eiaustralia

Contamination | Remediation | Geotechnical

CITE DEVELOPMENTS NO2 PTY LTD

Preliminary Geotechnical Assessment

21 Oaks Avenue, Dee Why, NSW

E26229.G01_Rev2
6 May 2024

Document Control

Report Title: Preliminary Geotechnical Assessment, 21 Oaks Avenue, Dee Why, NSW

Report No: E26229.G01_Rev2

Copies	Recipient
1 Soft Copy (PDF – Secured, issued by email)	Cite Developments No2 Pty Ltd Mr. Moe Jaara PO Box 456 Pyrmont NSW 2009
2 Original (Saved to Digital Archives) (\\Pah\ei-au$\07 - Projects\E26229_Cite Group_Dee Why_PSI_PGA\05_Deliverables\Work in Progress\G01\E26229.G01_Rev2 - Cite Developments_Dee Why_PGA Report.docx)	EI Australia Suite 6.01, 55 Miller Street, PYRMONT NSW 2009

Author	Technical Reviewer
	
Ernest Widjaja **Geotechnical Engineer**	**Mike Leung** **Principal Geotechnical Engineer**

Anthony Camillos
Geotechnical Engineer

Revision	Details	Date	Amended By
-	Original	29 November 2023	
1	Updated Architectural Drawings	8 February 2024	E2/AC
2	Address DA Comment	6 May 2024	ML

Table of Contents

		Page Number
1.	**INTRODUCTION**	**1**
1.1	Background	1
1.2	Proposed Development	1
1.3	Assessment Objectives	1
2.	**SITE DESCRIPTION**	**2**
2.1	Site Description and Identification	2
2.2	Local Land Use	2
2.3	Regional Setting	3
2.4	Conceptual Ground Model	4
3.	**RECOMMENDATIONS**	**5**
3.1	Geotechnical Overview	5
3.2	Dilapidation Surveys	5
3.3	Excavation Methodology and Vibration Monitoring	5
3.3.1	*Preliminary Excavation Assessment*	*5*
3.3.2	*Excavation Monitoring*	*5*
3.3.3	*Site Preparation and Earthworks*	*6*
3.4	Excavation Retention and Retaining Walls	6
3.5	Groundwater Considerations	7
3.6	WaterNSW/DCCEEW Requirements	8
3.7	Foundation Options	8
4.	**CONCLUSIONS**	**9**
5.	**FURTHER GEOTECHNICAL INPUTS**	**9**
6.	**STATEMENT OF LIMITATIONS**	**10**
REFERENCES		**11**
ABBREVIATIONS		**11**

Schedule of Tables

Table 2-1	Summary of Site Information	2
Table 2-2	Summary of Local Land Use	3
Table 2-3	Topographic and Geological Information	3
Table 2-4	Conceptual Ground Model	4

Appendices

FIGURES

Figure 1 Site Locality Plan

APPENDIX A – IMPORTANT INFORMATION

1. Introduction

1.1 Background

At the request of Gartner Trovato Architects Pty Ltd on behalf of Cite Developments No2 Pty Ltd (the Client), EI Australia (EI) has carried out a Preliminary Geotechnical Assessment (PGA) for the proposed development at 21 Oaks Avenue, Dee Why, NSW (the Site).

This PGA report has been undertaken to assess the likely site surface and subsurface conditions and anticipated geotechnical factors associated with the proposed development, in support of a Development Application to Northern Beaches Council, and the preparation of the initial design of the proposed development.

1.2 Proposed Development

The following documents, supplied by the Client, were used to assist in the preparation of this PGA report:

- Architectural drawings prepared by Gartner Trovato Architects Pty Ltd – Project No. 2226, Drawing Nos. A00 to A12, Revision A, dated on 7 February 2024; and
- Site survey plan prepared by SDG Pty Ltd – Referenced 8737, dated 17 May 2022. The datum in the survey plan is in Australian Height Datum (AHD), hence all Reduced Levels (RL) mentioned in this report are henceforth in AHD.

Based on the provided documents, EI understands that the proposed development involves the demolition of the existing site structures and the construction of a seven-storey mixed use development overlying a two-level basement. The lowest basement level is proposed to have a finished floor level (FFL) of between RL 11.59m and 11.92m AHD. A Bulk Excavation Level (BEL) ranging between RL 11.29m and 11.62 AHD is assumed, which includes allowance for the construction of the basement slab. To achieve the BEL, excavation depths from 4.9m to 6.8m Below Existing Ground Level (BEGL) have been estimated. Locally deeper excavations may be required for footings, lift shafts, water tanks, and service trenches.

1.3 Assessment Objectives

This PGA report has been undertaken to assess the likely Site surface and subsurface conditions for the development of a preliminary conceptual ground model of soil, rock and groundwater conditions beneath the site based on our experience and previous investigations within the vicinity of the site. This model is to assist in providing preliminary geotechnical advice and recommendations for consideration in the preparation of concept designs and construction methodologies for the proposed development including:

- Dilapidation surveys;
- Excavation assessment;
- Groundwater considerations;
- Excavation retention;
- Preliminary building foundation options including preliminary design parameters; and
- The requirement for specific geotechnical investigations for detailed design post-DA and following site clearance.

2. Site Description

2.1 Site Description and Identification

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

Table 2-1 Summary of Site Information

Information	Detail
Street Address	21 Oaks Avenue, Dee Why, NSW.
Lot and Deposited Plan (DP) Identification	Lot 10, Section 15 in DP8172.
Brief Site Description	The site comprises a two-storey commercial brick dwelling fronting Oaks Avenue with a small tree cover yard with a canal along the southern boundary.
Site Area	The site area is approximately 678 m² (Excluding Road Widening Zone) and 770.9 m² (Including Road Widening Zone) based on the survey plans referenced above.

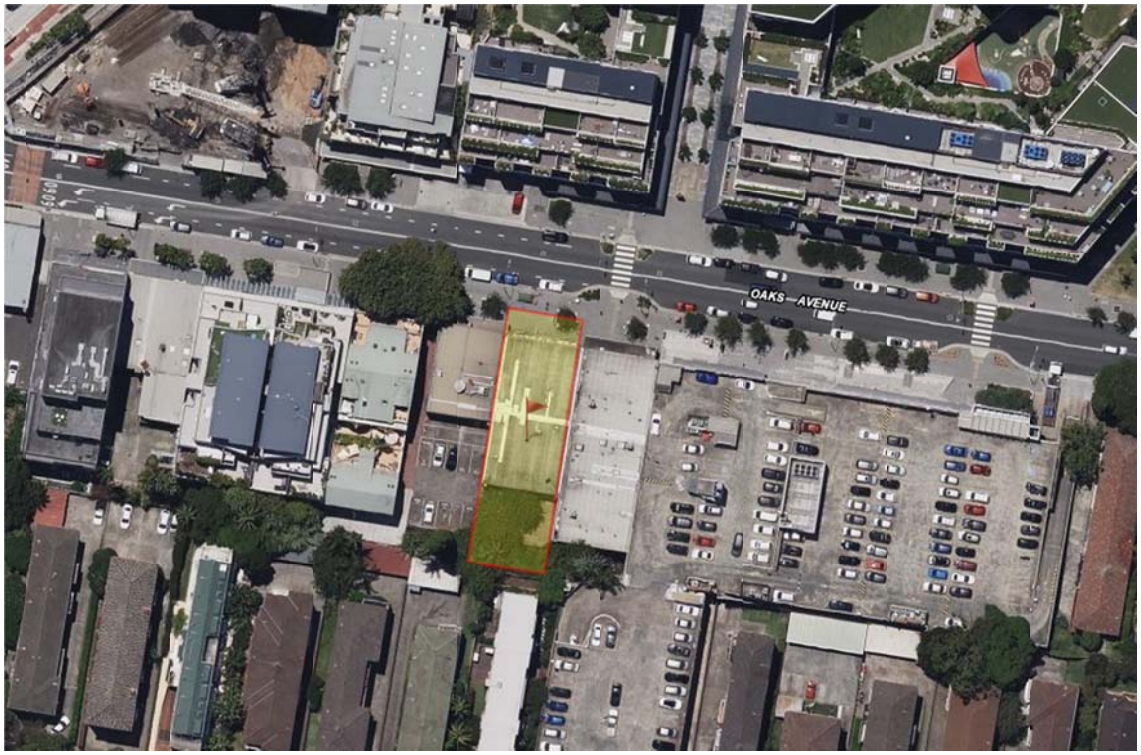


Plate 1: Aerial photograph of the site (source: SIXMaps, accessed 29/11/23)

2.2 Local Land Use

The site is situated within an area of commercial use. Current uses on surrounding land at the time of our presence on site are described in **Table 2-2** below. For the sake of this report, the site boundary nearest to Oaks Avenue shall be adopted as the northern site boundary.

Table 2-2 Summary of Local Land Use

Direction Relative to Site	Land Use Description
North	Oaks Avenue, a two lane, asphalt-paved road with dedicated parking in both directions. The footpath is noted being very wide in this section with an EV charging station located approximately 7.0m from the northern site boundary.
East	Property at 23 Oaks Avenue, a two-storey commercial building. The building abuts the site boundary.
South	Properties at 28 and 30 Pacific Parade three storey residential apartment buildings with a partial basement observed at No. 28. The closest building is noted as being offset by approximately 4.8m from the southern site boundary however a cement block wall is offset only 1.7m from the site boundary.
West	Property at 17 and 19 Oaks Avenue, a two-storey commercial building with an at grade parking lot to the south of the site. the building abuts the site boundary.

2.3 Regional Setting

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

Table 2-3 Topographic and Geological Information

Attribute	Description
Topography	The site is located on the south side of the Oaks Avenue within approximately flat topography with site levels varying from R.L. 18.4 m AHD at the Southern side to R.L. 17.2 at the northern site corner.
Regional Geology	Information on regional sub-surface conditions, referenced from the Department of Mineral Resources Geological Map Sydney 1:100,000 Geological Series Sheet 9130 (DMR 1983) indicates the site to be underlain by Hawkesbury Sandstone, which consists of medium to coarse-grained quartz sandstone with very minor shale and laminite lenses. EI notes that the site is on the boundary of a Quaternary Alluvial deposit (Qha) which typically comprises silty to peaty quartz sand, silt and clay.
Drainage	Likely to be consistent with site slope (i.e. to the east). Stormwater expected to be collected in local council stormwater drains and discharged into the local drainage line (75m to the east).
Nearest Surface Water Feature	Concrete lined open channel running in an approximate north-east alignment towards Dee Why Lagoon
Expected groundwater conditions	Based on a review of the EI data set of the previous projects nearby, the following findings can be provided ▪ Site 60m west of the subject site: A geotechnical investigation was carried out in June 2020, during which groundwater was encountered at five CPT (Cone Penetration Test) location at depths of between about 4.5m to 5.3m Below Ground Level (BGL) or equivalent to RL12.7mAHD to RL13.5m AHD.

2.4 Conceptual Ground Model

A summary of subsurface ground conditions likely to be encountered at the Site is presented in **Table 2-4** below. The information presented below is inferred from a review of our in-house database and our knowledge of the area. Based on regional information, the subsurface conditions around the site are likely to be comprised of fill, overlying alluvium and residual soils overlying sandstone bedrock. The depth to bedrock may be in excess of 20m.

Table 2-4 Conceptual Ground Model

Unit	Material	Comment
1	Fill	Fill material is inferred to be uncontrolled and poorly compacted. Filling may be deeper beneath the existing site structures and within landscaped areas of the site.
2	Alluvium	Interbedded sand and clay of variable strength/density is expected. Based on limited in-house information, this layer may be up to 20 m in depth.
3	Residual Soil	Sandy Clay/Clayey Sand, grading onto extremely weathered material.
4	Sandstone	Sandstone is expected to be initially of very low strength and distinctly weathered. The strength generally increases and weathering generally decreases with depth. Based on previous investigations carried out within the area of the site, we expect the depth to bedrock may be 15m BEGL or deeper.

Based on the limited in-house information available for the area, the depth to groundwater is inferred to be between 4 to 6 m BEGL.

3. Recommendations

3.1 Geotechnical Overview

Considering the proposed development and likely subsurface conditions that may be encountered, we consider the following to be the main geotechnical issues for the proposed development:

- Basement excavatability and vibration monitoring;
- Excavation retention;
- Possible presence of deep, interbedded alluvial soil of variable strength/density;
- Foundation design for building loads;
- Depth to bedrock; and
- Depth of groundwater.

Further discussions on the above issues are provided in the following sections.

3.2 Dilapidation Surveys

Dilapidation surveys should be carried out on the adjoining structures and infrastructures that fall within the zone of influence of the excavation. The zone of influence of the excavation can be defined as a horizontal distance back from the edge of the excavation of at least twice the excavation depth.

3.3 Excavation Methodology and Vibration Monitoring

3.3.1 Preliminary Excavation Assessment

In order to achieve the assumed BEL for the proposed two level basements, excavation depths of 4.9m to 6.8m BEGL is expected across the site. It is likely that the proposed excavation will therefore extend through Units 1 and 2 as described in **Table 2-4** above.

Prior to any excavation commencing:

- An appropriate full depth retention system must be installed; and
- Reference must be made to the Safe Work Australia Excavation Work Code of Practice – January 2020.

Units 1, 2 and 3 (if encountered) can be readily excavated by buckets of medium to large earthmoving hydraulic excavators.

3.3.2 Excavation Monitoring

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

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

- Limit lateral deflection of temporary or permanent retaining structures;

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

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

- Prior to commencement of excavations;
- Immediately after installation of any temporary or permanent retaining structures;
- Immediately after the excavation has reached a depth of 1.5 m, and each 1.5 m depth increment thereafter;
- Immediately after the excavation has reached bulk excavation level; and
- Immediately after backfilling behind retaining structures.

3.3.3 Site Preparation and Earthworks

Working platforms for construction plant, placed on in-situ materials or on new fill, may be required and should be designed by a geotechnical engineer.

3.4 Excavation Retention and Retaining Walls

From a Geotechnical perspective, it is critical to maintain the stability of the adjacent structures and infrastructures during demolition and excavation works. Excavations and retention systems will need to take into consideration the stability of adjoining structures so as not to have any adverse effects on the buildings and structures adjoining the excavation.

Based on the provided architectural drawings, the basement excavation perimeter is proposed to abut the eastern and western site boundaries and be offset by approximately 6.1m from the northern and southern site boundaries. Based on the expected in-situ geological profile and groundwater conditions, temporary batters are not recommended for this site. Hence, a retention system will be required for the support of the entire excavation.

Due to the limited offsets EI notes that the footings of the neighbouring buildings should be investigated, prior to the excavation of the capping beam. If the capping beam is located below the existing footings, underpinning of the neighbouring properties will be required prior to the installation of the shoring system.

The primary issues associated with the excavation will be controlling the groundwater and provide adequate support to adjoining structures/infrastructures. Groundwater is expected to be encountered during excavation. Therefore, to allow for the construction of the basement slab, lift pits and service trenches in ‘dry’ condition, temporary dewatering will be required. In this regards, it is anticipated that the groundwater table will be maintained at a depth of about 1 m below the bulk excavation level and potentially deeper around lift pits or working platforms (if required).

Dewatering has the potential to cause some drawdown and ground settlement below the adjoining sites; the extent of the drawdown depends upon the depth to which the cut-off system is installed and the pumping operations. Outlets into the stormwater system will require Council approval.

As EI expected alluvial soils and groundwater table within the proposed excavation depth, a suitable retention system may comprise an anchored of propped Cutter Soil Mix (CSM) wall or secant pile wall. The retention system must be installed to below Bulk Excavation Level (BEL) (including footings, service trenches and lift overrun pits) a sufficient depth to satisfy stability, piping, founding and groundwater cut-off considerations. Anchors must be installed progressively for lateral restraint as excavation proceeds. Where permission for the installation of anchors beneath adjoining properties is not granted, internal props or bracing may be required.

3.5 Groundwater Considerations

Based on the limited in-house information available for the area, the depth to groundwater is inferred to be between 4 to 6m BEGL, which is above the excavation level. There is likelihood that the basement will intersect the groundwater table. We recommend that groundwater monitoring wells be installed to facilitate groundwater level measurements, monitoring of the groundwater levels, and enables completion of pump out (rising head) tests at the site to appreciate the groundwater regime, fluctuation range, and estimation of hydraulic conductivity for the substrata. The purpose of the groundwater level monitoring is as follows:

- Appreciate the groundwater regime as it in turn informs the design of retention structures and the need for a hydrostatic basement slab;
- Impact of the groundwater on construction methodology and selection of appropriate shoring design and piling technique;
- Assist in finalisation of the drainage system, and inform the need for a tanked basement.
- Estimation of the groundwater seepage into the excavation during the course of basement excavation, and in service should the basement be designed as drained;

Groundwater samples are recommended to be collected from the groundwater monitoring wells for assessment of aggressivity towards buried steel and concrete structures in accordance with

In the event that the groundwater is above the BEL, dewatering will be required during construction. Dewatering has the potential to cause some drawdown and ground settlement below adjoining sites; the extent of the drawdown depends upon the depth to which the cut-off system is installed and the pumping operations. Settlements would affect any adjoining buildings supported on shallow footing systems and if records of the footing systems of the adjoining buildings are available, these should be reviewed to assess the risk from dewatering.

A critical factor relating to dewatering of the site is maintenance of the depressed groundwater levels until such a time as the building has significant weight to prevent movement should the pump system fail and the groundwater level rise.

Groundwater monitoring wells in the form of standpipe piezometers will need to be installed to facilitate measurement and monitoring of groundwater levels.

EI recommends a Groundwater Take Assessment is undertaken to estimate the groundwater inflows into the excavation, for both during construction and in the long term.

A detailed monitoring program should be implemented to identify the risks and trigger levels decided for when the contingency measures need to be taken.

3.6 WaterNSW/DCCEEW Requirements

Following the demolition of the existing building, detailed geotechnical and environmental assessments should be carried out to assess the localized groundwater level and quality. In the event that the groundwater is above the proposed BEL, dewatering will be required in the course of basement excavation and construction.

Council and the Department of Climate Change, Energy, the Environment and Water (DCCEEW) do not allow permanent dewatering; therefore, the basement must be designed as a tanked structure where the basement intersects the groundwater table. Temporary dewatering for construction purposes is normally allowed provided it is properly designed and managed to ensure that the likely drawdown will have no adverse impact on adjoining structures/infrastructures. A dewatering licence may also be required.

Groundwater quality testing, particularly with regard to acidity generated as a result of acid sulfate soils, will be required to permit discharge into the stormwater. Outlets into the stormwater system will require Council approval.

3.7 Foundation Options

Given the expectation of relatively deep alluvial materials a raft slab maybe a suitable option, however given the mixed nature of the material a pile stiffened raft slab may be the most suitable option.

In the case of a piled stiffened raft slab, the piles are designed to their ultimate capacity and act as settlement reducers to the stiffened raft slab. However specific details of the raft slab and piles will need to be finalised after the geotechnical investigation has been undertaken.

Alternatively piled footings to Unit 4 Sandstone may be considered.

For piles founded on Unit 4 sandstone, these must be embedded a minimum of 0.5m into the sandstone bedrock, and can be preliminarily designed for a maximum allowable bearing capacity of 600 kPa. The Allowable shaft adhesion equal to 10% of the allowable bearing pressure in compression may also be used.

Grout Injected CCFA piles are recommended for this site. Due to the collapsible nature of the sands and the presence of groundwater, a cased continuous flight auger (CCFA) is considered most suitable for this site to prevent soil loss during the installation of piles. For piles founded into sandstone bedrock, relatively large capacity piling rigs with rock augers and coring buckets will be required if drilling through the sandstone bedrock.

Design of piles should consider the aggressivity of the soil and groundwater in accordance with Sections 6.4 and 6.5 of AS2159-2009.

EI recommends a geotechnical investigation to be carried out following demolition, with at least 4 CPTs should be taken to refusal of the hard soil/bedrock. Additionally at least 2 cored boreholes should be undertaken to confirm the depth and quality of the underlying bedrock.

4. Conclusions

This PGA report provides preliminary advice for construction at the site based on available information prior to intrusive geotechnical investigations. Geotechnical factors which may influence the development at the site include:

- Presence of deep, variably interbedded alluvial soil (predominantly sand);
- Foundation conditions of adjoining properties
- Depth to bedrock; and
- Depth of groundwater.

Further geotechnical investigation and design inputs are required during the detailed design phase prior to and during construction. These are detailed further in **Section 5** of this report.

5. Further Geotechnical Inputs

Detailed geotechnical subsurface investigation prior to final design to determine the site specific subsurface profile and geotechnical parameters for design of footings is recommended.

The Geotechnical Investigation should involve:

- At least four CPTs within the site taken to refusal of hard soil/bedrock.
- At least two cored boreholes undertaken to confirm the depth and quality of the bedrock.
- At least two groundwater monitoring well within the site to monitor the groundwater levels and for completion of pump out tests.
- Groundwater take assessment to assess the inflow volumes once the design of shoring system is available.

We do not recommend that the final design be carried out based on this PGA report. The PGA report must be reviewed following the completion of the intrusive geotechnical investigation.

In addition, Geotechnical Inspections of footings/piles should be carried out during the construction stage to check the initial assumptions about the Geological profile, foundations conditions and likely variations that may occur between borehole locations and to provide additional advice.

6. Statement of Limitations

This report has been prepared for the exclusive use of Cite Developments No2 Pty Ltd who is the only intended beneficiary of EI's work. The scope of the investigations carried out for the purpose of this report is limited to those agreed by Cite Developments No2 Pty Ltd.

This PGA report is purely a desktop assessment and no intrusive works were carried out at the Site. Further geotechnical investigation and design input are required during the detailed design phase prior to and during construction. These are detailed further in **Section 5** of this report.

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

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

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

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

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

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

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

References

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

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

AS3600:2009, *Concrete Structures,* Standards Australia

Safe Work Australia Excavation Work Code of Practice, dated January 2020 – WorkCover NSW

NSW Department of Finance and Service, Spatial Information Viewer, maps.six.nsw.gov.au.

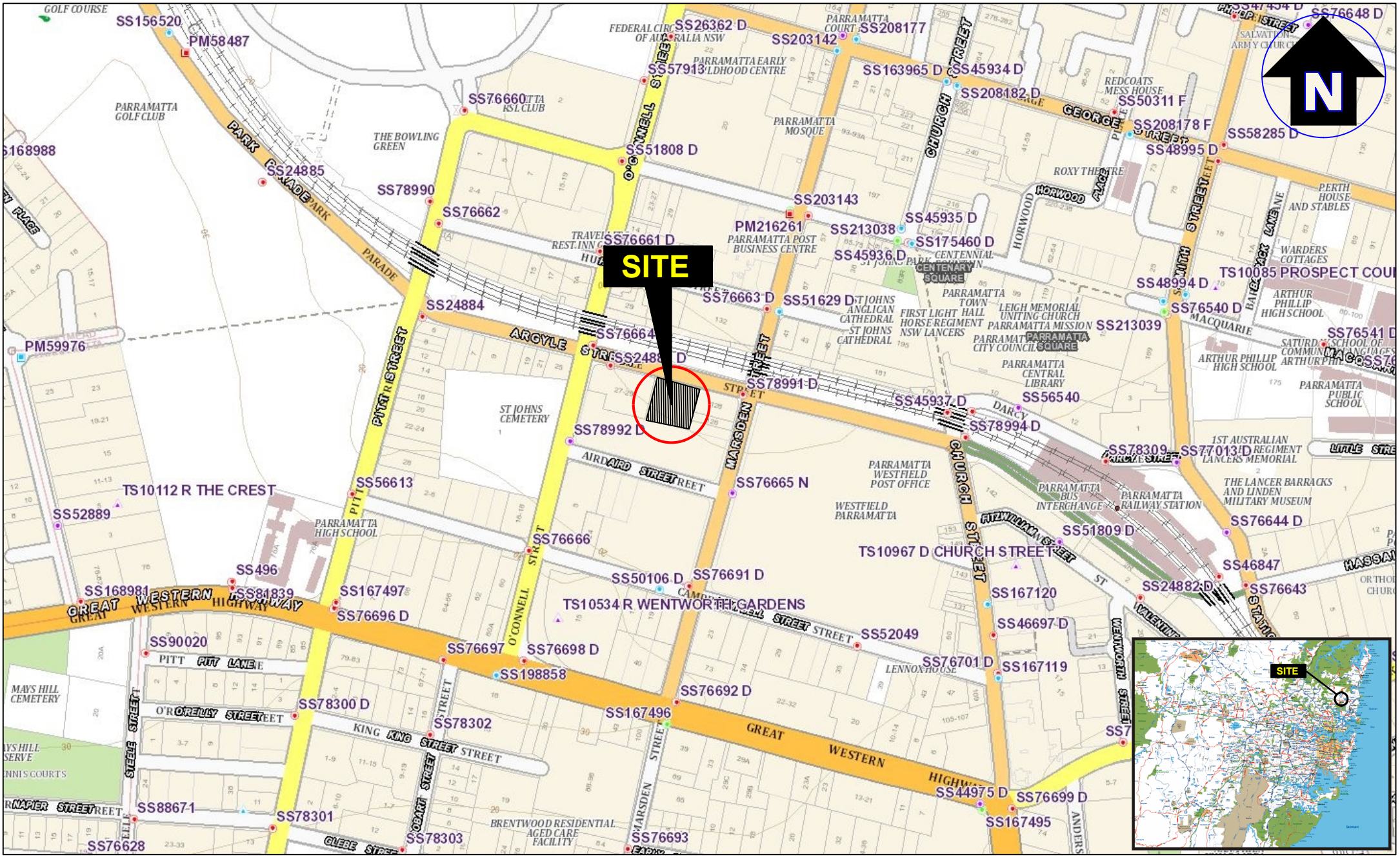
NSW Department of Mineral Resources (1983) Sydney 1:100,000 Geological Series Sheet 9130 (Edition 1). Geological Survey of New South Wales, Department of Mineral Resources.

Abbreviations

AHD	Australian Height Datum
AS	Australian Standard
BEGL	Below Existing Ground Level
DP	Deposited Plan
EI	EI Australia
PGA	Preliminary Geotechnical Assessment
RL	Reduced Level

Figures

Figure 1 Site Locality Plan



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

Drawn:	A.E.
Approved:	M.L.
Date:	12-12-23
Scale:	Not To Scale

TE2 Roxy Argyle Pty Ltd

Preliminary Geotechnical Assessment
33 Argyle Street, Parramatta, NSW

Site Locality Plan

Figure: 1

Project: E26220.G01

Appendix A – Important Information

Important Information

SCOPE OF SERVICES

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

RELIANCE ON DATA

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

GEOTECHNICAL ENGINEERING

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

LIMITATIONS OF SITE INVESTIGATION

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

SUBSURFACE CONDITIONS ARE TIME DEPENDENT

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

VERIFICATION OF SITE CONDITIONS

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

REPRODUCTION OF REPORTS

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

REPORT FOR BENEFIT OF CLIENT

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

OTHER LIMITATIONS

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