



# GEOTECHNICAL SITE INVESTIGATION

7 October 2025

SYDNEY | MELBOURNE | BRISBANE | PERTH

Phone: 1300 852 216  
Email: [info@geotesta.com.au](mailto:info@geotesta.com.au)  
[www.geotesta.com.au](http://www.geotesta.com.au)



Transport for NSW  
Authorised Engineering  
Organisation

**Project:** 1-3 Reid Street & 2-4 Woodside Avenue Lindfield NSW 2070

---

**Client:** CPDM

---

**Date:** 7 October 2025

---

**Report no.:** NE2140

---

Role	Name/Title	Signature	Date
<b>Written</b>	Ngoc Thang Pham Geotechnical Engineer		07/10/2025
<b>Reviewed Approved</b>	Ferry Haryono Associate Geotechnical Engineer		07/10/2025

---

# Contents

<b>1</b>	<b>INTRODUCTION</b> .....	<b>5</b>
1.1	Terms of Reference.....	5
1.2	Scope of work .....	5
<b>2</b>	<b>PROPOSED DEVELOPMENT</b> .....	<b>6</b>
<b>3</b>	<b>SITE CHARACTERISATION</b> .....	<b>7</b>
3.1	Site Description .....	7
3.2	Site Geology.....	7
<b>4</b>	<b>GEOTECHNICAL INVESTIGATION</b> .....	<b>9</b>
4.1	Previous Investigation – Geotesta (2024).....	9
4.2	Current Investigation – Geotesta (2025).....	9
4.3	Groundwater Level .....	11
<b>5</b>	<b>LABORATORY TESTS</b> .....	<b>12</b>
5.1	Salinity and Aggressivity Assessment .....	12
5.1.1	Salinity Assessment.....	12
5.1.2	Aggressivity Assessment.....	12
5.2	Exposure classification for concrete in saline and sulphate soils .....	13
<b>6</b>	<b>SITE PREPARATION AND EARTHWORK</b> .....	<b>14</b>
6.1	Site Preparation.....	14
6.2	Backfill and Controlled Fill (Landscaped Areas Only) .....	14
<b>7</b>	<b>BASEMENT EXCAVATION AND SHORING WALL</b> .....	<b>15</b>
7.1	Basement Excavation.....	15
7.2	Vibration Monitoring .....	15
7.3	Additional Required Documents .....	16
7.4	Temporary Cut Batters .....	17
7.5	Pile Shoring Wall .....	17
7.6	Ground Anchors .....	18
7.7	Shoring Wall Deflection .....	19
7.8	Basement Slab .....	19
<b>8</b>	<b>GEOTECHNICAL DESIGN PARAMETERS</b> .....	<b>20</b>
<b>9</b>	<b>FOUNDATION</b> .....	<b>21</b>
9.1	Pad/Strip foundation.....	21
9.2	Pile foundation .....	21
<b>10</b>	<b>REFERENCES</b> .....	<b>23</b>

## Figures

Figure 1. A Section of the Residential Flat Building Development .....	6
Figure 2. Site Aerial View and Drilled Boreholes .....	7
Figure 3. Geology Map of Site and Surrounding Area .....	8
Figure 4. Subsurface Profile Cross Sections – Geotesta (2025).....	11

## Tables

Table 1. Summary of Sub-surface Materials (Geotesta 2024).....	9
Table 2. Summary of the Ground Investigation (Geotesta 2025).....	10
Table 3. Summary of Sub-surface Materials (Geotesta 2025).....	10
Table 4. Material Description (Geotesta 2025).....	10
Table 5. Soil Salinity Test Results.....	12
Table 6. Soil Aggressivity Test Results and Exposure Classification for Piles.....	13
Table 7. Excavation Classes and Typical Equipment.....	15
Table 8. Guideline Values for Short-Term Vibration on Structures (Peak Particle Velocity, mm/s)	15
Table 9. Vibration Trigger Points.....	16
Table 10. Recommendation on Unsupported Batters.....	17
Table 11. Recommended Bond Stress for Anchor Design .....	18
Table 12. Interpreted Geotechnical Parameters.....	20
Table 13. Bearing Capacity for Pad/Strip Footings.....	21
Table 14. Skin Friction in Compression and End Bearing Capacity of Piles .....	22

## Appendices

Appendix A: Borehole Logs.....	25
Appendix B: Laboratory Results.....	26

# 1 INTRODUCTION

Geotesta was engaged by CPDM to undertake a geotechnical site investigation for the proposed development at 1-3 Reid Street & 2-4 Woodside Avenue Lindfield NSW 2070. The project involves the demolition of all existing buildings and structures, followed by construction of a residential flat building.

This report has been prepared in accordance with Geotesta's proposal (Ref: PN2163.01, dated 31 July 2025) and outlines findings from the geotechnical investigation and laboratory testing.

## 1.1 Terms of Reference

This report should be read in conjunction with the following documents:

- Architectural Drawings – Proposed Residential Flat Building, 1-3 Reid Street & 2-4 Woodside Avenue Lindfield NSW 2070, prepared by PBD Architects, dated 1/04/2025.
- Survey Plan – 1-3 Reid Street & 2-4 Woodside Avenue, Lindfield, prepared by TSS Total Surveying Solutions, dated 11/09/2024.
- Survey Plan – 2–8 Highgate Road, Lindfield, prepared by TSS Total Surveying Solutions, dated 20/09/2024.
- Geotechnical Site Investigation Report – 1-3 Reid Street & 2-4 Woodside Avenue Lindfield NSW, Report No. NE1995, Rev 2, dated 12/03/2025 (Geotesta Pty Ltd).

## 1.2 Scope of work

The scope of this report includes the following:

- Review of available geological information relevant to the site.
- Subsurface profile encountered with details of borehole logs
- Groundwater conditions encountered in the boreholes
- Laboratory test results
- Geotechnical design parameters and subsurface profile bearing capacity
- Discussion and recommendations relevant to the proposed development works.

## 2 PROPOSED DEVELOPMENT

The proposed development comprises the construction of a residential flat building (RFB) containing 89 apartments, including 23 affordable units, within a 9-storey structure over two levels of basement car parking. A sectional view of the proposed building is presented in Figure 1.



Figure 1. A Section of the Residential Flat Building Development

### 3 SITE CHARACTERISATION

#### 3.1 Site Description

The site located at 1-3 Reid Street & 2-4 Woodside Avenue Lindfield NSW 2070, encompasses an area of approximately 3,852.8 m<sup>2</sup> and is situated within the jurisdiction of the Ku-ring-gai Council Local Government Area. The site is bounded by Lindfield Avenue to the southwest, Woodside Avenue to the southeast, Reid Street to the northwest, and four residential dwellings to the southwest (refer to Figure 2).

The southwestern boundary of the site is adjacent to a railway corridor that connects Lindfield Station and Killara Station, with the shortest distance between the site and the railway track being approximately 36 metres.

The site exhibits a gentle slope, with ground elevations ranging from approximately 87.92 m AHD at the southern corner to 91.86 m AHD at the northern corner.



Figure 2. Site Aerial View and Drilled Boreholes

#### 3.2 Site Geology

The NSW Seamless Geology database ([minview.geoscience.nsw.gov.au](http://minview.geoscience.nsw.gov.au)), developed by the Geological Survey of NSW (GSNSW), indicates that the site is underlain by the Ashfield Shale (Twia) formation. This unit comprises black to light grey shale and laminite of Middle Triassic age. In the surrounding area, the Hawkesbury Sandstone (Tuth) formation is also mapped (Figure 3), consisting

of medium- to coarse-grained sandstone with small- to large-scale high-angle cross-bedding, and minor shale and laminite lenses.

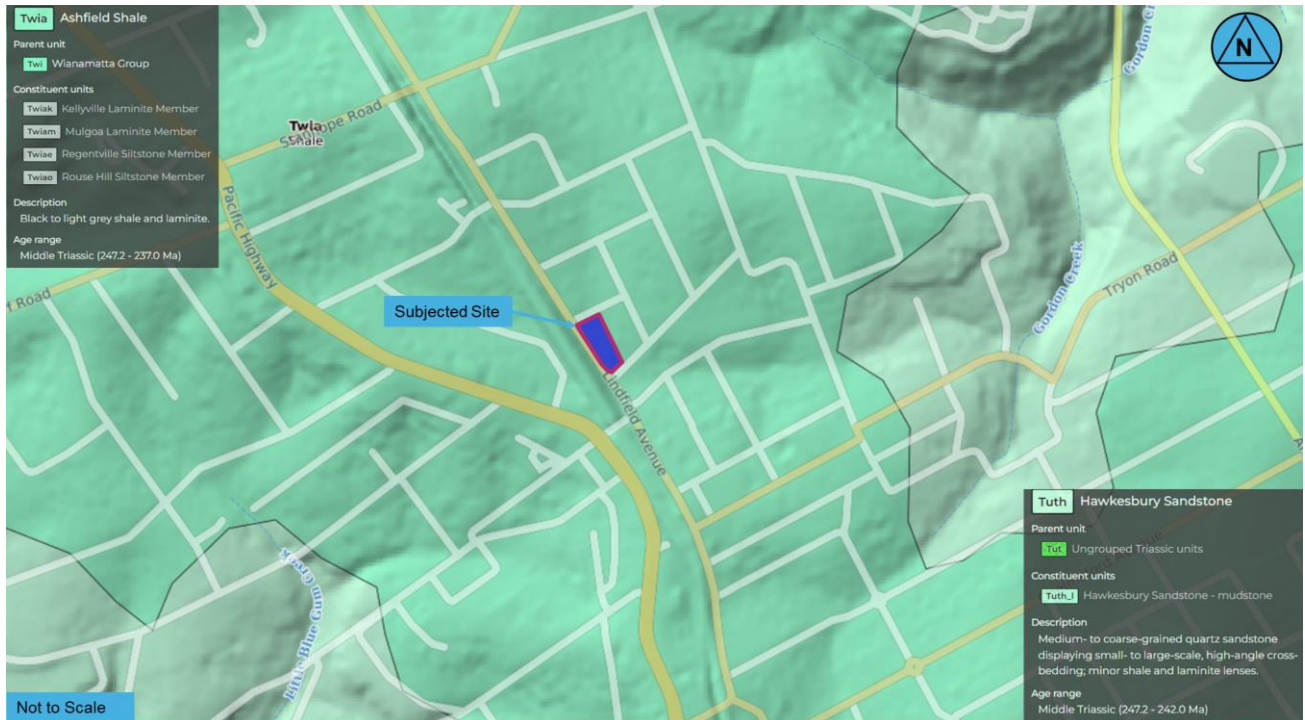


Figure 3. Geology Map of Site and Surrounding Area

## 4 GEOTECHNICAL INVESTIGATION

### 4.1 Previous Investigation – Geotesta (2024)

A geotechnical investigation was undertaken by Geotesta at the subject site on 04 November 2024, with findings documented in the report titled Geotechnical Site Investigation (Report No. NE1995, Revision 2), dated 12 March 2025.

A total of seven boreholes (BH1 to BH7) were advanced to depths of up to 2.2 m below ground level (bgl). Due to restricted site access, BH3 and BH5 were drilled using a ute-mounted rig, while the remaining boreholes were completed to depths of 1.4–1.7 m bgl using a hand auger.

The borehole locations are presented in Figure 2, and the subsurface conditions encountered are summarised in Table 1.

Table 1. Summary of Sub-surface Materials (Geotesta 2024)

Borehole	Termination Depth (m)	Topsoil/Fill (m)	Silty/Sandy CLAY (m)	Sandstone (m)
BH1	1.4	0.0 – 0.2	0.2 – 1.4	-
BH2	1.5	0.0 – 0.5	0.5 – 1.5	-
BH3	1.8	0.0 – 0.7	0.7 – 1.7	1.7 - 1.8
BH4	1.7	0.0 – 0.4	0.4 – 1.7	-
BH5	2.2	0.0 – 0.5	0.5 – 2.1	2.1 – 2.2
BH6	1.5	0.0 – 0.4	0.4 – 1.5	-
BH7	1.4	0.0 – 0.3	0.3 – 1.4	-

### 4.2 Current Investigation – Geotesta (2025)

Geotesta undertook a supplementary geotechnical investigation on 7, 8, 11 and 12 August 2025. The field program comprised the drilling of four (4) boreholes to maximum depths of 25 m. Auger drilling was used through soil layers and weathered rock to refusal, followed by NMLC rock coring in competent rock. Standard Penetration Tests (SPTs) were carried out at regular intervals to assess the consistency and relative density of soil strata.

All field observations and in-situ test results are presented in the borehole logs provided in **Appendix A**. Site plan showing borehole locations from both the 2024 and 2025 investigations is presented in Figure 2.

A summary of the 2025 borehole drilling program is provided in Table 2, while the interpreted subsurface soil and rock profiles are summarised in Table 3 and Table 4. One cross section of the identified subsurface profile is presented in Figure 4.

Table 2. Summary of the Ground Investigation (Geotesta 2025)

ID	Investigation Type	Termination Depth (m bgl)	Surface Elevation (m AHD)
BH01	Borehole drilling	24.0	88.70
BH02	Borehole drilling	25.0	91.51
BH03	Borehole drilling	16.05	92.81
BH04	Borehole drilling	16.10	89.60

Table 3. Summary of Sub-surface Materials (Geotesta 2025)

Unit	Material	Approximate Depth range of Unit (mBGL*)			
		BH01	BH02	BH03	BH04
1	Topsoil/Fill	0.0-0.3	0.0-0.2	0.0-0.2	0.15-0.3
2	Sandy/Silty CLAY	0.3-0.5	0.2-3.78	0.2-2.0	0.3-1.8
3A	Class V SANDSTONE	0.5-2.1	3.78-4.1	2.0-3.8	1.8-2.5
3B	Class IV SANDSTONE	2.1-4.2	4.1-6.6	3.8-4.8	2.5-3.5; 7.9-9.3
3C	Class III SANDSTONE	4.2-20.1	6.6-11.5	4.8-12.0	3.5-7.9
3D	Class II/I SANDSTONE	20.1-24.0	11.5-25.0	12.0-16.05	9.3-16.10

\*measured from the existing ground surface.

Table 4. Material Description (Geotesta 2025)

Material	Description
Topsoil/Fill	Mulching and pebbles, Silty SAND, Sandy/Clayey SILT, and SAND
Sandy/Silty CLAY	Firm to stiff, moist
SANDSTONE	Medium-coarse grained, very low-high strength, extremely weathered - Fresh

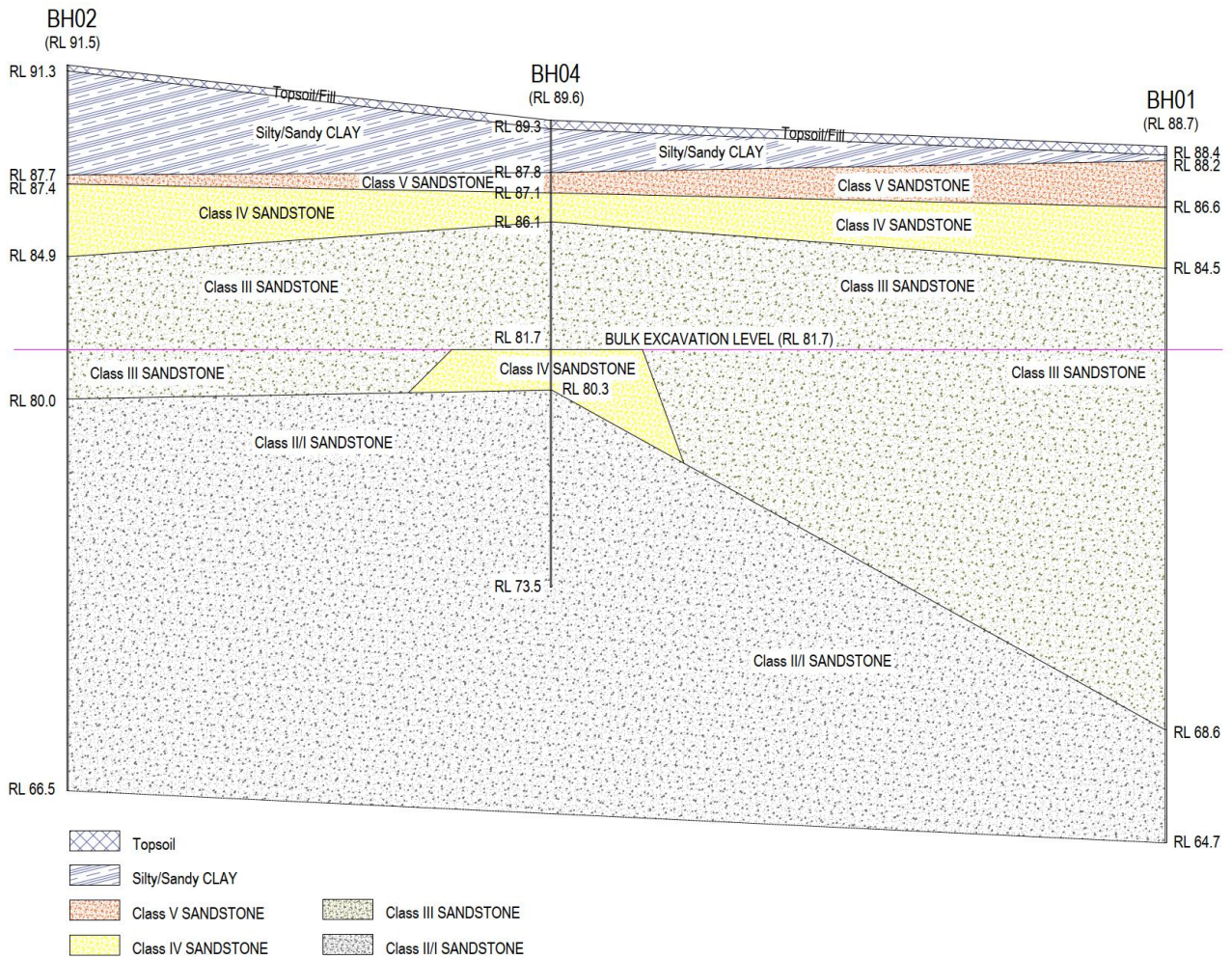


Figure 4. Subsurface Profile Cross Sections – Geotesta (2025)

Subsurface profiles from Geotesta investigations in 2024 and 2025 indicate consistent stratigraphy across the site, characterised by Topsoil/Fill overlying Silty/Sandy CLAY and sandstone bedrock.

### 4.3 Groundwater Level

Geotesta’s 2024 investigation did not encounter groundwater in any boreholes to a depth of 2.2 m bgl, except at BH4, where saturated soil was observed at 1.4 m below the existing ground surface. Based on the moist conditions recorded in adjacent boreholes at similar depths, this wet horizon is considered likely to represent perched water, attributable to site irrigation or recent rainfall.

In Geotesta’s 2025 investigation, groundwater was not observed during augering. During rock coring, identification of groundwater inflow was limited due to the use of drilling water, making direct observations of groundwater occurrence inconclusive.

Given the proposed basement excavation, groundwater monitoring is considered necessary to establish the depth, variability, and seasonal fluctuations of the groundwater table. This information will be critical for:

- assessing potential groundwater inflow risks during basement excavation,
- determining the need for temporary or permanent dewatering systems, and
- informing appropriate waterproofing and drainage measures for basement structures.

## 5 LABORATORY TESTS

### 5.1 Salinity and Aggressivity Assessment

Eight (8) soil samples were submitted to Eurofins MGT Laboratory, a NATA-accredited laboratory, for chemical tests for the salinity and aggressivity assessment. The testing was carried out for the aggressivity suite and to assess the exposure classification for the proposed development.

Given the proposed development comprises a two-level basement extending to sandstone bedrock, the assessment considers the potential for variation in soil chemical properties with depth, particularly for soils that will be in contact with concrete and steel elements such as piles, retaining walls, and basement slabs. Sandstone bedrock, encountered at depths varying from 0.5m to 3.78m, is generally considered chemically inert, reducing the likelihood of aggressive conditions at depth.

#### 5.1.1 Salinity Assessment

Laboratory test results for the salinity assessment are summarised in Table 5.

Table 5. Soil Salinity Test Results.

Sample ID	Depth (m)	EC (1:5, dS/m)	ECe <sup>1</sup> (ds/m)	Salinity Assessment <sup>2</sup>
S-1-BH1-0.3m	0.3	0.018	0.162	Non-Saline
S-2-BH1-1.0m	1.0	0.033	0.297	Non-Saline
S-3-BH2-0.7m	0.7	0.019	0.171	Non-Saline
S-4-BH2-3.5m	3.5	0.026	0.234	Non-Saline
S-5-BH3-1.5m	1.5	0.012	0.108	Non-Saline
S-6-BH3-2.5m	2.5	0.043	0.387	Non-Saline
S-7-BH4-0.5m	0.5	0.078	0.702	Non-Saline
S-8-BH4-1.5m	1.5	0.054	0.486	Non-Saline

<sup>1</sup>Based on EC to ECe multiplication factors in the Department of Land and Water Conservation (2002) Guidelines (Table 6.1), a multiplication factor of 9 was applied to clay loam and 14 to sandy loam.

<sup>2</sup>Based on Table 6.2 of Department of Land and Water Conservation (2002), where ECe < 2dS/m = Non-saline; ECe = 2-4dS/m = slightly saline; ECe = 4-8dS/m = moderately saline; ECe = 8-16dS/m = very saline; ECe > 16dS/m = highly saline.

#### Interpretation:

All tested samples recorded ECe values less than 2 dS/m, indicating the near-surface soils are non-saline. The underlying sandstone bedrock is chemically inert, and therefore deeper strata are not expected to pose additional salinity risk to concrete or steel.

#### 5.1.2 Aggressivity Assessment

Sulphate and pH test results for aggressivity assessment are summarised in Table 6.

Table 6. Soil Aggressivity Test Results and Exposure Classification for Piles.

Sample ID	pH (1:5)	Sulphate (mg/kg)	Chloride (mg/kg)	Aggressivity Assessment (Concrete)	Aggressivity Assessment (Steel)
S-1-BH1-0.3m	7.1	<10	<10	Non-aggressive	Non-aggressive
S-2-BH1-1.0m	5.2	38	13	Mild	Non-aggressive
S-3-BH2-0.7m	5.7	26	10	Non-aggressive	Non-aggressive
S-4-BH2-3.5m	5.9	17	22	Non-aggressive	Non-aggressive
S-5-BH3-1.5m	5.8	11	<10	Non-aggressive	Non-aggressive
S-6-BH3-2.5m	5.1	71	<10	Mild	Non-aggressive
S-7-BH4-0.5m	8	29	<10	Non-aggressive	Non-aggressive
S-8-BH4-1.5m	5.6	120	14	Non-aggressive	Non-aggressive

*In accordance with AS2159(2009)*

**Interpretation:**

- The majority of the samples indicate non-aggressive conditions for both concrete and steel.
- Two samples (S-2 at 1.0 m and S-6 at 2.5 m) recorded sulphate levels that classify as mildly aggressive towards concrete.
- No evidence of aggressivity towards steel was recorded.

Accordingly, the site soils are considered non- to mildly aggressive to concrete and non-aggressive to steel.

**5.2 Exposure classification for concrete in saline and sulphate soils**

Based on the salinity and sulphate test results, the following preliminary exposure classifications are recommended in accordance with AS2159 (2009):

- Concrete in saline soils: Exposure Classification A1.
- Concrete in sulphate soils: Exposure Classification A2.
- Steel in sulphate soils: Exposure Classification A1.

These classifications should be adopted for the preliminary design of concrete and steel structural elements at the site.

## 6 SITE PREPARATION AND EARTHWORK

### 6.1 Site Preparation

- Topsoil from landscaped areas should be stripped and stockpiled for potential reuse. Any excess topsoil not reused should be disposed of off-site following a waste classification report.
- Any evidence of contamination or asbestos-containing materials encountered during excavation should be reported immediately to the Project Engineer.

### 6.2 Backfill and Controlled Fill (Landscaped Areas Only)

- Where required for landscaped areas, controlled fill should be placed in uniform layers and compacted to the specified density in accordance with AS 3798 (2007).
- Sand fill should be compacted in layers not exceeding 250 mm thickness; clay fill should be compacted in layers not exceeding 200 mm thickness.
- The natural clayey soils on site are suitable for backfilling non-structural areas only; they must not be used beneath structural slabs, footings, roads, or driveways due to their poor drainage and shrink-swell potential.
- Compaction testing should be undertaken by a suitably qualified geotechnical testing company in accordance with AS 1289 methods. Layers that do not meet the minimum compaction criteria should be stripped, replaced, re-compacted, and re-tested.
- Testing frequency should be as follows:
  - 1 test per layer per 500m<sup>2</sup>; or
  - 1 test per 100m<sup>3</sup> distributed reasonably evenly throughout the full depth and area; or
  - 3 tests per visit (whichever requires the most tests).

## 7 BASEMENT EXCAVATION AND SHORING WALL

### 7.1 Basement Excavation

Excavation to the proposed basement depths requires the implementation of appropriate support systems to ensure stability and safety. Excavation support minimises lateral movement of the excavation face and reduces the risk to adjacent buildings, underground services, and surrounding roadways (Lindfield Avenue, Reid Street, and Woodside Avenue).

The new development requires excavation to a maximum depth of approximately RL 81.7 m for the bulk excavation and RL 80.3 m for the lift pit. Based on the geotechnical investigation, soft to intermediate excavation conditions are expected in Topsoil/Fill and natural clay layers up to RL 89.5 m, categorised as soft digging, achievable with a 20–30 t excavator. Excavation below RL 89.5 m may encounter intermediate to hard conditions, as the underlying strata consist of sandstone bedrock.

The excavation conditions and recommended equipment for each class are summarised in Table 7.

Table 7. Excavation Classes and Typical Equipment

Excavation Class	Description	Typical Equipment
Easy Excavation (Soft Dig)	Soils and extremely weathered rock are easily removed by hydraulic excavators.	Hydraulic excavators (various bucket sizes)
Moderate Excavation (Intermediate Dig)	Fractured rock or weak rock requires more powerful excavators or ripping.	Larger hydraulic excavators, rippers (dozer or excavator mounted)
Difficult Excavation (Hard Dig)	Competent rock requiring specialised equipment.	Hydraulic hammers, rock saws, rock grinders, heavy-duty rippers

### 7.2 Vibration Monitoring

Excavation using hydraulic rock hammers may transmit ground vibrations to nearby structures and buried services, potentially causing structural damage or occupant discomfort.

Currently, no Australian Standard specifies vibration criteria for building damage. Guidance is referenced from German Standard DIN 4150-3: 1999 – Structural Vibration, Part 3: Effects of Vibration on Structures. The standard provides guideline values for peak particle velocity (PPV) according to structure type and frequency, as presented in Table 8.

Table 8. Guideline Values for Short-Term Vibration on Structures (Peak Particle Velocity, mm/s)

Type of Structure	1Hz to 10Hz	10Hz to 50Hz	50Hz to 100Hz <sup>1</sup>
Commercial/Industrial buildings	20	20 to 40	40 to 50
Dwellings	5	5 to 15	15 to 20
Sensitive/heritage structures	3	3 to 8	8 to 10

*Note: Values for frequencies above 100 Hz may be used as minimum values.*

Considering the guidance on the effects of vibration levels presented in Table 8, Geotesta recommends capping the Peak Particle Velocity (PPV) at 5 mm/s for frequencies equal or less than

10 Hz and at 8 mm/s for frequencies greater than 10 Hz. The vibration trigger levels and required actions are presented in Table 9. The limits presented in Table 9 are generally considered to be conservative.

Table 9. Vibration Trigger Points

Level	% of Agreed Limit	Value (mm/s, <10 Hz)	Value (mm/s, ≥10 Hz)	Response
Alert	< 80%	4.0	6.4	No action required; works may continue.
Action	80-100%	4.0 – 5.0	6.4 – 8.0	Notify Project Manager. Review and modify construction methods to reduce vibration.
Alarm	≥100%	≥5.0	≥ 8.0	Stop works immediately. Notify Project Manager. Review and modify construction methods. Assess the condition of Sydney Water assets. Resume work only after approval from the Geotechnical Engineer and Project Manager.

In case of any vibration monitoring levels reaching the maximum trigger levels, the Project Manager to be notified. The contractor will implement construction vibration mitigation measures and/or immediately cease works until approval is received by the geotechnical engineer to continue.

To mitigate construction vibration due to the hard excavation conditions present at the site, lower energy equipment such as small rock breakers, operating equipment at a lower percentage of the maximum equipment operating capacity (say 50% of the maximum operating capacity of 300 kg rock hammer) and/or saw cutting are recommended as considerations to confirm that PPV values fall within acceptable limits. Ultimately it is the excavation contractor’s responsibility to select equipment and methods that can be undertaken such that PPV values fall within acceptable limits.

Utmost care must be taken when using excavators with hydraulic impact hammer attachments for any rock excavation, as there will likely be the direct transmission of ground vibrations to nearby structures and infrastructures.

### 7.3 Additional Required Documents

To minimise potential risks during excavation, the following documents must be prepared, reviewed, and approved by both the geotechnical and structural engineers:

- **Construction Methodology Plan:** A comprehensive plan detailing the step-by-step construction methods, equipment to be used, sequence of activities, and strategies to mitigate risks to the site and surrounding environment.
- **Inspection and Test Plan:** A document specifying inspection and testing procedures, frequencies, and acceptance criteria to ensure the construction complies with the design specifications and standards.

These documents must be considered mandatory and must be developed prior to the commencement of construction. Their preparation and approval are critical to maintaining the safety, quality, and compliance of the project.

## 7.4 Temporary Cut Batters

The highest point of the existing site is at RL 91.86, while the bulk excavation level is approximately RL 81.7 m, resulting in maximum excavation depths of about 10.16 m. Vertical shoring systems will be implemented for the basement, and temporary vertical batters are not expected. In areas where unsupported slopes are required during internal excavation, batter slopes should be constructed in accordance with the recommended values provided in Table 10.

Table 10. Recommendation on Unsupported Batters

Unit	Soil / Rock Type	Temporary Batter Slope (H:V)	Permanent Batter Slope (H:V)
1	Topsoil/Fill	2:1	2.5:1
2	Sandy / Silty CLAY	1.5:1	2:1
3A & 3B	Class V/IV SANDSTONE	1:1	2:1
3C	Class III SANDSTONE	Sub-vertical	Sub-vertical
3D	Class II/I SANDSTONE	Vertical	Vertical

The batter slope angle is recommended subjected to the following measures:

- The batters should be protected against erosion.
- Temporary batters shall not be left unsupported for more than 2 months without further advice. Following heavy rains (raining more than 6 hours with the intensity of greater than 15mm/day) should be inspected by a geotechnical engineer.
- An offset distance of 1.5m from the batter crest should be maintained for the loads.

It is recommended that a geotechnical engineer be engaged during excavation stage to confirm/identify the material for the whole excavation depth.

## 7.5 Pile Shoring Wall

The basement construction will require excavation to depth of approximately 10.16m. Considering the groundwater conditions, soil/rock profile, and the presence of adjoining roadways and buildings, soldier/secant/contiguous pile shoring walls supported by temporary anchored/props and walers are recommended as the preferred shoring system for excavating the basement. In the long term, lateral restraint will be provided by the basement floor slabs, which should be designed to act as bracing elements.

The retaining walls must be designed to resist both earth pressures and surcharge loads induced by adjacent structures, traffic and footings. Due to the interaction between soil and structure, the performance of the walls will also depend on their stiffness, the stiffness of the supports, the excavation sequence, and groundwater conditions. Numerical modelling is therefore recommended for the analysis and design of the shoring system, with Interpreted Mohr–Coulomb parameters provided in Table 12.

The behaviour of the rock mass is further influenced by natural jointing, which reduces strength and stiffness relative to intact rock. Unfavourable joint orientations, particularly those dipping towards the excavation, may result in wedge or planar failures. It is therefore essential that jointing patterns are incorporated into numerical models to identify potential local instabilities and to develop appropriate design measures. Where a tanked basement with secant pile walls is adopted, groundwater pressures may impose significant additional loading and must be accounted for in the design.

In addition, in-situ stresses within the Sydney Basin rock mass, arising from tectonic forces, overburden, and geological history, may influence excavation performance. High horizontal stresses can cause spalling or cracking of rock, particularly in deep excavations, and must be considered in numerical models to assess deformation and failure risk. However, where a drained basement with soldier pile walls is adopted, stress relief is expected to occur progressively during excavation, and no significant locked-in lateral stresses are anticipated.

The following aspects should be considered in the design and construction of the proposed pile shoring wall:

- Soldier pile shoring wall: Pile spacing should not exceed four times the pile diameter ( $s/d \leq 4$ ). Apply reinforced shotcrete or mesh/lagging to soil and weathered/loose rock faces as excavation proceeds. For competent rock, full-face shotcrete is generally not required, though local treatment may be needed in zones of jointing or instability. Spacing and facing requirements should be reviewed based on actual ground conditions and the proximity and founding levels of adjacent footings.
- Socket piles should extend a minimum of 1.5 m below the bulk excavation level to account for potential rock mass defects and unstable rock wedges.
- All bored piles must be inspected.

## 7.6 Ground Anchors

Recommended ultimate bond stress for ground anchor design is shown in Table 11.

Table 11. Recommended Bond Stress for Anchor Design

Unit	Material	Ultimate Bond Stress (kPa)
Unit 3A	Class V SANDSTONE	160
Unit 3B	Class IV SANDSTONE	320
Unit 3C	Class III SANDSTONE	800
Unit 3D	Class II/I SANDSTONE	1,400

The free length of the anchors should be sufficient to prevent failure along a potential sliding wedge behind the retention structure. As a general guide, the free length should extend at least 1.5 m beyond the line drawn at 45° from the base of the basement excavation.

Anchors are typically installed at an inclination of 15° to 20° below horizontal. The bond length should, where practicable, not exceed 12 m, to ensure adequate load transfer characteristics.

Anchor design and testing must be carried out in accordance with the relevant Australian Standards, including AS 5100 (2017) and AS 4678 (2002).

During excavation, the depth of cut should not extend more than 0.5 m below the anchor level until the anchors have been installed and fully prestressed.

### 7.7 Shoring Wall Deflection

Shoring wall deflections and associated ground settlements depend on excavation depth, ground strength, groundwater, drainage, and wall stiffness. Given the proximity of Lindfield Avenue, Woodside Avenue, and Reid Street, deflections along these boundaries must be controlled to avoid damage. Although these roads are not classified as state roads, a deflection limit of 30 mm or 0.5% of the excavation depth, or the retaining wall serviceability limit (whichever is less), may be adopted in line with *TfNSW Technical Direction GTD 2020/001* (2 July 2020). An Excavation Impact Assessment will be required to assess potential effects on adjacent roads and dwellings.

Minor additional deflections may occur between excavation and retention system installation. To manage this, a dilapidation survey of adjoining structures should be completed before excavation, with regular survey monitoring during construction.

### 7.8 Basement Slab

The basement slab will predominantly be founded on Class III Sandstone, with localised areas on Class IV Sandstone (refer to Figure 4). The exposed rock surface should be trimmed, scabbled, and remediated to remove irregularities, cavities, and loose or weathered zones, ensuring a stable subgrade prior to construction.

A free-draining granular layer (e.g. 10–20 mm washed crushed rock or other approved drainage aggregate), typically 150–300 mm thick, shall be placed over the prepared rock surface to provide a uniform bedding layer, act as a separation medium, and assist with load distribution. A geotextile separator may be installed where required to prevent contamination of the drainage layer.

The granular layer shall be compacted in accordance with AS 3798 and AS 1289, tested for compliance, and verified by the geotechnical engineer prior to slab construction.

Where necessary, a concrete blinding or levelling screed (25–50 mm thick) may be placed over the free-draining layer to facilitate reinforcement placement and waterproofing application.

All materials and sub-slab works shall be carried out in accordance with good engineering practice and be subject to geotechnical inspection and acceptance prior to basement slab placement.

## 8 GEOTECHNICAL DESIGN PARAMETERS

The interpreted geotechnical parameters of the soil/rock materials encountered during the geotechnical site investigation are provided in Table 12.

Table 12. Interpreted Geotechnical Parameters.

Unit	Material	$\gamma$ (kN/m <sup>3</sup> )	$\Phi'$ (°)	$c'$ (kPa)	$S_u$ (kPa)	$E'$ (MPa)	$\nu'$
1	Topsoil	18	18-20 (19)	2-5 (3)	25-50 (25)	7.5-15 (8)	0.3
2	Firm to stiff Sandy/Silty CLAY	18.5	18-24 (20)	2-7 (4)	25-100 (40)	7.5-30 (15)	0.3
3A	Class V SANDSTONE	22	32	20-50 (30)	-	50-200 (200)	0.35
3B	Class IV SANDSTONE	22	35	50-200 (100)	-	100-700 (200)	0.3
3C	Class III SANDSTONE	23	35	200-400 (300)	-	350-1,200 (400)	0.25
3D	Class II/I SANDSTONE	24	37	400-600 (400)	-	900-5,000 (1000)	0.2
<p><i>Note: Both upper bound and lower bound values for geotechnical parameters are provided. Values in brackets are characteristic values</i></p>							

## 9 FOUNDATION

### 9.1 Pad/Strip foundation

Review of the architectural drawings indicates that the final basement level will be at RL 82.0. Allowing for a slab thickness of approximately 0.3 m, the estimated bulk excavation level (BEL) is RL 81.7. At this depth, excavation will predominantly expose Class III Sandstone, with localised areas of Class IV Sandstone (refer to Figure 4).

Depending on the load magnitude, pad and strip footings can be considered for supporting the proposed structure, as the sandstone bedrock provides high bearing capacity. To minimise the potential for differential settlement, foundations should be established within strata of comparable stiffness. As variations in the soil and rock profile are expected across the site, the founding depths provided in this report are indicative only. All footing excavations shall be inspected by the geotechnical engineer to confirm both the founding material and depth prior to construction.

The modulus and allowable bearing capacities presented in Table 12 and Table 13 may be adopted for design purposes.

Table 13. Bearing Capacity for Pad/Strip Footings

Unit	Material	Allowable Bearing Capacity (kPa)	Ultimate Bearing Capacity (kPa)
Unit 3B	Class IV SANDSTONE	1,000	2,000 - 7,000
Unit 3C	Class III SANDSTONE	3,500	10,000 – 20,000
Unit 3D	Class II/I SANDSTONE	6,000	20,000 - 50,000

Spoon testing is recommended for at least one-third of footings founded on sandstone bedrock, with the remaining two-thirds inspected visually by a geotechnical engineer. Spoon testing involves drilling a 50 mm diameter hole beneath the footing base to a depth of 1.5 times the footing width, followed by testing to detect weak or clay seams. If weak seams are identified, footings should be deepened until sound material is reached.

Settlements will depend on applied loads and founding conditions; however, footings designed using the parameters in Table 13 are expected to settle by no more than approximately 1% of their width.

Some seepage is anticipated into the excavation, and exposed rock at the base of footings may deteriorate if left uncovered. To minimise this risk, footing excavations should be inspected, tested, and concreted without delay—preferably on the same day. If concreting is delayed, a thick blinding layer should be placed to protect the founding surface.

### 9.2 Pile foundation

Bored piles are suitable for supporting the proposed development and should be founded with an embedment of at least one pile diameter into competent founding material. Inspection of all bored piles is required to verify proper founding conditions. The allowable end bearing capacities and shaft adhesion values are summarised in Table 14.

Table 14. Skin Friction in Compression and End Bearing Capacity of Piles

Unit	Material	Allowable End bearing (kPa)	Ultimate End bearing (kPa)	Allowable Shaft Adhesion (kPa)	Ultimate Shaft Adhesion (kPa)
3B	Class IV SANDSTONE	1,000	2,000 - 7,000	80	250 - 800
3C	Class III SANDSTONE	3,500	10,000 – 20,000	350	800 - 1,500
3D	Class III/I SANDSTONE	6,000	20,000 - 50,000	600	1,500 - 3000

For design purposes, 50% of the allowable shaft adhesion in compression may be adopted for tension.

Raft slabs or piled raft systems can be used to transfer column loads; however, the variable thickness and strength of the rock profile may result in differential settlements that must be considered. The design of raft or piled raft systems is iterative, as the efficiency of the raft in distributing column loads to the founding materials governs the overall elastic behaviour. Where these systems are proposed, further geotechnical assessment and design verification are required.

## 10 REFERENCES

- AS 1726-2017, Geotechnical site investigations
- AS 2870-2011, Residential slabs and footings
- AS 3600-2018, Concrete structures
- AS 2159.2009, Piling-Design and installation
- AS 4678-2002, Earth-retaining structures
- AS 5100.5-2017, Bridge design Part 5: Concrete
- AS 3798-2007, Guidelines on earthworks for commercial and residential developments
- Pells, P.J.N., Mostyn, G., Walker, B.F. (1998). Design Loadings for Foundations on Shale and Sandstone in the Sydney Region.
- Pells, P. J. N., Mostyn, G., & Walker, B. F. (1998). Foundations on sandstone and shale in the Sydney region. *Australian Geomechanics*, 33(3), 17-29.
- Pells, P. J. N., Mostyn, G., Bertuzzi, R., & Wong, P. K. (2019). Classification of sandstones and shales in the Sydney region; a forty-year review. *Australian Geomechanics*, 54(2), 29-55.
- Bertuzzi, R., & Pells, P. J. (2002). Geotechnical parameters of Sydney sandstone and shale. *Australian Geomechanics: Journal and News of the Australian Geomechanics Society*, 37(5), 41-54.
- Transport for NSW (2020), Technical Direction – Excavation adjacent to Transport for NSW infrastructure, GTD 2020/001, Version No. 01.

# Appendices

# Appendix A: Borehole Logs

# NON-CORE DRILL HOLE LOG

**HOLE NO: BH01**

PROJECT : Geotechnical Site Investigation  
 LOCATION : 1-3 Woodside Avenue, Lindfield NSW

JOB NO: NE2140  
 Sheet 1 of 5 FINAL DEPTH: 24.00 m

POSITION : (GDA94 / MGA zone 56) SURFACE ELEVATION : 88.70 m (AHD) ANGLE FROM HORIZONTAL : 90°

RIG TYPE : Hanjin DB8 CONTRACTOR : BG Drilling DRILLER :

DATE STARTED : 07/08/25 DATE COMPLETED : 07/08/25 DATE LOGGED : LOGGED BY : MA CHECKED BY : AW

CASING DIAMETER : BARREL (Length) : BIT : BIT CONDITION :

METHOD	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	RL (m AHD)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY / RELATIVE DENSITY	STRUCTURE & OTHER OBSERVATIONS
AD/T		SPT: 0.50-0.95 m N=R	0.0	0.0		CL-ML	TOPSOIL: Sandy SILT, dark grey, trace rootlets and gravel	M	F	
			0.30	0.30		CI	Sandy CLAY: medium plasticity, brown	M	St	
			0.50	0.50			SANDSTONE: medium to coarse grained, red brown to pale grey, very low strength, extremely to highly weathered			
			88.0	1.0						
			87.0	2.0						
			86.0	3.0			2.00	<i>Continued on cored borehole.</i>		
			85.0	4.0						
			84.0	5.0						
			83.0	6.0						
			82.0	7.0						



# CORED DRILL HOLE LOG

**HOLE NO: BH01**

PROJECT : Geotechnical Site Investigation  
 LOCATION : 1-3 Woodside Avenue, Lindfield NSW

JOB NO: NE2140  
 Sheet 2 of 5 FINAL DEPTH: 24.00 m

POSITION : (GDA94 / MGA zone 56) SURFACE ELEVATION : 88.70 m (AHD) ANGLE FROM HORIZONTAL : 90°

RIG TYPE : Hanjin DB8 CONTRACTOR : BG Drilling DRILLER :

DATE STARTED : 07/08/25 DATE COMPLETED : 07/08/25 DATE LOGGED : LOGGED BY : MA CHECKED BY : AW

CASING DIAMETER : BARREL (Length) : BIT : BIT CONDITION :

METHOD	TCR	ROD	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	RL (m AHD)	DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	WEATHERING	ESTIMATED STRENGTH Is(50)	DISCONTINUITIES & ADDITIONAL DATA	NATURAL FRACTURE SPACING (mm)	WELL INSTALLATION
										VL 0-1 L 0-3 M 1 H 3 VH 10 EH		20 60 200 600 2000	
						0.0		<i>Continued from non-cored borehole.</i>					
				Is(50) A=0.97 MPa		2.0	•••••	SANDSTONE: medium-coarse grained, red brown to pale grey, medium strength, highly to moderately weathered	HW - MW	•	2.09 m: BP, 0°, RF, PR, W		
	100%	50%		Is(50) A=1.17 MPa		2.80	•••••	SANDSTONE: medium-coarse grained, red brown to pale grey, high strength, highly to moderately weathered	HW - MW	•	2.38 m: BP, 0°, RF, PR, W 2.48 m: BP, 0°, RF, PR, W 2.54-2.58 m: FZ 2.66 m: BP, 0°, RF, PR, W		
				Is(50) A=1.24 MPa		3.0	•••••		HW - MW	•	2.78 m: BP, 0°, RF, PR, W 2.85 m: BP, 0°, RF, PR, W 2.92 m: BP, 0°, RF, PR, W 3.00-3.03 m: FZ 3.13 m: BP, 0°, RF, PR, W		
				Is(50) A=1.02 MPa		4.0	•••••		HW - MW	•	3.42 m: BP, 0°, RF, PR, W 3.53 m: BP, 0°, RF, PR, W 3.64 m: BP, 0°, RF, PR, W 3.68 m: BP, 0°, RF, PR, W 3.73 m: BP, 0°, RF, PR, W 3.79 m: BP, 0°, RF, PR, W 4.00 m: DB 4.11 m: BP, 0°, RF, PR, W		
	100%	94%		Is(50) A=1.33 MPa		4.20	•••••	SANDSTONE: medium-coarse grained, pale grey, high strength, slightly weathered	SW	•	5.00 m: HB		
				Is(50) A=1.15 MPa		6.0	•••••		SW	•	5.81 m: BP, 0°, RF, UN, CN 6.00 m: HB		
	100%	95%		Is(50) A=1.24 MPa		7.0	•••••		SW	•	6.35 m: BP, 0°, RF, UN, W  6.72 m: BP, 0°, RF, UN, W 6.83 m: BP, 0°, RF, UN, W 7.00 m: HB		



# CORED DRILL HOLE LOG

**HOLE NO: BH01**

PROJECT : Geotechnical Site Investigation  
 LOCATION : 1-3 Woodside Avenue, Lindfield NSW

JOB NO: NE2140  
 Sheet 3 of 5 FINAL DEPTH: 24.00 m

METHOD	TCR	RQD	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	RL (m AHD)	DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	WEATHERING	ESTIMATED STRENGTH Is(50)	DISCONTINUITIES & ADDITIONAL DATA	NATURAL FRACTURE SPACING (mm)	WELL INSTALLATION		
														VL <sub>0-1</sub>	L <sub>0-3</sub>
NMLC	100%	95%		Is(50) A=1.28 MPa	81.0		SANDSTONE: medium-coarse grained, pale grey, high strength, slightly weathered	SW		7.95 m: JT, 80°, RF, UN, CN 8.00 m: HB 8.05 m: HB 8.07 m: BP, 0°, RF, UN, W 8.09-8.10 m: FZ 8.12-8.13 m: FZ 8.30 m: BP, 5°, RF, PR, CN					
				Is(50) A=0.05 MPa	8.0			HW	Grades: becoming very low strength, highly weathered						
				Is(50) A=0.98 MPa	80.0			MW	Grades: becoming moderately weathered						
				Is(50) A=0.97 MPa	9.0			SW	Grades: becoming medium strength						
				Is(50) A=0.97 MPa	79.0			MW	Grades: becoming slightly weathered						
	100%	98%		Is(50) A=1.07 MPa	10.0			10.50	SANDSTONE: medium-coarse grained, pale grey, high strength, slightly weathered				SW		10.30 m: BP, 0°, RF, UN, CN 10.42 m: BP, 0°, RF, UN, CN 10.74 m: BP, 5°, RF, PR, Mn 11.00 m: HB 11.05 m: BP, 0°, RF, PR, W 11.08 m: DB
				Is(50) A=1.35 MPa	78.0								MW	Grades: moderately weathered	
				Is(50) A=1.79 MPa	11.0								SW	Grades: becoming slightly weathered	
				Is(50) A=1.21 MPa	77.0								SW		
				Is(50) A=1.29 MPa	12.0								SW		
100%	100%		Is(50) A=1.21 MPa	76.0	13.0	SANDSTONE: medium-coarse grained, pale grey, high strength, slightly weathered	SW		11.84 m: BP, 0°, RF, UN, CN 12.00 m: DB 13.00 m: HB 13.36 m: BP, 0°, RF, PR, CN 13.90 m: BP, 0°, RF, PR, CN 13.95 m: HB 14.00 m: HB 14.30 m: DB 14.43 m: BP, 0°, RF, UN, CN 14.74 m: DB						
			Is(50) A=1.29 MPa	75.0			SW								





# CORED DRILL HOLE LOG

**HOLE NO: BH01**

PROJECT : Geotechnical Site Investigation  
 LOCATION : 1-3 Woodside Avenue, Lindfield NSW

JOB NO: NE2140  
 Sheet 5 of 5 FINAL DEPTH: 24.00 m

METHOD	TCR	RQD	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	RL (m AHD)	DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	WEATHERING	ESTIMATED STRENGTH Is(50)	DISCONTINUITIES & ADDITIONAL DATA	NATURAL FRACTURE SPACING (mm)	WELL INSTALLATION
										VL $\phi < 1$ L $0 < 3$ M $1$ H $3$ VH $10$ EH		20 40 60 80 100 200 400 600 800 1000 2000	
NMLC	100%	100%		Is(50) A=1.48 MPa	66.0		•••••	SANDSTONE: grey, high strength, fresh	FR	•	22.65 m: BP, 0°, RF, PR, CN		
						23.0	•••••				23.00 m: HB		
				Is(50) A=1.95 MPa	65.0		•••••			•			
					24.0	24.00	•••••	Hole Terminated at 24.00 m - Target depth achieved			24.00 m: DB		
						64.0							
						25.0							
						63.0							
						26.0							
						62.0							
						27.0							
						61.0							
						28.0							
						60.0							
						29.0							
						59.0							
						30.0							



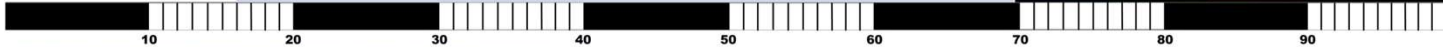
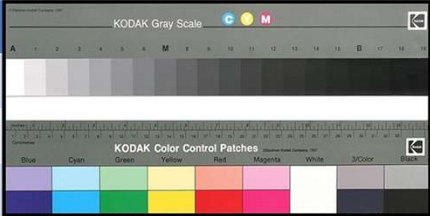


**PROJECT:** 1-3 Woodside Avenue, Lindfield 2070

**PROJECT NO:** NE2140

**BOREHOLE NO:** BH01

**DEPTH:** 2.0-12.0m



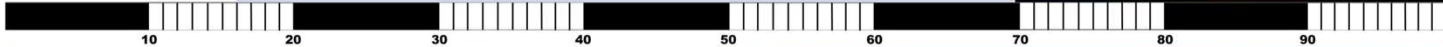
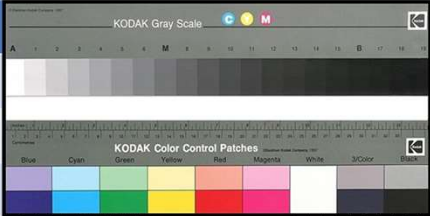


**PROJECT:** 1-3 Woodside Avenue, Lindfield 2070

**PROJECT NO:** NE2140

**BOREHOLE NO:** BH01

**DEPTH:** 12.0-21.0m



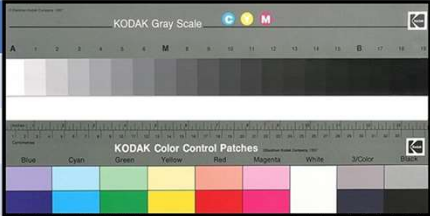


**PROJECT:** 1-3 Woodside Avenue, Lindfield 2070

**PROJECT NO:** NE2140

**BOREHOLE NO:** BH01

**DEPTH:** 21.0-24.0m



21  
22  
23

**Terminated @24.0m**

# NON-CORE DRILL HOLE LOG

**HOLE NO: BH01**

PROJECT : Geotechnical Site Investigation  
 LOCATION : 1-3 Woodside Avenue, Lindfield NSW

JOB NO: NE2140  
 Sheet 1 of 1 FINAL DEPTH: 24.00 m

POSITION : (GDA94 / MGA zone 56) SURFACE ELEVATION : 88.70 m (AHD) ANGLE FROM HORIZONTAL : 90°

RIG TYPE : Hanjin DB8 CONTRACTOR : BG Drilling DRILLER :

DATE STARTED : 07/08/25 DATE COMPLETED : 07/08/25 DATE LOGGED : LOGGED BY : MA CHECKED BY : AW

CASING DIAMETER : BARREL (Length) : BIT : BIT CONDITION :

METHOD	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	RL (m AHD)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY / RELATIVE DENSITY	STRUCTURE & OTHER OBSERVATIONS	WELL INSTALLATION
ADT		SPT: 0.50-0.95 m N=R	88.0	0.0	[Symbol]	[Symbol]	TOPSOIL: Sandy SILT, dark grey, trace rootlets and gravel	M	F		Gatic Cover Top Cap Bentonite
				0.50	[Symbol]	[Symbol]	Sandy CLAY: medium plasticity, brown SANDSTONE: medium to coarse grained, red brown to pale grey, very low strength, extremely to highly weathered	M	ST		
NMLC		Is(50) A=0.97 MPa	87.0	2.00	[Symbol]	[Symbol]	SANDSTONE: medium-coarse grained, red brown to pale grey, medium strength, highly to moderately weathered				Sand
		Is(50) A=1.17 MPa	86.0	2.80	[Symbol]	[Symbol]	SANDSTONE: medium-coarse grained, red brown to pale grey, high strength, highly to moderately weathered				
		Is(50) A=1.24 MPa	85.0	4.20	[Symbol]	[Symbol]	SANDSTONE: medium-coarse grained, pale grey, high strength, slightly weathered				
		Is(50) A=1.02 MPa	84.0	5.0	[Symbol]	[Symbol]					
		Is(50) A=1.33 MPa	83.0	6.0	[Symbol]	[Symbol]					
		Is(50) A=1.15 MPa	82.0	7.0	[Symbol]	[Symbol]					
		Is(50) A=1.24 MPa	81.0	8.00	[Symbol]	[Symbol]	Grades: becoming very low strength, highly weathered				
		Is(50) A=1.28 MPa	80.0	8.30	[Symbol]	[Symbol]	Grades: becoming moderately weathered				
		Is(50) A=0.05 MPa	80.0	8.90	[Symbol]	[Symbol]	Grades: becoming medium strength				
		Is(50) A=0.98 MPa	79.0	9.50	[Symbol]	[Symbol]	Grades: becoming slightly weathered				
		Is(50) A=0.97 MPa	78.0	10.50	[Symbol]	[Symbol]					
		Is(50) A=1.07 MPa	77.0	11.00	[Symbol]	[Symbol]	SANDSTONE: medium-coarse grained, pale grey, high strength, slightly weathered				
		Is(50) A=1.35 MPa	77.0	11.10	[Symbol]	[Symbol]	Grades: moderately weathered				
		Is(50) A=1.79 MPa	76.0	12.0	[Symbol]	[Symbol]	Grades: becoming slightly weathered				
		Is(50) A=1.21 MPa	75.0	13.0	[Symbol]	[Symbol]					
		Is(50) A=1.29 MPa	74.0	14.0	[Symbol]	[Symbol]					
	Is(50) A=2.44 MPa	73.0	15.0	[Symbol]	[Symbol]						
	Is(50) A=1.77 MPa	72.0	16.50	[Symbol]	[Symbol]	Grades: becoming fresh					
	Is(50) A=1.75 MPa	71.0	17.0	[Symbol]	[Symbol]						
	Is(50) A=1.7 MPa	70.0	18.0	[Symbol]	[Symbol]						
	Is(50) A=1.65 MPa	70.0	19.0	[Symbol]	[Symbol]						
	Is(50) A=0.99 MPa	69.0	19.40	[Symbol]	[Symbol]	Grades: becoming medium strength					
	Is(50) A=1.37 MPa	68.0	20.10	[Symbol]	[Symbol]	SANDSTONE: grey, high strength, fresh					
	Is(50) A=1.61 MPa	67.0	21.0	[Symbol]	[Symbol]						
	Is(50) A=1.48 MPa	66.0	22.0	[Symbol]	[Symbol]						
	Is(50) A=1.95 MPa	65.0	23.0	[Symbol]	[Symbol]						
			24.00	[Symbol]	[Symbol]	Hole Terminated at 24.00 m - Target depth achieved					



# NON-CORE DRILL HOLE LOG

**HOLE NO: BH02**

PROJECT : Geotechnical Site Investigation  
 LOCATION : 1-3 Woodside Avenue, Lindfield NSW


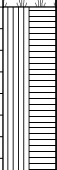
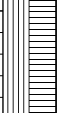
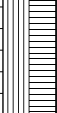
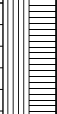
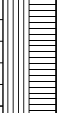
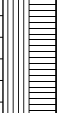

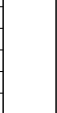
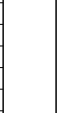
JOB NO: NE2140  
 Sheet 1 of 5 FINAL DEPTH: 25.00 m

POSITION : (GDA94 / MGA zone 56) SURFACE ELEVATION : 91.51 m (AHD) ANGLE FROM HORIZONTAL : 90°

RIG TYPE : Hanjin DB8 CONTRACTOR : BG Drilling DRILLER :

DATE STARTED : 08/08/25 DATE COMPLETED : 08/08/25 DATE LOGGED : LOGGED BY : MA CHECKED BY : AW

CASING DIAMETER : BARREL (Length) : BIT : BIT CONDITION :

METHOD	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	RL (m AHD)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY / RELATIVE DENSITY	STRUCTURE & OTHER OBSERVATIONS
AD/T				0.0			TOPSOIL: Sandy SILT, dark grey, trace rootlets, trace clay	M		
		SPT: 0.50-0.95 m 3,3,2 N=5	91.0	0.20		CI	Silty CLAY, medium plasticity, brown, with sand		F	
		SPT: 1.50-1.95 m 3,5,7 N=12	90.0	1.0			Grades: becoming red brown to pale grey, trace silt fragments			
			89.0	2.0				M		
			88.0	3.0					St	
			87.0	3.78			<i>Continued on cored borehole.</i>			
			86.0	4.0						
			85.0	5.0						
			84.0	6.0						
			83.0	7.0						



# CORED DRILL HOLE LOG

**HOLE NO: BH02**

PROJECT : Geotechnical Site Investigation  
 LOCATION : 1-3 Woodside Avenue, Lindfield NSW

JOB NO: NE2140  
 Sheet 2 of 5 FINAL DEPTH: 25.00 m

POSITION : (GDA94 / MGA zone 56) SURFACE ELEVATION : 91.51 m (AHD) ANGLE FROM HORIZONTAL : 90°

RIG TYPE : Hanjin DB8 CONTRACTOR : BG Drilling DRILLER :

DATE STARTED : 08/08/25 DATE COMPLETED : 08/08/25 DATE LOGGED : LOGGED BY : MA CHECKED BY : AW

CASING DIAMETER : BARREL (Length) : BIT : BIT CONDITION :

METHOD	TCR	ROD	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	RL (m AHD)	DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	WEATHERING	ESTIMATED STRENGTH Is(50)	DISCONTINUITIES & ADDITIONAL DATA	NATURAL FRACTURE SPACING (mm)	WELL INSTALLATION
										VL 0-1 L 0-3 M 1 H 3 V 10 EH		20 60 200 600 2000	
						0.0		<i>Continued from non-cored borehole.</i>					
						91.0							
						1.0							
						90.0							
						2.0							
						89.0							
						3.0							
						88.0							
				Is(50) A=0.64 MPa		4.0	•••••	SANDSTONE: medium-coarse grained, red brown to pale grey, low to medium strength, highly weathered	HW	•	3.87 m: BP, 0°, RF, UN, W 3.93 m: BP, 0°, RF, UN, W 4.00 m: BP, 0°, RF, UN, W 4.05 m: BP, 0°, RF, UN, W 4.10 m: BP, 0°, RF, UN, W 4.35 m: BP, 0°, RF, UN, W 4.39-4.60 m: FZ		
	100%	0%		Is(50) A=0.27 MPa		87.0	•••••	Grades: becoming medium strength		•	4.64-4.70 m: FZ 4.74 m: BP, 0°, RF, PR, W 4.80 m: BP, 0°, RF, PR, W 4.86 m: HB 4.96 m: BP, 0°, RF, PR, W 5.00 m: HB		
				Is(50) A=1.06 MPa		5.0	•••••	Grades: becoming high strength, moderately weathered		•			
				Is(50) A=0.92 MPa		86.0	•••••		MW	•	5.38 m: BP, 0°, RF, PR, W 5.42 m: BP, 0°, RF, PR, W 5.49 m: BP, 0°, RF, PR, W 5.54 m: BP, 0°, RF, PR, W 5.60 m: BP, 0°, RF, PR, W 5.63-5.80 m: FZ		
						5.80	X	CORE LOSS (5.8m-5.94m)					
						5.94	•••••	SANDSTONE: medium-coarse grained, grey, medium strength, fresh	FR	•	6.00 m: HB 6.07 m: HB		
				Is(50) A=1.53 MPa		85.0	•••••	SANDSTONE: medium-coarse grained, grey, high strength, fresh	FR	•	6.66 m: BP, 0°, RF, PR, CN		
						7.0	•••••		FR	•	7.00 m: HB 7.05 m: BP, 0°, RF, UN, CN		



# CORED DRILL HOLE LOG

**HOLE NO: BH02**

PROJECT : Geotechnical Site Investigation  
 LOCATION : 1-3 Woodside Avenue, Lindfield NSW

JOB NO: NE2140  
 Sheet 3 of 5 FINAL DEPTH: 25.00 m

METHOD	TCR	RQD	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	RL (m AHD)	DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	WEATHERING	ESTIMATED STRENGTH Is(50) ● - Axial ○ - Diametral	DISCONTINUITIES & ADDITIONAL DATA	NATURAL FRACTURE SPACING (mm)	WELL INSTALLATION
NMLC	100%	60%		Is(50) A=0.67 MPa	84.0	8.0	[Dotted pattern]	SANDSTONE: medium-coarse grained, grey, high strength, fresh	FR	●	7.12 m: BP, 0°, RF, UN, CN	[Fracture spacing scale]	
											7.18 m: BP, 0°, RF, UN, CN		
											7.23 m: BP, 0°, RF, UN, CN		
											7.27 m: BP, 0°, RF, UN, CN		
											7.32 m: BP, 0°, RF, UN, CN		
	7.43 m: DB												
	7.48 m: DB												
	7.53 m: BP, 0°, RF, UN, CN												
	7.58 m: BP, 0°, RF, UN, CN												
	7.63 m: BP, 0°, RF, UN, CN												
7.71 m: BP, 0°, RF, UN, CN													
7.86 m: BP, 0°, RF, UN, CN													
7.92 m: BP, 0°, RF, UN, CN													
8.00 m: HB													
8.03 m: BP, 0°, RF, PR, CN													
8.25 m: DB													
8.29 m: DB													
8.46 m: BP, 0°, RF, PR, CN													
8.72 m: BP, 0°, RF, PR, CN													
8.83 m: DB													
100%	97%	Is(50) A=1.25 MPa	83.0	9.0	[Dotted pattern]	9.00 m: DB	SW	●	9.23 m: BP, 0°, RF, PR, CN				
									9.36 m: DB				
									9.51 m: BP, 0°, RF, PR, CN				
									9.64 m: DB				
									9.74 m: DB				
9.88 m: BP, 0°, RF, PR, CN													
10.00 m: DB													
100%	97%	Is(50) A=1.38 MPa	82.0	10.0	[Dotted pattern]	10.94 m: BP, 0°, RF, PR, CN	SW	●	11.00 m: DB				
									11.10 m: DB				
									11.42 m: BP, 0°, RF, PR, CN				
									11.44 m: BP, 0°, RF, PR, CN				
									11.45 m: BP, 0°, RF, PR, CN				
11.49 m: BP, 0°, RF, PR, CN													
100%	96%	Is(50) A=1.25 MPa	81.0	11.0	[Dotted pattern]	12.00 m: DB	HW	●	12.20 m: DB				
									12.00 m: DB				
									12.00 m: DB				
									12.00 m: DB				
									12.00 m: DB				
100%	96%	Is(50) A=0.58 MPa	80.0	12.0	[Dotted pattern]	13.00 m: DB	MW - SW	●	13.33 m: BP, 0°, RF, PR, CN				
									13.00 m: DB				
									13.33 m: BP, 0°, RF, PR, CN				
									13.68 m: DB				
									13.92 m: DB				
100%	96%	Is(50) A=1.16 MPa	79.0	13.0	[Dotted pattern]	14.00 m: DB	SW	●	14.00 m: DB				
									14.00 m: DB				
									14.00 m: DB				
									14.00 m: DB				
									14.00 m: DB				
100%	96%	Is(50) A=1.45 MPa	78.0	14.0	[Dotted pattern]	14.10	SANDSTONE: medium-coarse grained, grey, high strength, slightly weathered	SW	●	14.10	[Fracture spacing scale]		
													14.10
100%	96%	Is(50) A=1.57 MPa	77.0	14.0	[Dotted pattern]	14.10	SANDSTONE: medium-coarse grained, grey, high strength, slightly weathered	SW	●	14.10	[Fracture spacing scale]		
													14.10



# CORED DRILL HOLE LOG

**HOLE NO: BH02**

PROJECT : Geotechnical Site Investigation  
 LOCATION : 1-3 Woodside Avenue, Lindfield NSW

JOB NO: NE2140  
 Sheet 4 of 5 FINAL DEPTH: 25.00 m

METHOD	TCR	RQD	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	RL (m AHD)	DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	WEATHERING	ESTIMATED STRENGTH Is(50) ● - Axial ○ - Diametral	DISCONTINUITIES & ADDITIONAL DATA	NATURAL FRACTURE SPACING (mm)	WELL INSTALLATION	
														VL <sub>0-1</sub>
NMLC	100%	98%		Is(50) A=1.81 MPa	76.0	15.0	●	SANDSTONE: medium-coarse grained, grey, high strength, slightly weathered	SW	●	15.00 m: HB 15.03 m: HB  15.29 m: DB 15.46 m: DB 15.62 m: BP, 0°, RF, PR, CN 15.78 m: DB 15.92 m: BP, 0°, RF, PR, CN 16.00 m: DB			
	100%	100%		Is(50) A=1.51 MPa	17.0	16.0	●	Grades: becoming moderately weathered	MW	●	16.72 m: BP, 0°, RF, PR, CN  17.00 m: HB 17.03 m: HB 17.12 m: BP, 5°, RF, PR, CN			
	100%	100%		Is(50) A=1.02 MPa  Is(50) A=0.93 MPa	18.0	18.0	●	SANDSTONE: medium-coarse grained, grey, medium strength, moderately weathered	MW	●	17.91 m: BP, 0°, RF, PR, CN 18.00 m: HB 18.20 m: BP, 0°, RF, PR, CN			
	100%	100%		Is(50) A=1.45 MPa	19.0	19.0	●	SANDSTONE: medium-coarse grained, grey, high strength, moderately weathered	MW	●	18.52 m: DB 18.55 m: DB 18.81 m: BP, 0°, RF, UN, CN 18.94 m: DB 19.00 m: HB			
	100%	100%		Is(50) A=1.37 MPa	71.0	20.0	●		MW	●	19.77 m: BP, 0°, RF, UN, CN 19.90 m: DB 19.95 m: HB 20.00 m: HB			
	100%	100%		Is(50) A=1.73 MPa	70.0	21.0	●		MW	●	21.05 m: HB  21.31 m: BP, 0°, RF, UN, CN 21.46 m: BP, 0°, RF, UN, CN 21.64 m: DB 21.82 m: DB 21.92 m: BP, 0°, RF, UN, CN 21.96 m: HB 22.00 m: HB			
						69.0	22.0							



# CORED DRILL HOLE LOG

**HOLE NO: BH02**

PROJECT : Geotechnical Site Investigation  
 LOCATION : 1-3 Woodside Avenue, Lindfield NSW

JOB NO: NE2140  
 Sheet 5 of 5 FINAL DEPTH: 25.00 m

METHOD	TCR	RQD	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	RL (m AHD)	DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	WEATHERING	ESTIMATED STRENGTH Is(50)	DISCONTINUITIES & ADDITIONAL DATA	NATURAL FRACTURE SPACING (mm)	WELL INSTALLATION
										VL $\phi < 1$ L $0-3$ M $1$ H $3$ VH $10$ EH			
NMLC	100%	100%		Is(50) A=1.92 MPa	23.0	23.0	•	SANDSTONE: medium-coarse grained, grey, high strength, moderately weathered	MW	•	22.76 m: BP, 5°, RF, UN, Mn		
				Is(50) A=1.45 MPa	68.0	23.0	•			23.00 m: HB			
					24.0	24.0	•			•	23.63 m: BP, 0°, RF, PR, CN		
				Is(50) A=2.01 MPa	24.0	24.0	•			•	23.98 m: HB 24.00 m: HB		
					25.0	25.0	•	Hole Terminated at 25.00 m - Target depth achieved			25.00 m: HB		
					66.0	26.0							
					65.0	27.0							
					64.0	28.0							
					63.0	29.0							
					62.0	30.0							



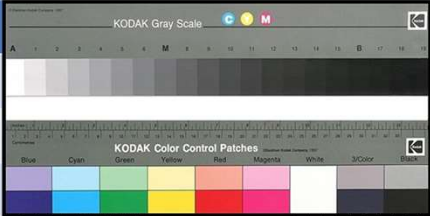


**PROJECT:** 1-3 Woodside Avenue, Lindfield 2070

**PROJECT NO:** NE2140

**BOREHOLE NO:** BH02

**DEPTH:** 3.78-13.0m



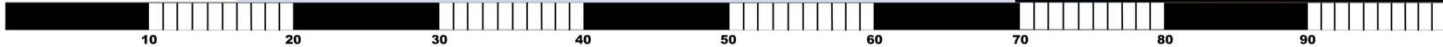
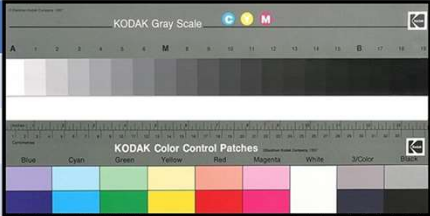


**PROJECT:** 1-3 Woodside Avenue, Lindfield 2070

**PROJECT NO:** NE2140

**BOREHOLE NO:** BH02

**DEPTH:** 13.0-22.0m



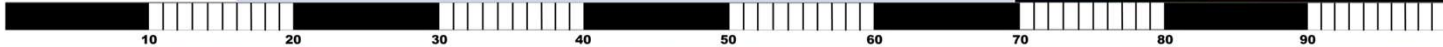
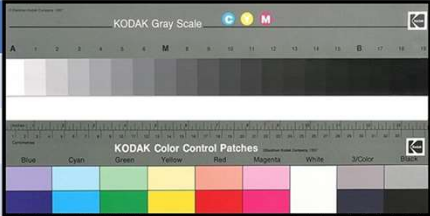


**PROJECT:** 1-3 Woodside Avenue, Lindfield 2070

**PROJECT NO:** NE2140

**BOREHOLE NO:** BH02

**DEPTH:** 22.0-25.0m



22

23

24

Terminated @25.0m

# NON-CORE DRILL HOLE LOG

**HOLE NO: BH02**

PROJECT : Geotechnical Site Investigation  
 LOCATION : 1-3 Woodside Avenue, Lindfield NSW

JOB NO: NE2140  
 Sheet 1 of 1 FINAL DEPTH: 25.00 m

POSITION : (GDA94 / MGA zone 56) SURFACE ELEVATION : 91.51 m (AHD) ANGLE FROM HORIZONTAL : 90°

RIG TYPE : Hanjin DB8 CONTRACTOR : BG Drilling DRILLER :

DATE STARTED : 08/08/25 DATE COMPLETED : 08/08/25 DATE LOGGED : LOGGED BY : MA CHECKED BY : AW

CASING DIAMETER : BARREL (Length) : BIT : BIT CONDITION :

METHOD	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	RL (m AHD)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY / RELATIVE DENSITY	STRUCTURE & OTHER OBSERVATIONS	WELL INSTALLATION
ADT		SPT: 0.50-0.95 m 3,3,2 N=5	91.0	0.0	█		0.20 TOPSOIL: Sandy SILT, dark grey, trace rootlets, trace clay	M			█
		SPT: 1.50-1.95 m 3,5,7 N=12	90.0	1.0	█		1.00 Silty CLAY, medium plasticity, brown, with sand Grades: becoming red brown to pale grey, trace silt fragments	F			█
NMLC			89.0	2.0	█	Cl		M	St		█
		Is(50) A=0.64 MPa	88.0	3.0	█		3.78 SANDSTONE; medium-coarse grained, red brown to pale grey, low to medium strength, highly weathered				█
		Is(50) A=0.27 MPa	87.0	4.0	█		4.60 Grades: becoming medium strength				█
		Is(50) A=1.06 MPa	86.0	5.0	█		5.00 Grades: becoming high strength, moderately weathered				█
		Is(50) A=0.92 MPa	85.0	6.0	█		5.80 CORE LOSS (5.8m-5.94m)				█
		Is(50) A=1.53 MPa	84.0	6.60	█		6.60 SANDSTONE: medium-coarse grained, grey, medium strength, fresh				█
		Is(50) A=0.67 MPa	83.0	7.0	█		SANDSTONE: medium-coarse grained, grey, high strength, fresh				█
		Is(50) A=1.25 MPa	82.0	8.0	█						█
		Is(50) A=1.07 MPa	81.0	9.0	█		9.30 Grades: becoming slightly weathered				█
		Is(50) A=1.38 MPa	80.0	10.0	█						█
		Is(50) A=1.25 MPa	79.0	11.0	█		11.50 Grades: becoming medium strength, highly weathered				█
		Is(50) A=0.58 MPa	78.0	11.60	█		11.60 Grades: becoming moderately to slightly weathered				█
		Is(50) A=1.16 MPa	77.0	12.05	█		12.05 Grades: becoming high strength				█
		Is(50) A=1.45 MPa	76.0	13.0	█						█
		Is(50) A=1.17 MPa	75.0	14.0	█		14.10 SANDSTONE: medium-coarse grained, grey, high strength, slightly weathered				█
	Is(50) A=1.57 MPa	74.0	15.0	█						█	
	Is(50) A=1.81 MPa	73.0	16.0	█						█	
	Is(50) A=1.51 MPa	72.0	17.0	█		17.00 Grades: becoming moderately weathered				█	
	Is(50) A=1.02 MPa	71.0	18.0	█		18.00 SANDSTONE: medium-coarse grained, grey, medium strength, moderately weathered				█	
	Is(50) A=0.93 MPa	70.0	19.0	█		19.00 SANDSTONE: medium-coarse grained, grey, high strength, moderately weathered				█	
	Is(50) A=1.45 MPa	69.0	20.0	█						█	
	Is(50) A=1.37 MPa	68.0	21.0	█						█	
	Is(50) A=1.73 MPa	67.0	22.0	█						█	
	Is(50) A=1.92 MPa	66.0	23.0	█						█	
	Is(50) A=1.45 MPa	65.0	24.0	█						█	
	Is(50) A=2.01 MPa	64.0	25.0	█		25.00 Hole Terminated at 25.00 m - Target depth achieved				█	



# NON-CORE DRILL HOLE LOG

**HOLE NO: BH03**

PROJECT : Geotechnical Site Investigation  
 LOCATION : 1-3 Woodside Avenue, Lindfield NSW

JOB NO: NE2140  
 Sheet 1 of 4 FINAL DEPTH: 16.05 m

POSITION : (GDA94 / MGA zone 56) SURFACE ELEVATION : 92.81 m (AHD) ANGLE FROM HORIZONTAL : 90°

RIG TYPE : Hanjin DB8 CONTRACTOR : BG Drilling DRILLER :

DATE STARTED : 11/08/25 DATE COMPLETED : 11/08/25 DATE LOGGED : LOGGED BY : MA CHECKED BY : AW

CASING DIAMETER : BARREL (Length) : BIT : BIT CONDITION :

METHOD	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	RL (m AHD)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY / RELATIVE DENSITY	STRUCTURE & OTHER OBSERVATIONS
AD/T				0.0	TOPSOIL		TOPSOIL: Clayey SILT, dark grey, trace rootlets	M	F	
		SPT: 0.50-0.95 m 3,3,4 N=7		0.20	Silty CLAY		Silty CLAY: medium plasticity, brown, with sand			
				0.920	Cl			M	F	
		SPT: 1.50-1.95 m 4,5,12 N=17		0.910	Grades		Grades: becoming pale grey		VSt	
				2.00	SANDSTONE		SANDSTONE: red brown to pale grey, very low to low strength, highly weathered			
				2.50	Continued on cored borehole.					
				3.0						
				3.890						
				4.0						
				4.880						
				5.0						
				5.870						
				6.0						
				6.860						
				7.0						



# CORED DRILL HOLE LOG

**HOLE NO: BH03**

PROJECT : Geotechnical Site Investigation  
 LOCATION : 1-3 Woodside Avenue, Lindfield NSW

JOB NO: NE2140  
 Sheet 2 of 4 FINAL DEPTH: 16.05 m

POSITION : (GDA94 / MGA zone 56) SURFACE ELEVATION : 92.81 m (AHD) ANGLE FROM HORIZONTAL : 90°

RIG TYPE : Hanjin DB8 CONTRACTOR : BG Drilling DRILLER :

DATE STARTED : 11/08/25 DATE COMPLETED : 11/08/25 DATE LOGGED : LOGGED BY : MA CHECKED BY : AW

CASING DIAMETER : BARREL (Length) : BIT : BIT CONDITION :

METHOD	TCR	ROD	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	RL (m AHD)	DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	WEATHERING	ESTIMATED STRENGTH Is(50)	DISCONTINUITIES & ADDITIONAL DATA	NATURAL FRACTURE SPACING (mm)	WELL INSTALLATION
										VL <sub>0-1</sub> L <sub>0-3</sub> M <sub>1</sub> H <sub>3</sub> VH <sub>10</sub> EH		20 60 200 600 2000	
						0.0		<i>Continued from non-cored borehole.</i>					
						92.0							
						1.0							
						91.0							
						2.0							
						90.0							
						3.0		SANDSTONE: medium-coarse grained, pale grey, very low strength, extremely to highly weathered, with sandy clay interbeds	XW - HW		3.06 m: BP, 5°, RF, PR, W 3.12 m: BP, 5°, RF, PR, W 3.30 m: BP, 5°, RF, PR, W 3.44-3.46 m: FZ		
				Is(50) A=0.01 MPa		90.0							
						89.0		Grades: becoming medium strength, moderately weathered	MW		3.81-3.82 m: FZ 3.85-3.87 m: FZ 3.99-4.00 m: FZ 4.16 m: DB 4.43 m: BP, 0°, RF, PR, W		
				Is(50) A=0.37 MPa		89.0							
						88.0		Grades: becoming slightly weathered	SW		4.98 m: HB 5.00 m: HB 5.05 m: HB 5.14 m: BP, 5°, RF, UN, W		
				Is(50) A=0.58 MPa		88.0							
						87.0		Grades: becoming fresh	FR		5.61 m: BP, 0°, RF, PR, W 5.71-5.73 m: IS 5.90 m: DB 6.00 m: DB 6.07 m: DB 6.10 m: BP, 0°, RF, PR, CN 6.30 m: BP, 0°, RF, PR, CN		
				Is(50) A=0.92 MPa		87.0							
						86.0		SANDSTONE: medium-coarse grained, pale grey, high strength, fresh, with dark laminations	FR		6.69 m: DB 6.81 m: DB 6.90 m: BP, 5°, RF, UN, W 6.95 m: DB 7.00 m: HB		
				Is(50) A=1.18 MPa		86.0							
						7.0							



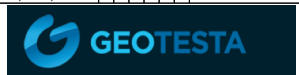
# CORED DRILL HOLE LOG

**HOLE NO: BH03**

PROJECT : Geotechnical Site Investigation  
 LOCATION : 1-3 Woodside Avenue, Lindfield NSW

JOB NO: NE2140  
 Sheet 3 of 4 FINAL DEPTH: 16.05 m

METHOD	TCR	RQD	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	RL (m AHD)	DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	WEATHERING	ESTIMATED STRENGTH Is(50)	DISCONTINUITIES & ADDITIONAL DATA	NATURAL FRACTURE SPACING (mm)	WELL INSTALLATION	
										VL <sub>0-1</sub> L <sub>0-3</sub> M <sub>1</sub> H <sub>3</sub> VH <sub>10</sub> EH				
NMLC	100%	100%		Is(50) A=0.84 MPa	85.0	8.0	•••••	SANDSTONE: medium-coarse grained, pale grey, high strength, fresh, with dark laminations	FR		7.22 m: BP, 0°, RF, PR, CN 7.43 m: BP, 0°, RF, PR, CN 7.70 m: BP, 0°, RF, PR, CN 8.00 m: DB 8.22 m: BP, 0°, RF, PR, CN 8.31 m: DB 8.40 m: DB 8.50 m: DB 8.56 m: DB 8.71 m: BP, 0°, RF, PR, CN 8.82 m: DB 8.95 m: HB 9.00 m: HB 9.06 m: BP, 5°, RF, UN, W	20 40 60 80 100 120 140 160 180 200		
				Is(50) A=1.81 MPa	84.0	9.0	•••••	Grades: becoming medium strength			10.00 m: BP, 5°, RF, UN, W 10.04 m: DB 10.12 m: DB			
				Is(50) A=1.84 MPa	83.0	10.0	•••••	Grades: becoming slightly weathered	SW		10.70 m: BP, 0°, RF, PR, CN 10.90 m: DB 11.00 m: HB 11.21 m: BP, 0°, RF, PR, Mn			
				Is(50) A=1.21 MPa	82.0	11.0	•••••	Grades: becoming high strength	FR		11.84 m: DB 11.93 m: BP, 0°, RF, PR, Mn 12.00 m: HB 12.05 m: HB 12.33 m: BP, 5°, RF, UN, W			
				Is(50) A=0.94 MPa	81.0	12.0	•••••	Grades: becoming fresh			12.95 m: HB 13.00 m: HB			
				Is(50) A=1.1 MPa	80.0	13.0	•••••		SW - FR		14.00 m: HB 14.04 m: HB			
				Is(50) A=0.97 MPa	79.0	14.0	•••••				14.34 m: BP, 5°, RF, UN, CN 14.54 m: BP, 5°, RF, PR, Mn			
					78.0	14.05	•••••				14.84 m: BP, 0°, RF, UN, W			



# CORED DRILL HOLE LOG

**HOLE NO: BH03**

PROJECT : Geotechnical Site Investigation  
 LOCATION : 1-3 Woodside Avenue, Lindfield NSW

JOB NO: NE2140  
 Sheet 4 of 4 FINAL DEPTH: 16.05 m

METHOD	TCR	RQD	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	RL (m AHD)	DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	WEATHERING	ESTIMATED STRENGTH Is(50)	DISCONTINUITIES & ADDITIONAL DATA	NATURAL FRACTURE SPACING (mm)	WELL INSTALLATION
	100%	100%		Is(50) A=1 MPa	15.0		•••••	SANDSTONE: medium-coarse grained, grey, slightly weathered to fresh, medium to high strength	SW - FR	VL <sup>0-1</sup> L <sup>0-3</sup> M <sub>1</sub> H <sub>3</sub> VH <sub>10</sub> EH	15.00 m: HB 15.03 m: HB	20 40 60 80 100 200 400 600 800 1000	
NMILC	100%	100%		Is(50) A=1.11 MPa	77.0		•••••						
				Is(50) A=1.35 MPa	16.0	16.05	•••••	Hole Terminated at 16.05 m - Target depth achieved			16.00 m: HB 16.05 m: DB		



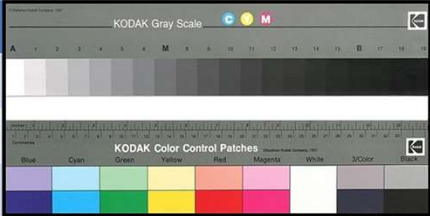


**PROJECT:** 1-3 Woodside Avenue, Lindfield 2070

**PROJECT NO:** NE2140

**BOREHOLE NO:** BH03

**DEPTH:** 2.5-11.0m



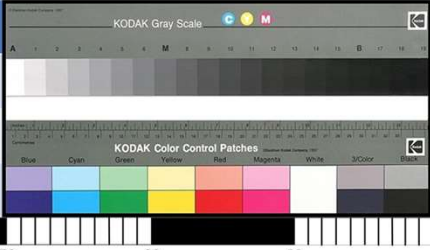


**PROJECT:** 1-3 Woodside Avenue, Lindfield 2070

**PROJECT NO:** NE2140

**BOREHOLE NO:** BH03

**DEPTH:** 11.0-16.05m



11

12

13

14

15

16 **Terminated @16.05m**

# NON-CORE DRILL HOLE LOG

**HOLE NO: BH03**

PROJECT : Geotechnical Site Investigation  
 LOCATION : 1-3 Woodside Avenue, Lindfield NSW

JOB NO: NE2140  
 Sheet 1 of 1 FINAL DEPTH: 16.05 m

POSITION : (GDA94 / MGA zone 56) SURFACE ELEVATION : 92.81 m (AHD) ANGLE FROM HORIZONTAL : 90°

RIG TYPE : Hanjin DB8 CONTRACTOR : BG Drilling DRILLER :

DATE STARTED : 11/08/25 DATE COMPLETED : 11/08/25 DATE LOGGED : LOGGED BY : MA CHECKED BY : AW

CASING DIAMETER : BARREL (Length) : BIT : BIT CONDITION :

METHOD	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	RL (m AHD)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY / RELATIVE DENSITY	STRUCTURE & OTHER OBSERVATIONS	WELL INSTALLATION
ADIT		SPT: 0.50-0.95 m 3,3,4 N=7	92.0	0.0	█	CI	0.20 TOPSOIL: Clayey SILT, dark grey, trace rootlets Silty CLAY: medium plasticity, brown, with sand	M	F		Gatic Cove Top Cap
		SPT: 1.50-1.95 m 4,5,12 N=17	91.0	1.0	█	CI	1.50 Grades: becoming pale grey 2.00 2.50 SANDSTONE: red brown to pale grey, very low to low strength, highly weathered SANDSTONE: medium-coarse grained, pale grey, very low strength, extremely to highly weathered, with sandy clay interbeds	M	F		
NMLC		Is(50) A=0.01 MPa	89.0	3.0	█		3.90 Grades: becoming medium strength, moderately weathered		VSt		Grout
		Is(50) A=0.37 MPa	88.0	4.0	█		5.00 Grades: becoming slightly weathered				Bentonite
		Is(50) A=0.58 MPa	87.0	5.0	█		6.00 Grades: becoming fresh				Sand
		Is(50) A=0.92 MPa	86.0	6.0	█		6.70 SANDSTONE: medium-coarse grained, pale grey, high strength, fresh, with dark laminations				Bentonite
		Is(50) A=1.18 MPa	85.0	7.0	█		7.90 Grades: becoming medium strength				
		Is(50) A=0.84 MPa	84.0	8.0	█		8.50 Grades: becoming slightly weathered				
		Is(50) A=1.81 MPa	83.0	9.0	█		8.80 Grades: becoming high strength				
		Is(50) A=1.84 MPa	82.0	10.0	█		10.20 Grades: becoming fresh				
		Is(50) A=1.21 MPa	81.0	11.0	█		11.60 SANDSTONE: medium-coarse grained, grey, slightly weathered to fresh, medium to high strength				
		Is(50) A=0.94 MPa	80.0	12.0	█						
		Is(50) A=1.1 MPa	79.0	13.0	█						
		Is(50) A=0.97 MPa	78.0	14.0	█						
		Is(50) A=1 MPa	77.0	15.0	█						
		Is(50) A=1.11 MPa Is(50) A=1.35 MPa	76.0	16.0	█		16.05 Hole Terminated at 16.05 m - Target depth achieved				



# NON-CORE DRILL HOLE LOG

**HOLE NO: BH04**

PROJECT : Geotechnical Site Investigation  
 LOCATION : 1-3 Woodside Avenue, Lindfield NSW

JOB NO: NE2140  
 Sheet 1 of 4 FINAL DEPTH: 16.10 m

POSITION : (GDA94 / MGA zone 56) SURFACE ELEVATION : 89.60 m (AHD) ANGLE FROM HORIZONTAL : 90°

RIG TYPE : Christie Rig CONTRACTOR : BG Drilling DRILLER :

DATE STARTED : 12/08/25 DATE COMPLETED : 12/08/25 DATE LOGGED : LOGGED BY : MA CHECKED BY : AW

CASING DIAMETER : BARREL (Length) : BIT : BIT CONDITION :

METHOD	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	RL (m AHD)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY / RELATIVE DENSITY	STRUCTURE & OTHER OBSERVATIONS
ADT				0.0	Concrete (0.0-0.15m)					
				0.15	FILL		FILL: Gravelly SAND, coarse-grained, brown	M	VL	
		SPT: 0.50-0.95 m 2,1,1 N=2		0.30	Sandy CLAY: low to medium plasticity, dark grey				S	
				1.0	CL-CI		Grades: Silty Sandy Clay, red brown to pale grey	M	F	
		SPT: 1.50-1.95 m 5,5 N=R		1.80	SANDSTONE: medium-grained, brown to grey, very low to low strength				H	
			2.45	Continued on cored borehole.						
			87.0							
			86.0							
			85.0							
			84.0							
			83.0							
			7.0							



# CORED DRILL HOLE LOG

**HOLE NO: BH04**

PROJECT : Geotechnical Site Investigation  
 LOCATION : 1-3 Woodside Avenue, Lindfield NSW

JOB NO: NE2140  
 Sheet 2 of 4 FINAL DEPTH: 16.10 m

POSITION : (GDA94 / MGA zone 56) SURFACE ELEVATION : 89.60 m (AHD) ANGLE FROM HORIZONTAL : 90°

RIG TYPE : Christie Rig CONTRACTOR : BG Drilling DRILLER :

DATE STARTED : 12/08/25 DATE COMPLETED : 12/08/25 DATE LOGGED : LOGGED BY : MA CHECKED BY : AW

CASING DIAMETER : BARREL (Length) : BIT : BIT CONDITION :

METHOD	TCR	ROD	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	RL (m AHD)	DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	WEATHERING	ESTIMATED STRENGTH Is(50)	DISCONTINUITIES & ADDITIONAL DATA	NATURAL FRACTURE SPACING (mm)	WELL INSTALLATION
										VL 0-1 L 0-3 M 1 H 3 VH 10 EH		20 60 200 600 2000	
						0.0		<i>Continued from non-cored borehole.</i>					
						89.0							
						1.0							
						2.0							
						2.50					2.50 m: DB		
						2.55					2.55 m: DB		
						2.66					2.66 m: DB		
						2.79					2.79 m: JT, 20°, RF, UN, CN		
						2.85					2.85 m: BP, 0°, RF, PR, W		
						3.00					3.00 m: HB		
						3.45					3.45 m: BP, 0°, RF, PR, CN		
						4.00					4.00 m: BP, 0°, RF, PR, CN		
						4.90					4.90 m: HB		
						5.00					5.00 m: HB		
						5.10					5.10 m: HB		
						5.28					5.28 m: BP, 10°, RF, PR, CN		
						5.75					5.75 m: HB		
						5.83					5.83 m: BP, 0°, RF, PR, CN		
						6.00					6.00 m: HB		
						6.07					6.07 m: HB		
						6.18					6.18 m: BP, 0°, RF, PR, CN		
						7.00					7.00 m: HB		
						7.0							



# CORED DRILL HOLE LOG

**HOLE NO: BH04**

PROJECT : Geotechnical Site Investigation  
 LOCATION : 1-3 Woodside Avenue, Lindfield NSW

JOB NO: NE2140  
 Sheet 3 of 4 FINAL DEPTH: 16.10 m

METHOD	TCR	RQD	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	RL (m AHD)	DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	WEATHERING	ESTIMATED STRENGTH Is(50)	DISCONTINUITIES & ADDITIONAL DATA	NATURAL FRACTURE SPACING (mm)	WELL INSTALLATION	
														VL <sub>0-1</sub>
NMLC	100%	96%		Is(50) A=0.36 MPa	82.0	8.0	[Dotted pattern]	SANDSTONE: medium-coarse grained, grey, high strength, moderately to slightly weathered	MW - SW	●	7.33 m: BP, 0°, RF, PR, CN			
								Grades: becoming medium strength			7.65 m: BP, 10°, RF, UN, CN			7.71 m: BP, 10°, RF, UN, CN
											8.00 m: HB			
											8.17 m: BP, 0°, RF, UN, CN			8.27 m: BP, 15°, RF, PR, W
											8.43-8.46 m: FZ			
	100%	70%			A=0.23 MPa	81.0	9.0	[Dotted pattern]	Grades: becoming moderately weathered	MW	●	8.73 m: BP, 5°, RF, UN, W	8.90 m: HB	8.95-9.03 m: FZ
									Grades: becoming low strength			9.56 m: BP, 5°, RF, UN, W		
												9.82-10.20 m: FZ		
												10.32 m: BP, 0°, RF, UN, W		
												10.70 m: BP, 10°, RF, PR, W		
100%	100%	A=0.68 MPa	80.0	10.0	[Dotted pattern]	9.82	XW - HW	●	10.98-11.02 m: FZ	11.31 m: BP, 0°, RF, UN, CN	11.42 m: BP, 0°, RF, UN, CN	11.55 m: HB		
						SHALE/SANDSTONE interbeds: dark grey to black, very low strength, extremely to highly weathered			11.75 m: BP, 5°, RF, PR, CN					
									12.00 m: HB	12.02 m: HB	12.13-12.17 m: FZ			
									12.67 m: BP, 0°, RF, PR, CN					
									13.00 m: HB	13.08 m: BP, 0, RF, UN, CN	13.24 m: BP, 0, RF, UN, CN			
100%	96%	A=0.02 MPa	79.0	11.0	[Dotted pattern]	10.20	SW	●	13.60 m: BP, 0, RF, UN, CN	13.96 m: BP, 0, RF, UN, CN	14.00 m: HB			
						SANDSTONE: medium-coarse grained, pale grey, medium to high strength, slightly weathered								
100%	96%	A=1.66 MPa	78.0	12.0	[Dotted pattern]	12.50	SW	●						
						SANDSTONE: medium-coarse grained, pale grey, high strength, slightly weathered								
100%	96%	A=0.76 MPa	77.0	13.0	[Dotted pattern]		SW	●						
100%	96%	A=1.17 MPa	76.0	14.0	[Dotted pattern]		SW	●						
100%	96%	A=1.91 MPa	75.0	[Dotted pattern]		SW	●							
100%	96%	A=1.48 MPa	[Dotted pattern]	[Dotted pattern]		SW	●							



# CORED DRILL HOLE LOG

**HOLE NO: BH04**

PROJECT : Geotechnical Site Investigation  
 LOCATION : 1-3 Woodside Avenue, Lindfield NSW

JOB NO: NE2140  
 Sheet 4 of 4 FINAL DEPTH: 16.10 m

METHOD	TCR	RQD	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	RL (m AHD)	DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	WEATHERING	ESTIMATED STRENGTH Is(50)	DISCONTINUITIES & ADDITIONAL DATA	NATURAL FRACTURE SPACING (mm)	WELL INSTALLATION
										VL <sub>0-1</sub> L <sub>0-3</sub> M <sub>1</sub> H <sub>3</sub> VH <sub>10</sub> EH			
NMLC	100%	96%		Is(50) A=0.04 MPa	15.0	15.0	•••••	SANDSTONE: medium-coarse grained, pale grey, high strength, slightly weathered			15.00 m: HB 15.08 m: BP 0, RF, PR, CN	30 60 90 120 150 180 210 240	
					74.0	74.0	•••••	Grades: clay seam (15.5-15.55m)	SW •		15.50-15.52 m: FZ 15.61 m: JT 60, RF, UN, CN 15.63 m: BP 0, RF, PR, CN		
					16.0	16.10	•••••	Hole Terminated at 16.10 m - Target depth achieve			15.86 m: BP 0, RF, PR, W 15.98 m: BP 0, RF, PR, W 16.00 m: HB 16.09 m: HB		
					73.0	73.0	•••••						
					17.0	17.0	•••••						
					72.0	72.0	•••••						
					18.0	18.0	•••••						
					71.0	71.0	•••••						
					19.0	19.0	•••••						
					70.0	70.0	•••••						
					20.0	20.0	•••••						
					69.0	69.0	•••••						
					21.0	21.0	•••••						
					68.0	68.0	•••••						
					22.0	22.0	•••••						



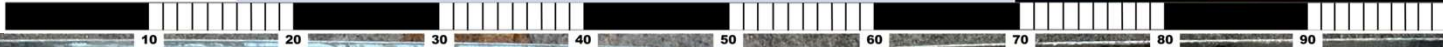
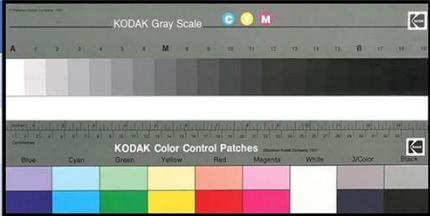


**PROJECT:** 1-3 Woodside Avenue, Lindfield 2070

**PROJECT NO:** NE2140

**BOREHOLE NO:** BH04

**DEPTH:** 2.45-11.0m



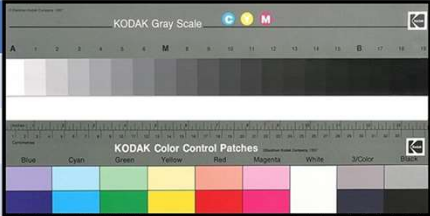


**PROJECT:** 1-3 Woodside Avenue, Lindfield 2070

**PROJECT NO:** NE2140

**BOREHOLE NO:** BH04

**DEPTH:** 11.0-16.1m



11

12

13

14

15

16

Terminated @16.1m

# NON-CORE DRILL HOLE LOG

**HOLE NO: BH04**

PROJECT : Geotechnical Site Investigation  
 LOCATION : 1-3 Woodside Avenue, Lindfield NSW

JOB NO: NE2140  
 Sheet 1 of 1 FINAL DEPTH: 16.10 m

POSITION : (GDA94 / MGA zone 56) SURFACE ELEVATION : 89.60 m (AHD) ANGLE FROM HORIZONTAL : 90°

RIG TYPE : Christie Rig CONTRACTOR : BG Drilling DRILLER :

DATE STARTED : 12/08/25 DATE COMPLETED : 12/08/25 DATE LOGGED : LOGGED BY : MA CHECKED BY : AW

CASING DIAMETER : BARREL (Length) : BIT : BIT CONDITION :

METHOD	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	RL (m AHD)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY / RELATIVE DENSITY	STRUCTURE & OTHER OBSERVATIONS	WELL INSTALLATION
AD/IT		SPT: 0.50-0.95 m 2,1,1 N=2	89.0	0.0	[Concrete]	FI	Concrete (0.0-0.15m)	M	VI		[Gatic Cover Top Cap]
		SPT: 1.50-1.95 m 5,5 N=R	88.0	0.30	[Gravelly Sand]	CL-CI	FILL: Gravelly SAND, coarse-grained, brown Sandy CLAY: low to medium plasticity, dark grey Grades: Silty Sandy Clay, red brown to pale grey	M	S		
NMLC		Is(50) A=0.58 MPa	87.0	1.00	[Sandstone]	CL-CI	SANDSTONE: medium-grained, brown to grey, very low to low strength		F		[Bentonite]
		Is(50) A=0.43 MPa	86.0	1.80	[Sandstone]	CL-CI	SANDSTONE: medium-coarse grained, red brown to pale grey, medium strength, moderately weathered		H		
		Is(50) A=0.51 MPa	85.0	2.45	[Sandstone]	CL-CI	Grades: becoming pale grey, moderately to slightly weathered				
		Is(50) A=0.78 MPa	84.0	3.45	[Sandstone]	CL-CI	SANDSTONE: medium-coarse grained, grey, high strength, moderately to slightly weathered				
		Is(50) A=1.13 MPa	83.0	5.80	[Sandstone]	CL-CI	Grades: becoming medium strength				
		Is(50) A=1.44 MPa	82.0	7.88	[Sandstone]	CL-CI	Grades: becoming moderately weathered				
		Is(50) A=0.36 MPa	81.0	8.50	[Sandstone]	CL-CI	Grades: becoming low strength				
		Is(50) A=0.23 MPa	80.0	8.95	[Sandstone]	CL-CI	SHALE/SANDSTONE interbeds: dark grey to black, very low strength, extremely to highly weathered				
		Is(50) A=0.68 MPa	79.0	9.82	[Sandstone]	CL-CI	SANDSTONE: medium-coarse grained, pale grey, medium to high strength, slightly weathered				
		Is(50) A=0.02 MPa	78.0	10.20	[Sandstone]	CL-CI	SANDSTONE: medium-coarse grained, pale grey, high strength, slightly weathered				
	Is(50) A=1.66 MPa	77.0	12.50	[Sandstone]	CL-CI	SANDSTONE: medium-coarse grained, pale grey, high strength, slightly weathered				[Bentonite]	
	Is(50) A=0.76 MPa	76.0	15.50	[Sandstone]	CL-CI	Grades: clay seam (15.5-15.55m)				[Sand]	
	Is(50) A=1.17 MPa	75.0	16.10	[Sandstone]	CL-CI	Hole Terminated at 16.10 m - Target depth achieve				[Sand]	



## Appendix B: Laboratory Results

**Geotesta Pty Ltd (NSW)**  
**Unit 6, 20/22 Foundry Road**  
**Seven Hills**  
**NSW 2147**



**NATA Accredited**  
**Accreditation Number 1261**  
**Site Number 18217**

Accredited for compliance with ISO/IEC 17025 – Testing  
 NATA is a signatory to the ILAC Mutual Recognition  
 Arrangement for the mutual recognition of the  
 equivalence of testing, medical testing, calibration,  
 inspection, proficiency testing scheme providers and  
 reference materials producers reports and certificates.

**Attention:** **Mahdi Ashtari**

**Report** **1256199-S**  
 Project name **2-8 Highgate Rd and 1-3 Woodside Avenue Lindfield**  
 Project ID **NE2139/40**  
 Received Date **Aug 14, 2025**

Client Sample ID			<b>S-1-BH1-0.3m</b>	<b>S-2-BH1-1.0m</b>	<b>S-3-BH2-0.7m</b>	<b>S-4-BH2-3.5m</b>
Sample Matrix			<b>Soil</b>	<b>Soil</b>	<b>Soil</b>	<b>Soil</b>
Eurofins Sample No.			<b>S25- Au0037350</b>	<b>S25- Au0037351</b>	<b>S25- Au0037352</b>	<b>S25- Au0037353</b>
Date Sampled			<b>Aug 13, 2025</b>	<b>Aug 13, 2025</b>	<b>Aug 13, 2025</b>	<b>Aug 13, 2025</b>
Test/Reference	LOR	Unit				
Chloride	10	mg/kg	< 10	13	< 10	22
Conductivity (1:5 aqueous extract at 25 °C as rec.)	10	uS/cm	18	33	19	26
pH (1:5 Aqueous extract at 25 °C as rec.)	0.1	pH Units	7.1	5.2	5.7	5.9
Resistivity*	0.5	ohm.m	550	310	540	380
Sulphate (as SO4)	10	mg/kg	< 10	38	26	17
<b>Acid Sulfate Soils Field pH Test</b>						
pH-F (Field pH test)*	0.1	pH Units	7.6	5.3	5.4	5.7
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	5.1	4.0	4.8	4.9
Reaction Ratings**S05	0	comment	4.0	2.0	2.0	1.0
<b>Sample Properties</b>						
% Moisture	1	%	19	14	20	17

Client Sample ID			<b>S-5-BH3-1.5m</b>	<b>S-6-BH3-2.5m</b>	<b>S-7-BH4-0.5m</b>	<b>S-8-BH4-1.5m</b>
Sample Matrix			<b>Soil</b>	<b>Soil</b>	<b>Soil</b>	<b>Soil</b>
Eurofins Sample No.			<b>S25- Au0037354</b>	<b>S25- Au0037355</b>	<b>S25- Au0037356</b>	<b>S25- Au0037357</b>
Date Sampled			<b>Aug 13, 2025</b>	<b>Aug 13, 2025</b>	<b>Aug 13, 2025</b>	<b>Aug 13, 2025</b>
Test/Reference	LOR	Unit				
Chloride	10	mg/kg	< 10	< 10	< 10	14
Conductivity (1:5 aqueous extract at 25 °C as rec.)	10	uS/cm	12	43	78	54
pH (1:5 Aqueous extract at 25 °C as rec.)	0.1	pH Units	5.8	5.1	8.0	5.6
Resistivity*	0.5	ohm.m	830	230	130	190
Sulphate (as SO4)	10	mg/kg	11	71	29	120
<b>Acid Sulfate Soils Field pH Test</b>						
pH-F (Field pH test)*	0.1	pH Units	5.5	5.4	8.6	5.7
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	4.3	3.4	6.6	4.7
Reaction Ratings**S05	0	comment	1.0	3.0	3.0	2.0
<b>Sample Properties</b>						
% Moisture	1	%	13	14	19	25

**Sample History**

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

<b>Description</b>	<b>Testing Site</b>	<b>Extracted</b>	<b>Holding Time</b>
Chloride - Method: LTM-INO-4270 Anions by Ion Chromatography	Sydney	Aug 14, 2025	28 Days
Conductivity (1:5 aqueous extract at 25 °C as rec.) - Method: LTM-INO-4030 Conductivity	Sydney	Aug 14, 2025	7 Days
pH (1:5 Aqueous extract at 25 °C as rec.) - Method: LTM-GEN-7090 pH by ISE	Sydney	Aug 14, 2025	7 Days
Sulphate (as SO <sub>4</sub> ) - Method: In-house method LTM-INO-4270 Sulphate by Ion Chromatograph	Sydney	Aug 14, 2025	28 Days
Acid Sulfate Soils Field pH Test - Method: LTM-GEN-7060 Determination of field pH (pHF) and field pH peroxide (pHFOX) tests	Sydney	Aug 14, 2025	7 Days
% Moisture - Method: LTM-GEN-7080 Moisture	Sydney	Aug 14, 2025	14 Days

<b>Melbourne</b> 6 Monterey Road Dandenong South VIC 3175 +61 3 8564 5000 NATA# 1261 Site# 1254	<b>Geelong</b> 19/8 Lewalan Street Grovedale VIC 3216 +61 3 8564 5000 NATA# 1261 Site# 25403	<b>Sydney</b> 179 Magowar Road Girraween NSW 2145 +61 2 9900 8400 NATA# 1261 Site# 18217	<b>Canberra</b> Unit 1,2 Dacre Street Mitchell ACT 2911 +61 2 6113 8091 NATA# 1261 Site# 25466	<b>Brisbane</b> 1/21 Smallwood Place Murarie QLD 4172 +61 7 3902 4600 NATA# 1261 Site# 20794 & 2780	<b>Newcastle</b> 1/2 Frost Drive Mayfield West NSW 2304 +61 2 4968 8448 NATA# 1261 Site# 25079	<b>Perth</b> 46-48 Banksia Road Welshpool WA 6106 +61 8 6253 4444 NATA# 2377 Site# 2370 & 2554	<b>Auckland</b> 35 O'Rorke Road Penrose Auckland 1061 +64 9 526 4551 IANZ# 1327	<b>Auckland (Focus)</b> Unit C1/4 Pacific Rise Mount Wellington Auckland 1061 +64 9 525 0568 IANZ# 1308	<b>Christchurch</b> 43 Detroit Drive Rolleston Christchurch 7675 +64 3 343 5201 IANZ# 1290	<b>Tauranga</b> 1277 Cameron Road Gate Pa Tauranga 3112 +64 9 525 0568 IANZ# 1402
---	--	--	--	---	--	--	--	--	---	--

 web: www.eurofins.com.au  
 email: EnviroSales@eurofinsanz.com

**Company Name:** Geotesta Pty Ltd (NSW)  
**Address:** Unit 6, 20/22 Foundry Road  
 Seven Hills  
 NSW 2147

**Project Name:** 2-8 Highgate Rd and 1-3 Woodside Avenue Lindfield  
**Project ID:** NE2139/40

**Order No.:**  
**Report #:** 1256199  
**Phone:** 1300852 216  
**Fax:**
**Received:** Aug 14, 2025 1:55 PM  
**Due:** Aug 20, 2025  
**Priority:** 4 Day  
**Contact Name:** Mahdi Ashtari

**Eurofins Analytical Services Manager : Adam Bateup**

Sample Detail						Acid Sulfate Soils Field pH Test	Aggressivity Soil Set	Moisture Set
Sydney Laboratory - NATA # 1261 Site # 18217						X	X	X
External Laboratory								
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID			
1	S-1-BH1-0.3m	Aug 13, 2025		Soil	S25-Au0037350	X	X	X
2	S-2-BH1-1.0m	Aug 13, 2025		Soil	S25-Au0037351	X	X	X
3	S-3-BH2-0.7m	Aug 13, 2025		Soil	S25-Au0037352	X	X	X
4	S-4-BH2-3.5m	Aug 13, 2025		Soil	S25-Au0037353	X	X	X
5	S-5-BH3-1.5m	Aug 13, 2025		Soil	S25-Au0037354	X	X	X
6	S-6-BH3-2.5m	Aug 13, 2025		Soil	S25-Au0037355	X	X	X
7	S-7-BH4-0.5m	Aug 13, 2025		Soil	S25-Au0037356	X	X	X
8	S-8-BH4-1.5m	Aug 13, 2025		Soil	S25-Au0037357	X	X	X
<b>Test Counts</b>						8	8	8

## Internal Quality Control Review and Glossary

### General

- Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follow guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013. They are included in this QC report where applicable. Additional QC data may be available on request.
- Unless otherwise stated, all soil/sediment/solid results are reported on a dry weight basis.
- Unless otherwise stated, all biota/food results are reported on a wet weight basis on the edible portion.
- For CEC results where the sample's origin is unknown or environmentally contaminated, the results should be used advisedly.
- Actual LORs are matrix dependent. Quoted LORs may be raised where sample extracts are diluted due to interferences.
- Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds where annotated.
- SVOC analysis on waters is performed on homogenised, unfiltered samples unless noted otherwise.
- Samples were analysed on an 'as received' basis.
- Information identified in this report with **blue** colour indicates data provided by customers that may have an impact on the results.
- This report replaces any interim results previously issued.

### Holding Times

Please refer to the 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours before sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and despite any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the sampling date; therefore, compliance with these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether, the holding time is seven days; however, for all other VOCs, such as BTEX or C6-10 TRH, the holding time is 14 days.

### Units

<b>mg/kg:</b> milligrams per kilogram	<b>mg/L:</b> milligrams per litre	<b>ppm:</b> parts per million
<b>µg/L:</b> micrograms per litre	<b>ppb:</b> parts per billion	<b>%:</b> Percentage
<b>org/100 mL:</b> Organisms per 100 millilitres	<b>NTU:</b> Nephelometric Turbidity Units	<b>MPN/100 mL:</b> Most Probable Number of organisms per 100 millilitres
<b>CFU:</b> Colony Forming Unit	<b>Colour:</b> Pt-Co Units (CU)	

### Terms

<b>APHA</b>	American Public Health Association
<b>CEC</b>	Cation Exchange Capacity
<b>COC</b>	Chain of Custody
<b>CP</b>	Client Parent - QC was performed on samples pertaining to this report
<b>CRM</b>	Certified Reference Material (ISO17034) - reported as percent recovery.
<b>Dry</b>	Where moisture has been determined on a solid sample, the result is expressed on a dry weight basis.
<b>Duplicate</b>	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
<b>LOR</b>	Limit of Reporting.
<b>LCS</b>	Laboratory Control Sample - reported as percent recovery.
<b>Method Blank</b>	In the case of solid samples, these are performed on laboratory-certified clean sands and in the case of water samples, these are performed on de-ionised water.
<b>NCP</b>	Non-Client Parent - QC performed on samples not pertaining to this report, QC represents the sequence or batch that client samples were analysed within.
<b>RPD</b>	Relative Percent Difference between two Duplicate pieces of analysis.
<b>SPIKE</b>	Addition of the analyte to the sample and reported as percentage recovery.
<b>SRA</b>	Sample Receipt Advice
<b>Surr - Surrogate</b>	The addition of a similar compound to the analyte target is reported as percentage recovery. See below for acceptance criteria.
<b>TBTO</b>	Tributyltin oxide ( <i>bis</i> -tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment; however, free tributyltin was measured, and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
<b>TCLP</b>	Toxicity Characteristic Leaching Procedure
<b>TEQ</b>	Toxic Equivalency Quotient or Total Equivalence
<b>QSM</b>	US Department of Defense Quality Systems Manual Version 6.0
<b>US EPA</b>	United States Environmental Protection Agency
<b>WA DWER</b>	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

### QC - Acceptance Criteria

The acceptance criteria should only be used as a guide and may be different when site-specific Sampling Analysis and Quality Plan (SAQP) have been implemented.

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is ≤30%; however, the following acceptance guidelines are equally applicable:

Results <10 times the LOR:	No Limit
Results between 10-20 times the LOR:	RPD must lie between 0-50%
Results >20 times the LOR:	RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range, not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS. SVOCs recoveries 20 – 150%, VOC recoveries 50 – 150%

PFAS field samples containing surrogate recoveries above the QC limit designated in QSM 6.0, where no positive PFAS results have been reported or reviewed, and no data was affected.

### QC Data General Comments

- Where a result is reported as less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
- Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown are not data from your samples.
- pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
- Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery, the term "INT" appears against that analyte.
- For Matrix Spikes and LCS results, a dash "-" in the report means that the specific analyte was not added to the QC sample.
- Duplicate RPDs are calculated from raw analytical data; thus, it is possible to have two sets of data.

**Quality Control Results**

Test				Units	Result 1		Acceptance Limits	Pass Limits	Qualifying Code
<b>Method Blank</b>									
Conductivity (1:5 aqueous extract at 25 °C as rec.)				uS/cm	< 10		10	Pass	
<b>Method Blank</b>									
Chloride				mg/kg	< 10		10	Pass	
Sulphate (as SO4)				mg/kg	< 10		10	Pass	
<b>LCS - % Recovery</b>									
Conductivity (1:5 aqueous extract at 25 °C as rec.)				%	100		70-130	Pass	
<b>LCS - % Recovery</b>									
Chloride				%	108		70-130	Pass	
Sulphate (as SO4)				%	106		70-130	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
<b>Spike - % Recovery</b>									
					Result 1				
Chloride	S25-Au0037354	CP	%	112			70-130	Pass	
Sulphate (as SO4)	S25-Au0037354	CP	%	105			70-130	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
<b>Duplicate</b>									
					Result 1	Result 2	RPD		
Conductivity (1:5 aqueous extract at 25 °C as rec.)	S25-Au0037354	CP	uS/cm	12	13	8.0	30%	Pass	
Resistivity*	S25-Au0037354	CP	ohm.m	830	770	8.0	30%	Pass	
<b>Duplicate</b>									
					Result 1	Result 2	RPD		
Chloride	S25-Au0037357	CP	mg/kg	14	14	<1	30%	Pass	
Sulphate (as SO4)	S25-Au0037357	CP	mg/kg	120	93	22	30%	Pass	
<b>Duplicate</b>									
<b>Acid Sulfate Soils Field pH Test</b>					Result 1	Result 2	RPD		
pH-F (Field pH test)*	S25-Au0037357	CP	pH Units	5.7	5.7	pass	20%	Pass	
pH-FOX (Field pH Peroxide test)*	S25-Au0037357	CP	pH Units	4.7	4.5	pass	30%	Pass	
<b>Duplicate</b>									
<b>Sample Properties</b>					Result 1	Result 2	RPD		
% Moisture	S25-Au0037357	CP	%	25	23	10	30%	Pass	

**Comments**
**Sample Integrity**

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	No
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

**Qualifier Codes/Comments**

Code	Description
S05	Field Screen uses the following fizz rating to classify the rate the samples reacted to the peroxide: 1.0; No reaction to slight. 2.0; Moderate reaction. 3.0; Strong reaction with persistent froth. 4.0; Extreme reaction.

**Authorised by:**

Nileshni Goundar	Analytical Services Manager
Ryan Phillips	Senior Analyst-Sample Properties
Dilani Samarakoon	Senior Analyst-SPOCAS
Ryan Phillips	Senior Analyst-Inorganic



**Glenn Jackson**  
**Managing Director**

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

\* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please [click here](#).

Eurofins shall not be liable for loss, cost, damages or expenses incurred by the client, or any other person or company, resulting from the use of any information or interpretation given in this report. In no case shall Eurofins be liable for consequential damages including, but not limited to, lost profits, damages for failure to meet deadlines and lost production arising from this report. This document shall not be reproduced except in full and relates only to the items tested. Unless indicated otherwise, the tests were performed on the samples as received.



**SYDNEY | MELBOURNE | BRISBANE | PERTH**

Phone: 1300 852 216

Email: [info@geotesta.com.au](mailto:info@geotesta.com.au)

[www.geotesta.com.au](http://www.geotesta.com.au)