770
Exchangeable Magnesium, Mg	meq/100g	0.02	12	6.3
Exchangeable Magnesium Percentage*	%	0.1	73.9	65.3
Exchangeable Sodium, Na	mg/kg	2	820	700
Exchangeable Sodium, Na	meq/100g	0.01	3.6	3.0
Exchangeable Sodium Percentage*	%	0.1	22.5	31.2
Cation Exchange Capacity	meq/100g	0.02	16	9.7

Soluble Anions (1:5) in Soil/Solids by Ion Chromatography [AN245] Tested: 13/5/2025

PARAMETER	UOM	LOR	BH01_0.0-0.1 SOIL - 23/4/2025 SE282211A.001	BH01_0.3-0.4 SOIL - 23/4/2025 SE282211A.002	BH03_0.9-1.0 SOIL - 24/4/2025 SE282211A.005	BH02_0.5-0.95 SOIL - 23/4/2025 SE282211A.013	BH03_0.5-0.95 SOIL - 23/4/2025 SE282211A.014
Chloride	mg/kg	0.25	11	70	35	500	20
Sulfate	mg/kg	5	10	78	77	160	44

PARAMETER	UOM	LOR	BH03_1.5 SOIL - 23/4/2025 SE282211A.015	BH04_3-3.01 SOIL - 23/4/2025 SE282211A.016	BH05_0.5-0.95 SOIL - 23/4/2025 SE282211A.017	BH05_1.5-1.95 SOIL - 23/4/2025 SE282211A.018	BH05_3.0-3.45 SOIL - 23/4/2025 SE282211A.019
Chloride	mg/kg	0.25	260	72	73	550	500
Sulfate	mg/kg	5	63	78	92	500	420

PARAMETER	UOM	LOR	BH06_1.5-1.95 SOIL - 23/4/2025 SE282211A.020	BH01_1.5-1.95 SOIL - 23/4/2025 SE282211A.021
Chloride	mg/kg	0.25	380	430
Sulfate	mg/kg	5	86	180

Alkalinity in Soil [AN002/AN135] Tested: 13/5/2025

PARAMETER	UOM	LOR	BH01_0.0-0.1 SOIL - 23/4/2025 SE282211A.001	BH01_0.3-0.4 SOIL - 23/4/2025 SE282211A.002	BH03_0.9-1.0 SOIL - 24/4/2025 SE282211A.005	BH05_0.5-0.95 SOIL - 23/4/2025 SE282211A.017	BH05_1.5-1.95 SOIL - 23/4/2025 SE282211A.018
Bicarbonate Alkalinity as HCO3 in Soil*	mg/kg	25	<25	<25	**130**	<25	<25
Carbonate Alkalinity as CO3 in Soil*	mg/kg	25	<25	<25	<25	<25	<25
Hydroxide Alkalinity as OH in Soil*	mg/kg	25	<25	<25	<25	<25	<25
Total Alkalinity as CaCO3 in Soil*	mg/kg	25	<25	<25	**110**	<25	<25

PARAMETER	UOM	LOR	BH05_3.0-3.45 SOIL - 23/4/2025 SE282211A.019	BH01_1.5-1.95 SOIL - 23/4/2025 SE282211A.021
Bicarbonate Alkalinity as HCO3 in Soil*	mg/kg	25	<25	<25
Carbonate Alkalinity as CO3 in Soil*	mg/kg	25	<25	<25
Hydroxide Alkalinity as OH in Soil*	mg/kg	25	<25	<25
Total Alkalinity as CaCO3 in Soil*	mg/kg	25	<25	<25

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES [AN040/AN320] Tested: 9/5/2025

PARAMETER	UOM	LOR	BH01_0.0-0.1 SOIL - 23/4/2025 SE282211A.001	BH01_0.3-0.4 SOIL - 23/4/2025 SE282211A.002	BH03_0.9-1.0 SOIL - 24/4/2025 SE282211A.005	BH05_0.5-0.95 SOIL - 23/4/2025 SE282211A.017	BH05_1.5-1.95 SOIL - 23/4/2025 SE282211A.018
Calcium, Ca	mg/kg	5	1800	390	33	350	84
Magnesium, Mg	mg/kg	5	1500	2000	1400	1600	3100
Sodium, Na	mg/kg	5	160	460	580	260	980
Potassium, K	mg/kg	10	1200	630	520	610	860

PARAMETER	UOM	LOR	BH05_3.0-3.45 SOIL - 23/4/2025 SE282211A.019	BH01_1.5-1.95 SOIL - 23/4/2025 SE282211A.021
Calcium, Ca	mg/kg	5	29	26
Magnesium, Mg	mg/kg	5	1900	2300
Sodium, Na	mg/kg	5	970	880
Potassium, K	mg/kg	10	770	700

Moisture Content [AN002] Tested: 9/5/2025

PARAMETER	UOM	LOR	BH02_0.5-0.95 SOIL - 23/4/2025 SE282211A.013	BH03_0.5-0.95 SOIL - 23/4/2025 SE282211A.014	BH03_1.5 SOIL - 23/4/2025 SE282211A.015	BH04_3-3.01 SOIL - 23/4/2025 SE282211A.016	BH05_0.5-0.95 SOIL - 23/4/2025 SE282211A.017
% Moisture	%w/w	1	**11.1**	**14.5**	**18.5**	**8.8**	**12.2**

PARAMETER	UOM	LOR	BH05_1.5-1.95 SOIL - 23/4/2025 SE282211A.018	BH05_3.0-3.45 SOIL - 23/4/2025 SE282211A.019	BH06_1.5-1.95 SOIL - 23/4/2025 SE282211A.020	BH01_1.5-1.95 SOIL - 23/4/2025 SE282211A.021
% Moisture	%w/w	1	**13.8**	**10.8**	**9.8**	**7.8**

METHOD	METHODOLOGY SUMMARY
AN002/AN135	Alkalinity (and forms of) by Titration: The sample is extracted 1to 5 in deionised water and the extract titrated with standard acid to pH 8.3 (P titre) and pH 4.5 (T titre) and permanent and/or total alkalinity calculated. The results are expressed as equivalents of calcium carbonate or recalculated as bicarbonate, carbonate and hydroxide. Reference APHA 2320. Internal Reference AN135
AN002	The test is carried out by drying (at either 40°C or 105°C) a known mass of sample in a weighed evaporating basin. After fully dry the sample is re-weighed. Samples such as sludge and sediment having high percentages of moisture will take some time in a drying oven for complete removal of water.
AN040/AN320	A portion of sample is digested with nitric acid to decompose organic matter and hydrochloric acid to complete the digestion of metals. The digest is then analysed by ICP OES with metals results reported on the dried sample basis. Based on USEPA method 200.8 and 6010C.
AN040	A portion of sample is digested with Nitric acid to decompose organic matter and Hydrochloric acid to complete the digestion of metals and then filtered for analysis by AAS or ICP as per USEPA Method 200.8.
AN101	pH in Soil Sludge Sediment and Water: pH is measured electrometrically using a combination electrode and is calibrated against 3 buffers purchased commercially. For soils, sediments and sludges, an extract with water (or 0.01M CaCl2) is made at a ratio of 1:5 and the pH determined and reported on the extract. Reference APHA 4500-H+.
AN106	Conductivity and TDS by Calculation: Conductivity is measured by meter with temperature compensation and is calibrated against a standard solution of potassium chloride. Conductivity is generally reported as µmhos/cm or µS/cm @ 25°C. For soils, an extract of as received sample with water is made at a ratio of 1:5 and the EC determined and reported on the extract, or calculated back to the as-received sample. Salinity can be estimated from conductivity using a conversion factor, which for natural waters, is in the range 0.55 to 0.75. Reference APHA 2510 B.
AN122	Exchangeable Cations, CEC and ESP: Soil sample is extracted in 1M Ammonium Acetate at pH=7 (or 1M Ammonium Chloride at pH=7) with cations (Na, K, Ca & Mg) then determined by ICP OES/ICP MS and reported as Exchangeable Cations. For saline soils, these results can be corrected for water soluble cations and reported as Exchangeable cations in meq/100g or soil can be pre-treated (aqueous ethanol/aqueous glycerol) prior to extraction. Cation Exchange Capacity (CEC) is the sum of the exchangeable cations in meq/100g.
AN122	The Exchangeable Sodium Percentage (ESP) is calculated as the exchangeable sodium divided by the CEC (all in meq/100g) times 100. ESP can be used to categorise the sodicity of the soil as below: ESP < 6% non-sodic ESP 6-15% sodic ESP >15% strongly sodic Method is referenced to Rayment and Lyons, 2011, sections 15D3 and 15N1.-
AN245	Anions by Ion Chromatography: A water sample is injected into an eluent stream that passes through the ion chromatographic system where the anions of interest ie Br, Cl, NO2, NO3 and SO4 are separated on their relative affinities for the active sites on the column packing material. Changes to the conductivity and the UV-visible absorbance of the eluent enable identification and quantitation of the anions based on their retention time and peak height or area. APHA 4110 B

FOOTNOTES

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

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

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

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

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

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

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

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

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

Appendix C Vibration Limits

German Standard DIN 4150 – Part 3: 2016-12 provides guideline levels of vibration velocity for evaluating the effects of vibration in structures. The limits presented in this standard are generally considered to be conservative.

The DIN 4150 values (maximum levels measured in any direction at the foundation, OR, maximum levels measured in (x) or (y) directions, in the plane of the uppermost floor), are summarised in **Table A** below.

It should be noted that peak vibration velocities higher than the minimum figures in **Table A** for low frequencies may be quite 'safe', depending on the frequency content of the vibration and the actual conditions of the structures.

It should also be noted that these levels are 'safe limits', up to which no damage due to vibration effects has been observed for the particular class of building. 'Damage' is defined by DIN 4150 to include even minor non-structural cracking in cement render, the enlargement of cracks already present, and the separation of partitions or intermediate walls from load bearing walls. Should damage be observed at vibration levels lower than the 'safe limits', then it may be attributed to other causes. DIN 4150 also states that when vibration levels higher than the 'safe limits' are present, it does not necessarily follow that damage will occur. Values given are only a broad guide.

Table A DIN 4150 – Structural Damage – Safe Limits for Building Vibration

Group	Type of Structure	Peak Vibration Velocity (mm/s)			
		At Foundation Level at a Frequency of:			Plane of Floor of Uppermost Storey
		Less than 10 Hz	10 Hz to 50 Hz	50 Hz to 100 Hz	All Frequencies
1	Buildings used for commercial purposes, industrial buildings and buildings of similar design	20	20 to 40	40 to 50	40
2	Dwellings and buildings of similar design and/or use	5	5 to 15	15 to 20	15
3	Structures that because of their particular sensitivity to vibration, do not correspond to those listed in Group 1 and 2 and have intrinsic value (e.g. buildings that are under a preservation order)	3	3 to 8	8 to 10	8

Note: For frequencies above 100 Hz, the higher values in the 50 Hz to 100 Hz column should be used.

Appendix D Important Information

Important Information

SCOPE OF SERVICES

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

RELIANCE ON DATA

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

GEOTECHNICAL ENGINEERING

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

LIMITATIONS OF SITE INVESTIGATION

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

SUBSURFACE CONDITIONS ARE TIME DEPENDENT

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

VERIFICATION OF SITE CONDITIONS

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

REPRODUCTION OF REPORTS

 Where information from the accompanying report is to be included in contract documents or engineering specification for the project, the entire report should be included in order to minimize the likelihood of misinterpretation from logs.

REPORT FOR BENEFIT OF CLIENT

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

OTHER LIMITATIONS

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