

The background of the entire page is a photograph of industrial machinery, likely a drilling rig, with various metal components, pipes, and a large orange wheel visible. The image is overlaid with several semi-transparent geometric shapes in shades of grey, teal, and orange, creating a modern, technical aesthetic.

Geotechnical Investigation Building A - Lot 102, 3 Halifax Street, Macquarie Park NSW

Prepared for: Lachlans Line A1 Pty Ltd

Reference: P3006_18

Date: 23 February 2026

Morrow Geotechnics Pty Ltd

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Report Prepared for	Lachlans Line A1 Pty Ltd

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Full Name & Title		Signature
Author	Mark Peach Experienced Engineering Geologist	
Reviewer	Alan Morrow Principal Geotechnical Engineer	

1. Project Background

Morrow Geotechnics Pty Ltd has undertaken a geotechnical investigation to provide geotechnical advice and recommendations for the proposed development at Lot 102, 3 Halifax Street, Macquarie Park NSW (the site).

The following geotechnical reports have been prepared for the site:

- Morrow Geotechnics Pty Ltd, Geotechnical Investigation Report, Residential Development Lot 102, 3 Halifax Street, Macquarie Park NSW, ref: P3006_01 rev1, dated 17 May 2024 (MG24);
- JK Geotechnics, Report to Urban Growth on Geotechnical Investigation for Proposed Multi-Storey Residential Subdivision at Waterloo Road, Macquarie Park, NSW; ref 27484P Rev 1 and dated 9 July 2014; and
- Alliance Geotechnical Pty Ltd, Geotechnical Desktop Study Report; Project Lachlan's Line Macquarie Park Stage 2 & 3; 5 Halifax Street, Macquarie Park NSW; ref 14707-GR-1-1-Rev 2 and dated 29 November 2022.

1.1 Proposed Development

Architectural plans for the proposed development have been prepared by Francis-Jones Carpenter Pty Ltd, project code LGLAL, revision 2 and dated 7 August 2024. Morrow Geotechnics understands that the proposed development will involve construction of a forty four storey multi-dwelling structure over eight levels of basement carpark with Bulk Excavation Level (BEL) at RL 12.80 mAHD.

1.2 Investigation Intent

The intent of the investigation is to provide geotechnical advice and recommendations specific to the ground conditions observed at site for the proposed development. These recommendations include:

- Expected subsurface conditions;
- Lot classification in accordance with AS2870 and geotechnical parameters for foundation design;
- Excavation support options, including lateral earth pressures and pile design parameters;
- Advice on possible seepage water associated with construction;
- Earthquake site classification in accordance with AS1170.4; and
- Geotechnical construction considerations.

1.3 Published Geological Mapping

Information on regional sub-surface conditions, referenced from the Department of Mineral Resources Geological Map Sydney 1:100,000 (Geological Series Sheet 9130) indicates that the site is underlain by (Rh) Hawkesbury Sandstone, which is typically comprised of medium to coarse-grained quartz sandstone, with very minor shale and laminite lenses.

1.4 Published Soil Landscapes

The Soil Conservation Service of NSW Sydney 1:100,000 Soil Landscapes Series Sheet 9130 (1st Edition) indicates that the soil landscape at the site likely comprises the Lucas Heights Landscape. The Lucas Heights Landscape comprises gently undulating crests and ridges on

plateau surfaces of the Mittagong formation with slopes up to 10 %. Soils are generally moderately deep (0.5 to 1.5 m) hardsetting Yellow Podzolic Soils and Yellow Soloths. These soils are noted to present stony soil, and low available water capacity.

2. Observations

2.1 Investigation Methods

Fieldwork was undertaken by Morrow Geotechnics on 28, 29 & 30 May 2025, with previous drilling undertaken on 8, 10, 11 & 14 August 2023 (MG24). Work carried out as part of this investigation includes:

- Review of publicly available information from previous reports in the project area, published geological and soil mapping and government agency websites;
- Site walkover inspection by an Experienced Engineering Geologist to assess topographical features, condition of surrounding structures and site conditions;
- Dial Before You Dig (DBYD) services search of proposed borehole locations;
- Drilling of one borehole (BH301) with a track mounted drill rig using solid flight augers equipped with a tungsten-carbide bit. The borehole was extended beyond refusal using HQ coring techniques to a depth of 55.76 mBGL (metres Below Ground Level). Rock core was boxed and photographed and point load tests were undertaken on selected core sample to assess rock strength. Borehole locations are shown on **Figure 1**, and the borehole logs are attached to this report; and
- Groundwater observations within boreholes during drilling. Installation of one groundwater monitoring well within the borehole immediately following drilling.

2.2 Subsurface Conditions

The stratigraphy at the site is characterised by fill, residual and alluvial soils overlying sandstone bedrock. Observations taken during the investigation have been used to produce a stratigraphic model of the site.

A summary of the subsurface conditions across the site, interpreted from the investigation results, is presented in **Table 1** and **Table 2** below. More detailed descriptions of subsurface conditions at the test locations are available in the borehole logs presented in **Appendix A**. The details of the method of soil and rock classification, explanatory notes and abbreviations adopted in the borehole logs are also presented in **Appendix A**.

Table 1 Summary of Inferred Subsurface Conditions

Unit	Material	Generalised Description
1	Fill	Sandy CLAY to Clayey Gravelly SAND, firm to Stiff clays and loose sand, with fine to medium sized gravels. Unit 1 is inferred to be uncontrolled and poorly compacted.
2	Stiff to Hard Clay	Residual and alluvial sandy to gravelly CLAY, stiff to very stiff grading to hard, medium plasticity, fine to medium grained with medium sized iron stone and sandstone gravels and extremely weathered sandstone bands.
3	Class V/IV Sandstone	Extremely to distinctly weathered SANDSTONE, very low to low strength, fine grained with sub horizontal ironstone bands and extremely weathered sandstone and clay seams.
4	Class III Sandstone	Slightly weathered to Fresh SANDSTONE, medium to high strength sandstone, fine grained, generally massive with moderately weathered zones.
5	Class II/I Sandstone	Slightly Weathered to Fresh SANDSTONE, high strength, fine grained, generally massive with sub-horizontal bedding and trace siltstone clasts.
6	Class II Shale	Fresh SHALE, high strength, fine grained, trace interbedded sandstone.

Table 2 Summary of Inferred Subsurface Conditions

Unit		Approx. Depth Range of Unit ¹ mBGL (RL mAHD)			
		BH301	BH2 (MG24)	BH3(MG24)	BH4(MG24)
1	Fill	0.0 to 1.3	0.0 to 0.2	0.0 to 0.8	0.0 to 0.05
		(37.8 to 36.5)	(41.5 to 41.7)	(44.1 to 43.3)	(39.7 to 39.65)
2	Stiff to Hard Clay	1.3 to 1.6	-	-	-
		(36.5 to 36.2)			
3	Class V/IV Sandstone	1.6 to 2.0	0.2 to 2.7	0.8 to 1.1	0.05 to 2.6
		(36.2 to 35.8)	(41.7 to 38.8)	(43.3 to 43.0)	(39.65 to 37.1)
4	Class III Sandstone	2.0 to 8.5	2.7 to 11.0	1.1 to 9.4	2.6 to 3.3
		(35.8 to 29.3)	(38.8 to 30.5)	(43.0 to 34.7)	(37.1 to 36.4)
5	Class II/I Sandstone	8.5 to 49.6	11.0 to 20.0	9.4 to 30.2	3.3 to 20.41
		(29.3 to -11.8)	(30.5 to 21.5)	(34.71 to 13.9)	(36.4 to 19.3)
6	Class II Shale	49.6 to 55.76	-	-	-
		(-11.8 to -17.96)			

Notes:

- Depth ranges shown are based on material observed within test locations and will vary across the site.
- RL for BH301 is an approximation based on nearby survey RLs only.

2.3 Groundwater Observations

A standpipe piezometer was installed within BH301 as part of the geotechnical investigation with well details found in **Table 3** below. The monitoring wells were constructed using 50mm diameter screw threaded PVC casing, sections of which were machine slotted. The annulus between the casing and borehole was backfilled using a 2 mm filter gravel pack to above the top of the screen. A bentonite plug with a minimum thickness of 0.5m was then installed above the gravel pack, the remaining annulus was backfilled with drill cuttings. The well was finished with a cement plug and a gatic cover.

Table 3 Piezometer Details

Piezometer	BH301
Top of Piezometer approx. RL (mAHD)	38.7 mAHD
Piezometer Depth (m)	55.76 m
Bentonite Plug Depth mBGL	5.0 to 6.5
Screen Depth (mBGL)	7.76 to 55.76

3. Discussions and Recommendations

3.1 Foundation Design

It is not recommended that shallow footings or slabs found within Unit 1 material due to the potential for differential settlement caused by footings bridging between materials of varying stiffness. Shallow footings and slabs at the site should be designed in accordance with AS2870:2011 based on a Site Classification of 'A.' The site classification has been provided on the basis that the performance expectations set out in Appendix B of AS2870–2011 are acceptable and that future site maintenance will be undertaken in accordance with CSIRO BTF 18

The parameters given in **Table 4** may be used for the design of pad footings and bored piles. Morrow Geotechnics recommends that a Preliminary Geotechnical Strength Reduction Factor (GSRF) of 0.4 is used for the design of piles in accordance with AS 2159:2009 if no allowance is made for pile testing during construction. Should pile testing be nominated, the GSRF may be reviewed and a value of 0.55 to 0.65 may be expected.

Selection of footing types and founding depth will need to consider the risk of adverse differential ground movements within the foundation footprint and between high level and deeper footings. Unless an allowance for such movement is included in the design of the proposed development, we recommend that all new structures found on natural materials with comparable end bearing capacities and elastic moduli.

Ultimate geotechnical strengths are provided for use in limit state design. Allowable bearing pressures are provided for serviceability checks. These values have been determined to limit settlements to an acceptable level for conventional building structures, typically less than 1% of the minimum footing dimension.

Table 4 Pad Footing and Pile Design Parameters

Material		Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6
		Fill	Stiff to Hard Clay	Class V/IV Sandstone	Class III Sandstone	Class II/I Sandstone	Class II Shale
Allowable Bearing Pressure (kPa)		N/A	200	1000	3500	6000	3500
Ultimate Vertical End Bearing Pressure (kPa)		N/A	450	3000	10500	18000	10500
Elastic Modulus (MPa)		5	15	80	400	1000	600
Ultimate Shaft Adhesion (kPa)	In Compression	0	50	150	800	1500	600
	In Tension	0	25	75	400	750	300
Susceptibility to Liquefaction during an Earthquake		Medium	Low	Low	Low	Low	Low

Notes:

- Side adhesion values given assume there is intimate contact between the pile and foundation material. Design engineer to check both 'piston' pull-out and 'cone' pull-out mechanics in accordance with AS4678-2002 Earth Retaining Structures.
- Susceptibility to liquefaction during an earthquake is based on the following definition:
 Low - Medium to very dense sands, stiff to hard clays, and rock
 Medium - Loose to medium dense sands, soft to firm clays, or uncontrolled fill below the water table
 High - Very loose sands or very soft clays below the water table

To adopt these parameters we have assumed that the bases of all pile excavations are cleaned of loose debris and water and inspected by a suitably qualified 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.

3.2 AS1170 Earthquake Site Risk Classification

Assessment of the material encountered during the investigation in accordance with the guidelines provided in AS1170.4-2007 indicates an earthquake subsoil class of Class Be –Rock for the site.

3.3 Excavation Retention

Geotechnical parameters for input to shoring design have been provided in **Table 5** below.

Table 5 Earth Pressure Parameters

		Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6
Material		Fill	Stiff to Hard Clay	Class V/IV Sandstone	Class III Sandstone	Class II/I Sandstone	Class II Shale
Unit Weight (kN/m ³)		18	19	23	24	24	24
Earth Pressure Coefficients	At Rest, K _o	0.53	0.56	0.43	0.36	0.29	0.36
	Passive, K _p	2.77	2.56	3.69	4.60	5.83	4.60
	Active, K _a	0.36	0.33	0.27	0.22	0.17	0.22
Drained Cohesion, c' (kPa)		0	6	15	100	250	200
Friction Angle, ϕ' (°)		28	26	35	40	45	40
Elastic Modulus (MPa)		5	15	80	400	1000	600
Poisson's Ratio		0.30	0.30	0.30	0.20	0.20	0.20

Notes:

- 1 Unit Weight is based on visual assessment only and may vary by $\pm 10\%$.
- 2 Earth pressures are provided on the assumption that the ground behind the retaining wall is flat and drained.

In addition, design of retaining walls should consider the following:

- Appropriate surcharge loading from construction equipment, vehicular traffic and neighbouring structures at finished surface level should be considered in the retention design. Surcharge loads on retention structures may be calculated using a rectangular stress block with an earth pressure coefficient of 0.5 applied to surcharge loads at ground surface level.
- Anchor design should ignore the contribution of any bonded length within a wedge which extends upwards at 45° from bulk excavation level to account for a failure wedge forming behind the shoring system.

3.4 Excavation Vibration Considerations

As a guide, safe working distances for typical items of vibration intensive plant are listed in **Table 6**. The safe working distances are quoted for both “cosmetic” damage (refer British Standard BS 7385:1993) and human comfort (refer NSW Environmental Protection Agency Vibration Guideline). The safe working distances should be complied with at all times, unless otherwise mitigated to the satisfaction of the relevant stakeholders.

Table 6 Recommended Safe Working Distances for Vibration Intensive Plant

Plant Item	Rating/Description	Safe Working Distance	
		Cosmetic Damage (BS 7385:1993) ¹	Human Response (EPA Vibration Guideline)
Vibratory Roller	< 50 kN (typically 1-2 tonnes)	5 m	15 m to 20 m
	< 100 kN (typically 2-4 tonnes)	6 m	20 m
	< 200 kN (typically 4-6 tonnes)	12 m	40 m
	< 300 kN (typically 7-13 tonnes)	15 m	100 m
	< 300 kN (typically 13-18 tonnes)	20 m	100 m
	< 300 kN (typically >18 tonnes)	25 m	100 m
Small Hydraulic Hammer	300 kg – 5 to 12 t excavator	2 m	7 m
Med Hydraulic Hammer	900 kg – 12 to 18 t excavator	7 m	23 m
Large Hydraulic Hammer	1600 kg – 18 to 34 t excavator	22 m	73 m
Vibratory Pile Driver	Sheet Piles	2 m to 20 m	20 m
Pile Boring	≤ 800 mm	2m (nominal)	N/A
Jackhammer	Handheld	1 m (nominal)	Avoid contact with structure

Notes:

- ¹ More stringent conditions may apply to heritage buildings or other sensitive structures.

In relation to human comfort (response), the safe working distances in **Table 6** relate to continuous vibration and apply to residential receivers. For most construction activities, vibration emissions are intermittent in nature and for this reason, higher vibration levels, occurring over shorter periods are permitted, as discussed in British Standard BS 6472-1:2008.

The safe working distances provided in **Table 6** are given for guidance only. Monitoring of vibration levels may be required to ensure vibrations levels remain below threshold values during the construction period.

3.5 Soil and Rock Excavability

The expected ability of equipment to excavate the soil and rock encountered at the site is summarised in **Table 7**. This assessment is based on available site investigation data and guidance on the assessment of excavability of rock by Pettifer and Fookes (1994). The presence of medium to high strength bands in lower strength rock and the discontinuity spacing may influence the excavability of the rock mass.

Table 7 Soil and Rock Excavatability

Unit	Material	Excavatability
1	Fill	Easy digging by a 20t Excavator
2	Residual Sand	
3	Class V/IV Sandstone	Hard ripping by 20t Excavator with hydraulic hammering required where medium strength shale is encountered within Unit 3.
4	Class III Sandstone	Hydraulic hammering will be required within Unit 4, 5 and 6.
5	Class II/I Sandstone	
6	Class II Shale	

The excavation methodology may also be affected by the following factors:

- Scale and geometry of the excavation;
- Availability of suitable construction equipment;
- Potential reuse of material on site; and
- Acceptable excavation methods, noise, ground vibration and other environmental criteria.

4. Additional Geotechnical Input

Further input from a geotechnical professional during design and construction is advised in order to ensure a cost-effective design which can be constructed safely and efficiently. Areas for geotechnical input should include:

- All excavated material transported off site should be classified in accordance with NSW EPA 2014 - Waste Classification Guideline Part 1; Classifying Waste.
- A suitably qualified geotechnical engineer is to assess the condition of exposed material at foundation or subgrade level to assess the ability of the prepared surface to act as a foundation or as a subgrade.
- Observation of the material within pile excavations should be undertaken at the start of piling works to confirm that material across the site is in accordance with the geotechnical model presented in this report.
- Regular inspections of battered and unsupported excavations, where proposed, to confirm geotechnical conditions and to assess the suitability of design assumptions and to provide further advice with regards to excavation retention/ support and proposed construction methodologies, if required.

5. Statement of Limitations

The adopted investigation scope was limited by the investigation intent and the presence of structures on site at the time of the investigation. Further geotechnical inspections should be carried out during construction to confirm the geotechnical model provided in this report.

Your attention is drawn to the document "Important Information", which is included in **Appendix B** 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 Morrow Geotechnics, but rather to ensure that all parties who may rely on this report are aware of the responsibilities each assumes in so doing.

6. References

AS1726:1993, *Geotechnical Site Investigations*, Standards Australia.

AS2159:2009, *Piling – Design and Installation*, Standards Australia.

AS2870:2011, *Residential Slabs and Footings*, Standards Australia.

Chapman, G.A. and Murphy, C.L. (1989), Soil Landscapes of the Sydney 1:100000 sheet. Soil Conservation Services of NSW, Sydney.

NSW Department of Mineral Resources (1985) Sydney 1:100,000 Geological Series Sheet 9130 (Edition 1). Geological Survey of New South Wales, Department of Mineral Resources.

Pells (2004) Substance and Mass Properties for the Design of Engineering Structures in the Hawkesbury Sandstone, Australian Geomechanics Journal, Vol 39 No 3



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Project
Geotechnical Investigation

Project Address
Lot 2, 3 Halifax Street, Macquarie Park NSW

Drawing Title
Figure 1

Client
Landmark Group Pty Ltd

Project Number
P3006

Figure

1

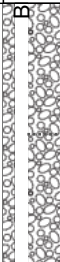
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MP

Date:
04 June 2025

APPENDIX A

BOREHOLE LOGS AND EXPLANATORY NOTES

Morrow Geotechnics				Geotechnical Log - Borehole							
Bellambi, NSW				BH2							
Phone: 0405 843 933											
UTM : 56H				Drill Rig : GEO305 - Comacchio				Job Number : P2968			
Easting (m) : 327283.0				Driller Supplier : MATRIX DRILLING				Client : Landmark Group Construction Australia Pty Ltd			
Northing (m) : 6259208.1				Logged By : Frank Li				Project : Macquarie Park			
Ground Elevation : 41.5 (m)				Reviewed By : Mark Peach				Location : 5 Halifax Street, Macquarie Park			
Total Depth : 20 m BGL				Date : 08/08/2023				Loc Comment :			
Drilling Method	Water	Well Diagram	Testing	Soil Origin	Graphic Log	Classification Code	Depth (m)	Elevation (m)	Material Description	Consistency/Density	Moisture
			DCP								
ADT		Backfill 50mm PVC Solid	1	Fill		ML	0.2	41.5	Fill sandy CLAY (ML) : non-plastic, light brown, fine grained sand, w < pl.	F	w < PL
			3 HB	Rock		SST		Extremely weathered,rock sandy CLAY (SST) : hard, low plasticity, light orange, fine to medium grained sand, inorganic, w ≈ pl.	H	w ≈ PL	
							1	40.5	1m : Commenced NMLC Coring;		
							2	39.5			
							3	38.5			
							4	37.5			
							5	36.5			

Morrow Geotechnics				Geotechnical Log - Borehole											
Bellambi, NSW				BH2											
Phone: 0405 843 933															
UTM : 56H				Drill Rig : GEO305 - Comacchio				Job Number : P2968							
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Total Depth : 20 m BGL				Date : 08/08/2023				Loc Comment :							
Drilling Method	Water	Well Diagram	RQD% and TCR%	Testing		Estimated Strength	Weathering	Depth (m)	Elevation (m)	Graphic Log	Classification Code	Material Description	Defect Spacing (mm)	Defect Depth	Defect Description
				Is(50)											
		B							41.5						

morrow Morrow Geotechnics Bellambi, NSW Phone: 0405 843 933 Geotechnical Log - Borehole BH2																	
UTM : 56H				Drill Rig : GEO305 - Comacchio				Job Number : P2968									
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Drilling Method	Water	Well Diagram	RQD% and TCR%	Testing	Estimated Strength	Weathering	Depth (m)	Elevation (m)	Graphic Log	Classification Code	Material Description	Defect Spacing (mm)	Defect Depth	Defect Description			
				Is(50)													
NMLC Coring	0% Water Loss		RQD = 90% TCR = 100%	d: 1.43, a: 2.15	VLS LS MS HS VHS EHS	MW-S		35.5		SST	rock SANDSTONE: moderately to slightly weathered, high strength, light orange red, medium grained, (massive, iron stained).						
						SW	6.2		SST	rock SANDSTONE: slightly weathered, high strength, orange red light orange, medium grained, (massive).			6.26-6.27, XWS, RO, PL, CT, 6.35, P, RO, PL, CL, CT, 6.36, J, 15°, RO, PL, CT, 6.37-6.38, XWS, 15°, RO, PL, CT, 6.38, P, RO, PL, CT, 6.71, P, RO, PL, STN, OP 6.75, P, 4°, RO, PL, CT				
			RQD = 83% TCR = 100%	d: 1.43, a: 1.4		7	34.5					7.4-7.43, IS, sandy clay, RO, PL, CT, 7.74, P, RO, PL, CL, CT					
				d: 0.03, a: 0.69		8	33.5					7.97, P, RO, PL, CL, CT 8.06, P, 2mm seam, RO, PL, CT, 8.1, IS, sandy clay, RO, PL, CT, 8.2-8.22, IS, sandy clay, RO, PL, CT, 8.28, P, RO, PL, CL, CT					
			RQD = 94% TCR = 100%	d: 2.18, a: 2.28		F	8.1		SST	rock SANDSTONE: fresh weathered, medium strength, very light grey, medium grained, (cross bedded).							
						F	8.6		SST	rock SANDSTONE: fresh weathered, high strength, very light grey, medium grained, (cross bedded).							
						SW			SST	rock SANDSTONE: slightly weathered, high strength, orange grey, medium grained, (cross bedded).							
				d: 1.26, a: 1.38		F	9	32.5		SST	rock SANDSTONE: fresh weathered, high strength, grey, medium grained, (massive, minor carbonaceous laminations).			9.18, P, carbonaceous laminations, RO, PL, CL, OP 9.19, P, carbonaceous laminations, RO, PL, CL, OP 9.47, P, 5°, RO, PL, CT, OP 9.53, P, 5°, RO, PL, CT, OP 9.94, P, 5°, RO, PL, CT, OP 9.98-10, XWS, sandy clay seam, 5°, RO, PL, CT, 10.05, P, RO, PL, CL, OP 10.56-10.58, IS, sandy clay seam, 5°, RO, PL, CT, 10.79, P, 5°, RO, PL, CL, OP 10.81, P, 5°, RO, PL, CL, OP 11.38, P, 25°, RO, PL, CL, OP 11.7, P, RO, PL, STN, OP 11.72, P, RO, PL, STN, OP 11.82, P, 16°, RO, PL, CT, OP			
						SW	10	31.5		SST	rock SANDSTONE: slightly weathered, high strength, orange light grey red, medium grained, (massive, iron stained).						
				d: 2.11, a: 2.1		11	30.5										
				RQD = 96% TCR = 100%		d: 1.66, a: 2.2											

Page 2 of 4



BH2

Job Number : P2968

Drill Rig : GEO305 - Comacchio

Client : Landmark Group Construction Australia Pty Ltd

Easting (m) : 327283.0

Driller Supplier : MATRIX DRILLING

Project : Macquarie Park

Northing (m) : 6259208.1

Logged By : Frank Li

Location : 5 Halifax Street, Macquarie Park

Ground Elevation : 41.5 (m)

Reviewed By : Mark Peach

Loc Comment :

Total Depth : 20 m BGL

Date : 08/08/2023

Page 3 of 4



BH2

Job Number : P2968
Client : Landmark Group Construction Australia Pty Ltd
Project : Macquarie Park
Location : 5 Halifax Street, Macquarie Park
Loc Comment :

Page 4 of 4

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CLIENT NAME: LANDMARK GROUP
PROJECT: 5 HALIFAX STREET
LOCATION: MACQUARIE PARK
JOB NUMBER: P2968
LOGGED BY: AB+FL

BOREHOLE ID: BH2
DEPTH: 1.09 - 6.00m
CORE TRAY NO.: 1 of 4
DATE: 8/8/23



morrow



0405 843 933



Bellambi, NSW



info@morrowgeo.com.au

Photo description

BH2 - Tray 1 of 4

Client

Landmark Group Construction Australia Pty Ltd

Location

5 Halifax Street, Macquarie Park

Project name

Macquarie Park

Project No

P2968

Scale

Not to Scale

BH No

BH2

BH Depth

CorePhoto

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CLIENT NAME: LANDMARK GROUP

PROJECT: 5 HALIFAX STREET

LOCATION: MACQUARIE PARK

JOB NUMBER: P2968

LOGGED BY: AB+FL

BOREHOLE ID: BH2

DEPTH: 6-11m

CORE TRAY NO.: 2

DATE: 8/8/23



morrow



0405 843 933



Bellambi, NSW



info@morrowgeo.com.au

Photo description

BH2 - Tray 2 of 4

Client

Landmark Group Construction Australia Pty Ltd

Location

5 Halifax Street, Macquarie Park

Project name

Macquarie Park

Project No

P2968

Scale

Not to Scale

BH No

BH2

BH Depth

CorePhoto

morrow

CLIENT NAME: LANDMARK GROUP

PROJECT: 5 HALIFAX STREET

LOCATION: MACQUARIE PARK

JOB NUMBER: P2968

LOGGED BY: AB+FL

BOREHOLE ID: BH2

DEPTH: 11-16.0m

CORE TRAY NO.: 3

DATE: 8/8/23



0405 843 933



Bellambi, NSW



info@morrowgeo.com.au

Photo description

BH2 - Tray 3 of 4

Client

Landmark Group Construction Australia Pty Ltd

Location

5 Halifax Street, Macquarie Park

Project name

Macquarie Park

Project No

P2968

Scale

Not to Scale

BH No

BH2

BH Depth

CorePhoto

morrow

CLIENT NAME: LANDMARK GROUP

PROJECT: 5 HALIFAX STREET

LOCATION: MACQUARIE PARK

JOB NUMBER: P2968

LOGGED BY: AB-FL

BOREHOLE ID: BH2

DEPTH: 16.0 → 20.0

CORE TRAY NO.: 4

DATE: 8/8/23



0405 843 933



Bellambi, NSW



info@morrowgeo.com.au

Photo description

BH2 - Tray 4 of 4

Client

Landmark Group Construction Australia Pty Ltd

Location

5 Halifax Street, Macquarie Park

Project name

Macquarie Park

Project No

P2968

Scale

Not to Scale

BH No

BH2

BH Depth

CorePhoto

Page 1 of 1



BH3

Job Number : P2968

Client : Landmark Group Construction Australia Pty Ltd

Project : Macquarie Park

Project : Macquarie Park

Location : 5 Halifax Street, Macquarie Park

Loc Comment :

Morrow Geotechnics										Geotechnical Log - Borehole												
Bellambi, NSW										BH3												
Phone: 0405 843 933																						
UTM : 56H										Job Number : P2968												
Easting (m) : 327200.9										Client : Landmark Group Construction Australia Pty Ltd												
Northing (m) : 6259255.4										Project : Macquarie Park												
Ground Elevation : 44.1 (m)										Location : 5 Halifax Street, Macquarie Park												
Total Depth : 30.22 m BGL										Loc Comment :												
Drill Rig : GEO305 - Comacchio																						
Driller Supplier : MATRIX DRILLING																						
Logged By : Mark Peach																						
Reviewed By : Alan Morrow																						
Date : 10/08/2023																						
Drilling Method	Water	Well Diagram	RQD% and TCR%	Testing	Estimated Strength	Weathering	Depth (m)	Elevation (m)	Graphic Log	Classification Code	Material Description	Defect Spacing (mm)	Defect Depth	Defect Description								
				Is(50)																		
NMLC Coring	0% Water Loss		50mm RQD = 99% TCR = 100%		VLS LS MS HS VHS EHS	SW		38.4		SST	rock SANDSTONE: slightly weathered, high strength, grey orange, fine to medium grained, (massive, iron stained minor clay coating on bedding partings).	30										
														100								
					</																	

Morrow Geotechnics				Geotechnical Log - Borehole											
Bellambi, NSW				BH3											
Phone: 0405 843 933															
UTM : 56H				Drill Rig : GEO305 - Comacchio				Job Number : P2968							
Easting (m) : 327200.9				Driller Supplier : MATRIX DRILLING				Client : Landmark Group Construction Australia Pty Ltd							
Northing (m) : 6259255.4				Logged By : Mark Peach				Project : Macquarie Park							
Ground Elevation : 44.1 (m)				Reviewed By : Alan Morrow				Location : 5 Halifax Street, Macquarie Park							
Total Depth : 30.22 m BGL				Date : 10/08/2023				Loc Comment :							
Drilling Method	Water	Well Diagram	RQD% and TCR%	Testing	Estimated Strength	Weathering	Depth (m)	Elevation (m)	Graphic Log	Classification Code	Material Description	Defect Spacing (mm)	Defect Depth	Defect Description	
				Is(50)											type, inclination, planarity, roughness, coating, thickness
NMLC Coring	0% Water Loss		RQD = 83% TCR = 100%		VLS LS MS HS VHS EHS	MW		32.4		SST	As above, but moderately , orange, (massive, iron stained).				
				d: 1.81, a: 2.06			13	31.1							13
				d: 1.83, a: 1.82											
							13.6								
							14	30.1							14
				d: 0.8, a: 2.06											
							14								
							15	29.1							15
				d: 2.04, a: 2.3											
					F				SST	As above, but fresh , (massive, sub horizontal bedding partings).			14.03, P, clay coating , IR, CT, OP		
														14.1, P, 3° , , IR, CL, O	
														14.11-14.12, IS, shale inclusion , 2° , , IR, CL	
														14.14, P, clay coating 3° , , IR, CT, OP	
														14.22, P, 6° , RO, CV, CL, OP	
														14.26, P, 6° , RO, CV, CL, OP	
														14.31, P, 5° , , CV, CL, OP	
														14.37, P, 5° , RO, CV, CL, OP	
														14.42, P, 5° , , CV, CL, OP	
														14.73, P, RO, PL, CL, OP	
													15, P, 8° , RO, PL, CL, OP		
													15.15, P, 8° , , PL, CL, OP		

Page 4 of 6

Morrow Geotechnics										Geotechnical Log - Borehole														
Bellambi, NSW										BH3														
Phone: 0405 843 933																								
UTM : 56H					Drill Rig : GEO305 - Comacchio					Job Number : P2968														
Easting (m) : 327200.9					Driller Supplier : MATRIX DRILLING					Client : Landmark Group Construction Australia Pty Ltd														
Northing (m) : 6259255.4					Logged By : Mark Peach					Project : Macquarie Park														
Ground Elevation : 44.1 (m)					Reviewed By : Alan Morrow					Location : 5 Halifax Street, Macquarie Park														
Total Depth : 30.22 m BGL					Date : 10/08/2023					Loc Comment :														
Drilling Method	Water	Well Diagram	RQD% and TCR%	Testing		Estimated Strength	Weathering	Depth (m)	Elevation (m)	Graphic Log	Classification Code	Material Description	Defect Spacing (mm)	Defect Depth	Defect Description									
				Is(50)																				
NMLC Coring	0% Water Loss		RQD = 100% TCR = 100%				F		20.4		SST	rock SANDSTONE: fresh weathered, high strength, light grey, fine to medium grained, (massive).	30		24.5 P, 5°, RO, PL, CL, OP									
			RQD = 96% TCR = 100%												27.07-27.09, P, shale nodule (20mm x 45mm), 10°, RO, IR, CL, C									
															27.17, P, 8°, RO, PL, CL, OP									
			</																					

Page 6 of 6

morrow

CLIENT NAME: LANDMARK GROUP
PROJECT: MACQUARIE PARK
LOCATION: 5 HALIFAX STREET
JOB NUMBER: P2968
LOGGED BY: MP

BOREHOLE ID: BH3
DEPTH: 1.07m to 6.0m
CORE TRAY NO: Box 1 of 6
DATE: 10/08/23



morrow



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Bellambi, NSW



info@morrowgeo.com.au

Photo description

BH3 - Tray 1 of 6

Client

Landmark Group Construction Australia Pty Ltd

Location

5 Halifax Street, Macquarie Park

Project name

Macquarie Park

Project No

P2968

Scale

Not to Scale

BH No

BH3

BH Depth

CorePhoto

morrow

CLIENT NAME: LANDMARK GROUP
PROJECT: MACQUARIE PARK
LOCATION: 5 HALIFAX STREET
JOB NUMBER: P2968
LOGGED BY: MP

BOREHOLE ID: BH3
DEPTH: 6.0m to 11.0m
CORE TRAY NO: Box 2 of 6
DATE: 10/08/23



morrow



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Bellambi, NSW



info@morrowgeo.com.au

Photo description

BH3 - Tray 2 of 6

Client

Landmark Group Construction Australia Pty Ltd

Location

5 Halifax Street, Macquarie Park

Project name

Macquarie Park

Project No

P2968

Scale

Not to Scale

BH No

BH3

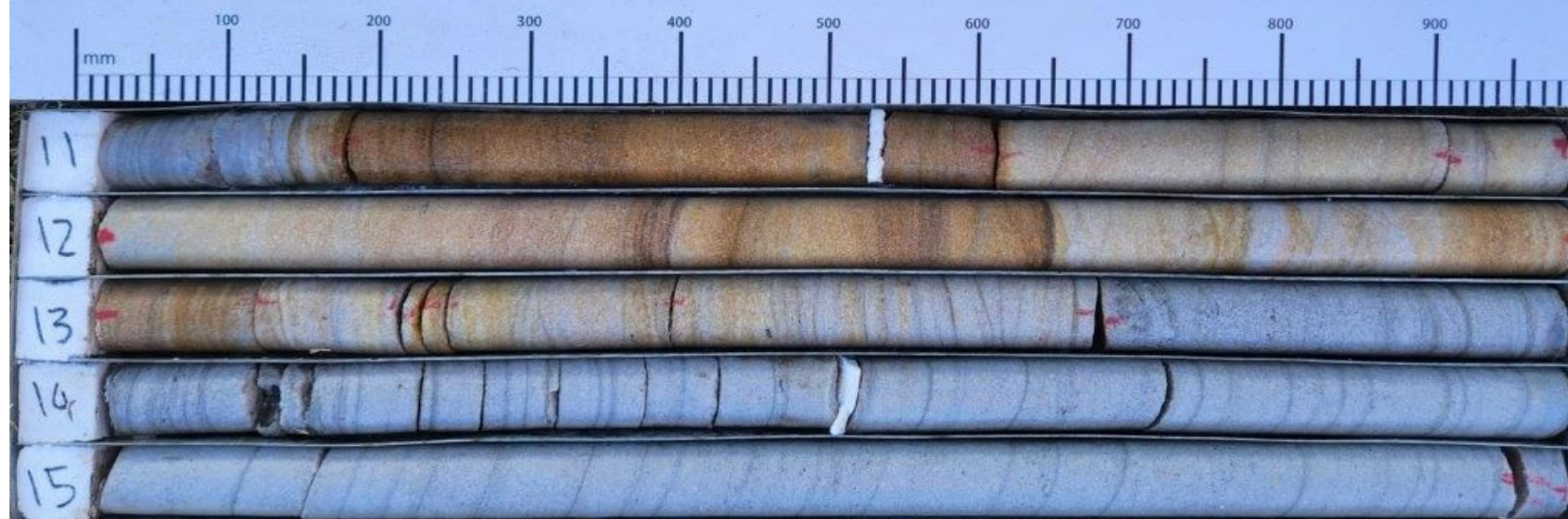
BH Depth

CorePhoto

morrow

CLIENT NAME: LANDMARK GROUP
PROJECT: MACQUARIE PARK
LOCATION: 5 HALIFAX STREET
JOB NUMBER: P2968
LOGGED BY: MP

BOREHOLE ID: BH3
DEPTH: 11.0m to 16.0m
CORE TRAY NO: Box 3 of 6
DATE: 10/08/23



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Bellambi, NSW



info@morrowgeo.com.au

Photo description

BH3 - Tray 3 of 6

Client

Landmark Group Construction Australia Pty Ltd

Location

5 Halifax Street, Macquarie Park

Project name

Macquarie Park

Project No

P2968

Scale

Not to Scale

BH No

BH3

BH Depth

CorePhoto

morrow

CLIENT NAME: LANDMARK GROUP
PROJECT: MACQUARIE PARK
LOCATION: 5 HALIFAX STREET
JOB NUMBER: P2968
LOGGED BY: MP

BOREHOLE ID: BH3
DEPTH: 16.0m to 21.0m
CORE TRAY NO: Box 4 of 6
DATE: 11/08/23



0405 843 933



Bellambi, NSW



info@morrowgeo.com.au

Photo description

BH3 - Tray 4 of 6

Client

Landmark Group Construction Australia Pty Ltd

Location

5 Halifax Street, Macquarie Park

Project name

Macquarie Park

Project No

P2968

Scale

Not to Scale

BH No

BH3

BH Depth

CorePhoto

morrow

CLIENT NAME: LANDMARK GROUP

PROJECT: MACQUARIE PARK

LOCATION: 5 HALIFAX STREET

JOB NUMBER: P2968

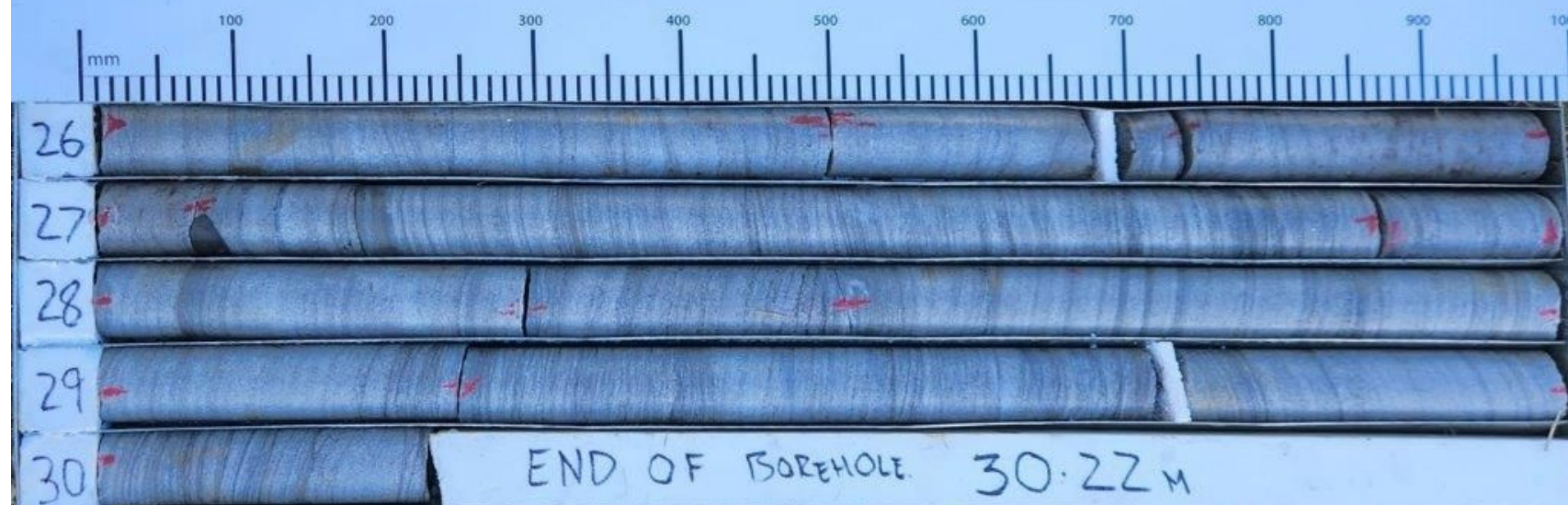
LOGGED BY: MP

BOREHOLE ID: BH3

DEPTH: 26.0m to 30.22m

CORE TRAY NO: Box 6 of 6

DATE: 11/08/23



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Photo description

BH3 - Tray 5 of 6

Client

Landmark Group Construction Australia Pty Ltd

Location

5 Halifax Street, Macquarie Park

Project name

Macquarie Park

Project No

P2968

Scale

Not to Scale

BH No

BH3

BH Depth

CorePhoto

morrow

CLIENT NAME: LANDMARK GROUP

PROJECT: MACQUARIE PARK

LOCATION: 5 HALIFAX STREET

JOB NUMBER: P2968

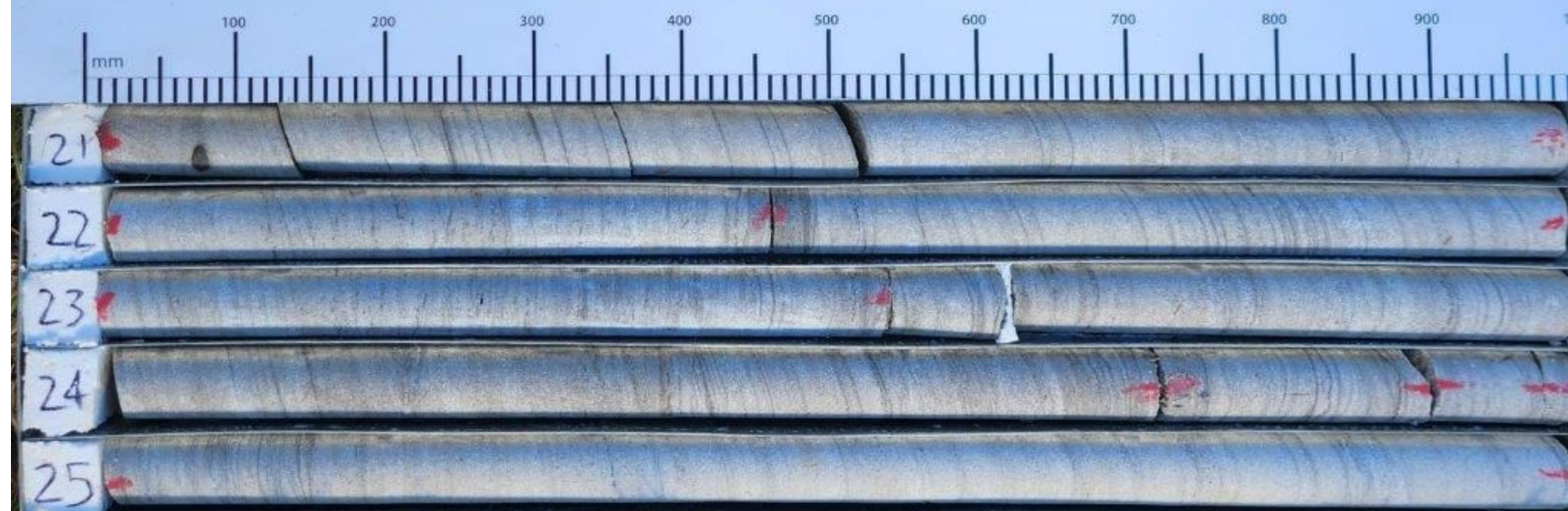
LOGGED BY: MP

BOREHOLE ID: BH3

DEPTH: 21.0m to 26.0m

CORE TRAY NO: Box 5 of 6

DATE: 11/08/23



morrow



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Bellambi, NSW



info@morrowgeo.com.au

Photo description

BH3 - Tray 6 of 6

Client

Landmark Group Construction Australia Pty Ltd

Location

5 Halifax Street, Macquarie Park

Project name

Macquarie Park

Project No

P2968

Scale

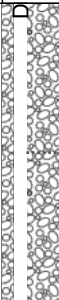
Not to Scale

BH No

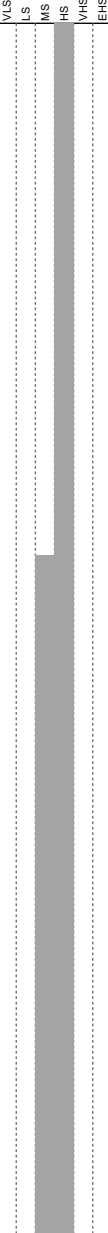
BH3

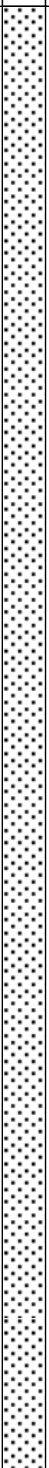
BH Depth

CorePhoto

Morrow Geotechnics			Geotechnical Log - Borehole									
Bellambi, NSW			BH4									
Phone: 0405 843 933												
UTM : 56H			Drill Rig : GEO305 - Comacchio			Job Number : P3006						
Easting (m) : 327183.7			Driller Supplier : MATRIX DRILLING			Client : Landmark Group Construction Australia Pty Ltd						
Northing (m) : 6259255.4			Logged By : Mark Peach			Project : Macquarie Park						
Ground Elevation : 39.7 (m)			Reviewed By : Alan Morrow			Location : 3 Halifax Street, Macquarie Park						
Total Depth : 20.41 m BGL			Date : 17/08/2023			Loc Comment :						
Drilling Method	Water	Well Diagram	Testing	Soil Origin	Graphic Log	Classification Code	Depth (m)	Elevation (m)	Material Description	Consistency/Density	Moisture	
			DCP									
ADT			2 HB			CL-CI	0.05	39.7	Topsoil sandy CLAY (CL-CI) : soft, low to medium plasticity, brown, fine grained sand, trace fine sized gravel, w < pl. Rock SANDSTONE: moderately weathered, low to medium strength, grey orange, fine to medium grained, (high resistance).	S LS-MS	w < PL D	
						SST	1	38.7				
							2	37.7	1.14m : Commenced NMLC Coring;			
							3	36.7				
							4	35.7				
							5	34.7				

Morrow Geotechnics				Geotechnical Log - Borehole												
Bellambi, NSW				BH4												
Phone: 0405 843 933																
UTM : 56H				Drill Rig : GEO305 - Comacchio				Job Number : P3006								
Easting (m) : 327183.7				Driller Supplier : MATRIX DRILLING				Client : Landmark Group Construction Australia Pty Ltd								
Northing (m) : 6259255.4				Logged By : Mark Peach				Project : Macquarie Park								
Ground Elevation : 39.7 (m)				Reviewed By : Alan Morrow				Location : 3 Halifax Street, Macquarie Park								
Total Depth : 20.41 m BGL				Date : 17/08/2023				Loc Comment :								
Drilling Method	Water	Well Diagram	RQD% and TCR%	Testing		Estimated Strength	Weathering	Depth (m)	Elevation (m)	Graphic Log	Classification Code	Material Description	Defect Spacing (mm)	Defect Depth	Defect Description	
				Is(50)												
NMLC Coring	0% Water Loss		RQD = 100% TCR = 100%	Is(50)	Estimated Strength	Weathering	Depth (m)	Elevation (m)	Graphic Log	Classification Code	Material Description	Defect Spacing (mm)	Defect Depth	Defect Description		
			RQD = 93% TCR = 100%													

Morrow Geotechnics										Geotechnical Log - Borehole								
Bellambi, NSW										BH4								
Phone: 0405 843 933																		
UTM : 56H										Drill Rig : GEO305 - Comacchio		Job Number : P3006						
Easting (m) : 327183.7										Driller Supplier : MATRIX DRILLING		Client : Landmark Group Construction Australia Pty Ltd						
Northing (m) : 6259255.4										Logged By : Mark Peach		Project : Macquarie Park						
Ground Elevation : 39.7 (m)										Reviewed By : Alan Morrow		Location : 3 Halifax Street, Macquarie Park						
Total Depth : 20.41 m BGL										Date : 17/08/2023		Loc Comment :						
Drilling Method	Water	Well Diagram	RQD% and TCR%	Testing	Estimated Strength	Weathering	Depth (m)	Elevation (m)	Graphic Log	Classification Code	Material Description	Defect Spacing (mm)	Defect Depth	Defect Description				
				Is(50)														
NMLC Coring	0% Water Loss		RQD = 98% TCR = 100%			F		33.7		SST	rock SANDSTONE: fresh weathered, high strength, light grey, fine to medium grained, (generally massive, minor carbonaceous laminations).			6.27-6.29, IS, infilled extremely weathered sandstone, 6°, IR, CT,				
				d: 1.61, a: 1.73				7							32.7		7	6.81, P, 10°, RO, PL, CL, OP
																		7.19, P, carbonaceous staining, 4°, PL, STN OP
				d: 1.30, a: 1.01													7.21, P, carbonaceous staining, 3°, PL, STN OP	
																	7.6, P, carbonaceous staining, 2°, PL, STN OP	
			RQD = 98% TCR = 100%	d: 2.36, a: 2.41		SW-F	8	31.7		SST	As above, but slightly to fresh, medium to high strength, orange light grey, (massive).		8	9.21-9.23, P, sandy clay, 3°, PL,				
				d: 0.81, a: 1.68			9	30.7					9	9.76-9.77, IS, infilled shale, 6°, SO, UN, CL,				
							10	29.7					10	10.09-10.13, 3°, IR, CL, OP				
				d: 1.27, a: 1.38			10.6			SST	rock SANDSTONE: fresh weathered, high strength, grey, fine to medium grained, (massive, minor carbonaceous laminations and cross bedding).			10.51, P, clay coating 3°, PL, CT,				
						F	11	28.7					11	10.51-10.54, IS, clay infilled, 3°, CL,				
			RQD = 99% TCR = 100%	d: 1.55, a: 1.73										10.6-10.61, P, clay infilled, 3°, PL, CT,				
														11.81, P, clay coating 3°, RO, PL, CT, OP				

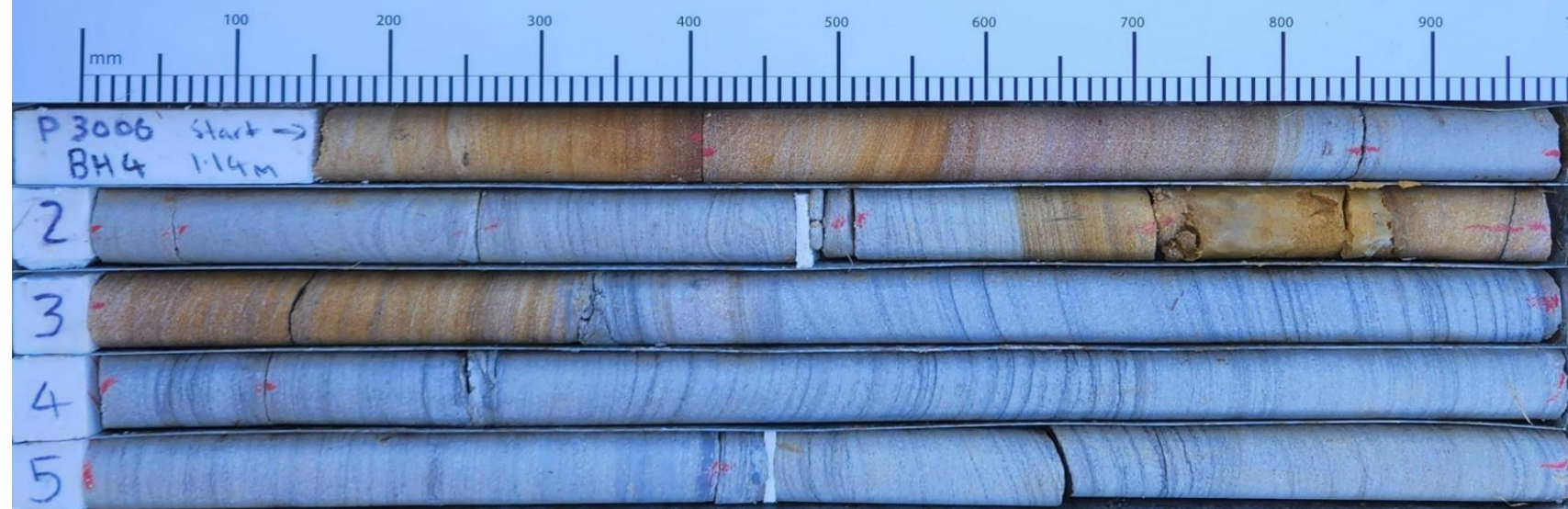
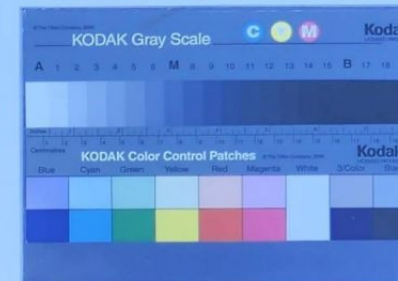
Morrow Geotechnics				Geotechnical Log - Borehole											
Bellambi, NSW				BH4											
Phone: 0405 843 933															
UTM : 56H				Drill Rig : GEO305 - Comacchio				Job Number : P3006							
Easting (m) : 327183.7				Driller Supplier : MATRIX DRILLING				Client : Landmark Group Construction Australia Pty Ltd							
Northing (m) : 6259255.4				Logged By : Mark Peach				Project : Macquarie Park							
Ground Elevation : 39.7 (m)				Reviewed By : Alan Morrow				Location : 3 Halifax Street, Macquarie Park							
Total Depth : 20.41 m BGL				Date : 17/08/2023				Loc Comment :							
Drilling Method	Water	Well Diagram	RQD% and TCR%	Testing	Estimated Strength	Weathering	Depth (m)	Elevation (m)	Graphic Log	Classification Code	Material Description	Defect Spacing (mm)	Defect Depth	Defect Description	
				Is(50)											type, inclination, planarity, roughness, coating, thickness
NMLC Coring	0% Water Loss		RQD = 99% TCR = 100%					27.7		SST	rock SANDSTONE: fresh weathered, high strength, grey, fine to medium grained, (massive, minor carbonaceous laminations and cross bedding).	30		—15.21, P, 7°, PL, CL, OP	
								100							
				d: 1.80, a: 2.01				13				26.7	13		
				d: 1.75, a: 1.82				14				25.7	14		
				d: 1.14, a: 1.07				15				24.7	15		
				d: 1.63, a: 0.77				16				23.7	16		
						</									

Morrow Geotechnics										Geotechnical Log - Borehole									
Bellambi, NSW										BH4									
Phone: 0405 843 933																			
UTM : 56H										Job Number : P3006									
Easting (m) : 327183.7										Client : Landmark Group Construction Australia Pty Ltd									
Northing (m) : 6259255.4										Project : Macquarie Park									
Ground Elevation : 39.7 (m)										Location : 3 Halifax Street, Macquarie Park									
Total Depth : 20.41 m BGL										Loc Comment :									
Drill Rig : GEO305 - Comacchio																			
Driller Supplier : MATRIX DRILLING																			
Logged By : Mark Peach																			
Reviewed By : Alan Morrow																			
Date : 17/08/2023																			
Drilling Method	Water	Well Diagram	RQD% and TCR%	Testing	Estimated Strength	Weathering	Depth (m)	Elevation (m)	Graphic Log	Classification Code	Material Description	Defect Spacing (mm)	Defect Depth	Defect Description					
				Is(50)	VLS LS MS HS VHS EHS														
NMLC Coring	0% Water Loss		RQD = 100% TCR = 100%			F		21.7		SST	rock SANDSTONE: fresh weathered, high strength, grey, fine to medium grained, (massive, minor carbonaceous laminations and cross bedding).			18.1-18.13, IS, infilled shale nodule, 4", SO, IR, CL,					
						F	19	20.7		SST	rock SANDSTONE: fresh weathered, high strength, grey, fine grained, (thin sub-horizontal laminations).			19.38, P, 2", RO, PL, CL, OP					
						F	19.3	19.3		SST	rock SANDSTONE: fresh weathered, high strength, grey, fine to medium grained, (massive).			19.78, P, 2", RO, PL, CL, OP					
							20	19.7		SST									

morrow

CLIENT NAME: LANDMARK GROUP
PROJECT: MACQUARIE PARK
LOCATION: 5 HALIFAX STREET
JOB NUMBER: P3006
LOGGED BY: MP

BOREHOLE ID: BH4
DEPTH: 1.14m to 6.0m
CORE TRAY NO.: Box 1 of 4
DATE: 17-08-23



morrow



0405 843 933



Bellambi, NSW



info@morrowgeo.com.au

Photo description

BH4 - Tray 1 of 4

Client

Landmark Group Construction Australia Pty Ltd

Location

5 Halifax Street, Macquarie Park

Project name

Macquarie Park

Project No

P3006

Scale

Not to Scale

BH No

BH4

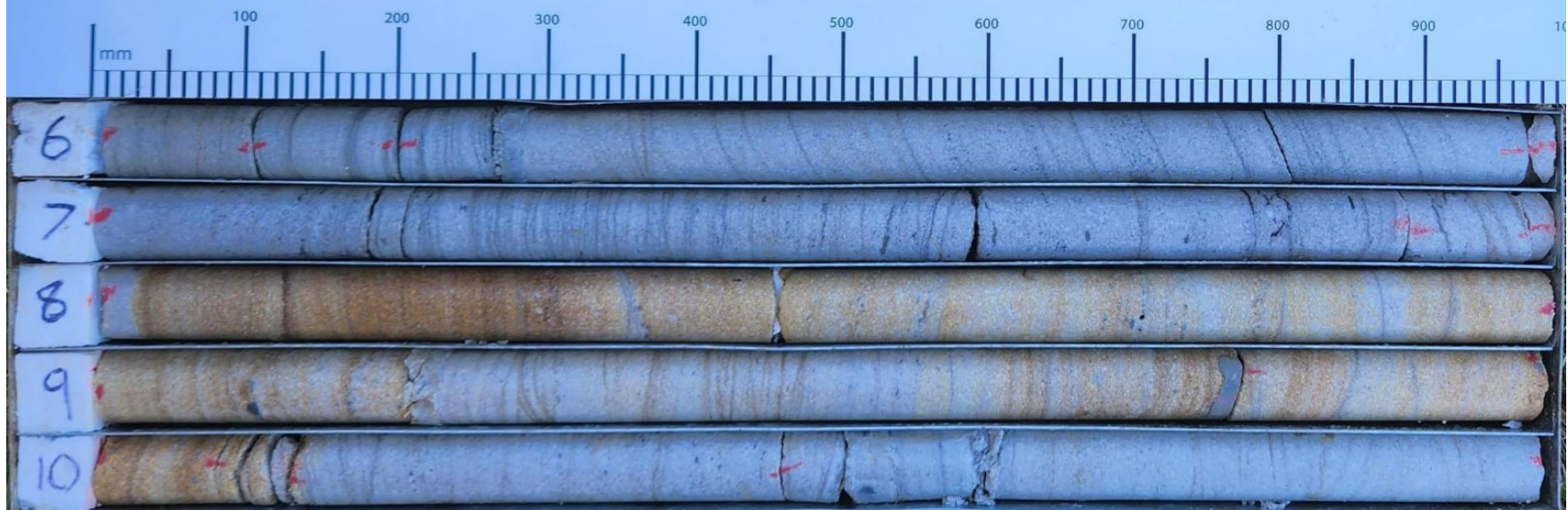
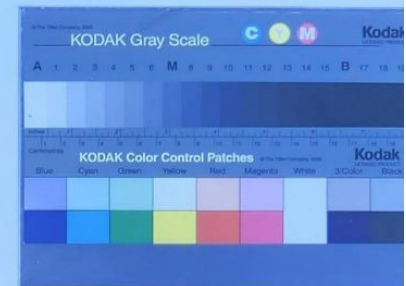
BH Depth

CorePhoto

morrow

CLIENT NAME: LANDMARK GROUP
PROJECT: MACQUARIE PARK
LOCATION: 5 HALIFAX STREET
JOB NUMBER: P3006
LOGGED BY: MP

BOREHOLE ID: BH4
DEPTH: 6.0m to 11.0m
CORE TRAY NO.: Box 2 of 4
DATE: 17-08-23



morrow



0405 843 933



Bellambi, NSW



info@morrowgeo.com.au

Photo description

BH4 - Tray 2 of 4

Client

Landmark Group Construction Australia Pty Ltd

Location

5 Halifax Street, Macquarie Park

Project name

Macquarie Park

Project No

P3006

Scale

Not to Scale

BH No

BH4

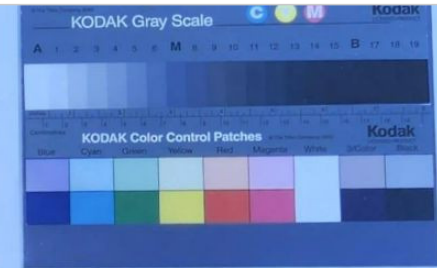
BH Depth

CorePhoto

morrow

CLIENT NAME: LANDMARK GROUP
PROJECT: MACQUARIE PARK
LOCATION: 5 HALIFAX STREET
JOB NUMBER: P3006
LOGGED BY: MP

BOREHOLE ID: BH4
DEPTH: 11.0m to 16.0m
CORE TRAY NO.: Box 3 of 4
DATE: 17.08.23



0405 843 933



Bellambi, NSW



info@morrowgeo.com.au

Photo description

BH4 - Tray 3 of 4

Client

Landmark Group Construction Australia Pty Ltd

Location

5 Halifax Street, Macquarie Park

Project name

Macquarie Park

Project No

P3006

Scale

Not to Scale

BH No

BH4

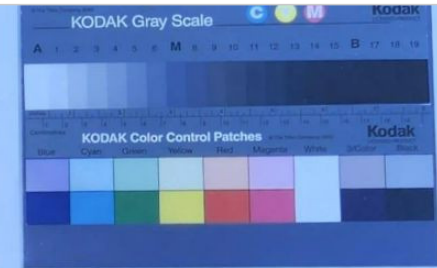
BH Depth

CorePhoto

morrow

CLIENT NAME: LANDMARK GROUP
PROJECT: MAQUARIE PARK
LOCATION: 5 HALIFAX STREET
JOB NUMBER: P3006
LOGGED BY: MP

BOREHOLE ID: BH4
DEPTH: 11.0m to 16.0m
CORE TRAY NO.: Box 3 of 4
DATE: 17.08.23



0405 843 933



Bellambi, NSW



info@morrowgeo.com.au

Photo description

BH4 - Tray 3 of 4

Client

Landmark Group Construction Australia Pty Ltd

Location

5 Halifax Street, Macquarie Park

Project name

Macquarie Park

Project No

P3006

Scale

Not to Scale

BH No

BH4

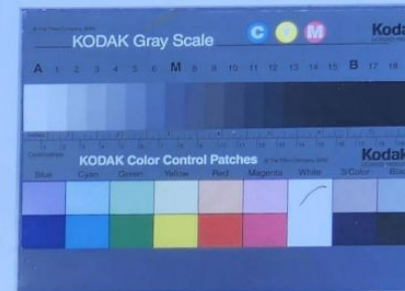
BH Depth

CorePhoto

morrow

CLIENT NAME: LANDMARK GROUP
PROJECT: MACQUARIE PARK
LOCATION: 5 HALIFAX STREET
JOB NUMBER: P3006
LOGGED BY: MP

BOREHOLE ID: BH4
DEPTH: 16.0 m to 20.41 m
CORE TRAY NO.: Box 4 of 4
DATE: 17.08.23



0405 843 933



Bellambi, NSW



info@morrowgeo.com.au

Photo description

BH4 - Tray 4 of 4

Client

Landmark Group Construction Australia Pty Ltd

Location

5 Halifax Street, Macquarie Park

Project name

Macquarie Park

Project No

P3006

Scale

Not to Scale

BH No

BH4

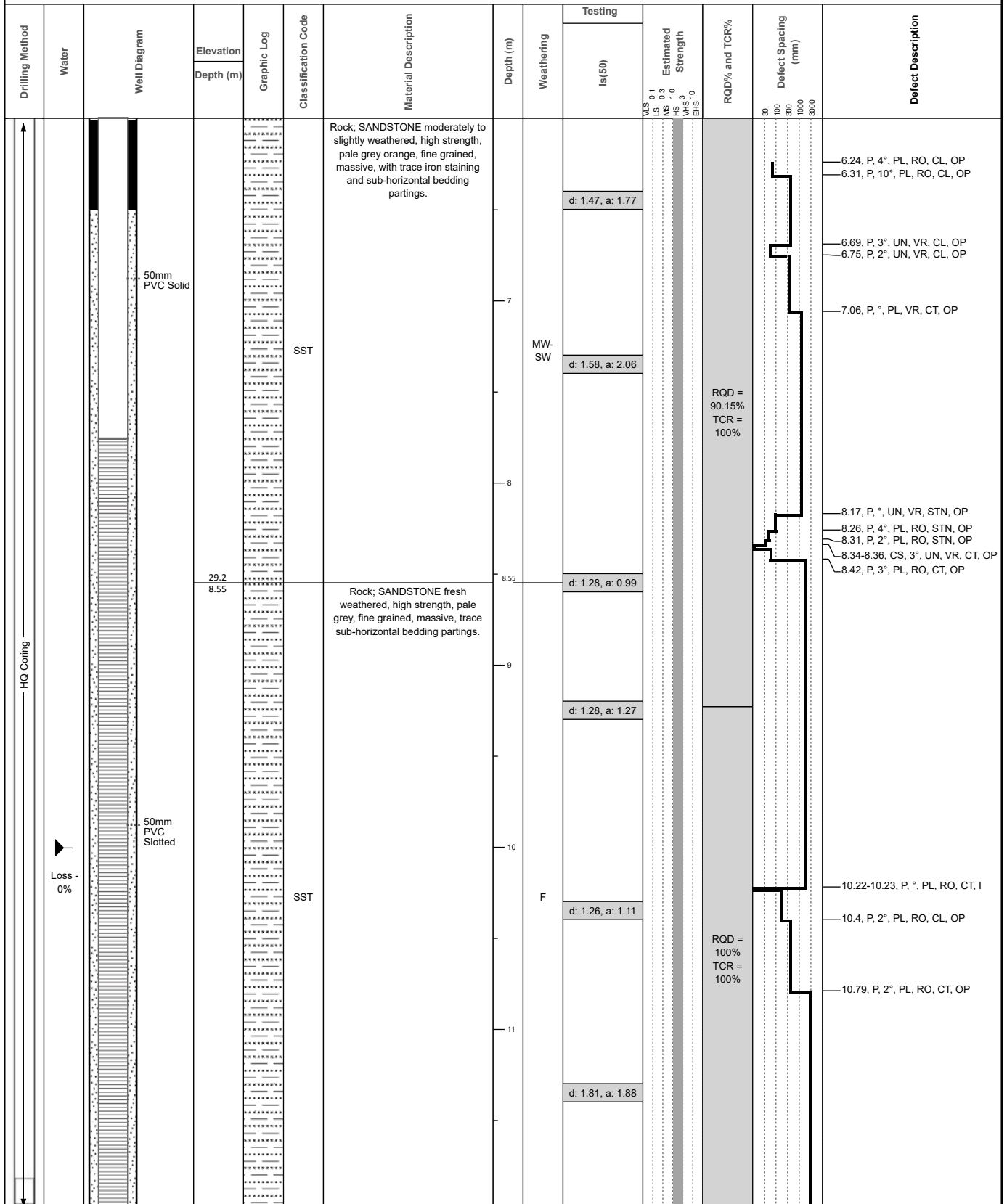
BH Depth

CorePhoto

UTM : 56H	Driller Rig : Hanjin DB-8	Job Number : P3006
Easting : 327251.80	Driller Supplier : BG Drilling	Client : Landmark Group Construction Australia Pty Ltd
Northing : 6259661.09	Logged By : Mark Peach	Project : Macquarie Park
RL : 37.8(m)	Reviewed By : Rhiannon McKeon	Location : 3 Halifax Street, Macquarie Park NSW
Total Depth : 55.76 m	Date : 28/05/2025	Loc Comment :

Drilling Method	Water	Well Diagram	Testing		Graphic Log	Material Type	Classification Code	Material Description	Depth (m)	Consistency	Weathering	Moisture	
			SPT	Elevation									
				Depth (m)									
								SANDY CLAY firm, medium plasticity, medium grained sand, brown grey orange, with fine to medium gravel, w = pl to w < pl sandstone gravels, low resistance.	1	F		w < PL	
			4,6,8 (N=14)										
				36.5 1.3									
			8 (N=16) Hard Bounce	36.2 1.6									
				35.8 2									
								SANDY CLAY stiff, medium plasticity, fine to medium grained sand, grey red, with fine gravel, w = pl with sandstone gravels, low resistance.	1.3	St		w ≈ PL	
								Rock; SANDSTONE highly to moderately weathered, medium strength, white red, fine grained, medium resistance.	1.6	MS	HW-MW	D	
								Rock; SANDSTONE slightly to moderately weathered, medium strength, pale grey with pale orange, fine grained, medium to high resistance.	2				

UTM : 56H	Driller Rig : Hanjin DB-8	Job Number : P3006
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Northing : 6259661.09	Logged By : Mark Peach	Project : Macquarie Park
RL : 37.8(m)	Reviewed By : Rhiannon McKeon	Location : 3 Halifax Street, Macquarie Park NSW
Total Depth : 55.76 m	Date : 28/05/2025	Loc Comment :

Drilling Method	Water	Well Diagram	Elevation	Graphic Log	Classification Code	Material Description	Depth (m)	Weathering	Testing		Estimated Strength	RQD% and TCR%	Defect Spacing (mm)	Defect Description									
			Depth (m)						Is(50)														
HQ Coring	Loss - 0%	50mm PVC Slotted			SST	Rock; SANDSTONE fresh weathered, high strength, pale grey, fine grained, massive, trace sub-horizontal bedding partings.		F		d: 2.02, a: 2.26	MS 0.1 LS 0.3 MS 1.0 PS 3 BS 10	RQD = 100% TCR = 100%	30 100 300 1000 3000										

UTM : 56H	Driller Rig : Hanjin DB-8	Job Number : P3006
Easting : 327251.80	Driller Supplier : BG Drilling	Client : Landmark Group Construction Australia Pty Ltd
Northing : 6259661.09	Logged By : Mark Peach	Project : Macquarie Park
RL : 37.8(m)	Reviewed By : Rhiannon McKeon	Location : 3 Halifax Street, Macquarie Park NSW
Total Depth : 55.76 m	Date : 28/05/2025	Loc Comment :

Drilling Method	Water	Well Diagram	Elevation Depth (m)	Graphic Log	Classification Code	Material Description	Depth (m)	Weathering	Testing		RQD% and TCR%	Defect Spacing (mm)	Defect Description
									Is (50)	Estimated Strength			
HQ Coring	Loss - 0%	50mm PVC Slotted		SST		Rock; SANDSTONE fresh weathered, high strength, pale grey, fine grained, massive, trace sub-horizontal bedding partings.	19	F	d: 0.99, a: 1.68	MS 0.1 US 0.3 HS 1.0 VHS 3 EHS 10	RQD = 100% TCR = 100%		18.96-19, IS, 12°, UN, RO, CL, I, infilled siltstone
	Loss - 0%								d: 1.04, a: 1.95				
HQ Coring	Loss - 0%	50mm PVC Slotted		SST		Rock; SANDSTONE fresh weathered, high strength, pale grey, fine grained, massive, trace sub-horizontal bedding partings.	20	F	d: 1.12, a: 1.32		RQD = 100% TCR = 100%		20.07, P, °, PL, RO, CL, OP
	Loss - 0%								d: 1.04, a: 1.53				
HQ Coring	Loss - 0%	50mm PVC Slotted		SST		Rock; SANDSTONE fresh weathered, high strength, pale grey, fine grained, massive, trace sub-horizontal bedding partings.	21	F	d: 1.00, a: 1.25		RQD = 100% TCR = 100%		22.33, P, 3°, PL, RO, CT, OP, With clay coating
	Loss - 0%								d: 1.18, a: 1.32				
HQ Coring	Loss - 0%	50mm PVC Slotted		SST		Rock; SANDSTONE fresh weathered, high strength, pale grey, fine grained, massive, trace sub-horizontal bedding partings.	22	F			RQD = 100% TCR = 100%		23.35, P, 6°, PL, RO, CL, OP
	Loss - 0%												

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Easting : 327251.80	Driller Supplier : BG Drilling	Client : Landmark Group Construction Australia Pty Ltd
Northing : 6259661.09	Logged By : Mark Peach	Project : Macquarie Park
RL : 37.8(m)	Reviewed By : Rhiannon McKeon	Location : 3 Halifax Street, Macquarie Park NSW
Total Depth : 55.76 m	Date : 28/05/2025	Loc Comment :

Drilling Method	Water	Well Diagram	Elevation Depth (m)	Graphic Log	Classification Code	Material Description	Depth (m)	Weathering	Testing		RQD% and TCR%	Defect Spacing (mm)	Defect Description
									Is(50)	Estimated Strength MS 0.1 LS 0.3 HS 1.0 VHS 3 EHS 10			
					SST	Rock; SANDSTONE fresh weathered, high strength, pale grey, fine grained, massive, trace sub-horizontal bedding partings.					RQD = 100% TCR = 100%		—24.08, P, 3°, PL, RO, CT, OP, With clay coating.
							25		d: 1.18, a: 1.51				
							26		d: 1.48, a: 1.17		RQD = 100% TCR = 100%		
							27	F	d: 1.17, a: 1.45				—26.69, P, 3°, PL, SO, CL, OP
							28		d: 0.72, a: 1.41				—27.66, P, 2°, UN, RO, CT, OP, clay coating —28.03, P, 10°, PL, RO, CL, OP
							29		d: 1.18, a: 1.18		RQD = 100% TCR = 100%		—29.33, P, 3°, PL, SO, CT, OP, With clay coating.

UTM : 56H	Driller Rig : Hanjin DB-8	Job Number : P3006
Easting : 327251.80	Driller Supplier : BG Drilling	Client : Landmark Group Construction Australia Pty Ltd
Northing : 6259661.09	Logged By : Mark Peach	Project : Macquarie Park
RL : 37.8(m)	Reviewed By : Rhiannon McKeon	Location : 3 Halifax Street, Macquarie Park NSW
Total Depth : 55.76 m	Date : 28/05/2025	Loc Comment :

Drilling Method	Water	Well Diagram	Elevation Depth (m)	Graphic Log	Classification Code	Material Description	Depth (m)	Weathering	Testing		RQD% and TCR%	Defect Spacing (mm)	Defect Description
									Is(50)	Estimated Strength			
HQ Coring	Loss - 0%	50mm PVC Slotted	5.0 32.83	SST	SST	Rock; SANDSTONE fresh weathered, high strength, pale grey, fine grained, massive, trace sub-horizontal bedding partings.	31	F	d: 0.82, a: 1.81	MS 0.1 US 0.3 HS 1.0 VHS 3 EHS 10	RQD = 100% TCR = 100%	30 100 300 1000 3000	
									d: 1.77, a: 1.73				
									d: 1.09, a: 1.15				
									d: 1.56, a: 1.85				
HQ Coring	Loss - 0%	50mm PVC Slotted	4.1 33.72	SST	SST	As above, but: pale grey grey, medium to coarse grained, massive with infilled claystone and carbonaceous staining.	33	F	d: 1.43, a: 1.39		RQD = 96.71% TCR = 100%	30 100 300 1000 3000	32.9, P, °, PL, SO, CL, OP 32.95, P, °, PL, RO, STN, OP, Carbonaceous Staining. 33.03, P, 3°, UN, VR, CL, OP 33.43, P, °, IR, VR, STN, OP, Carbonaceous Staining.
									d: 1.57, a: 1.61				

UTM : 56H	Driller Rig : Hanjin DB-8	Job Number : P3006
Easting : 327251.80	Driller Supplier : BG Drilling	Client : Landmark Group Construction Australia Pty Ltd
Northing : 6259661.09	Logged By : Mark Peach	Project : Macquarie Park
RL : 37.8(m)	Reviewed By : Rhiannon McKeon	Location : 3 Halifax Street, Macquarie Park NSW
Total Depth : 55.76 m	Date : 28/05/2025	Loc Comment :

Drilling Method	Water	Well Diagram	Elevation Depth (m)	Graphic Log	Classification Code	Material Description	Depth (m)	Weathering	Testing					RQD% and TCR%	Defect Spacing (mm)	Defect Description
									Is (50)	MS 0.1	US 0.3	Estimated Strength	MS 1.0			
HQ Coring	Loss - 0%	50mm PVC Slotted	-2.3 40.14	SST		Rock; SANDSTONE fresh weathered, high strength, pale grey, fine grained, massive, trace sub-horizontal bedding partings.			d: 1.26, a: 1.62					RQD = 100% TCR = 100%		
							37		d: 1.55, a: 2.05							
							38	F	d: 1.34, a: 1.30					RQD = 100% TCR = 100%		38.11, P, 2°, PL, RO, CL, OP 38.29, P, 4°, PL, RO, CL, OP
							39		d: 1.21, a: 1.31							
							40		d: 1.47, a: 2.70							
						As above, but: trace shale laminations and inclusions.	40.14									40.14, P, 2°, PL, RO, CL, OP 40.22, P, 2°, PL, RO, CL, OP
							41	F	d: 1.50, a: 1.57					RQD = 97.05% TCR = 100%		

UTM : 56H	Driller Rig : Hanjin DB-8	Job Number : P3006
Easting : 327251.80	Driller Supplier : BG Drilling	Client : Landmark Group Construction Australia Pty Ltd
Northing : 6259661.09	Logged By : Mark Peach	Project : Macquarie Park
RL : 37.8(m)	Reviewed By : Rhiannon McKeon	Location : 3 Halifax Street, Macquarie Park NSW
Total Depth : 55.76 m	Date : 28/05/2025	Loc Comment :

Drilling Method	Water	Well Diagram	Elevation Depth (m)	Graphic Log	Classification Code	Material Description	Depth (m)	Weathering	Testing		RQD% and TCR%	Defect Spacing (mm)	Defect Description
									Is(50)	Estimated Strength			
HQ Coring	Loss - 0%	50mm PVC Slotted	-4.4		SST	As above, but: trace shale laminations and inclusions.	42.15	T		MS 0.1 LS 0.3 HS 1.0 VHS 3 EHS 10	RQD = 97.05% TCR = 100%		
			42.15			Rock; SANDSTONE fresh weathered, high strength, pale grey, fine grained, massive, trace sub-horizontal bedding partings.			d: 1.68, a: 1.49				
							43						43.08, P, 2°, PL, RO, CT, OP
									d: 1.45, a: 1.92				
							44						
									d: 1.33, a: 1.31		RQD = 99.67% TCR = 100%		
							45	F					44.83, P, 5°, PL, RO, CT, OP
					SST				d: 1.27, a: 1.18				45.13, P, °, PL, RO, CL, OP
							46						
									d: 1.28, a: 1.18				
							47				RQD = 100% TCR = 100%		46.75, P, °, PL, RO, CL, OP
									d: 0.58, a: 1.23				

UTM : 56H	Driller Rig : Hanjin DB-8	Job Number : P3006
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Northing : 6259661.09	Logged By : Mark Peach	Project : Macquarie Park
RL : 37.8(m)	Reviewed By : Rhiannon McKeon	Location : 3 Halifax Street, Macquarie Park NSW
Total Depth : 55.76 m	Date : 28/05/2025	Loc Comment :

Drilling Method	Water	Well Diagram	Elevation Depth (m)	Graphic Log	Classification Code	Material Description	Depth (m)	Weathering	Testing		RQD% and TCR%	Defect Spacing (mm)	Defect Description
									Is(50)	Estimated Strength			
HQ Coring	Loss - 0%	50mm PVC Slotted	-11.8	SST	Rock; SANDSTONE fresh weathered, high strength, pale grey, fine grained, massive, trace sub-horizontal bedding partings.	F	49	F	d: 1.35, a: 1.65	MS 0.1 US 0.3 HS 1.0 VHS 3 EHS 10	RQD = 100% TCR = 100%	30 100 300 1000 3000	48.28, P, ", UN, RO, CT, OP
			49.6				49.6		d: 1.44, a: 1.53				
HQ Coring	Loss - 0%	50mm PVC Slotted		SHA	Rock; SHALE fresh weathered, high strength, dark grey, fine grained, trace interbedded sandstone.	F	50	F	d: 0.51, a: 1.28		RQD = 100% TCR = 100%	30 100 300 1000 3000	49.6, P, 3", UN, RO, CL, OP
							51		d: 0.50, a: 2.01				
HQ Coring	Loss - 0%	50mm PVC Slotted		SHA	Rock; SHALE fresh weathered, high strength, dark grey, fine grained, trace interbedded sandstone.	F	52	F	d: 0.68, a: 1.53		RQD = 100% TCR = 100%	30 100 300 1000 3000	49.6, P, 3", UN, RO, CL, OP
							53		d: 0.96, a: 1.28				

UTM : 56H	Driller Rig : Hanjin DB-8	Job Number : P3006
Easting : 327251.80	Driller Supplier : BG Drilling	Client : Landmark Group Construction Australia Pty Ltd
Northing : 6259661.09	Logged By : Mark Peach	Project : Macquarie Park
RL : 37.8(m)	Reviewed By : Rhiannon McKeon	Location : 3 Halifax Street, Macquarie Park NSW
Total Depth : 55.76 m	Date : 28/05/2025	Loc Comment :

Drilling Method	Water	Well Diagram	Elevation Depth (m)	Graphic Log	Classification Code	Material Description	Depth (m)	Weathering	Testing		RQD% and TCR%	Defect Spacing (mm)	Defect Description
									Is(50)	Estimated Strength			
					SHA	Rock: SHALE fresh weathered, high strength, dark grey, fine grained, trace interbedded sandstone.	55	F	d: 0.73, a: 1.99	MS 0.1 US 0.3 HS 1.0 VHS 3 EHS 10	RQD = 100% TCR = 100%		
									d: 0.73, a: 1.13				
						BH301 Reached Target Depth at 55.76m							

morrow

CLIENT NAME: LANDMARK GROUP PTY LTD

PROJECT: MACQUARIE PARK

LOCATION: LOT 2, 3 HALIFAX STREET

JOB NUMBER: P3006

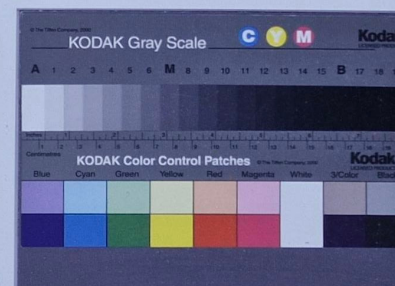
LOGGED BY: MP

BOREHOLE ID: BH 301

DEPTH: 6.0m to 10.0m

CORE TRAY NO.: Box 1

DATE: 28.05.25



morrow



02 8599 7579



Sydney Gadigal Land,
2/5-7 Malta Steet, Fairfield
East NSW 2155



info@morrowgeo.com.au

Photo description

BH301 Box 1 of 13

Client

Landmark Group Construction Australia Pty Ltd

Location

3 Halifax Street, Macquarie Park NSW

Project name

Macquarie Park

Project No

P3006

Scale

Not to Scale

BH No

BH301

BH Depth

6.0m to 10.0m

morrow

CLIENT NAME: LANDMARK GROUP PTY LTD

PROJECT: MACQUARIE PARK

LOCATION: LOT 2, 3 HALIFAX STREET

JOB NUMBER: P3006

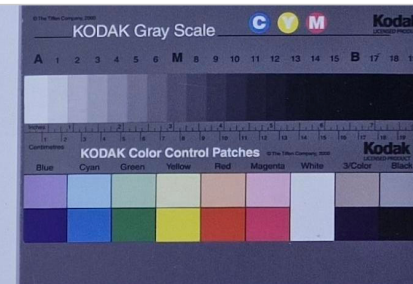
LOGGED BY: MP

BOREHOLE ID: BH301

DEPTH: 10.0m to 14.0m

CORE TRAY NO.: Box 2

DATE: 28.05.25



morrow



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Sydney Gadigal Land,
2/5-7 Malta Steet, Fairfield
East NSW 2155



info@morrowgeo.com.au

Photo description

BH301 Box 2 of 13

Client

Landmark Group Construction Australia Pty Ltd

Location

3 Halifax Street, Macquarie Park NSW

Project name

Macquarie Park

Project No

P3006

Scale

Not to Scale

BH No

BH301

BH Depth

10.0m to 14.0m

morrow

CLIENT NAME: LANDMARK GROUP PTY LTD

PROJECT: MACQUARIE PARK

LOCATION: 3 HALIFAX STREET

JOB NUMBER: P3006

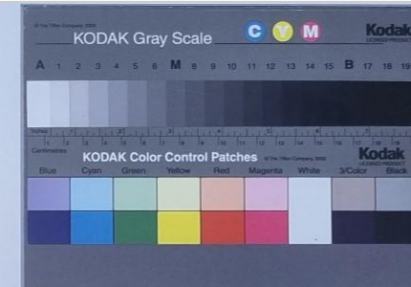
LOGGED BY: MP

BOREHOLE ID: BH301

DEPTH: 14.0m to 18.0m

CORE TRAY NO.: Box 3

DATE: 28.05.25



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Sydney Gadigal Land,
2/5-7 Malta Steet, Fairfield
East NSW 2155



info@morrowgeo.com.au

Photo description

BH301 Box 3 of 13

Client

Landmark Group Construction Australia Pty Ltd

Location

3 Halifax Street, Macquarie Park NSW

Project name

Macquarie Park

Project No

P3006

Scale

Not to Scale

BH No

BH301

BH Depth

14.0m to 18.0m

morrow

CLIENT NAME: LANDMARK GROUP PTY LTD

PROJECT: MACQUARIE PARK

LOCATION: 3 HALIFAX STREET

JOB NUMBER: P3006

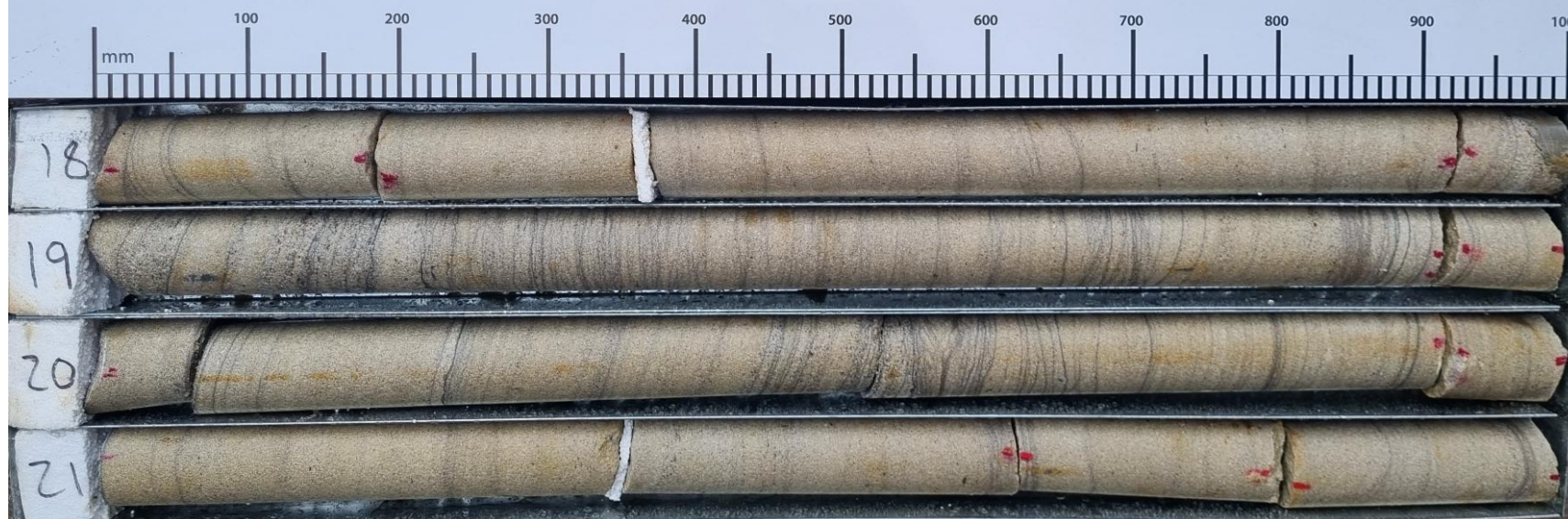
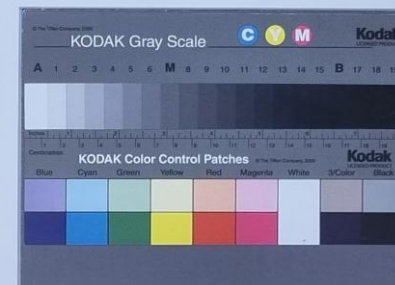
LOGGED BY: MP

BOREHOLE ID: BH301

DEPTH: 18.0-22.0m

CORE TRAY NO.: Box 4

DATE: 28.05.25



morrow



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Sydney Gadigal Land,
2/5-7 Malta Steet, Fairfield
East NSW 2155



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Photo description

BH301 Box 4 of 13

Client

Landmark Group Construction Australia Pty Ltd

Location

3 Halifax Street, Macquarie Park NSW

Project name

Macquarie Park

Project No

P3006

Scale

Not to Scale

BH No

BH301

BH Depth

18.0m to 22.0m

morrow

CLIENT NAME: LANDMARK GROUP PTY LTD

PROJECT: MACQUARIE PARK

LOCATION: 3 HALIFAX STREET

JOB NUMBER: P3006

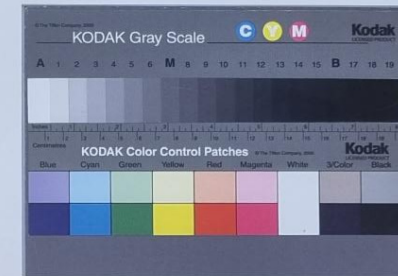
LOGGED BY: MP

BOREHOLE ID: BH301

DEPTH: 22.0 - 25.0m

CORE TRAY NO.: 5

DATE: 28/05/2025



morrow



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Sydney Gadigal Land,
2/5-7 Malta Steet, Fairfield
East NSW 2155



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Photo description

BH301 Box 5 of 13

Client

Landmark Group Construction Australia Pty Ltd

Location

3 Halifax Street, Macquarie Park NSW

Project name

Macquarie Park

Project No

P3006

Scale

Not to Scale

BH No

BH301

BH Depth

22.0m to 26.0m

morrow

CLIENT NAME: LANDMARK GROUP PTY LTD

PROJECT: MACQUARIE PARK

LOCATION: 3 HALIFAX STREET

JOB NUMBER: P3006

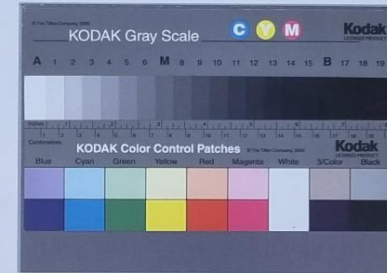
LOGGED BY: MP

BOREHOLE ID: BH301

DEPTH: 260 → 300 m

CORE TRAY NO.: 6

DATE: 28/05/2025



morrow



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Sydney Gadigal Land,
2/5-7 Malta Steet, Fairfield
East NSW 2155



info@morrowgeo.com.au

Photo description

BH301 Box 6 of 13

Client

Landmark Group Construction Australia Pty Ltd

Location

3 Halifax Street, Macquarie Park NSW

Project name

Macquarie Park

Project No

P3006

Scale

Not to Scale

BH No

BH301

BH Depth

26.0m to 30.0m

morrow

CLIENT NAME: LANDMARK GROUP

PROJECT: MACQUARIE PARK

LOCATION: 3 HALIFAX STREET

JOB NUMBER: P3006

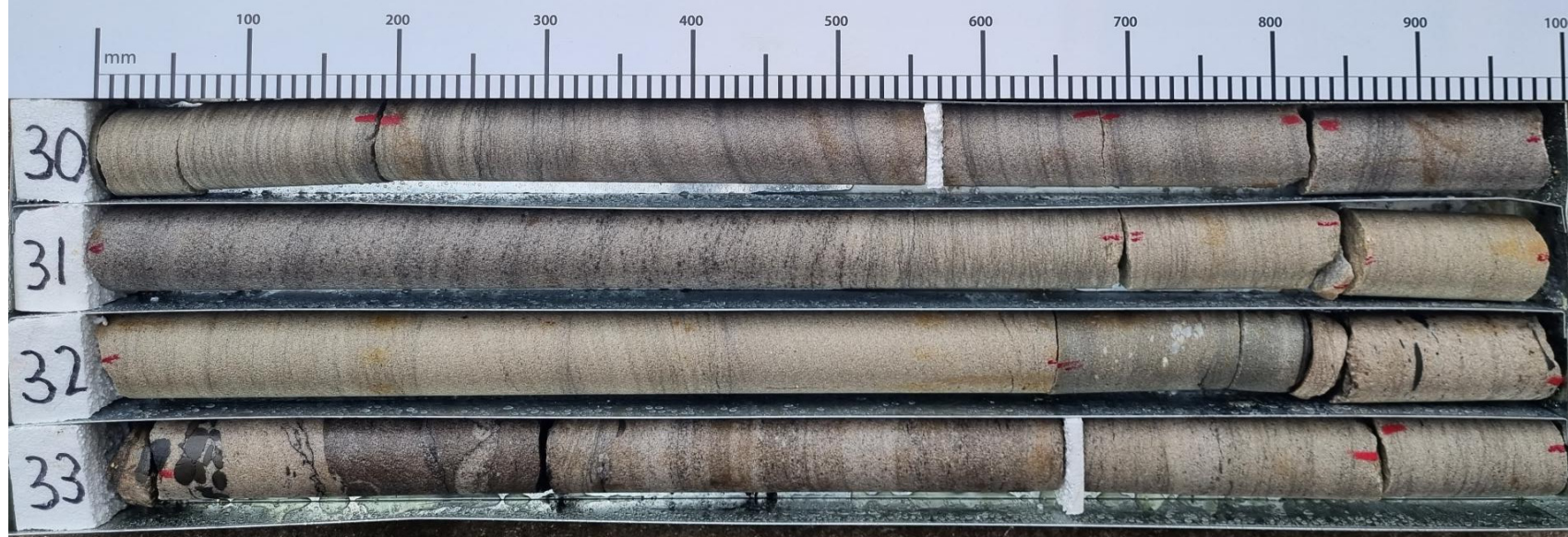
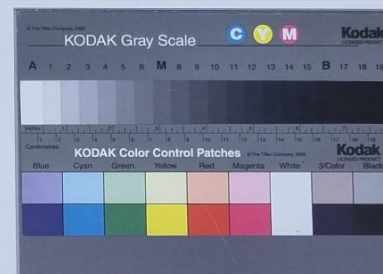
LOGGED BY: M.P.

BOREHOLE ID: BH301

DEPTH: 30 → 34 m

CORE TRAY NO.: 7

DATE: 28/05/2025



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Sydney Gadigal Land,
2/5-7 Malta Steet, Fairfield
East NSW 2155



info@morrowgeo.com.au

Photo description

BH301 Box 7 of 13

Client

Landmark Group Construction Australia Pty Ltd

Location

3 Halifax Street, Macquarie Park NSW

Project name

Macquarie Park

Project No

P3006

Scale

Not to Scale

BH No

BH301

BH Depth

30.0m to 34.0m

morrow

CLIENT NAME: LANDMARK GROUP

PROJECT: MACQUARIE PARK

LOCATION: 3 HALIFAX STREET

JOB NUMBER: P3006

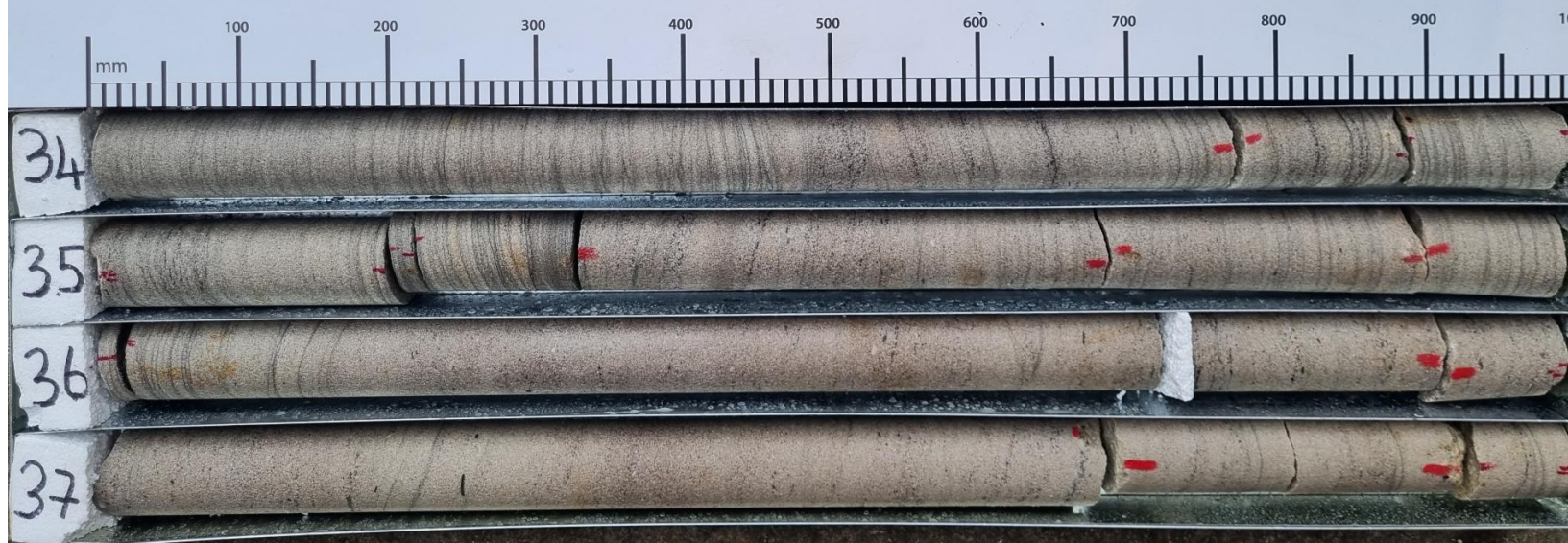
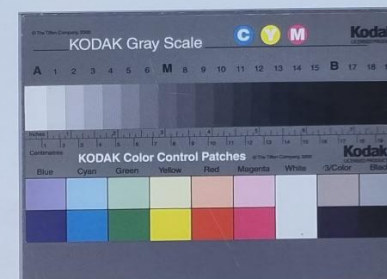
LOGGED BY: M.P.

BOREHOLE ID: BH301

DEPTH: 34.0 → 38.0m

CORE TRAY NO.: 8

DATE: 28/05/2025



morrow



02 8599 7579



Sydney Gadigal Land,
2/5-7 Malta Steet, Fairfield
East NSW 2155



info@morrowgeo.com.au

Photo description

BH301 Box 8 of 13

Client

Landmark Group Construction Australia Pty Ltd

Location

3 Halifax Street, Macquarie Park NSW

Project name

Macquarie Park

Project No

P3006

Scale

Not to Scale

BH No

BH301

BH Depth

34.0m to 38.0m

morrow

CLIENT NAME: LANDMARK GROUP

PROJECT: MACQUARIE PARK

LOCATION: 3 HALIFAX STREET

JOB NUMBER: P3006

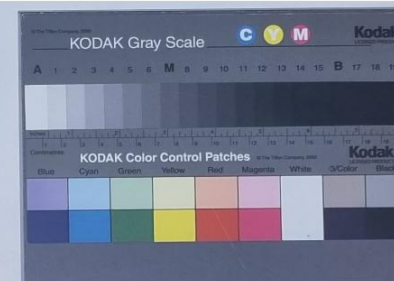
LOGGED BY: M.P.

BOREHOLE ID: BH301

DEPTH: 38.0 → 42.0m

CORE TRAY NO.: 9

DATE: 28/05/2025



morrow



02 8599 7579



Sydney Gadigal Land,
2/5-7 Malta Steet, Fairfield
East NSW 2155



info@morrowgeo.com.au

Photo description

BH301 Box 9 of 13

Client

Landmark Group Construction Australia Pty Ltd

Location

3 Halifax Street, Macquarie Park NSW

Project name

Macquarie Park

Project No

P3006

Scale

Not to Scale

BH No

BH301

BH Depth

38.0m to 42.0m

morrow

CLIENT NAME: LANDMARK GROUP

PROJECT: MACQUARIE PARK

LOCATION: 3 HALIFAX STREET

JOB NUMBER: P3006

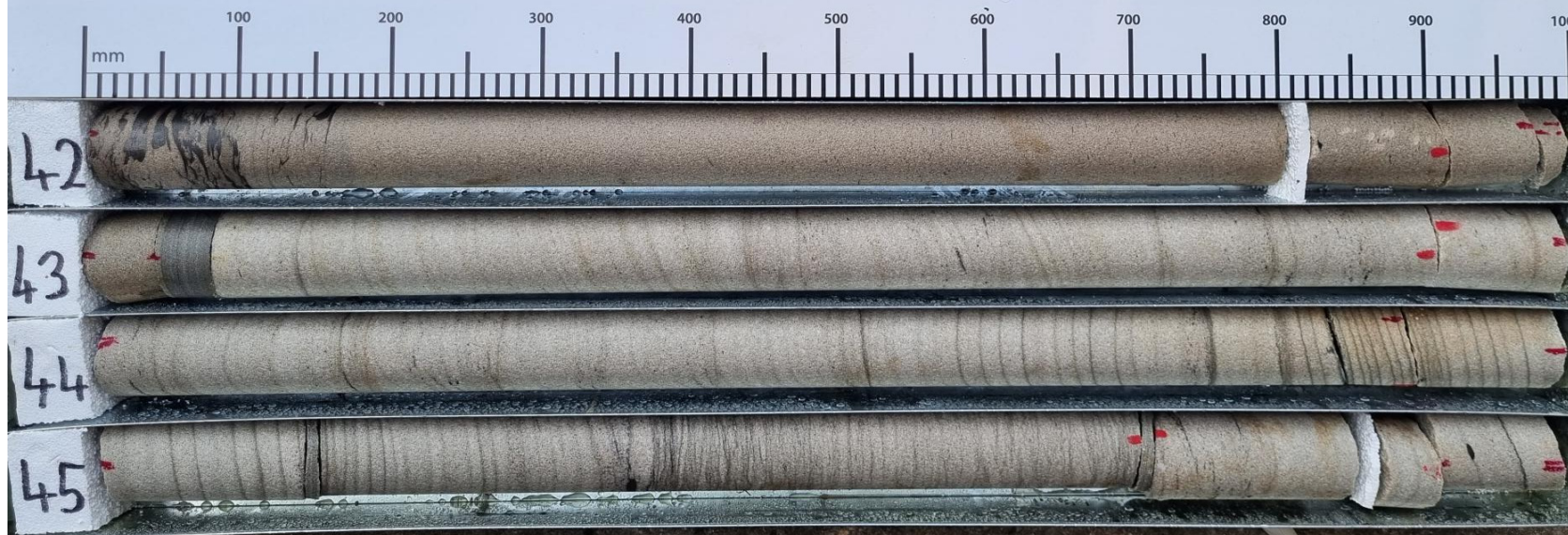
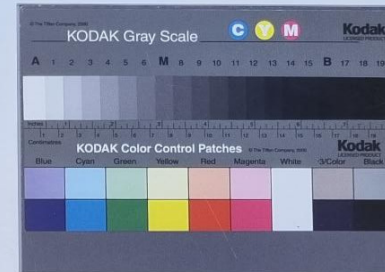
LOGGED BY: M.P.

BOREHOLE ID: BH301

DEPTH: 42.0 → 46.0m

CORE TRAY NO.: 10

DATE: 28/05/2025



morrow



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Sydney Gadigal Land,
2/5-7 Malta Steet, Fairfield
East NSW 2155



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Photo description

BH301 Box 10 of 13

Client

Landmark Group Construction Australia Pty Ltd

Location

3 Halifax Street, Macquarie Park NSW

Project name

Macquarie Park

Project No

P3006

Scale

Not to Scale

BH No

BH301

BH Depth

42.0m to 46.0m

morrow

CLIENT NAME: LANDMARK GROUP

PROJECT: MACQUARIE PARK

LOCATION: 3 HALIFAX STREET

JOB NUMBER: P3006

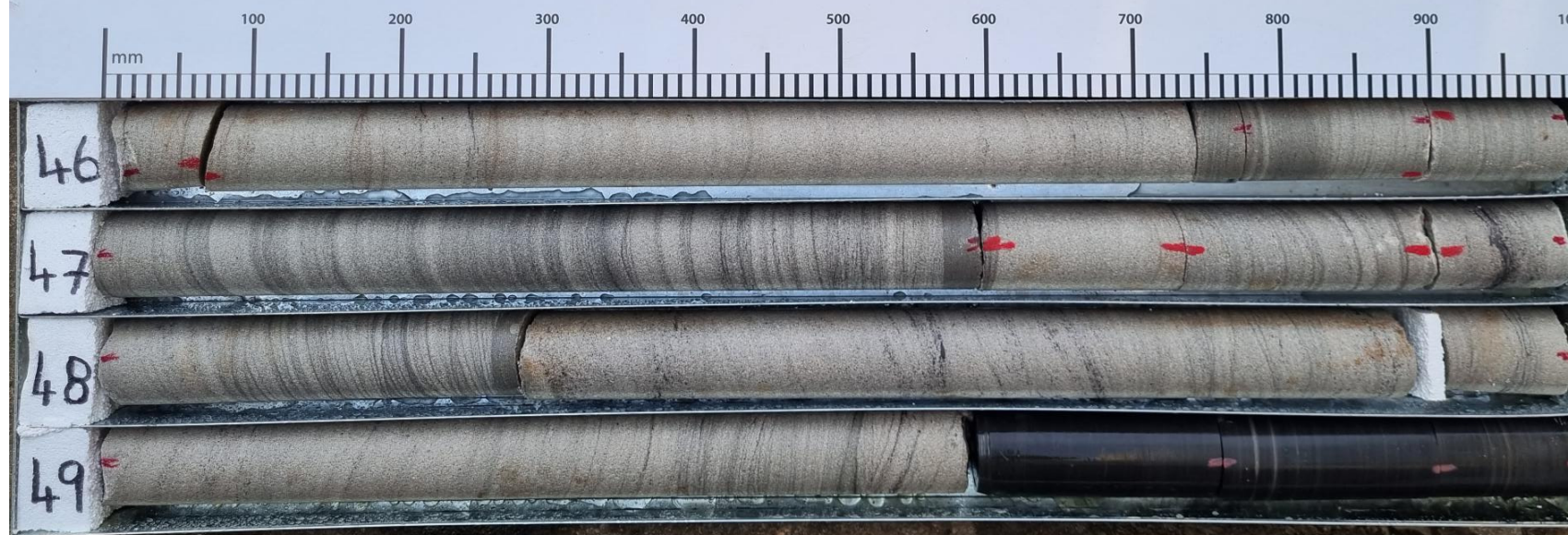
LOGGED BY: M.P.

BOREHOLE ID: BH301

DEPTH: 46.0-50.0m

CORE TRAY NO.: 11

DATE: 28/05/2025



morrow



02 8599 7579



Sydney Gadigal Land,
2/5-7 Malta Steet, Fairfield
East NSW 2155



info@morrowgeo.com.au

Photo description

BH301 Box 11 of 13

Client

Landmark Group Construction Australia Pty Ltd

Location

3 Halifax Street, Macquarie Park NSW

Project name

Macquarie Park

Project No

P3006

Scale

Not to Scale

BH No

BH301

BH Depth

46.0m to 50.0m

morrow

CLIENT NAME: LANDMARK GROUP

PROJECT: MACQUARIE PARK

LOCATION: 3 HALIFAX STREET

JOB NUMBER: P3006

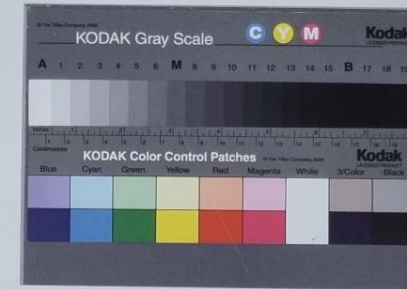
LOGGED BY: M.P.

BOREHOLE ID: BH301

DEPTH: 50.0 to 54.0

CORE TRAY NO.: 12

DATE: 28/05/2025



morrow



02 8599 7579



Sydney Gadigal Land,
2/5-7 Malta Steet, Fairfield
East NSW 2155



info@morrowgeo.com.au

Photo description

BH301 Box 12 of 13

Client

Landmark Group Construction Australia Pty Ltd

Location

3 Halifax Street, Macquarie Park NSW

Project name

Macquarie Park

Project No

P3006

Scale

Not to Scale

BH No

BH301

BH Depth

50.0m to 54.0m

morrow

CLIENT NAME: LANDMARK GROUP

PROJECT: MACQUARIE PARK

LOCATION: 3 HALIFAX STREET

JOB NUMBER: P3006

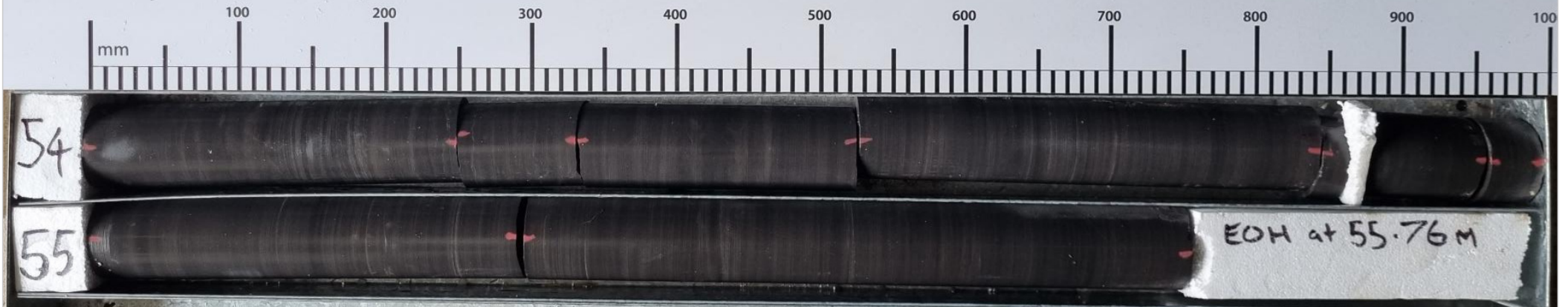
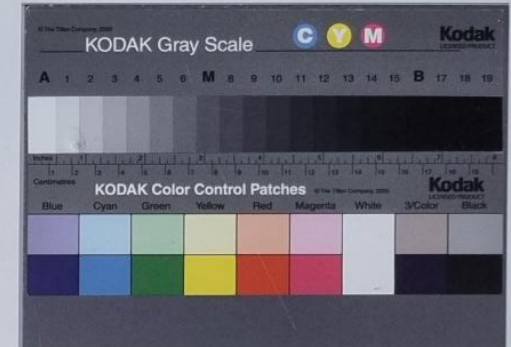
LOGGED BY: M.P.

BOREHOLE ID: BH301

DEPTH: 54.00 - 55.76

CORE TRAY NO.: 13

DATE: 28/05/2025



02 8599 7579



Sydney Gadigal Land,
2/5-7 Malta Street, Fairfield
East NSW 2155



info@morrowgeo.com.au

Photo description

BH301 Box 13 of 13

Client

Landmark Group Construction Australia Pty Ltd

Location

3 Halifax Street, Macquarie Park NSW

Project name

Macquarie Park

Project No

P3006

Scale

Not to Scale

BH No

BH301

BH Depth

54.0m to 55.76m

GENERAL

Information obtained from site investigations is recorded on log sheets. The "Cored Drill Hole Log" presents data from an operation where a core barrel has been used to recover material - commonly rock. The "Non-Core Drill Hole - Geological Log" presents data from an operation where coring has not been used and information is based on a combination of regular sampling and insitu testing. The material penetrated in non-core drilling is commonly soil but may include rock. The "Excavation - Geological Log" presents data and drawings from exposures of soil and rock resulting from excavation of pits, trenches, etc.

The heading of the log sheets contains information on Project Identification, Hole or Pit Identification, Location and Elevation. The main section of the logs contains information on methods and conditions, material substance description and structure presented as a series of columns in relation to depth below the ground surface which is plotted on the left side of the log sheet. The common depth scale is 8m per drill log sheet and about 3-5m for excavation logs sheets.

As far as is practicable the data contained on the log sheets is factual. Some interpretation is inevitable in the identification of material boundaries in areas of partial sampling, the location of areas of core loss, description and classification of material, estimation of strength and identification of drilling induced fractures. Material description and classifications are based on SAA Site Investigation Code AS 1726 - 1993 with some modifications as defined below.

These notes contain an explanation of the terms and abbreviations commonly used on the log sheets.

DRILLING

Drilling & Casing

ADV	Auger Drilling with V-Bit
ADT	Auger Drilling with TC Bit
WB	Wash-bore drilling
RR	Rock Roller
NMLC	NMLC core barrel
NQ	NQ core barrel
HMLC	HMLC core barrel
HQ	HQ core barrel

Drilling Fluid/Water

The drilling fluid used is identified and loss of return to the surface estimated as a percentage.

Drilling Penetration/Drill Depth

Core lifts are identified by a line and depth with core loss per run as a percentage. Ease of penetration in non-core drilling is abbreviated as follows:

VE	Very Easy
E	Easy
M	Medium
H	High
VH	Very High

Groundwater Levels

Date of measurement is shown.

Standing water level measured in completed boreholeLevel taken during or immediately after drilling

D	Disturbed
B	Bulk
U	Undisturbed
SPT	Standard Penetration Test
N	Result of SPT (sample taken)
PBT	Plate Bearing Test
PZ	Piezometer Installation
HP	Hand Penetrometer Test

EXCAVATION LOGS

Explanatory notes are provided at the bottom of drill log sheets. Information about the origin, geology and pedology may be entered in the "Structure and other Observations" column. The depth of the base of excavation (for the logged section) at the appropriate depth in the "Material Description" column. Refusal of excavation plant is noted should it occur. A sketch of the exposure may be added.

MATERIAL DESCRIPTION – SOIL

Classification Symbol - In accordance with the Unified Classification System (AS 1726-1993, Appendix A, Table A1)

Material Description - In accordance with AS 1726-1993, Appendix A2.3

Moisture Condition

D	Dry, looks and feels dry
M	Moist, No free water on remoulding
W	Wet, free water on remoulding

Consistency - In accordance with AS 1726-1993, Appendix A2.5

VS	Very Soft	< 12.5 kPa
S	Soft	12.5 – 25 kPa
F	Firm	25 – 50 kPa
St	Stiff	50 – 100 kPa
VSt	Very Stiff	100 – 200 kPa
H	Hard	> 200 kPa

Strength figures quoted are the approximate range of undrained shear strength for each class.

Density Index. (%) is estimated or is based on SPT results.

VL	Very Loose	< 15 %
L	Loose	15 – 35 %
MD	Medium Dense	35 – 65 %
D	Dense	65 – 85 %
VD	Very Dense	> 85 %

MATERIAL DESCRIPTION -ROCK

Material Description

Identification of rock type, composition and texture based on visual features in accordance with AS 1726-1993, Appendix A3.1-A3.3 and Tables A6a, A6b and A7.

Core Loss

Is shown at the bottom of the run unless otherwise indicated.

Bedding

Thinly Laminated	< 6 mm
Laminated	6 - 20
Very Thinly Bedded	20 - 60
Thinly Bedded	60 - 200
Medium Bedded	200 - 600
Thickly Bedded	600 - 2000
Very Thickly Bedded	> 2000

Weathering - No distinction is made between weathering and alteration. Weathering classification assists in identification but does not imply engineering properties.

Fresh (F)	Rock substance unaffected by weathering
Slightly Weathered (SW)	Rock substance partly stained or discoloured. Colour and texture of fresh rock recognisable.
Moderately Weathered (MW)	Staining or discolouration extends throughout rock substance. Fresh rock colour not recognisable.
Highly Weathered (HW)	Stained or discoloured throughout. Signs of chemical or physical alteration. Rock texture retained.
Extremely Weathered (EW)	Rock texture evident but material has soil properties and can be remoulded.

Strength - The following terms are used to described rock strength:

Rock Strength Class	Abbreviation	Point Load Strength Index, $I_s(50)$ (MPa)
Extremely Low	EL	< 0.03
Very Low	VL	0.03 to 0.1
Low	L	0.1 to 0.3
Medium	M	0.3 to 1
High	H	1 to 3
Very High	VH	3 to 10
Extremely High	EH	≥ 10

Strengths are estimated and where possible supported by Point Load Index Testing of representative samples. Test results are plotted on the graphical estimated strength by using:

Diametral Point Load Test

Axial Point Load Test

Where the estimated strength log covers more than one range it indicates the rock strength varies between the limits shown.

MATERIALS STRUCTURE/FRACTURES

ROCK

Natural Fracture Spacing - A plot of average fracture spacing excluding defects known or suspected to be due to drilling, core boxing or testing. Closed or cemented joints, drilling breaks and handling breaks are not included in the Natural Fracture Spacing.

Visual Log - A diagrammatic plot of defects showing type, spacing and orientation in relation to core axis.

Defects		Defects open in-situ or clay sealed Defects closed in-situ Breaks through rock substance
	————— -----	

Additional Data - Description of individual defects by type, orientation, in-filling, shape and roughness in accordance with AS 1726-1993, Appendix A Table A10, notes and Figure A2.

Orientation - angle relative to the plane normal to the core axis.

Type	BP JT SM FZ SZ VN FL CL DL HB DB	Bedding Parting Joint Seam Fracture Zone Shear Zone Vein Foliation Cleavage Drill Lift Handling Break Drilling Break
Infilling	CN X Clay KT CA Fe Qz MS MU	Clean Carbonaceous Clay Chlorite Calcite Iron Oxide Quartz Secondary Mineral Unidentified Mineral
Shape	PR CU UN ST IR DIS	Planar Curved Undulose Stepped Irregular Discontinuous
Roughness	POL SL S RF VR	Polished Slickensided Smooth Rough Very Rough

SOIL

Structures - Fissuring and other defects are described in accordance with AS 1726-1993, Appendix A2.6, using the terminology for rock defects.

Origin - Where practicable an assessment is provided of the probable origin of the soil, eg fill, topsoil, alluvium, colluvium, residual soil

APPENDIX B

IMPORTANT INFORMATION

This Document has been provided by Morrow Geotechnics Pty Ltd subject to the following limitations:

This Document has been prepared for the particular purpose outlined in Morrow Geotechnics' proposal and no responsibility is accepted for the use of this Document, in whole or in part, in other contexts or for any other purpose.

The scope and the period of Morrow Geotechnics' Services are as described in Morrow Geotechnics' proposal, and are subject to restrictions and limitations. Morrow Geotechnics did not perform a complete assessment of all possible conditions or circumstances that may exist at the site referenced in the Document. The scope of services may have been limited by such factors as time, budget, site access or other site conditions. If a service is not expressly indicated, do not assume it has been provided. If a matter is not addressed, do not assume that any determination has been made by Morrow Geotechnics in regards to it. Any advice given within this document is limited to geotechnical considerations only. Other constraints particular to the project, including but not limited to architectural, environment, heritage and planning matters may apply and should be assessed independently of this advice.

Conditions may exist which were undetectable given the limited nature of the enquiry Morrow Geotechnics was retained to undertake with respect to the site. Variations in conditions may occur between investigatory locations, and there may be special conditions pertaining to the site which have not been revealed by the investigation and which have not therefore been taken into account in the Document. Accordingly, additional studies and actions may be required. No geotechnical investigation can provide a full understanding of all possible subsurface details and anomalies at a site.

In addition, it is recognised that the passage of time affects the information and assessment provided in this Document. Morrow Geotechnics' opinions are based upon information that existed at the time of the production of the Document. It is understood that the Services provided allowed Morrow Geotechnics to form no more than an opinion of the actual conditions of the site at the time the site was visited and cannot be used to assess the effect of any subsequent changes in the quality of the site, or its surroundings, or any laws or regulations.

Any assessments made in this Document are based on the conditions indicated from published sources and the investigation described. No warranty is included, either express or implied, that the actual conditions will conform exactly to the assessments contained in this Document.

Where data supplied by the client or other external sources, including previous site investigation data, have been used, it has been assumed that the information is correct unless otherwise stated. No responsibility is accepted by Morrow Geotechnics for incomplete or inaccurate data supplied by others.

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 Morrow Geotechnics be notified of any variations and be provided with an opportunity to review the recommendations of this report.

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