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PRELIMINARY GEOTECHNICAL INVESTIGATION REPORT

271 Warringah Road,

Beacon Hill NSW

Prepared for

Water Lifestyle Network Pty Ltd

Report No: GS9688/1-A

10th September 2025

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REFERENCES

1. Australian Standard – AS 1726-2017 Geotechnical Site Investigation.
2. Australian Standard – AS 1170.4-2007 Structural Design Actions – Part 4: Earthquake actions in Australia.
3. Australian Standard – AS3798-2007 Guidelines on Earthworks for Commercial and Residential Developments.
4. Australian Standard – AS 2870-2011 Residential slabs and footings.
5. Australian Standard – AS 2159-2009 Piling - Design and installation.
6. Pells P.J.N, Mostyn, G. & Walker B.F., “Foundations on Sandstone and Shale in the Sydney Region”, Australian Geomechanics Journal, 1998.

1. INTRODUCTION

GSNE Services Pty Ltd ("GSNE Services") was appointed by Water Lifestyle Network Pty Ltd (the "client") to undertake a Preliminary Geotechnical Site Investigation ("GSI") within the property located at 271 Warringah Road, Beacon Hill NSW (the "site"). The location of the property is presented in Figure 1 of Appendix B.

The site investigation was carried out on 25th August 2025 and was followed by geotechnical interpretation, assessment, and preparation of a geotechnical report.

The purpose of the investigation was to assess the ground conditions and feasibility of the site from a geotechnical perspective for the proposed development. The investigation included assessment of the site's existing geotechnical conditions to provide general recommendations for the design and construction of the proposed development.

This report presents the results of the geotechnical site investigation, laboratory testing, interpretation, and an assessment of the site's existing geotechnical conditions as a basis to provide recommendations for the design and construction of ground structures for the proposed development.

To assist in reading the report, reference should be made to the "Important Information about Your Geotechnical Report" attached as Appendix A.

2. AVAILABLE INFORMATION

Before preparing this report, the following information was made available to or was referred to by GSNE:

- Structural drawings prepared by CAM Consulting Structural & Civil Engineers, Job No.C24130, Drawing No. C24130-E00-E10, dated 23rd August 2025.
- Survey report by Total Surveying Solutions, Job no.240046, Plan no.240046-1, dated 20 February 2024.

3. SCOPE OF WORK

Following the brief, fieldwork for the geotechnical site investigation was carried out by an Experienced Geotechnical Professional from GSNE Services, following in general the guidelines provided in Australian Standard AS 1726-2017 (Reference 1) and comprised the following:

- Collate and review Dial-Before-You-Dig (DBYD) plans.
- A site walk-over inspection by a Geotechnical Engineer in order to determine the overall surface conditions and to identify relevant site features.
- Review of DBYD plans and service locating carried out using electromagnetic detection equipment to ensure that the investigation locations are free from underground utilities.
- Machine drilling of one (1) borehole including auguring and rock coring.
- The approximate location of the borehole completed during the site investigation is shown on Figure 1 in Appendix B.

- Soil and rock logged in accordance with AS1726-2017 Geotechnical Investigations.
- Recovered soil samples sent to NATA certified laboratories for Soil Salinity and Aggressivity tests.
- Rock cores placed in boxes, logged, photographed and taken to our laboratory for point load strength testing.
- One groundwater monitoring well was installed and groundwater levels measured to establish the groundwater level.

Based on the results of the site investigation and laboratory testing, GSNE carried out a geotechnical interpretation and assessment of the main potential geotechnical issues that may be associated with the proposed development. This geotechnical report was prepared to summarise the results of the geotechnical site investigation, interpretation, assessment, and recommendation.

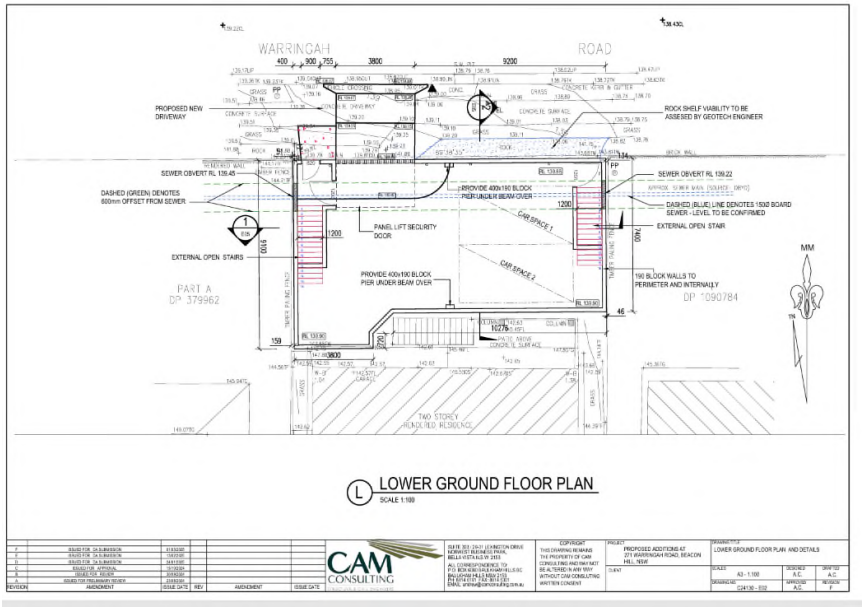
4. SITE DESCRIPTION

The site is located at 271 Warringah Road, Beacon Hill NSW, within the Northern Beaches Local Government Area, and is registered as Lot 7 in DP 654934. The site has an area of approximately 396.9m^2 and is rectangular in shape.

The site currently contains a double-storey house. The site is defined by small trees along the northern boundary. Vehicular access (concrete driveway) to the site is provided at the northern boundary of the site from Warringah Road, which is relatively sloping towards northern side, the reminder of the site is relatively flat. No surface standing water was observed.

5. PROPOSED DEVELOPMENT

Based on the information provided by the client and the architectural drawings, we understand that the proposed development will comprise excavation at the site frontage for a new car park and podium. Refer to the lower ground floor plan below.



6. SUBSURFACE CONDITIONS

6.1 Geology

Reference to the Sydney 1:100,000 Geological Series Sheet 9130 Edition 1, dated 1983, by the Geological Survey of New South Wales, Department of Mineral Resources, indicates the site is underlain by Hawkesbury Sandstone (Rh) comprising medium to coarse grained sandstone very minor shale and laminate lenses.

The assessment of the subsurface materials observed and discussed in Section 6.2, is consistent with the published geology, (Rh) encountered at the greatest depths reached.

6.2 Ground Profile

The subsoil conditions encountered within the boreholes are summarised in Table 1 and are described in detail in the attached engineering borehole logs, core photographs, laboratory test results and point load tests (i.e. Appendices C to E). The ground excavation characteristics and related design purposes should be according to the borehole logs and specific test results.

In general terms, the ground profile comprises:

1. Topsoil / Fill materials.
2. Soil comprising generally Silty Sand.
3. Highly to moderately weathered Sandstone.
4. Medium to high Strength Sandstone Class III/II

Geotechnical ground model in more detail is shown in Table 1.

Table 1. Geotechnical Model - Summary of Subsurface Conditions (depth)

Unit	Description	BH1(1)
Surface levels (m AHD) approximately		142.65
FILL / TOPSOIL	Silty Sand, medium grained dark grey, poorly compacted	0.0-0.2
Residual	Silty Sand, fine to medium grained with sandstone pieces	0.2-0.65
Bedrock (2)	Sandstone, highly weathered, assessed Class III Sandstone[1,] Medium Strength	0.65-2.70
	Sandstone, highly weathered, assessed Class IV Sandstone[1,] Low Strength	2.70-3.9
	Sandstone, highly to moderately weathered, assessed Class III Sandstone[1,] Medium Strength	3.9-4.7
	Sandstone, highly to moderately weathered, assessed Class II Sandstone[1,] High Strength	4.7-6.35

1 The depths are meters below ground level and are based on the information from the test locations only and do not necessarily represent the maximum and minimum values across the site

2. Classified according to Pells P.J.N, Mostyn G. & Walker B.F. Foundations on Sandstone and Shale in the Sydney Region, Australian Geomechanics Journal, 1998 (Reference 2)

6.3 Groundwater

Groundwater was not encountered during auger boring in the borehole. Water level measurement was not possible during core drilling in the rock due to the appearance of water required for coring.

One groundwater monitoring well was installed in the borehole drilled.

After installing the PVC 50mm 3m screen at the bottom and a 3m casing on top in the drilled borehole, the water from the monitoring well was bailed out on the 25th August 2025. The monitoring well was then not measured for a period of 10 days to allow for the underlying groundwater conditions to re-equilibrate following on from the drilling process where water was introduced. On the 5th September 2025, a Geotechnical Engineer from GSNE Services went to the site to measure the groundwater level, with no groundwater observed / detected in the borehole.

Natural groundwater flows may be in the form of minor seepage through natural joints and defects in the bedrock. After heavy rain, groundwater may be present in the fill due to infiltration from the surface. It should be noted that groundwater levels may be subject to seasonal and daily fluctuations influenced by factors like rainfall and the future development of the surrounding properties.

6.4 Laboratory Testing

Recovered soil samples from the site were submitted to the following laboratories:

- SGS Environmental for soil chemical analysis.
- GSNE Services for point load testing for rock core samples.

These tests included:

- Chemical testing (Salinity, pH, Chloride (Cl^-), sulphates (SO_4^{2-}), and electrical conductivity) to assess soil salinity and aggressively towards buried concrete and steel piles or other structures.
- Point Load Strength Index (PLSI) testing on rock core samples from borehole (total of 12 samples) for rock substance strength (Is_{50}).

6.5 Soil Salinity and Aggressivity Test Results

Soil samples recovered from the boreholes were tested for salinity, electrical conductivity (EC), pH, chloride (Cl-) and Sulphate (S04) content.

The results are presented in Table 2, with the details attached in Appendix D. Results are assessed in conjunction with the exposure classification for soil aggressive levels for buried concrete and steel elements, following AS 2159-2009.

Table 2. Soil Salinity and Aggressivity Test Results

Borehole	Depth (m) bgl	pH	Conductivity (µS/cm)	Sulphate (SO_4) (mg/kg or ppm)	Chloride (CL^-) (mg/kg or ppm)	Salinity Condition
BH1	0.2-0.4	6.0	12	<5.0	1.4	Non saline
BH1	0.4-0.6	5.8	16	<5.0	2.0	Non saline

The above test results indicate that the site is non saline, non-aggressive to steel piles and mild-aggressive for concrete piles.

6.6 Exposure Classification

An Exposure classification of A1 for Concrete in Saline soils, and an Exposure classification of A2 for Concrete in Sulphate and Chloride soils.

6.7 Point Load Strength Index Test Results

The point load test results (Is_{50}) range from 0.29-1.71, corresponding to unconfined compressive strength values of 5.72 to 34.12 MPa, using a multiplication factor of twenty. The details of the results are summarised in Appendix E.

7. GEOTECHNICAL ASSESSMENT

7.1 General

Based on the ground conditions encountered during the investigation, it was found that filling material varied between 0.1m to 0.2m BGL, underlain by residual Silty Sand, underlain by highly to moderately weathered bedrock.

Key geotechnical constraints to the development include excavation conditions, groundwater control (during construction and long-term), temporary shoring, permanent retaining, foundation conditions, and hazards related to slope instability risk. Recommendations for the design and construction of the development are provided in the following sections.

7.2 Site Lot Classification

After considering the area geology, the soil profile encountered in the borehole, the site is classified as CLASS 'S' with respect to foundation construction (Australian Standard 2870-2011 Residential Slabs and Footings).

It has been estimated that the Characteristic Surface Movement (ys) of the underlying natural soil material will be in the range of 0-20mm.

7.3 Excavation Conditions

Excavation is expected to be through fill materials, then residual soils and sandstone bedrock of variable strength. Excavation within the soil and highly weathered low strength bedrock is expected to be readily achieved using a large hydraulic excavator down to the level of medium strength bedrock. However, localised use of rock breaking equipment or ripping may be required if and where high strength bands are encountered.

Excavation in medium strength rock will require the use of heavy ripping and/or hydraulic rock hammers. Excavation for foundations or trenches in this strength of rock would require the use of hydraulic hammers and possibly a rock saw. Both noise and vibration would be generated by any excavation work within these bedrock materials.

Where dust is likely to be a nuisance, suitable screens or barricades may be adopted during demolition, excavation and building works. Water sprays may also be used to dampen down the surface and reduce dust emission.

The rock classification system in Table 1 above is intended for use in the design of foundations and should not be used to directly assess the rock excavation characteristics. Contractors should refer to the engineering logs, core photographs, and point load test results when assessing the suitability of their excavation equipment.

7.4 Vibration Control

Consideration should be given to a vibration monitoring plan to monitor the potential vibration effects of demolition works, during piling and excavation on existing buildings within adjoining properties, and roads along the site boundary.

Recommended Maximum Peak Particle Velocity (PPV) for different types of buildings or structures is summarised in Table 3. Induced vibrations in structures adjacent to the excavation should not be exceeded.

Table 3. Recommended Maximum Peak Particle Velocity

Type of Building or Structure	Max. PPV (mm/sec)
Historical or structures in sensitive conditions	2
Residential and low-rise buildings	5
Brick or unreinforced structures in good condition	10
Commercial and industrial buildings or structures of reinforced concrete or steel construction.	25

It is recommended to carry out monitoring during excavation using a vibration monitoring instrument (seismograph) and alarm levels (being the appropriate PPV) selected in accordance with the type of structures present within the zone of influence of the proposed excavation.

If vibrations in adjacent structures exceed the above values or appear excessive during construction, excavation should cease, and the project Geotechnical Engineer should be contacted immediately for appropriate reviews.

It is recommended that a dilapidation survey of the existing buildings within adjoining properties is conducted. Preparation of dilapidation survey report and vibration monitoring plan together with vibration monitoring should constitute as “Hold Points”.

7.5 Batter Slopes

The following temporary batter slopes may be considered for areas where sufficient space exists between the proposed basement and the boundaries, dependent on the slope of the adjacent existing ground, and where any adjacent buildings (or infrastructure) are located outside a zone of influence obtained by drawing a line up at 45° from the toe of the proposed excavation.

Recommended maximum slopes for temporary batters are provided in Table 4 below.

Table 4. Recommended Batter Slopes (Temporary)

Material	Max. Batter Slope (H: V)
Natural Soils	1.5:1
Class IV Sandstone	1:1
Class III Sandstone	0.5:1
Class II Sandstone	Vertical

[1] Subject to assessment by a Geotechnical Professional Engineer to assess stability and provide recommendations as required.

Where batter slopes are not considered appropriate, temporary shoring should be provided. Shoring design should consider both short-term (construction) and permanent conditions as well as the presence of adjacent buildings and roads.

Where any adjacent buildings (or infrastructure) are located within a zone of influence obtained by drawing a line up at 45° from the toe of the proposed excavation, consideration should be given to inspection pits to determine the requirement for underpinning any affected adjacent properties.

Based on the ground conditions encountered and the requirements of the proposed development, consideration may be given to contiguous pile wall. The use of contiguous pile walls allows a small gap between piles which could allow groundwater inflow during excavation. The use of strip drains behind the piles and shotcrete in weak areas susceptible to inflow during excavation, may limit the amount of groundwater ingress but may be limited in its effectiveness if inflow rates are high.

All vertical drains should be connected to a perimeter drain provided at the toe of the final excavation, which should be discharged to the site stormwater system to provide long term drainage behind excavation walls.

For the maximum retained height being considered, a temporary anchorage system is likely to be required to provide the required lateral support during construction. Where two or more rows of anchors are required to support the shoring due to increased retained height or where significant lateral movements cannot be tolerated (e.g. due to adjacent infrastructure), the shoring/basement wall should be designed as a braced structure.

Anchor designs should be based on allowing effective bonding to be developed behind an ‘active zone’ determined by drawing a line at 45° from the base of the wall to intersect the ground surface behind the excavated face. It is considered that basement

floor slabs will provide permanent restraint to the retaining walls where these are incorporated into the permanent works. Anchors are therefore considered to be temporary but depending on the sensitivity of the adjacent infrastructure, it may be necessary to incorporate the temporary anchors into the permanent works to control deflections.

Anchor installation beyond the property boundaries will be subject to approval by owners of adjoining properties, and roads. Where an anchorage system is shown to be impractical, or limiting deflection of the shoring wall and adjacent assets is critical, then consideration of other temporary support options would be necessary.

These options include the following:

- Temporary solutions such as installation of props associated with staged excavation.
- Staged excavations and temporary partial berms in front of walls.
- Top-down construction where floor slabs and beams are constructed at the top of the shoring wall and at floor levels of the upper basement levels prior to excavation within the basement level underneath the floor slabs.

The shoring wall and anchors can be designed using the recommended parameters provided in Section 7.5 below.

As well as vibration monitoring outlined in Section 7.3, monitoring of shoring to ensure lateral movement is within tolerable limits should also be carried out adjacent to the existing buildings and road (RMS) infrastructure.

This should be carried out as part of a Geotechnical Monitoring Plan.

Detailed design of anchored or propped retaining walls should utilise commercial software packages such as Wallap, RS2 or Plaxis 2D/3D that can model the sequence of anchor installation and excavation to ensure deflections are within tolerable limits, and the effect of excavation on adjacent road. The design of retaining structures should also consider horizontal pressures due to surcharge loads from any adjacent infrastructure.

A dilapidation survey may be required prior to excavation for the existing buildings within the adjoining properties and the section of roads adjoining the site.

Detailed construction supervision, monitoring and inspections will be required during bulk excavation and should be carried out by an experienced Geotechnical Engineer, in addition to inspection of the structural elements by the Project Structural Engineer. The inspections should constitute as “Hold Points”.

7.6 Earth Retaining Structures

Earth retaining structures should be designed to withstand the lateral earth pressure, hydrostatic pressure and earthquake load (if applicable) pressures, and the applied surcharge loads in their zone of influence, including existing structures, traffic and construction related activities.

For the design of flexible retaining structures, where some lateral movement is acceptable, it is recommended that the design be based on active lateral earth pressure. Should it be critical to limit the horizontal deformation of a retaining structure, use of an earth pressure coefficient “at rest” should be considered, such as the case when the shoring wall is in the final permanent state and is restrained by the concrete slab in its final state.

Recommended parameters for the design of earth retaining structures in the soils and rock horizons underlying the site are presented in Table 5. Parameters are from Bertuzzi and Pells 2002 paper.

Table 5. Geotechnical Design Parameters for Retaining Structures

Unit	Unit Weight Υ(kN/m^3)	Effective Cohesion *c'* (kPa)	Effective Internal Friction Angle Φ' (degrees)	Modulus of Elasticity $E_{s,h}$ (MPa)
Residual Silty Sand, loose to medium dense	19	2	26	10
Sandstone Class IV	23	100	35	300
Sandstone Class III	24	250	35	600
Sandstone Class II	25	350	37	1200

Table 6 provides coefficients of lateral earth pressure for the soils and rock horizons encountered during the geotechnical site investigation. The coefficients provided are based on a horizontal ground surface and fully drained conditions.

Table 6. Coefficients of Lateral Earth Pressure

Unit	Coefficient of Active Lateral Earth Pressure Ka[(1)]	Coefficient of Lateral Earth Pressure at rest Ko[(1)]	Coefficient of Passive Lateral Earth Pressure Kp[(2)]
Natural Sandy Soils	0.39	0.56	2.56
Sandstone, Class IV	0.30	0.44	3.54

(1) These values assume that some wall movement and relaxation of horizontal stress will occur due to the excavation. Actual in-situ K_0 values may be higher, particularly in the rock units. For Class II and III Shale, geotechnical inspection of the excavated faces may be required.

(2) Includes a reduction factor to the ultimate value of Kpa to consider strain incompatibility between active and passive pressure conditions. Parameters assume horizontal backfill and not back wall friction.

- If present, adverse jointing systems in the rock may result in higher active earth pressures than those outlined above. Potential areas of block or wedge failure

should therefore be identified during construction and appropriate stabilization measures adopted.

- Coefficient of active and passive lateral earth pressure Ka and Kp, respectively, can be calculated using Rankine's or Coulomb's equations, as appropriate.
- Coefficient of lateral earth pressure at rest Ko, can be calculated using Jacky's equation.

The coefficients of lateral earth pressure should be verified by the project Structural Engineer prior to use in the design of retaining walls. Simplified calculations of lateral active (or at rest) and passive earth pressures can be carried out using Rankine's equation shown below:

$Pa = K\,\gamma\,H - 2c\sqrt{K}$ For calculation of Lateral Active or At Rest Earth Pressure

$Pp = K_p\,\gamma\,H + 2c\sqrt{K_p}$ For calculation of Passive Earth Pressure

Where:

Pa = Active (or at rest) Earth Pressure (kN/m^2)

Pp = Passive Earth Pressure (kN/m^2)

γ = Bulk density (kN/m^3)

K = Coefficient of Earth Pressure (Ka or Ko)

K_p = Coefficient of Passive Earth Pressure

H = Retained height (m)

c = Effective Cohesion (kN/m^2)

If adopted, temporary anchors will require embedment in bedrock. Allowable bond stresses may be adopted for temporary anchors, as detailed in Table 7 below.

Table 7. Allowable Bond Stress for Temporary Anchors

Units	Allowable Bond Stress (KPa)
Class IV Sandstone	250
Class III Sandstone	350
Class II Sandstone	800

Anchors should undergo proof testing following installation. The anchors can be designed for the parameters recommended above providing:

- For the allowable bond stresses listed above, it is assumed that the boreholes for each anchor are bored using standard percussive techniques and are well cleaned to have a suitable socket roughness to achieve these allowable bond stresses.
- Anchors are proof tested to 1.3 times the design working load specified by the Structural Engineer, before they are locked off at working load. Anchor testing should constitute as a “Hold Point”.

7.7 Foundations

7.7.1 Strip/Pad Footing System and Slab panels and internal beams

The footings for the proposed development will likely be established in Sandstone (Class IV/III). The strip/pad footings for small/isolated structures may be found in the highly weathered sandstone, The allowable bearing capacities presented in Table 9 can be adopted for the design of the pad/strip footings and slab panels/internal beams for proposed development at the site.

It should be noted that the soil profile may vary across the site. The foundation depths quoted in this report are measured from the surface during our testing and may vary accordingly if any filling or excavation works are carried out.

The Settlement of a footing is dependent on the load applied to the footing and the foundation conditions below the footing. All footings for the same structure should be found on the strata of similar stiffness to minimize the risk of differential movements, with articulation provided where appropriate.

Design of shallow and pile foundations should be carried out in accordance with Australian Standards AS2870-2011 (Reference 4) and AS2159-2009 (Reference 5), respectively.

Table 8 provides geotechnical parameters recommended for design of Pad foundations.

Table 8. Geotechnical Foundation Design Capacities

Material	Allowable Bearing Capacity (kPa)
Natural Sandy Soils	100
Class IV Sandstone	1000
Class III Sandstone	3500

7.7.2 Bored Piles

It is recommended that all footings be found on consistent bedrock. Considering piles may be required include the need to increase the resistance against lateral seismic and wind loads.

Table 9 provides geotechnical parameters recommended for design of pile foundations.

Table 9. Allowable End Bearing and Adhesion for Piles

Unit	Allowable End Bearing Capacity (kPa)		Ultimate Capacity Values	
	End Bearing Pressure (kPa)	Shaft Adhesion Compression (Tension)	End Bearing Pressure (MPa)	Shaft Adhesion Compression (Tension) (kPa)
Sandstone Class IV	1200	80 (40)	3.6	240 (120)
Sandstone Class III	3500	250 (125)	10.5	750(375)
Sandstone Class II	6000	500 (250)	20	1500 (750)

[1] Minimum embedment depths of one (1) and three (3) pile diameters in/to the Sandstone are necessary to achieve these allowable design values for end bearing and adhesion, respectively

.
Rock classes based on the criteria in Pells et al (1998) paper "Foundations on Shale and Sandstone in the Sydney Region". Bearing capacity values are also from Pells et al. (1998).

An experienced Geotechnical Professional should review footing designs to ensure compliance with the recommendations in the geotechnical report and assess foundation excavations to ensure suitable materials of appropriate bearing capacity have been reached. The presence of water within foundation excavations may negate satisfactory examination of founding surfaces and certification of founding materials quality. Foundation inspections should only be undertaken under conditions satisfying WHS requirements.

Verification of the capacity of the shallow foundations by inspections would be required and inspections should constitute "Hold Points".

7.8 Site Earthquake Classification

The results of the geotechnical site investigation indicate the presence of fill and natural cohesive soils, underlain by Class IV/III Sandstone of low to medium strength.

In accordance with Australian Standard AS 1170.4-2007 (Reference 2) the site may be classified as a "Rock site" (Class B_e) for design of foundations and retaining walls embedded in the bed rock.

The Hazard Factor (Z) for Sydney in accordance with AS 1170.4-2007 is 0.08.

8. LIMITATIONS

The geotechnical assessment of the subsurface profile and geotechnical conditions within the proposed development area and the conclusions and recommendations presented in this report have been based on available information obtained during the work carried out by GSNE Services and in the provided documents listed in Section 2 of this report. Inferences about the nature and continuity of ground conditions away from and beyond the locations of field exploration tests are made but cannot be guaranteed.

It is recommended that ground conditions including subsurface and groundwater conditions, encountered during construction and excavation vary substantially from those presented within this report, GSNE Services, be contacted immediately for further advice and any necessary review of recommendations. GSNE Services does not accept any liability for site conditions not observed or accessible during the time of the investigation or inspection.

This report and associated documentation and the information provided herein have been prepared solely for the use of **Water Lifestyle Network Pty Ltd** and any reliance assumed by third parties on this report shall be at such parties' own risk. Any ensuing liability resulting from the use of the report by third parties cannot be transferred to GSNE Services, directors or employees.

Thank you for the opportunity to undertake this work. We would be pleased to provide further information on any aspects of this report.

For and on behalf of

GSNE Services Pty Ltd

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APPENDIX A

IMPORTANT INFORMATION ABOUT YOUR GEOTECHNICAL REPORT

IMPORTANT INFORMATION ABOUT YOUR GEOTECHNICAL ENGINEERING REPORT

More construction problems are caused by site subsurface conditions than any other factor. As troublesome as subsurface problems can be, their frequency and extent have been lessened considerably in recent years, due in large measure to programs and publications of ASFE/ The Association of Engineering Firms Practicing in the Geosciences.

The following suggestions and observations are offered to help you reduce the geotechnical-related delays, cost-overruns and other costly headaches that can occur during a construction project.

A GEOTECHNICAL ENGINEERING REPORT IS BASED ON A UNIQUE SET OF PROJECT-SPECIFIC FACTORS

A geotechnical engineering report is based on a subsurface exploration plan designed to incorporate a unique set of project-specific factors. These typically include the general nature of the structure involved, its size and configuration, the location of the structure on the site and its orientation, physical concomitants such as access roads, parking lots, and underground utilities, and the level of additional risk which the client assumed by virtue of limitations imposed upon the exploratory program.

To help avoid costly problems, consult the geotechnical engineer to determine how any factors which change subsequent to the date of the report may affect its recommendations.

Unless your consulting geotechnical engineer indicates otherwise, *your geotechnical engineering report should NOT be used:*

- when the nature of the proposed structure is changed: for example, if an office building will be erected instead of a parking garage, or if a refrigerated warehouse will be built instead of an un-refrigerated one,
- when the size or configuration of the proposed structure is altered,
- when the location or orientation of the proposed structure is modified,
- when there is a change of ownership, or

for application to an adjacent site.

Geotechnical engineers cannot accept responsibility for problems which may develop if they are not consulted after factors considered in their report's development have changed.

Geotechnical reports present the results of investigations carried out for a specific project and usually for a specific phase of the project. The report may not be relevant for other phases of the project, or where project details change.

The advice herein relates only to this project and the scope of works provided by the Client.

Soil and Rock Descriptions are based on AS1726-1993, using visual and tactile assessment except at discrete locations where field and/or laboratory tests have been carried out. Refer to the attached terms and symbols sheets for definitions.

MOST GEOTECHNICAL "FINDINGS" ARE PROFESSIONAL ESTIMATES

Site exploration identifies actual subsurface conditions only at those points where samples are taken, when they are taken. Data derived through sampling and subsequent laboratory testing are extrapolated by geotechnical engineers who then render an opinion about overall subsurface conditions, their likely reaction to proposed construction activity, and appropriate foundation design. Even under optimal circumstances actual conditions may differ from those inferred to exist, because no geotechnical engineer, no matter how

qualified, and no subsurface exploration program, no matter how comprehensive, can reveal what is hidden by earth, rock and time. The actual interface between materials may be far more gradual or abrupt than a report indicates. Actual conditions in areas not sampled may differ from predictions. *Nothing can be done to prevent the unanticipated, but steps can be taken to help minimize their impact. For this reason, most experienced owners retain their geotechnical consultants through the construction stage,* to identify variances, conduct additional tests which may be needed, and to recommend solutions to problems encountered on site.

SUBSURFACE CONDITIONS CAN CHANGE

Subsurface conditions may be modified by constantly changing natural forces. Because a geotechnical engineering report is based on conditions which existed at the time of subsurface exploration, *construction decisions should not be based on a geotechnical engineering report whose adequacy may have been affected by time.* Speak with the geotechnical consultant to learn if additional tests are advisable before construction starts.

Construction operations at or adjacent to the site and natural events such as floods, earthquakes or groundwater fluctuations may also affect subsurface conditions, and thus, the continuing adequacy of a geotechnical report. The geotechnical engineer should be kept apprised of any such events, and should be consulted to determine if additional tests are necessary.

Subsurface conditions can change with time and can vary between test locations. Construction activities at or adjacent to the site and natural events such as flood, earthquake or groundwater fluctuations can also affect the subsurface conditions.

GEOTECHNICAL SERVICES ARE PERFORMED FOR SPECIFIC PURPOSES AND PERSONS

Geotechnical engineers' reports are prepared to meet the specific needs of specific individuals. A report prepared for a consulting civil engineer may not be adequate for a construction contractor, or even some other consulting civil engineer. Unless indicated otherwise, this report was prepared expressly for the client involved and expressly for purposes indicated by the client. Use by any other persons for any purpose, or by the client for a different purpose, may result in problems.
No individual other than the client should apply this report for its intended purpose without first conferring with the geotechnical engineer. No person should apply this report for any purpose other than that originally contemplated without first conferring with the geotechnical engineer.

A GEOTECHNICAL ENGINEERING REPORT IS SUBJECT TO MISINTERPRETATION

Costly problems can occur when other design professional develop their plans based on misinterpretations of a geotechnical engineering report. To help avoid these problems, the geotechnical engineer should be retained to work with other appropriate design professionals to explain relevant geotechnical findings and to review the adequacy of their plans and specifications relative to geotechnical issues.

The interpretation of the discussion and recommendations contained in this report are based on extrapolation/interpretation from data obtained at discrete locations. Actual conditions in areas not sampled or investigated may differ from those predicted

BORING LOGS SHOULD NOT BE SEPARATED FROM THE ENGINEERING REPORT

Final boring logs are developed by geotechnical engineers based upon their interpretation of field logs (assembled by site personnel) and laboratory evaluation of field samples. Only final boring logs customarily are included in geotechnical engineering reports. These logs should not under any circumstances be redrawn for inclusion in architectural or other design drawings because drafters may commit errors or omissions in the

transfer process. Although photographic reproduction eliminates this problem, it does nothing to minimize the possibility of contractors misinterpreting the logs during bid preparation. When this occurs, delays, disputes and unanticipated costs are the all-too-frequent result.

To minimise the likelihood of boring log misinterpretation, give contractors ready access in the complete geotechnical engineering report prepared or authorized for their use. Those who do not provide such access may proceed under mistaken impression that simply disclaiming responsibility for the accuracy of subsurface information always insulates them from attendant liability. Providing the best available information to contractors helps prevent costly construction problems and the adversarial attitudes which aggravate them to disproportionate scale.

READ RESPONSIBILITY CLAUSES CLOSELY

Because geotechnical engineering is based extensively on judgment and opinion, it is far less exact than other design disciplines. This situation has resulted in wholly unwarranted claims being lodged against geotechnical consultants. To help prevent this problem, geotechnical engineers have developed model clauses for use in written transmittals. These are not exculpatory clauses designed to foist geotechnical engineers' liabilities onto someone else. Rather, they are definitive clauses which identify where geotechnical engineers' responsibilities begin and end. Their use helps all parties involved recognize their individual responsibilities and take appropriate action. Some of these definitive clauses are likely to appear in your geotechnical engineering report, and you are encouraged to read them closely. Your geotechnical engineer will be pleased to give full and frank answers to your questions.

OTHER STEPS YOU CAN TAKE TO REDUCE RISK

Your consulting geotechnical engineer will be pleased to discuss other techniques which can be employed to mitigate risk. In addition, ASFE has developed a variety of materials which may be beneficial. Contact ASFE for a complimentary copy of its publications directory.

FURTHER GENERAL NOTES

Groundwater levels indicated on the logs are taken at the time of measurement and may not reflect the actual groundwater levels at those specific locations. It should be noted that groundwater levels can fluctuate due to seasonal and tidal activities.

APPENDIX B

SITE LOCALITY & BOREHOLE LOCATIONS

SITE LOCALITY MAP

Source: http://maps.six.nsw.gov.au/

PROJECT DETAILS			DRAWING DETAILS			
Project Title	Geotechnical Site Investigation		**Figure No.**	1	**Rev No.**	0
Project No.	GS9688-1A		**Scale**	As above	**Size**	A4
Client	**Water Lifestyle Network Pty Ltd**		**Drawn by**	MP	**Date**	25.08.2025
Site Address	271 Warringah Rd, Beacon Hill NSW		**Approved by**	MP	**Date**	25.08.2025

GSNE SERVICES PTY LTD
SOLUTIONS THAT LAST

APPENDIX C

ENGINEERING BOREHOLE LOGS & ROCK CORE PHOTOGRAPHS

GEOTECHNICAL SITE INVESTIGATION LOG: BH1

GSNE SERVICES PTY LTD
SOLUTIONS THAT LAST

PROJECT NO.:	GS9688-1A	**DRILLING DATE:**	25-08-2025	**TOTAL DEPTH:**	0.65
PROJECT NAME:	271 Warringah Rd Beacon Hill	**DRILLING CO.:**	Hard Access Drilling	**COORDINATES:**	-33.75283, 151.25354
CLIENT:	Water Lifestyle Network Pty Ltd	**METHOD:**			
ADDRESS:	271 Warringah Rd Beacon Hill	**DRILLER:**		**GROUND ELEV.:**	
		LOGGED BY:	Mark Kelly	**CHECKED BY:**	NP

Method	Depth Scale	Soil Symbol	Lithologic Description	Dynamic Cone Penetration Test (DCPT)	Depth Scale	Comments / Additional Notes
			Ground Surface at			
Auger (Solid-Stem)	0		**FILL** SILTY SAND, fine to medium grained, dark grey 0.2 m		0	
			Marine SAND SILTY SAND, with sandstone pieces at 0.4m, medium grained, loose to medium dense, yellow brown 0.65 m			
	1		Test Hole BH1 Terminated at 0.65 m		1	Borehole continued as cored borehole
	2				2	
	3				3	
	4				4	
	5				5	

Disclaimer:

Consistency
- VS = Very Soft
- S = Soft
- F = Firm
- St = Stiff
- VSt = Very Stiff
- H = Hard

Density Index
- VL = Very Loose
- L = Loose
- MD = Mediium Dense
- D = Dense
- VD = Very Dense

Samples
- B = Bulk
- D = Disturbed
- U50 = Undisturbed Sample (Retrieved in 50mm dia tube)
- N = S.P.T Values

Moisture
- D = Dry
- M = Moist
- W = Wet
- Wp = Plastic Limit
- Wl = Liquid Limit

SHEET: 1 of 1

GEOTECHNICAL SITE INVESTIGATION LOG: BH1 -Core

GSNE SERVICES PTY LTD
SOLUTIONS THAT LAST

PROJECT NO.:	GS9688-1A	**DRILLING DATE:**	25-08-2025	**TOTAL DEPTH:**	6.35
PROJECT NAME:	271 Warringah Rd Beacon Hill	**DRILLING CO.:**	Hard Access Drilling	**COORDINATES:**	
CLIENT:	Water Lifestyle Network Pty Ltd	**METHOD:**			
ADDRESS:	271 Warringah Rd Beacon Hill	**DRILLER:**		**GROUND ELEV.:**	
		LOGGED BY:	Mark Kelly	**CHECKED BY:**	NP

Depth Scale	Drilling Method	Drill Run Info: Run No.	RQD or (%)	TCR (%)	Fractures	Strength	Weathering	Graphic Log	Lithologic Description	Defect Description	Comments / Additional Notes
									Ground Surface at		
0	Rock Coring Auger (Solid-Stem)								Coring starts from 0.65m		
									0.65 m		
1		1	75	100		M	HW		Bedrock SANDSTONE, fine to medium grained, Highly to moderately weathered, medium strength	10° Js Pln Ro Stn 5° Js Und Ro 15° Js Pln Ro Cn 2° Js Irr Ro Stn	
2		2	50	100		M	HW			1° Js Pln Ro Stn 4° Js Pln Ro Cn 3° Js Pln Ro Cn 4° Js Pln Ro Cn	
3		3	65	100		L	HW			Cs Ro Fl 15° Js Pln Ro Cn Cs Ro	
4		3	65	100		M	MW			BP Pln Ro Stn	
									4.7 m		
5		4	70	100		H	MW			10° Js Pln Ro Cn	

https://ilogweb.blob.core.windows.net/ilog/tenants/32312190-dd33-dc32-7206-3a0d9f2f6638/drill-method-icon/c8722aaa-a1d5-4823-99f8-1f5003e76833.avif

RSLog / MP Templete - Rock coring - Copy / aargus-pty-ltd / admin / September 02, 2025 06:11 PM

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GEOTECHNICAL SITE INVESTIGATION LOG: BH1 -Core

GSNE SERVICES PTY LTD
SOLUTIONS THAT LAST

PROJECT NO.:	GS9688-1A	**DRILLING DATE:**	25-08-2025	**TOTAL DEPTH:**	6.35
PROJECT NAME:	271 Warringah Rd Beacon Hill	**DRILLING CO.:**	Hard Access Drilling	**COORDINATES:**	
CLIENT:	Water Lifestyle Network Pty Ltd	**METHOD:**			
ADDRESS:	271 Warringah Rd Beacon Hill	**DRILLER:**		**GROUND ELEV.:**	
		LOGGED BY:	Mark Kelly	**CHECKED BY:**	NP

Depth Scale	Drilling Method	Drill Run Info: Run No.	RQD or (%)	TCR (%)	Fractures	Strength	Weathering	Graphic Log	Lithologic Description	Defect Description	Comments / Additional Notes
5	Rock Coring	4	70	100		H	MW		Bedrock *(continued)* SANDSTONE, Moderately weathered, medium to coarse grained, pale grey, high strength	5° Js Pln Ro Stn 1° Js Pln Ro Cn 4° Js Stp Ro Cn	
6									6.35 m Test Hole BH1 -Core Terminated at 6.35 m	1° Js Pln Ro Cn	Borehole terminated at 6.35m
7											
8											
9											
10											

https://ilogweb.blob.core.windows.net/ilog/tenants/3231219b-dd33-dc32-7206-3a0d9f2f6638/drill-method-icon/c8722aaa-a1d5-4823-99f8-1f5003e76833.avif

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- M = Moist
- W = Wet
- Wp = Plastic Limit
- Wl = Liquid Limit

APPENDIX D

LABORATORY TEST RESULTS

ANALYTICAL REPORT

Accreditation No. 2562

CLIENT DETAILS

Contact	Mark Kelly
Client	AARGUS ENGINEERING TRUST
Address	PO BOX 398 DRUMMOYNE NSW 1470
Telephone	1300137038
Facsimile	(Not specified)
Email	mark.kelly@aargus.net
Project	**GS9688-1A Geotechnical Investigation**
Order Number	**GS9688-1A**
Samples	2

LABORATORY DETAILS

Manager	Shane McDermott
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
SGS Reference	**SE288541 R0**
Date Received	28/8/2025
Date Reported	5/9/2025

COMMENTS

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

SIGNATORIES

Dong LIANG
Metals/Inorganics Team Leader

Ly Kim HA
Organic Section Head

Ying Ying ZHANG
Laboratory Technician

pH in soil (1:5) [AN101] Tested: 5/9/2025

PARAMETER	UOM	LOR	BH1 0.2-0.4 SOIL - 1/9/2025 SE288541.001	BH1 0.4-0.6 SOIL - 1/9/2025 SE288541.002
pH	pH Units	0.1	**6.0**	**5.8**

Conductivity and TDS by Calculation - Soil [AN106] Tested: 5/9/2025

PARAMETER	UOM	LOR	BH1 0.2-0.4 SOIL - 1/9/2025 SE288541.001	BH1 0.4-0.6 SOIL - 1/9/2025 SE288541.002
Conductivity of Extract (1:5 as received)	µS/cm	1	**12**	**16**
Salinity (by calculation)*	mg/kg	5	**42**	**58**

Soluble Anions (1:5) in Soil/Solids by Ion Chromatography [AN245] Tested: 5/9/2025

PARAMETER	UOM	LOR	BH1 0.2-0.4 SOIL - 1/9/2025 SE288541.001	BH1 0.4-0.6 SOIL - 1/9/2025 SE288541.002
Chloride	mg/kg	0.25	**1.4**	**2.0**
Sulfate	mg/kg	5	<5.0	<5.0

Moisture Content [AN002] Tested: 4/9/2025

PARAMETER	UOM	LOR	BH1 0.2-0.4 SOIL - 1/9/2025 SE288541.001	BH1 0.4-0.6 SOIL - 1/9/2025 SE288541.002
% Moisture	%w/w	1	**9.3**	**9.4**

METHOD	METHODOLOGY SUMMARY
AN002	The test is carried out by drying (at either 40°C or 105°C) a known mass of sample in a weighed evaporating basin. After fully dry the sample is re-weighed. Samples such as sludge and sediment having high percentages of moisture will take some time in a drying oven for complete removal of water.
AN101	pH in Soil Sludge Sediment and Water: pH is measured electrometrically using a combination electrode and is calibrated against 3 buffers purchased commercially. For soils, sediments and sludges, an extract with water (or 0.01M CaCl2) is made at a ratio of 1:5 and the pH determined and reported on the extract. Reference APHA 4500-H+.
AN106	Conductivity and TDS by Calculation: Conductivity is measured by meter with temperature compensation and is calibrated against a standard solution of potassium chloride. Conductivity is generally reported as µmhos /cm or µS/cm @ 25°C. For soils, an extract of as received sample with water is made at a ratio of 1:5 and the EC determined and reported on the extract, or calculated back to the as-received sample. Salinity can be estimated from conductivity using a conversion factor, which for natural waters, is in the range 0.55 to 0.75. Reference APHA 2510 B.
AN245	Anions by Ion Chromatography: A water sample is injected into an eluent stream that passes through the ion chromatographic system where the anions of interest ie Br, Cl, NO2, NO3 and SO4 are separated on their relative affinities for the active sites on the column packing material. Changes to the conductivity and the UV-visible absorbance of the eluent enable identification and quantitation of the anions based on their retention time and peak height or area. APHA 4110 B

FOOTNOTES

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

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

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

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

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

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

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

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

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

STATEMENT OF QA/QC PERFORMANCE

SE288541 R0

CLIENT DETAILS

Contact	Mark Kelly
Client	AARGUS ENGINEERING TRUST
Address	PO BOX 398 DRUMMOYNE NSW 1470
Telephone	1300137038
Facsimile	(Not specified)
Email	mark.kelly@aargus.net
Project	**GS9688-1A Geotechnical Investigation**
Order Number	**GS9688-1A**
Samples	2

LABORATORY DETAILS

Manager	Shane McDermott
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
SGS Reference	**SE288541 R0**
Date Received	28 Aug 2025
Date Reported	05 Sep 2025

COMMENTS

All the laboratory data for each environmental matrix was compared to SGS' stated Data Quality Objectives (DQO). Comments arising from the comparison were made and are reported below.

The data relating to sampling was taken from the Chain of Custody document.
This QA/QC Statement must be read in conjunction with the referenced Analytical Report.
The Statement and the Analytical Report must not be reproduced except in full.

All Data Quality Objectives were met (within the SGS Alexandria Environmental laboratory).

SAMPLE SUMMARY

Sample counts by matrix	2 Soil	Type of documentation received	COC
Date documentation received	1/9/2025@10:37AM	Samples received in good order	Yes
Samples received without headspace	N/A	Sample temperature upon receipt	23°C
Sample container provider	SGS	Turnaround time requested	Standard
Samples received in correct containers	Yes	Sufficient sample for analysis	Yes
Sample cooling method	None	Samples clearly labelled	Yes
Complete documentation received	Yes		

HOLDING TIME SUMMARY

SE288541 R0

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS "Field Sampling Guide for Containers and Holding Time" (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the sampled date is not supplied then compliance with criteria cannot be determined. If the received date is after one or both due dates then holding time will fail by default.

Conductivity and TDS by Calculation - Soil

Method: ME-(AU)-[ENV]AN106

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1 0.2-0.4	SE288541.001	LB359844	01 Sep 2025	28 Aug 2025	08 Sep 2025	05 Sep 2025	08 Sep 2025	05 Sep 2025
BH1 0.4-0.6	SE288541.002	LB359844	01 Sep 2025	28 Aug 2025	08 Sep 2025	05 Sep 2025	08 Sep 2025	05 Sep 2025

Moisture Content

Method: ME-(AU)-[ENV]AN002

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1 0.2-0.4	SE288541.001	LB359761	01 Sep 2025	28 Aug 2025	15 Sep 2025	04 Sep 2025	09 Sep 2025	05 Sep 2025
BH1 0.4-0.6	SE288541.002	LB359761	01 Sep 2025	28 Aug 2025	15 Sep 2025	04 Sep 2025	09 Sep 2025	05 Sep 2025

pH in soil (1:5)

Method: ME-(AU)-[ENV]AN101

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1 0.2-0.4	SE288541.001	LB359844	01 Sep 2025	28 Aug 2025	08 Sep 2025	05 Sep 2025	06 Sep 2025	05 Sep 2025
BH1 0.4-0.6	SE288541.002	LB359844	01 Sep 2025	28 Aug 2025	08 Sep 2025	05 Sep 2025	06 Sep 2025	05 Sep 2025

Soluble Anions (1:5) in Soil/Solids by Ion Chromatography

Method: ME-(AU)-[ENV]AN245

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1 0.2-0.4	SE288541.001	LB359859	01 Sep 2025	28 Aug 2025	08 Sep 2025	05 Sep 2025	03 Oct 2025	05 Sep 2025
BH1 0.4-0.6	SE288541.002	LB359859	01 Sep 2025	28 Aug 2025	08 Sep 2025	05 Sep 2025	03 Oct 2025	05 Sep 2025

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA/QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

No surrogates were required for this job.

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Conductivity and TDS by Calculation - Soil

Method: ME-(AU)-[ENV]AN106

Sample Number	Parameter	Units	LOR	Result
LB359844.001	Conductivity of Extract (1:5 as received)	µS/cm	1	<1
	Salinity (by calculation)*	mg/kg	5	<5

Soluble Anions (1:5) in Soil/Solids by Ion Chromatography

Method: ME-(AU)-[ENV]AN245

Sample Number	Parameter	Units	LOR	Result
LB359859.001	Chloride	mg/kg	0.25	<0.25
	Sulfate	mg/kg	5	<5.0

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean
The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR
Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

NOTE: The RPD reported is calculated from the unrounded data for the original and replicate result. Manual calculation of the RPD from the rounded data reported may give a different calculated RPD.

Conductivity and TDS by Calculation - Soil

Method: ME-(AU)-[ENV]AN106

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE288541.002	LB359844.008	Conductivity of Extract (1:5 as received)	µS/cm	1	16	14	43	13
		Salinity (by calculation)*	mg/kg	5	58	50	49	13
SE288593.008	LB359844.007	Conductivity of Extract (1:5 as received)	µS/cm	1	23.3	29.4	38	23

Moisture Content

Method: ME-(AU)-[ENV]AN002

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE288541.002	LB359761.003	% Moisture	%w/w	1	9.4	9.2	41	1

pH in soil (1:5)

Method: ME-(AU)-[ENV]AN101

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE288541.002	LB359844.008	pH	pH Units	0.1	5.8	5.8	32	0
SE288593.008	LB359844.007	pH	pH Units	0.1	5.612	5.692	32	1

Soluble Anions (1:5) in Soil/Solids by Ion Chromatography

Method: ME-(AU)-[ENV]AN245

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE288541.002	LB359859.006	Chloride	mg/kg	0.25	2.0	2.3	42	13
		Sulfate	mg/kg	5	<5.0	<5.0	200	0

Laboratory Control Standard (LCS) results are evaluated against an expected result, typically the concentration of analyte spiked into the control during the sample preparation stage, producing a percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Conductivity and TDS by Calculation - Soil

Method: ME-(AU)-[ENV]AN106

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB359844.002	Conductivity of Extract (1:5 as received)	µS/cm	1	1000	1015	85 - 115	101

pH in soil (1:5)

Method: ME-(AU)-[ENV]AN101

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB359844.003	pH	pH Units	0.1	7.4	7.415	98 - 102	100

Soluble Anions (1:5) in Soil/Solids by Ion Chromatography

Method: ME-(AU)-[ENV]AN245

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB359859.002	Chloride	mg/kg	0.25	96	100	70 - 130	96
	Sulfate	mg/kg	5	99	100	70 - 130	99

MATRIX SPIKES

SE288541 R0

Matrix Spike (MS) results are evaluated as the percentage recovery of an expected result, typically the concentration of analyte spiked into a field sub -sample during the sample preparation stage. The original sample's result is subtracted from the sub-sample result before determining the percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA/QC plan (ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

No matrix spikes were required for this job.

MATRIX SPIKE DUPLICATES

SE288541 R0

Matrix spike duplicates are calculated as Relative Percent Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The original result is the analyte concentration of the matrix spike. The Duplicate result is the analyte concentration of the matrix spike duplicate.

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

No matrix spike duplicates were required for this job.

Samples analysed as received.

Solid samples expressed on a dry weight basis.

QC criteria are subject to internal review according to the SGS QA/QC plan and may be provided on request or alternatively can be found here: https://www.sgs.com/en-au/industry/environmental-health-and-safety

*	NATA accreditation does not cover the performance of this service.
**	Indicative data, theoretical holding time exceeded.
***	Indicates that both * and ** apply.
-	Sample not analysed for this analyte.
IS	Insufficient sample for analysis.
LNR	Sample listed, but not received.
LOR	Limit of reporting.
QFH	QC result is above the upper tolerance.
QFL	QC result is below the lower tolerance.
①	At least 2 of 3 surrogates are within acceptance criteria.
②	RPD failed acceptance criteria due to sample heterogeneity.
③	Results less than 5 times LOR preclude acceptance criteria for RPD.
④	Recovery failed acceptance criteria due to matrix interference.
⑤	Recovery failed acceptance criteria due to the presence of significant concentration of analyte (i.e. the concentration of analyte exceeds the spike level).
⑥	LOR was raised due to sample matrix interference.
⑦	LOR was raised due to dilution of significantly high concentration of analyte in sample.
⑧	Reanalysis of sample in duplicate confirmed sample heterogeneity and inconsistency of results.
⑨	Recovery failed acceptance criteria due to sample heterogeneity.
⑩	LOR was raised due to high conductivity of the sample (required dilution).
†	Refer to relevant report comments for further information.

SAMPLE RECEIPT ADVICE

SE288541

CLIENT DETAILS

Contact	Mark Kelly
Client	AARGUS ENGINEERING TRUST
Address	PO BOX 398 DRUMMOYNE NSW 1470
Telephone	1300137038
Facsimile	(Not specified)
Email	mark.kelly@aargus.net
Project	**GS9688-1A Geotechnical Investigation**
Order Number	**GS9688-1A**
Samples	2

LABORATORY DETAILS

Manager	Shane McDermott
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
Samples Received	Thu 28/8/2025
Report Due	Fri 5/9/2025
SGS Reference	**SE288541**

SUBMISSION DETAILS

This is to confirm that 2 samples were received on Thursday 28/8/2025. Results are expected to be ready by COB Friday 5/9/2025. Please quote SGS reference SE288541 when making enquiries. Refer below for details relating to sample integrity upon receipt.

Sample counts by matrix	2 Soil	Type of documentation received	COC
Date documentation received	1/9/2025@10:37AM	Samples received in good order	Yes
Samples received without headspace	N/A	Sample temperature upon receipt	23°C
Sample container provider	SGS	Turnaround time requested	Standard
Samples received in correct containers	Yes	Sufficient sample for analysis	Yes
Sample cooling method	None	Samples clearly labelled	Yes
Complete documentation received	Yes		

Unless otherwise instructed, water and bulk samples will be held for one month from date of report, and soil samples will be held for two months.

COMMENTS

1 sample has been placed on hold as no tests have been assigned for it. This sample will not be processed.

SAMPLE RECEIPT ADVICE

SE288541

CLIENT DETAILS

Client AARGUS ENGINEERING TRUST

Project GS9688-1A Geotechnical Investigation

SUMMARY OF ANALYSIS

No.	Sample ID	Conductivity and TDS by Calculation - Soil	Moisture Content	pH in soil (1:5)	Soluble Anions (1:5) in Soil/Solids by Ion
001	BH1 0.2-0.4	2	1	1	2
002	BH1 0.4-0.6	2	1	1	2

The above table represents SGS' interpretation of the client-supplied Chain Of Custody document.
The numbers shown in the table indicate the number of results requested in each package.
Please indicate as soon as possible should your request differ from these details .
Testing as per this table shall commence immediately unless the client intervenes with a correction .

AARGUS ENGINEERING TRUST PTY LTD

Laboratory Test Request / Chain of Custody Record

5 Tarlington Place, Smithfield NSW 2164
P O Box 398 DRUMMOYNE NSW 1470 Tel: 1300 137 038 Fax: 1300 136 038
Email reports: cynthia@gsne.com.au; mark.kelly@gsne.com.au; murali@gsne.com.au
Email invoices: aarguseng@gmail.com; cynthia@gsne.com.au; mark.kelly@gsne.com.au

TO: **SGS Environmental**
Unit 16, 33 Maddox Street
Alexandria NSW

PH: **8594 0400** FAX: **8594 0499** Email: au.samplereceipt.sydney@sgs.com
ATTN: **Samples Receipt**

Sampling Date:	25.08.2025	**Job No:**	GS9688-1A
Sampled By:	SK	**Project:**	Geotechnical Investigation
Project Manager:	NP	**Location:**	271 Warringah Rd Beacon Hill, NSW

Results required by: Standard Turnaround
Pricelist Code: 1352083

E-MAILED 1/9/25 10:37am

Sampling details			Sample type											
Location	Depth (m)	Date	Soil	Water	Metals (As, Cd, Cr, Cu, Hg, Pb, Ni, Zn)	pH	Sulphate	Chloride	Salinity				Analysis Suite(s)	KEEP SAMPLE?
BH1	0.2-0.4	01.09.2025	✓			☒	☒	☒	☒					YES
BH1	0.4-0.6	01.09.2025	✓			☒	☒	☒	☒					YES

1 sample on hold

SGS EHS Sydney COC
SE288541

Relinquished by			Received by		
Name	Signature	Date	Name	Signature	Date
Murali	MP	29.08.2025	Nick		28/8/25 @ 4:51pm

Legend:

WG	Water sample, glass bottle	USC	Undisturbed soil sample (glass jar)	DSP	Disturbed soil sample (small plastic bag)
WP	Water sample, plastic bottle	DSC	Disturbed soil sample (glass jar)	✓	Test required
GV	Glass vial	OTH	Other	ACAN	Air sample, canister

@ mole H^+/tonne

Please CC Nima Pirhadi (nima@gsne.com.au)

Luong, Thi Song Van (Alexandria)

From: Nima Pirhadi <nima@gsne.com.au>
Sent: Monday, 1 September 2025 10:19 AM
To: AU.SampleReceipt.Sydney, AU (Sydney); AU.SampleReceipt.Sydney, AU (Sydney)
Cc: AU.Environmental.Sydney, AU (Sydney); AU.Environmental.Sydney, AU (Sydney); Sagar Koirala; Murali
Subject: [EXTERNAL] COC-GS9688-1A Bacean Hill
Attachments: COC-GS9688-1A.xlsx

Hi,

Please find attached the COC for the samples sent to your lab. Kindly note that two of the three samples require testing.

Also, could you please cc me on the email that you will be sending to GSNE?

Kind Regards

Nima Pirhadi
Ph.D., Civil/Geotech. Eng.,
CPEng, NER, PER, RPEQ, MIEAust,
Principal Geotechnical Engineer,
Head of Geotechnical engineering

GSNE SERVICES PTY LTD
SOLUTIONS THAT LAST

GSNE Services Pty Ltd
5 Tarlington Place, Smithfield NSW 2164
(access off Gipps Road – 100m north of the roundabout)
PO Box 2160, Smithfield NSW 2164
Mobile: 0499277832
Email: nima@gsne.com.au

Yin, Emily (Alexandria)

From: AU.Environmental.Sydney, AU (Sydney)
Sent: Thursday, 4 September 2025 6:01 PM
To: AU.SampleReceipt.Sydney, AU (Sydney)
Subject: Change to 1 day tat FW: Update RE: [EXTERNAL] Re: SRA Job SE288541, your reference GS9688-1A Geotechnical Investigation, order number GS9688-1A

Hi SR ,
Pls change to 1 day tat no surcharge

Thanks

Rita Azzi

Industries and Environment
Client Services Representative

SGS Australia Pty Ltd
Unit 16, 33 Maddox Street
Alexandria, NSW, 2015
Phone: +61 (0)2 8594 0400
Direct: +61 (0)2 8594 3309
E-mail: Rita.azzi@sgs.com
General E-mail : au.environmental.sydney@sgs.com
Web: www.au.sgs.com

Working Monday to friday : 10 to 6pm

From: Nima Pirhadi <nima@gsne.com.au>
Sent: Thursday, 4 September 2025 4:27 PM
To: AU.Environmental.Sydney, AU (Sydney) <AU.Environmental.Sydney@SGS.com>; Cynthia David <cynthia@gsne.com.au>; Mark Kelly <mark.kelly@gsne.com.au>; Murali <murali@gsne.com.au>
Subject: Re: Update RE: [EXTERNAL] Re: SRA Job SE288541, your reference GS9688-1A Geotechnical Investigation, order number GS9688-1A

Hi Ritta,

I just wanted to follow up with you regarding the results of this job, as well as the Canterbury project currently with you. Our clients are putting us under considerable pressure and have been contacting us several times a day for the final report.

Would you be able to assist us by sending the results a bit earlier if possible?

Thank you very much for your support.

Kind Regards

Nima Pirhadi
Ph.D., Civil/Geotech. Eng.,
CPEng, NER, PER, RPEQ, MIEAust,
Principal Geotechnical Engineer,
Head of Geotechnical engineering

GSNE SERVICES PTY LTD
SOLUTIONS THAT LAST

GSNE Services Pty Ltd
5 Tarlington Place, Smithfield NSW 2164
(access off Gipps Road – 100m north of the roundabout)
PO Box 2160, Smithfield NSW 2164
Mobile: 0499277832
Email: nima@gsne.com.au
Tel: 1300137038

WHS & HAZMAT – ENVIRONMENTAL – ENGINEERING – DRILLING – LABORATORIES

From: Nima Pirhadi <nima@gsne.com.au>
Sent: 03 September 2025 12:26
To: AU.Environmental.Sydney, AU (Sydney) <AU.Environmental.Sydney@SGS.com>; Cynthia David <cynthia@gsne.com.au>; Mark Kelly <mark.kelly@gsne.com.au>; Murali <murali@gsne.com.au>
Subject: Re: Update RE: [EXTERNAL] Re: SRA Job SE288541, your reference GS9688-1A Geotechnical Investigation, order number GS9688-1A

APPENDIX E

POINT LOAD TEST RESULTS

POINT LOAD STRENGTH INDEX REPORT

Client:	Water Lifestyle Network Pty Ltd	**Date Tested:**	26/08/2025
Address:	271 Warringah Rd, Beacon Hill	**Job No:**	GS9688-1A
Project Address:	271 Warringah Rd, Beacon Hill	**Storage History:**	Core Boxes

Borehole ID	Depth (m)	Sample Description	Test Type	Point Load Index Is (50)	UCS (MPa)	Notes
BH1	0.71	Sandstone	Diametral	**1.24**	**24.80**	Sample Moist
			Axial	**1.00**	**20.00**	Sample Moist
BH1	1.34	Sandstone	Diametral	**1.14**	**22.80**	Sample Moist
			Axial	**0.65**	**13.00**	Sample Moist
BH1	1.65	Sandstone	Diametral	**0.85**	**17.00**	Sample Moist
			Axial	**0.75**	**15.00**	Sample Moist
BH1	2.26	Sandstone	Diametral	**1.03**	**20.60**	Sample Moist
			Axial	**0.83**	**16.60**	Sample Moist
BH1	2.75	Sandstone	Diametral	**0.33**	**6.60**	Sample Moist
			Axial	**0.29**	**5.80**	Sample Moist
BH1	3.26	Sandstone	Diametral	**0.62**	**12.40**	Sample Moist
			Axial	**0.37**	**7.40**	Sample Moist
BH1	3.76	Sandstone	Diametral	**0.41**	**8.20**	Sample Moist
			Axial	**0.56**	**11.20**	Sample Moist
BH1	4.27	Sandstone	Diametral	**0.67**	**13.40**	Sample Moist
			Axial	**0.58**	**11.60**	Sample Moist
BH1	4.67	Sandstone	Diametral	**1.54**	**30.80**	Sample Moist
			Axial	**1.71**	**34.20**	Sample Moist
BH1	5.21	Sandstone	Diametral	**2.58**	**51.60**	Sample Moist
			Axial	**0.86**	**17.20**	Sample Moist
BH1	5.65	Sandstone	Diametral	**0.74**	**14.80**	Sample Moist
			Axial	**0.60**	**12.00**	Sample Moist
BH1	6.14	Sandstone	Diametral	**2.30**	**46.00**	Sample Moist
			Axial	**0.97**	**19.40**	Sample Moist

Comments:			
UCS –Unconfined Compressive Test.	Sheet 1 of 1	Tested By:	SK
Multiplication Factor of 20 was used to calculate UCS.		Checked By:	NP