



# **Douglas Partners**

*Geotechnics | Environment | Groundwater*

Report on  
Geotechnical Investigation

Proposed Mixed-Use Development  
67 & 73-83 Mary Street, 50-52 Edith Street and 43  
Roberts Street, St Peters

Prepared for  
P75 Investments Pty Ltd

Project 209825.01  
July 2025

Integrated Practical Solutions





# Douglas Partners

Geotechnics | Environment | Groundwater

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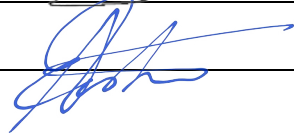
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The undersigned, on behalf of Douglas Partners Pty Ltd, confirm that this document and all attached drawings, logs and test results have been checked and reviewed for errors, omissions and inaccuracies.

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## Report on Geotechnical Investigation

### Proposed Mixed-Use Development

#### 67 & 73-83 Mary Street, 50-52 Edith Street and 43 Roberts Street, St Peters

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## 1. Introduction

This report has been prepared by Douglas Partners Pty Ltd (Douglas) to support a State Significant Development Application for a mixed-use development at 67 & 73-83 Mary Street, 50-52 Edith Street and 43 Roberts Street (the site), also known as Precinct 75 (Lot 100 DP 128113).

This report addresses the following items required by the Secretary's Environmental Assessment Requirements (SEARs) for the State Significant Development Application SSD-82639959.

| SEARs   | Response  |
|---|---|
| <p>12. Ground and Groundwater Conditions</p> <ul style="list-style-type: none"> <li>• Assess potential impacts on soil resources and related infrastructure and riparian lands on and near the site and including soil erosion.</li> <li>• Where required provide a Groundwater Impact Assessment in accordance with relevant Groundwater Guidelines. If the proposed development is on land identified as having high salinity or acid sulfate soil potential in an EPI provide a Salinity Management Plan or Acid Sulfate Soil Management Plan that includes appropriate management measures and strategies.</li> </ul> | <ul style="list-style-type: none"> <li>• Refer to geotechnical comments in Section 8 of this report.</li> <li>• Groundwater impact has been assessed and reported in Douglas report 209825.01.R.001.Rev0.</li> <li>• Refer to Section 4 of this report. The site is not mapped as containing a risk of saline or acid sulfate soils.</li> </ul> |

### 1.1 Proposed Development

The proposed development seeks approval for the construction of a mixed-use development comprising residential apartments (build to rent and affordable housing) and non-residential uses.

The site has an existing development consent approved by Inner West Council (DA/2021/0800) for a mixed-use development. The proposal will amend the existing consent by increasing the approved dwellings from 205 to approximately 470 and reducing the approved non-residential gross floor area.

The amendments relate to part of the site (predominantly within the approved Stage 2 area) including Buildings C, 1/6, 7 and 8. No changes are proposed to Building A and B, the lawn and the Dog Park, as well as other areas of approved open space and site connections.

Key elements include:

- Increased dwellings from 205 to approximately 470.
- Conversion of approved commercial and non-residential floor area to residential.
- Additional residential levels on Buildings C, 1/6 and 8.
- Reconfiguration of Building 1/6 footprint to increase publicly accessible open space.
- Demolition of additional structures.

It is understood that the proposed development includes a stepped two-level basement. The lowest basement level (i.e. B2 ranges from RL8.2 m to RL9.4 m, relative to Australian Height Datum (AHD)) and will require excavation to depths of up to 6.5-8.5 m below the existing ground surface, assuming 1 m excavation for footings and service trenches. It is understood that basement excavations would be supported by a secant pile wall.

The investigation included the drilling of seven cored boreholes to nominal depth of 12 to 15 m. One borehole was extended to 20 m to comply with DPIE “Minimum Requirements for Building Site Groundwater Investigations”.

Douglas undertook analysis to predict groundwater inflows and prepared a separate Dewatering Management Plan (Project 209825.01.R.001.Rev0, dated 6 August 2024).

## 2. Previous Investigations

Douglas was supplied with a preliminary geotechnical investigation report, previously undertaken by Environmental Investigations Australia (EIA) at the subject site, dated 9 August 2017 (Ref: E22317 GA\_Rev4). The investigation by EIA included six cored boreholes that were transformed to groundwater monitoring wells after completion. The EIA boreholes generally extended to 7 m to 9 m depth below existing ground surface and extended to about 2 m to 3 m below the proposed basement level. The borehole locations are shown on Drawing1 in Appendix B and the borehole logs are provided in Appendix D (extract from EIA Report Ref: E22317 GA\_Rev4).

Coffey Geotechnics has also previously undertaken an assessment of the permeability of the underlying soil and rock profile and provided an estimate of inflow volumes and comments on drained basements (Ref: GEOTLCOV25510AA-AB Rev 2, dated 23 March 2016). This Coffey investigation essentially involved excavating a pit to about 6 m depth and monitoring of the water level rise with time.

## 3. Site Description and Regional Geology

The site is an irregular-shaped lot with a plan area of approximately 15,000 m<sup>2</sup>. It is bounded by Edith Street to the north-east, residential buildings to the north-west, Mary Street to the south-west and neighbouring residential buildings to the south east.

The site slopes towards the south and south-west, with surface levels varying from about RL16 m to RL13 m AHD.

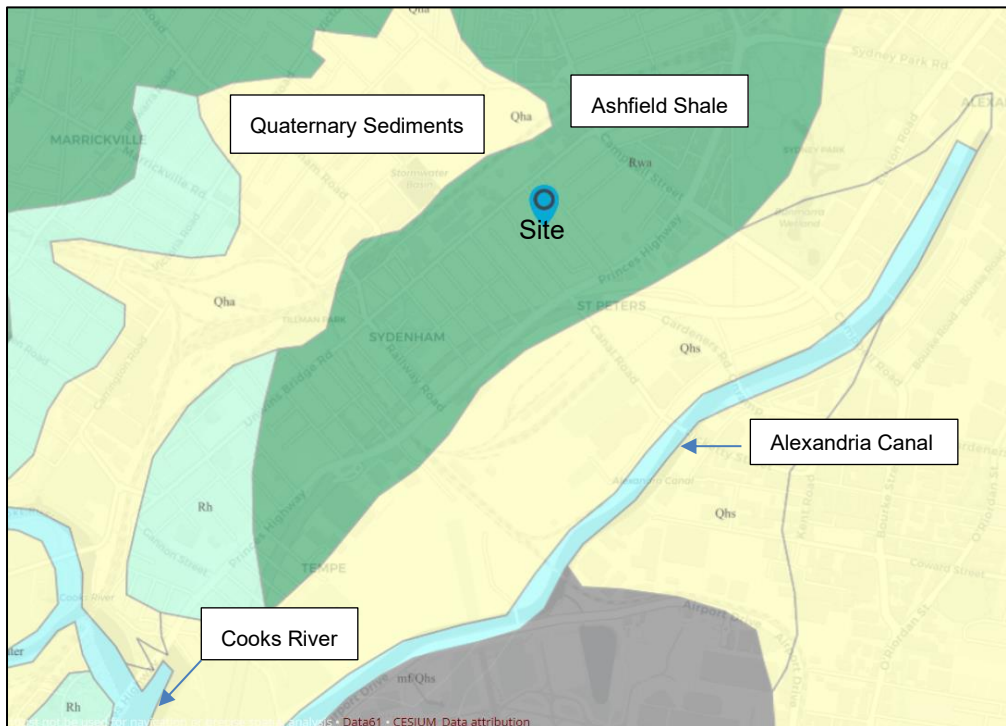
The closest water body to the site is Alexandra Canal, which is located about 1 km to the south-east of the site. The site location is shown in Figure 1 below.



**Figure 1: Site Location (ref: Metromap, 2021)**

#### **4. Regional Geology**

Reference to the Sydney 1:100 000 Series Geological Sheet indicates that the site is underlain by Ashfield Shale of the Wianamatta Group, which typically comprises black to dark grey shale and laminite. The lower lying areas about 300-400 m to the east and west of the site are underlain by Quaternary sediments comprising alluvial and estuarine sand, silt and clays to the west and peat, sand and mud swamp deposits to the east. An extract of the Geological mapping is shown in Figure 2 (overleaf).



**Figure 2: Extract of Geological mapping**

Acid sulfate soils (ASS) risk mapping published by the NSW Department of Climate Change, Energy, the Environment and Water (1998) indicate the site contains no known occurrence of ASS. Geological mapping and site elevations (above RL12AHD) also indicate that alluvial deposits containing ASS would likely not be present at the site. An assessment for ASS is therefore not considered to be warranted and has not been included within this report.

The site is outside of the Western Sydney Salinity Potential Mapping and areas of mapped dryland salinity. No further assessment is warranted.

## 5. Field Work

### 5.1 Field Work Methods

The field work for the geotechnical investigation included the following:

- A site walkover to set out seven borehole locations (BH1 to BH7);
- Checking for underground services at each of the borehole locations using an accredited service locator;
- Boreholes were drilled using a truck-mounted drilling rig from 18 October to 25 October 2021 as follows:
  - Initially, all boreholes were Diacore drilled to penetrate surface concrete and then extended into the soil profile using solid flight auger drilling to the top of weathered bedrock;

- o Boreholes were then extended to their target depths of between 12 m to 20.8 m using NMLC (52 mm diameter) rock diamond coring drilling. One borehole (BH1) was extended to 20 m depth;
  - o Standard Penetration Testing (SPT) was carried out at 1.5 m intervals within the soil profile; and
  - o Disturbed soil samples were retrieved from the soil cuttings for the required laboratory tests and identification and classification purposes;.
- Groundwater monitoring wells were installed to depths of 9 m in three nominated borehole locations (BH1, BH2 and BH5). The standpipes were purged on 1 November 2021;
  - Rising head permeability tests were carried out in the groundwater wells on 1 November 2021 and involved bailing out the water to draw-down the water level and measuring the rate of recharge. Data loggers were installed in all standpipes on the same day to monitor the ground water level variations for 3 months (this is ongoing and will be reported periodically);
  - Rising head permeability tests were also carried out in three groundwater wells (BH1, BH2 and BH), which were previously installed by EI Australia; and
  - Douglas attempted a Packer Permeability test in BH2, but the fractures within the bedrock resulted in the packer bursting and the test could not be completed. Further packer testing in other boreholes was planned but was not carried out due to risk of further damage to equipment.

The boreholes locations are shown on Drawing 1 in Appendix B, together with the location of the boreholes previously drilled by EI Australia, in 2014. Coordinates and surface levels for all Douglas locations were determined using a differential Global Positioning System (dGPS) receiver, which has an accuracy of 0.2 m. Coordinates have been measured in GDA94/MGA Zone 56 format (Geocentric Datum of Australia 1994 base with Map Grid of Australia projection) and levels are relative to Australian Height Datum.

## 5.2 Field Work Results

The detailed subsurface conditions encountered are presented in the borehole logs in Appendix C along with notes defining descriptive terms and classification methods. Photographs of the recovered rock cores are included with the respective borehole logs. The general subsurface profile encountered at the boreholes may be summarised as follows:

- |                      |  |
|----------------------|--|
| <b>CONCRETE</b>      | - Concrete pavement and slab at most of the borehole locations (excluding BH7). The thickness of concrete was measured to be between 120 mm to 200 mm. Reinforcement (5 mm diameter) was observed within the concrete slab at BH6 borehole.  |
| <b>FILL</b>          | - Generally included sandy gravel sub-base with nominal thickness of 100-150 mm immediately underneath concrete slab and pavements. The gravelly fill was followed by variable sandy and clayey fill to depths ranging from 0.1 m to 0.6 m. Hydrocarbon odours were noted in the fill at some locations. |
| <b>RESIDUAL SOIL</b> | - Medium to high plasticity silty CLAY and CLAY to depths in a range of 2.5 m to 5 m below ground level (RLs 8.0 m to 13.6 m AHD). The consistency of the clay was generally assessed as firm to stiff immediately below fill, grading to very stiff to hard at depth of 1.5 – 2.0 m.                    |

- WEATHERED ROCK** – Very low to low strength, extremely to highly weathered pale grey and brown SHALE and SILTSTONE to depths of between 5.8 m to 8.6 m (RLs 5.2 m to 8.5 m AHD). Some joints dipping at angles between 20° to 75° were observed within the weathered rock.
- MEDIUM STRENGTH ROCK** – Generally medium strength, fresh to slightly weathered, grey to dark grey SILTSTONE with some high strength bands underlying the weathered rock and extending to the termination depth of the boreholes. This unit was mostly slightly fractured to unbroken with some joints dipping at angles between 25° to 90°.

Groundwater was observed at 4 m depth in BH4 while auger drilling. Groundwater measurement was not possible during rock coring due to water introduced to the boreholes for diamond coring. Groundwater measurements were carried out in monitoring wells installed by EIA and Douglas across the site. The results of these measurements are summarised in Table 1.

**Table 1: Summary of Groundwater Level Measurement Results**

| Date                 | Measured Groundwater Depth (m) and RL (m AHD) |               |               |               |               |               |               |               |
|----------------------|---|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
|                      | MW1*  | MW2*          | MW3*          | MW4*          | MW5*          | BH1           | BH2           | BH5           |
| 25 September 2014**  | 3.8<br>(11.8)                                 | 1.4<br>(12.9) | --            | 1.1<br>(11.4) | 0.9<br>(13.6) | --            | --            | --            |
| 8 October 2014**     | 3.2<br>(12.4)                                 | 1.5<br>(12.8) | 1.7<br>(10.8) | 1.8<br>(10.7) | 1.1<br>(13.4) | --            | --            | --            |
| 28 October 2015**    | 3.1<br>(12.5)                                 | 1.4<br>(12.9) | 1.5<br>(11.0) | 1.9<br>(10.6) | 0.9<br>(13.6) | --            | --            | --            |
| 20 October 2021***   | 3.2<br>(12.4)                                 | 1.4<br>(12.9) | --            | 2.0<br>(10.5) | 0.7<br>(13.8) | --            | --            | --            |
| 1 November 2021      | --  | --            | --            | --            | --            | 1.9<br>(13.9) | 1.1<br>(11.9) | 1.7<br>(11.9) |
| 8 December 2021      | -   | -             | -             | -             | -             | 1.9<br>(13.9) | 0.8<br>(12.2) | 1.7<br>(11.9) |
| 1 February 2022      | -   | -             | -             | -             | -             | 2.1<br>(13.7) | 0.9<br>(12.1) | 1.7<br>(11.9) |
| 10 February 2022 *** | 3.1<br>(12.5)                                 | -             | -             | 1.8<br>(10.7) | 1.0<br>(13.5) | -             | -             | -             |
| 24 February 2022 *** | -   | -             | -             | -             | -             | 2.1<br>(13.7) | 0.6<br>(12.4) | 1.6<br>(12.0) |
| 26 February 2022 *** | 2.3<br>(13.3)                                 | -             | 1.0<br>(10.7) | 1.4<br>(11.1) | 0.9<br>(13.6) | -             | -             | -             |

\* RLs are approximate and extracted from Coffey report, Ref: GEOTLCOV25510AA-AB Rev 2, dated 23 March 2016

\*\* Groundwater levels by others and reported by Coffey as above

\*\*\* Groundwater levels measurements by Douglas

Groundwater monitoring with data-loggers in the three Douglas monitoring wells is currently underway and will be undertaken for a three-month period. The results of this monitoring will be provided in separate reports.

The results of permeability tests carried out by Douglas are given in Appendix E and are summarised in Table 2.

**Table 2: Results of Permeability Testing**

| <b>Test Location</b> | <b>Depth (m)</b> | <b>Test Method</b> | <b>Material</b>                                    | <b>Average Permeability (m/sec)</b> |
|----------------------|------------------|--------------------|--|-------------------------------------|
| BH1                  | 3.0 – 9.0        | Rising Head        | Residual soil, highly to slightly weathered rock   | 2.5E-07                             |
| BH2                  | 3.0 – 9.0        | Rising Head        | Residual soil, highly to slightly weathered rock   | 5.2E-07                             |
| BH5                  | 3.0 – 9.0        | Rising Head        | Residual soil, highly to slightly weathered rock   | 1.1E-06                             |
| MW1                  | 4.0 – 7.0        | Rising Head        | Highly weathered to fresh rock *                   | 3.3E-06                             |
| MW4                  | 2.2 – 7.0        | Rising Head        | Residual soil, highly to slightly weathered rock * | 6.9E-07                             |
| MW5                  | 5.5 – 7.8        | Rising Head        | highly to slightly weathered rock *                | 2.5E-07                             |

\* As per EIA logs, Report No.: E22317 GA\_Rev4, dated 9 August 2017

The permeability tests carried out by Douglas resulted in average values in a range of 2.5E-07 to 3.3E - 06 m/sec. Douglas' results are generally consistent with Coffey's test results in EIA groundwater wells, which were between 2.3E-07 to 4.6 E - 06 m/sec (Ref: GEOTLCOV25510AA-AB Rev 2, dated 23 March 2016).

## 6. Laboratory Testing

Selected soil samples taken from the boreholes were tested in the laboratory for Atterberg Limits, Linear Shrinkage and 4-day soaked California Bearing Ratio (CBR). The results are summarised in Tables 3 and 4Table 4, and detailed laboratory test reports are included in Appendix F.

**Table 3: Summary of Atterberg Limits Results**

| Test Location | Depth (m) | Soil Description                             | Liquid Limit % | Plastic Limit % | Plasticity Index % |
|---------------|-----------|--|----------------|-----------------|--------------------|
| BH5           | 1.5 – 1.6 | Clay, high plasticity, pale grey brown       | 53             | 22              | 31                 |
| BH7           | 1.9 – 2.0 | Clay, high plasticity, pale grey mottled red | 57             | 22              | 35                 |

**Table 4: Summary of CBR Test Results**

| Test Location | Depth (m) | Soil Description                               | OMC % | MDD (t/m <sup>3</sup> ) | Swell % | CBR |
|---------------|-----------|--|-------|-------------------------|---------|-----|
| BH4           | 0.3 – 1.0 | Clay, high plasticity, pale brown, mottled red | 21.0  | 1.58                    | 4.5     | 2.0 |
| BH5           | 0.2 – 1.0 | Clay, high plasticity, brown                   | 24.5  | 1.53                    | 0.5     | 4.5 |
| BH6           | 0.3 – 0.5 | Clay, high plasticity, pale grey, brown        | 27.5  | 1.48                    | 0.5     | 3.0 |

Legend:

OMC: Optimum Moisture Content

MDD: Maximum Dry Density

## 7. Geotechnical Model

The field work results together with the results of previous investigation by EI Australia are summarised on interpreted geotechnical cross-sections in Appendix B (Drawing 2 to 5), which show the interpreted layers of fill materials, natural soil, and rock units between the test locations. The interpreted boundaries shown on the sections are accurate only at the test locations and layers shown diagrammatically on the drawings are inferred only. Bands of lower or higher strength rock may be present within the generalised rock layers.

### 7.1 Soil Profile

The soil profile encountered in the boreholes generally comprised moderately compacted sandy gravel and silty clay fill to depths of between 0.1 m and 0.6 m; over medium to high plasticity silty clay, firm to stiff to nominal depth of 2.0 m, grading to very stiff and hard to depths in a range of 2.5 m to 5 m (RLs 8.0 m to 13.6 m AHD).

## 7.2 Rock Strata

Four geotechnical cross-sections (Sections A-A' to D-D'), showing the interpreted subsurface profile between selected boreholes, are presented as Drawings 2 to 5 in Appendix B. The sections show interpreted geotechnical divisions of underlying soil and rock together with the proposed basement level.

It should be noted that the interpreted boundaries shown on the sections are accurate at the borehole locations only and layers shown diagrammatically on this drawing are inferred only. Bands of lower and higher strength rock should be expected within the generalised layers.

The rock encountered in the cored boreholes has been classified in accordance with Pells et al (2019) "Classification of Sandstone and Shale in the Sydney Region: A Forty Year Review" Aust. Geomech Jnl., June, 2019. There are five classes of rock (I to V) based on strength, fracturing and the amount of defects such as sheared zones and clay seams. Class I rock is the best quality (high strength with very few defects) while Class V represents the lowest quality rock (very low strength and/or numerous defects) in the classification system.

The interpreted depth and Reduced Level (RL) at the top of the various rock classes is shown in Table 5. The previous EIA boreholes have also been classified. The EI borehole levels are approximated from the supplied survey plan of the site and may not be accurate.

**Table 5: Summary of Depths (and Reduced Levels) to Top of Various Rock Strata**

| Borehole | Surface RL (AHD) | Depth (RL) to Shale/Siltstone Strata (units in m)     |  |
|----------|------------------|---|--|
|          |                  | Very Low to Low Strength Shale/Siltstone (Class V-IV) | Medium Strength Siltstone (Class III-II)   |
| BH1      | 15.8             | 3.0 (12.8)  | 7.3 (8.5)                                  |
| BH2      | 13.0             | 5.0 (8.0)   | 7.7 (5.3)                                  |
| BH3      | 13.8             | 4.0 (9.8)   | 9.4 (4.4)                                  |
| BH4      | 15.0             | 4.0 (11.0)  | 8.1 (6.9)                                  |
| BH5      | 13.6             | 3.5 (10.1)  | 8.3 (5.3)                                  |
| BH6      | 16.1             | 2.5 (13.6)  | 5.8 (10.3)                                 |
| BH7      | 14.5             | 4.0 (10.5)  | 7.6 (6.9)                                  |
| EIA_BH1  | 15.4**           | 2.4 (13.0)  | 6.4 (9.0) *                                |
| EIA_BH2  | 14.5**           | 3.2 (11.3)  | 7.5 (7.0)                                  |
| EIA_BH3  | 11.7**           | 2.5 (9.2)   | Not encountered to end of borehole at 6.5m |
| EIA_BH4  | 12.4**           | 3.0 (9.4)   | 7.2 (5.2) *                                |
| EIA_BH5  | 14.3**           | 3.0 (11.3)  | 8.0 (6.3)                                  |
| EIA_BH6  | 13.7**           | 3.0 (10.7)  | 7.5 (6.2) *                                |

Note: \* Inferred based on limited data; assuming the rock quality improves with depth.

\*\* RLs are approximated from survey plan

The groundwater level was measured at depths of 0.7 m to 3.2 m (RLs 10.9 m to 13.9 m) below the ground surface. It should be noted that the groundwater levels are affected by climatic conditions and soil permeability and will vary with time. Further discussion on groundwater is provided in Douglas' Dewatering Management Plan (Project 209825.01.R.001.Rev0, dated 6 August 2024).

## 8. Comments

### 8.1 Excavation Conditions and Groundwater

Excavation for the two-level basement to about 7 m depth is expected to require the removal of mostly soil and very low strength to medium strength shale and siltstone.

Excavation of soil and very low to low strength rock should be achievable using conventional earthmoving equipment, however, the assistance of rock hammering or ripping will probably be required for effective removal of any medium strength rock or ironstone bands within the weathered rock profile.

For deeper excavations into medium strength rock, heavy ripping with a large bulldozer together with the use of hydraulic rock breakers may be required for effective removal of this material.

Reference should be made to Douglas' Dewatering Management Plan (Project 209825.01.R.001.Rev0, dated 6 August 2024) for comments on groundwater. Some comments from the DMP are provided below but reference should be made to the DMP for further details:

- Groundwater has been measured in wells on the site at depths of between about 1 m and 4 m below existing ground surfaces. The excavation is expected to extend to approximately 4 m below the long-term average measured water level.
- Groundwater modelling was undertaken to estimate inflow rates and volumes over a 9 month period of construction dewatering. The groundwater assessment estimated inflow rates between 44 m<sup>3</sup>/day (initial dewatering) and 14 m<sup>3</sup>/day (steady state) and inflow volumes of 2.83 ML (over 9 months).
- From a geotechnical point of view, it is considered that a drained basement is feasible without any significant impact to surrounding groundwater systems or property. This will be subject to review and approval from Council and relevant authorities and also subject to input from the project environmental consultant.

### 8.2 Vibrations

During excavation, it will be necessary to use appropriate methods and equipment to keep ground vibrations at adjacent buildings and structures within acceptable limits. Vibrations due to excavation into fill material and residual soil are expected to be relatively minor. However, some levels of vibration are expected during excavations into very low to low strength rock which should be monitored. Rock ripping and hammering of medium strength rock, generally generates noticeable vibrations in the vicinity of the excavation site.

Ground vibration can be strongly perceptible to humans at levels above 2.5 mm/s peak particle velocity (PPVi). This is generally much lower than the vibration levels required to cause structural damage to

non-sensitive buildings. The Australian Standard AS2670.2-1990 “Evaluation of human exposure to whole-body vibrations – continuous and shock induced vibrations in buildings (1-80 Hz)” indicates an acceptable day time limit of 8 mm/s PPVi for human comfort.

The existing buildings in vicinity of the site are likely supported by shallow footing on stiff or stronger residual soil. For this reason, it is suggested that a maximum PPVi of 8 mm/s (applicable at the foundation level of existing buildings) be provisionally adopted at this site for both architectural and human comfort considerations. This vibration limit may need to be reduced if there are sensitive buildings, structures or equipment in the area and following a review of the dilapidation surveys on nearby buildings. Due consideration should be given to the sensitivity of the nearby structures/utilities to vibration limits, by an experienced structural engineer.

Dilapidation surveys should be undertaken on surrounding structures and pavements prior to commencing work on the site to document any existing defects so that any claims for damage due to construction related activities can be accurately assessed. The appropriate extent of dilapidation surveys may be better assessed once details of the proposed development and construction methods have been confirmed.

### 8.3 Disposal of Excavated Material

All excavated materials will need to be disposed of in accordance with the provisions of the current legislation and guidelines including the *Waste Classification Guidelines* (EPA, 2014). This includes filling and natural materials that may be removed from the site. Accordingly, environmental testing will need to be carried out to classify spoil prior to transport from the site.

### 8.4 Excavation Support

#### 8.4.1 Batter Slopes

Suggested temporary and permanent batter slopes for unsupported excavations up to a maximum height of 4 m are shown in Table 6. If surcharge loads are applied near the crest of the slope then further specific geotechnical review and probably flatter batters or stabilisation using rock bolts or soil nails may be required.

**Table 6: Recommended Batter Slopes for Exposed Material**

| <b>Exposed Material</b>          | <b>Maximum Temporary Batter Slope<br/>(H : V)</b> | <b>Maximum Permanent Batter Slope<br/>(H : V)</b> |
|----------------------------------|---|---|
| Filling / Firm to Stiff Clay     | 1.5 : 1   | 2 : 1**   |
| Very Stiff to Hard Clay          | 1 : 1   | 2 : 1**   |
| Class V-IV Shale/Siltstone       | 0.75 : 1  | 1 : 1*  |
| Class III-II Siltstone or better | 0.5 : 1   | 1 : 1*  |

Note: \* Subject to jointing assessment by experienced Geotechnical Engineer/Engineering Geologist

\*\* Permanent batters in soil may need to be reduced to 3H: 1V to facilitate maintenance of grassed slopes, if required

## 8.4.2 Shoring Walls

Where batter slopes cannot be accommodated, vertical excavations within the filling, soils and shale/siltstone will require both temporary and permanent lateral support during and after excavation. Excavations in shale and siltstone will also need to consider jointing and potential wedges that may be formed, although this may not govern design for the relatively shallow two-level basement excavation.

Anchored soldier pile walls with appropriate drainage are generally considered suitable for the development. Secant piles could be considered if it necessary to reduce groundwater inflows in some parts of the site, such as the west and north-western boundary of the site.

The soldier piles are usually spaced at approximately 2 m to 2.5 m centres, and should be founded at least two pile diameters below the lowest excavation level (including detailed excavation). More closely spaced piles may be required to reduce wall movements, or prevent collapse of infill materials, particularly where pavements, structures or services are located in close proximity to the excavation. Closer spaced piles may be required adjacent to the Building 8 facade that is to be retained. Further investigation of the existing footing and founding levels will be required to inform the shoring design adjacent to Building 8.

Soldier piles and contiguous piles to a lesser extent are associated with higher seepage rates through the side walls. Secant piles walls would significantly reduce inflows through the side walls but may not necessarily be warranted on all boundaries. This decision will need to also consider environmental issues and advice from the project environmental consultant. Secant pile walls may provide an easier integration with a hydrostatic floor slab if adopted. Similar to soldier piles, the deviation of secant piles, particularly in deeper layers can be an issue, and remedial jet grouting behind the secant piles may be needed as excavations proceed to ensure a water-tight wall. Only experienced contractors with demonstrated should be considered.

At the completion of each 1.5 m to 2.0 m drop in excavation level, reinforced shotcrete infill panels should be constructed for soldier pile walls. At no stage should progressive vertical excavation proceed beyond 2 m without infill panel support being constructed. Regular inspections by a geotechnical professional should be carried out following each progressive drop in excavation level to confirm that the conditions encountered are consistent with the design assumptions.

It is suggested that preliminary design of cantilevered shoring systems (or shoring with one row of anchors or propping) be based on a triangular earth pressure distribution using the earth pressure coefficients provided in Table 7. Douglas could carry out further analysis if required to refine the shoring design.

'Active' earth pressure coefficient ( $K_a$ ) values may be used for a flexible wall where some wall movement is acceptable, and 'at rest' earth pressure ( $K_o$ ) values should be used where the wall movement needs to be reduced (i.e. adjacent to existing structures or utilities).

**Table 7: Recommended Design Parameters for Shoring Systems**

| Material                         | Unit Weight (kN/m <sup>3</sup> ) | Earth Pressure Coefficient |              | Effective Cohesion c' (kPa) | Effective Friction Angle (degrees) | Young's Modulus (MPa) |
|----------------------------------|----------------------------------|----------------------------|--------------|-----------------------------|------------------------------------|-----------------------|
|                                  |                                  | Active (Ka)                | At Rest (Ko) |                             |                                    |                       |
| Filling / Firm to Stiff Clay     | 19                               | 0.4                        | 0.6          | 3                           | 25                                 | 5-10                  |
| Stiff to Hard Clay               | 20                               | 0.35                       | 0.5          | 5                           | 26                                 | 25                    |
| Class V-IV Shale/Siltstone       | 22                               | 0.25                       | 0.3          | 10                          | 28                                 | 70                    |
| Class III-II Siltstone or better | 23                               | 0.2                        | 0.25         | 20                          | 30                                 | 200                   |

Where multiple rows of anchors or propping are used it is suggested that preliminary design of shoring walls could be based on a trapezoidal earth pressure distribution with a maximum pressure calculated based on  $4H$  kPa where  $H$  is equal to the retained height of soil and class V-IV rock. The maximum pressure should be increased to  $6H$  where wall movement needs to be reduced. In each case the maximum pressure generally acts over the central 60% of the wall, reducing to zero at the top and base.

The design of temporary and permanent support will also need to consider the possibility that 45 degree joints in the shale and siltstone will daylight near the base of the excavation leading to wedges of rock requiring support by the temporary and permanent retaining structures. As a guide, an anchor force equal to  $4.2H^2$  kN per meter length of wall would be required for a continuous 45 degree joint daylighting at the toe of the excavation. This mechanism usually only governs shoring design for deeper excavations in stronger shale and may not govern for a two level basement in mostly residual clay and class V-IV rock but should be checked.

The design of the shoring should allow for all surcharge loads, including building footings, inclined slopes behind the wall, traffic, site sheds, and construction related activities.

Shoring walls should also be designed for full hydrostatic pressures unless drainage of the ground behind impermeable walls can be provided. Drainage could comprise 150 mm wide strip drains pinned to the face at 1 m to 2 m centres behind the shotcrete in-fill panels. The base of the strip drains should extend out from the shoring wall to allow any seepage to flow into a perimeter toe drain which is connected to the stormwater drainage system.

Detailed design of shoring should be carried using software such as WALLAP or Plaxis to capture the soil/structure interaction and staging.

The legal implications of the use of ground anchors extending beneath neighbouring properties and public land will need to be considered. Approval should be sought from Council, and adjacent property owners. Alternatively internal propping of the could be utilised if anchoring is not permitted. Care will need to be taken to avoid anchors penetrating underground services.

### 8.4.3 Passive Resistance

Passive resistance for piles founded in rock below the base of the bulk excavation (including allowance for services and/or footings) may be based on the ultimate passive restraint values provided in Table 8. This ultimate value represents the pressure mobilised at high displacements and therefore it will be necessary to incorporate a factor of safety of at least 2 to limit wall movement. The top 0.5 m of the socket should be ignored due to possible disturbance and over-excavation. The rock jointing within the socket depth may also be a controlling factor and should be considered in the design.

**Table 8: Recommended Passive Resistance Values**

| <b>Foundation Stratum</b>        | <b>Ultimate Passive Pressure (kPa)</b> |
|----------------------------------|--|
| Class V-IV Shale/Siltstone       | 400                                    |
| Class III-II Siltstone or better | 4,000                                  |

### 8.4.4 Ground Anchors

The design of temporary and permanent ground anchors/rock bolts for the support of excavations and/or shoring systems may be carried out on the basis of the bond stresses given in Table 9.

**Table 9: Recommended Bond Stresses for Rock Anchor Design**

| <b>Material Description</b>      | <b>Maximum Allowable Bond Stress (kPa)</b> | <b>Maximum Ultimate Bond Stress (kPa)</b> |
|----------------------------------|--|---|
| Class V-IV Shale/Siltstone       | 50   | 100                                       |
| Class III-II Siltstone or better | 300  | 600                                       |

These values should be confirmed by pull-out tests prior to installation of support elements. Ultimately, it is the contractor's responsibility to ensure that the correct design values (specific to the support system and method of installation) are used and that the support element holes are carefully cleaned prior to grouting.

After temporary support elements have been installed, it is recommended that they are tested to 125% of their nominal working load. Where stress relief or further unavoidable movement of the shoring is expected, it is recommended that the support elements are locked-off between 60% and 80% of their working loads to accommodate the additional movement and subsequent increase in stress in the support elements. Consideration should, however, be given to the immediate design requirements. The capacity of the anchor may have to be increased if a lower initial lock-off is not feasible. Checks should be carried out to confirm that the load in the support elements has been maintained and that losses due to creep effects or other causes have not occurred.

It is anticipated that the new structure will support the shoring walls over the long term and therefore the support elements are expected to be temporary only. The use of permanent rockbolts and ground anchors, if required, will need careful attention to corrosion protection.

## 8.5 Foundations

It is expected that very low strength to medium strength (Class V-III) rock will be exposed close to the basement slab level (RLs 8.2 m to 9.4 m) over most of the site. The medium strength rock is expected to be exposed mostly in the northern part of the site. Closely-spaced defects or weak seams are expected within very low strength rock, particularly toward the southern part of the site, so a downgrade of the bearing pressure may be necessary. Pad footings may be suitable in some areas depending on loads and settlement tolerances. Preferably footings should be founded on consistent strata, however founding in different rock strata can be considered provided that the differential settlements are assessed.

Alternatively bored piles could be used to reach stronger rock, particularly in areas where weaker rock is exposed. Relatively high seepage should be expected within the open piles and therefore allowance for pumping to remove water or the use of tremie methods to place concrete should be considered.

Design of footings may be based on the parameters provided in Table 10. For bored piles, if required, shaft adhesion values for uplift (tension) may be taken as being equal to 70% of the shaft adhesion values for compression in Table 10.

**Table 10: Design Parameters for Foundation Design**

| Foundation Stratum           | Maximum Allowable Pressure |                                     | Maximum Ultimate Pressure |                                     |
|------------------------------|----------------------------|-------------------------------------|---------------------------|-------------------------------------|
|                              | End Bearing (kPa)          | Shaft Adhesion (Compression)* (kPa) | End Bearing (kPa)         | Shaft Adhesion (Compression)* (kPa) |
| Class V Shale/Siltstone      | 700                        | 75                                  | 3,000                     | 100                                 |
| Class IV Shale/Siltstone     | 1,000                      | 120                                 | 5,000                     | 150                                 |
| Class III Siltstone          | 3,500                      | 350                                 | 15,000                    | 600                                 |
| Class II Siltstone or better | 6,000                      | 500                                 | 30,000                    | 1,000                               |

Foundations proportioned on the basis of the allowable bearing pressures in Table 10 would be expected to experience total settlements of less than 1% of the footing width under the applied working load, with differential settlements between adjacent columns expected to be less than half of this value.

It should be noted that the serviceability limit-state is likely to govern the design of the footings in better quality rock and the ultimate bearing pressures provided in Table 10 will probably need to be lowered in order to limit settlements to an acceptable level. An appropriate geotechnical strength reduction factor should be applied when using the limit-state approach as outlined in AS 2159 – 2009 Piling – Design and installation.

All footings should be inspected by a geotechnical engineer to confirm that foundation conditions are suitable for the design parameters.

## 8.6 Subgrade Preparation and Engineered Fill

Following stripping of the existing pavement, it is suggested that site preparation and engineered filling for lightly loaded pavements and/or raising of site levels should incorporate the following:

- stripping organic topsoil and obvious unsuitable material;
- rolling of the exposed subgrade with at least 8 passes of a smooth drum roller with a minimum static weight of 10 tonnes. The final pass (proof roll) of the subgrade should be inspected by a geotechnical engineer to detect any soft or heaving areas. Any soft spots detected during proof rolling would generally need to be stripped to a stiff base or depth of approximately 0.5 m, subject to confirmation by a geotechnical engineer, and replaced with engineered filling. Allowance for removal of some soft and over-wet material should be made based on the shallow perched seepage observed in the boreholes;
- engineered filling for replacing soft spots or raising site levels should be placed in layers of 300 mm maximum loose thickness and compacted to a dry density ratio of between 98% and 102% relative to Standard compaction with moisture contents strictly within 2% of Standard optimum moisture content (OMC). The density ratio should be increased to between 100% and 102% Standard compaction within 0.3 m of the finished surface. The existing filling and clayey soils on site should generally be suitable for re-use as engineered filling provided it has a maximum particle size of 150 mm and moisture content within 2% of Standard OMC. Reuse of material should also consider the contamination status of the soil, which may require further assessment; and
- density testing of each layer of filling should be undertaken in accordance with AS 3798-2007 "Guidelines for Earthworks for Commercial and Residential Developments" to verify that specified density ratios have been achieved.

Based on the CBR laboratory results, preliminary design of pavements on clayey subgrade should be based on a design California bearing ratio (CBR) of 2% and Elasticity Modulus of 20MPa. Further inspection and possibly laboratory testing of the exposed subgrade soils should be carried out by an experienced geotechnical engineer during the earthworks.

## 9. Limitations

Douglas Partners Pty Ltd (Douglas) has prepared this report for this project at 75-85 Mary Street, St Peters in accordance with Douglas 's agreement 209825.01.C.001.Rev0 dated 14 May 2024, which outlines the terms of our engagement. This report is provided for the exclusive use of P75 Investments Pty Ltd for this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other sites, or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of Douglas, does so entirely at its own risk and without recourse to Douglas for any loss or damage. In preparing this report Douglas has necessarily relied upon information provided by the client and/or their agents.

The results provided in the report are indicative of the sub-surface conditions on the site only at the specific sampling and/or testing locations, and then only to the depths investigated and at the time the work was carried out. Sub-surface conditions can change abruptly due to variable geological processes

and also as a result of human influences. Such changes may occur after Douglas 's field testing has been completed.

Douglas 's advice is based upon the conditions encountered during this investigation. The accuracy of the advice provided by Douglas in this report may be affected by undetected variations in ground conditions across the site between and beyond the sampling and/or testing locations. The advice may also be limited by budget constraints imposed by others or by site accessibility.

The assessment of atypical safety hazards arising from this advice is restricted to the geotechnical components set out in this report and based on known project conditions and stated design advice and assumptions. While some recommendations for safe controls may be provided, detailed 'safety in design' assessment is outside the current scope of this report and requires additional project data and assessment.

This report must be read in conjunction with all of the attached and should be kept in its entirety without separation of individual pages or sections. Douglas cannot be held responsible for interpretations or conclusions made by others unless they are supported by an expressed statement, interpretation, outcome or conclusion stated in this report.

This report, or sections from this report, should not be used as part of a specification for a project, without review and agreement by Douglas . This is because this report has been written as advice and opinion rather than instructions for construction.

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**Douglas Partners Pty Ltd**

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## **Appendix A**

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About This Report

# About this Report

# Douglas Partners



## Introduction

These notes have been provided to amplify DP's report in regard to classification methods, field procedures and the comments section. Not all are necessarily relevant to all reports.

DP's reports are based on information gained from limited subsurface excavations and sampling, supplemented by knowledge of local geology and experience. For this reason, they must be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely.

## Copyright

This report is the property of Douglas Partners Pty Ltd. The report may only be used for the purpose for which it was commissioned and in accordance with the Conditions of Engagement for the commission supplied at the time of proposal. Unauthorised use of this report in any form whatsoever is prohibited.

## Borehole and Test Pit Logs

The borehole and test pit logs presented in this report are an engineering and/or geological interpretation of the subsurface conditions, and their reliability will depend to some extent on frequency of sampling and the method of drilling or excavation. Ideally, continuous undisturbed sampling or core drilling will provide the most reliable assessment, but this is not always practicable or possible to justify on economic grounds. In any case the boreholes and test pits represent only a very small sample of the total subsurface profile.

Interpretation of the information and its application to design and construction should therefore take into account the spacing of boreholes or pits, the frequency of sampling, and the possibility of other than 'straight line' variations between the test locations.

## Groundwater

Where groundwater levels are measured in boreholes there are several potential problems, namely:

- In low permeability soils groundwater may enter the hole very slowly or perhaps not at all during the time the hole is left open;

- A localised, perched water table may lead to an erroneous indication of the true water table;
- Water table levels will vary from time to time with seasons or recent weather changes. They may not be the same at the time of construction as are indicated in the report; and
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water measurements are to be made.

More reliable measurements can be made by installing standpipes which are read at intervals over several days, or perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from a perched water table.

## Reports

The report has been prepared by qualified personnel, is based on the information obtained from field and laboratory testing, and has been undertaken to current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal, the information and interpretation may not be relevant if the design proposal is changed. If this happens, DP will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface conditions, discussion of geotechnical and environmental aspects, and recommendations or suggestions for design and construction. However, DP cannot always anticipate or assume responsibility for:

- Unexpected variations in ground conditions. The potential for this will depend partly on borehole or pit spacing and sampling frequency;
- Changes in policy or interpretations of policy by statutory authorities; or
- The actions of contractors responding to commercial pressures.

If these occur, DP will be pleased to assist with investigations or advice to resolve the matter.

# *About this Report*

## **Site Anomalies**

In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, DP requests that it be immediately notified. Most problems are much more readily resolved when conditions are exposed rather than at some later stage, well after the event.

## **Information for Contractual Purposes**

Where information obtained from this report is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. DP would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

## **Site Inspection**

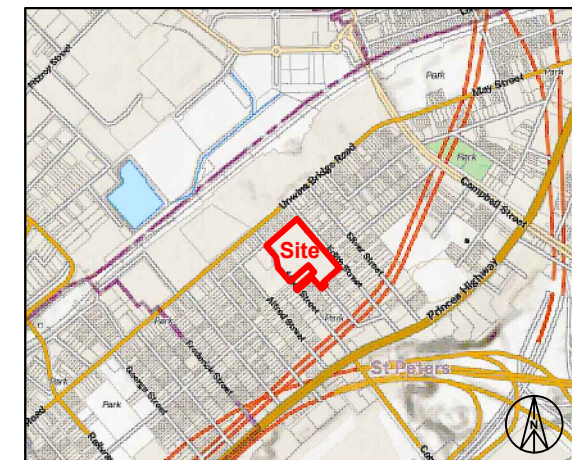
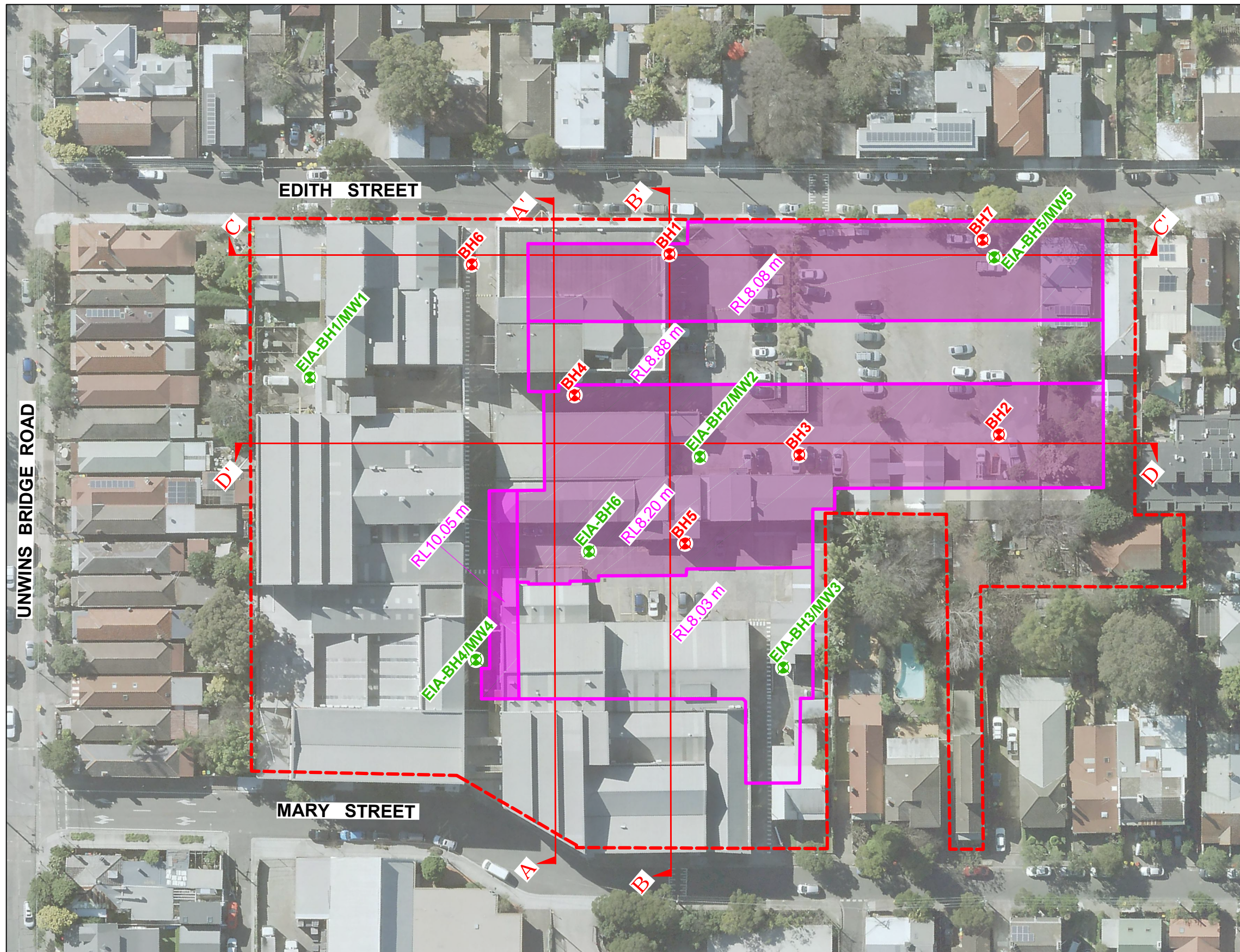
The company will always be pleased to provide engineering inspection services for geotechnical and environmental aspects of work to which this report is related. This could range from a site visit to confirm that conditions exposed are as expected, to full time engineering presence on site.

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## Appendix B

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Drawings



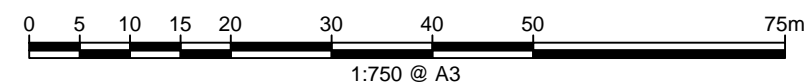
Locality Plan

**LEGEND**

- - - Approximate Site Boundary
- Approximate Basement 2 Floor Plan
- ◆ Cored Borehole Locations
- ◆ Previous Borehole/Monitoring Well Locations (EIA, E22317 GA\_Rev4, August 2017)
- └─┘ Geological Cross Section

**NOTE:**

1. Base image from MetroMap (Dated 30.07.2021)
2. Test locations by Environmental Investigations Australia (EIA) are approximate and based on Figure 2-Borehole Location Plan provided in EIA's report, Reference E22317 GA\_Rev4 (Dated 9 August, 2017)
3. Basement Outlines from Cox Architecture, Project No. 220160.00, Drawing No. DA-DA-20-98, Revision 22 (Dated 20.03.2023)

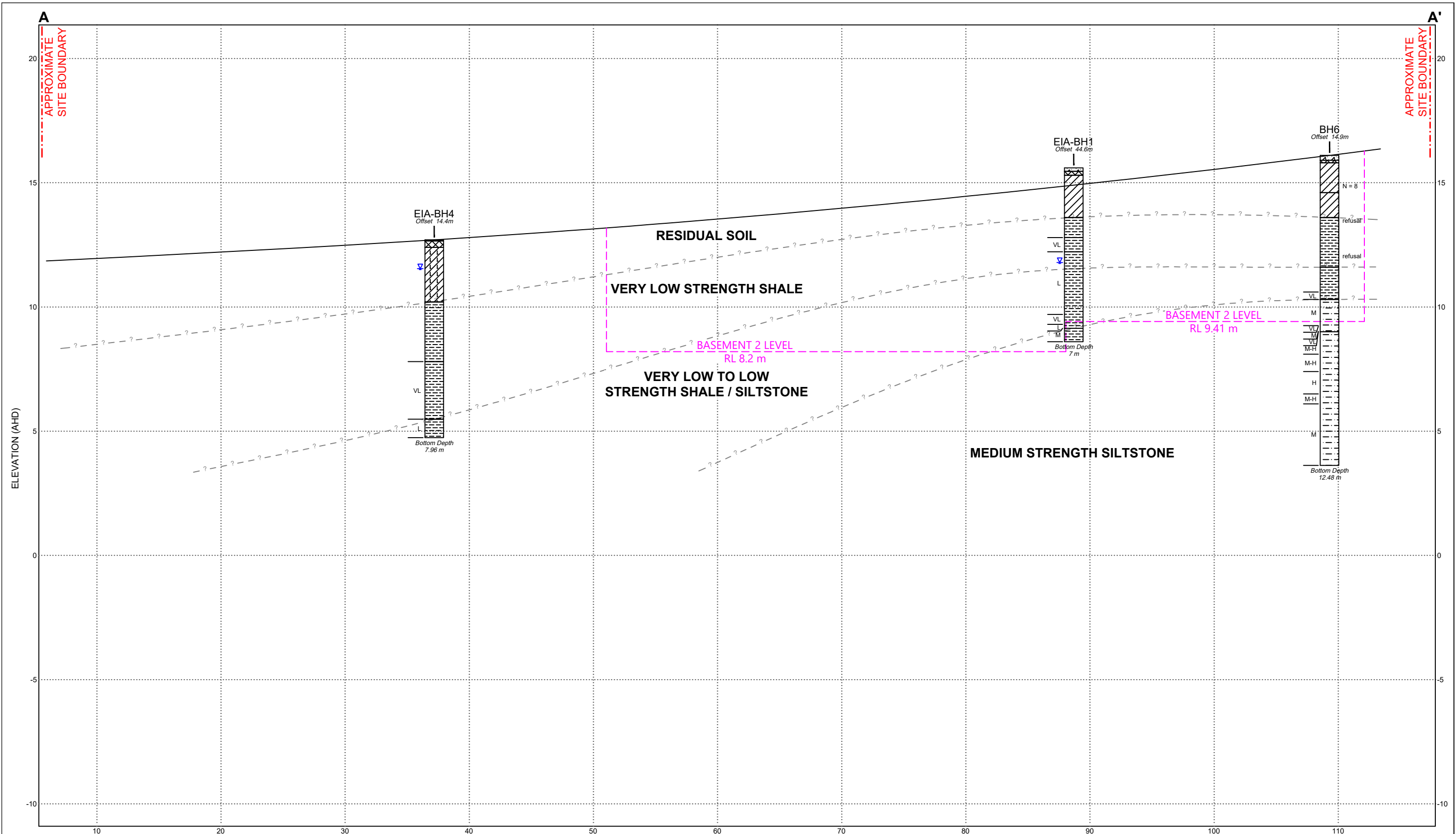


CLIENT: P75 Investments Pty Ltd  
 OFFICE: Sydney      DRAWN BY: LJH  
 SCALE: 1:750 @ A3      DATE: 23.07.2025

TITLE: **Test Location Plan**  
**Proposed Mixed-Use Development**  
**75-85 Mary Street, St Peters**



PROJECT No: 209825.01  
 DRAWING No: 1  
 REVISION: 1



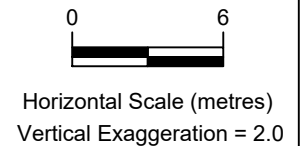
**LEGEND**

|  |          |  |                    |
|--|----------|--|--------------------|
|  | Concrete |  | Siltstone          |
|  | Filling  |  | Asphaltic Concrete |
|  | Clay     |  | Silty Clay         |
|  | Shale    |  |                    |

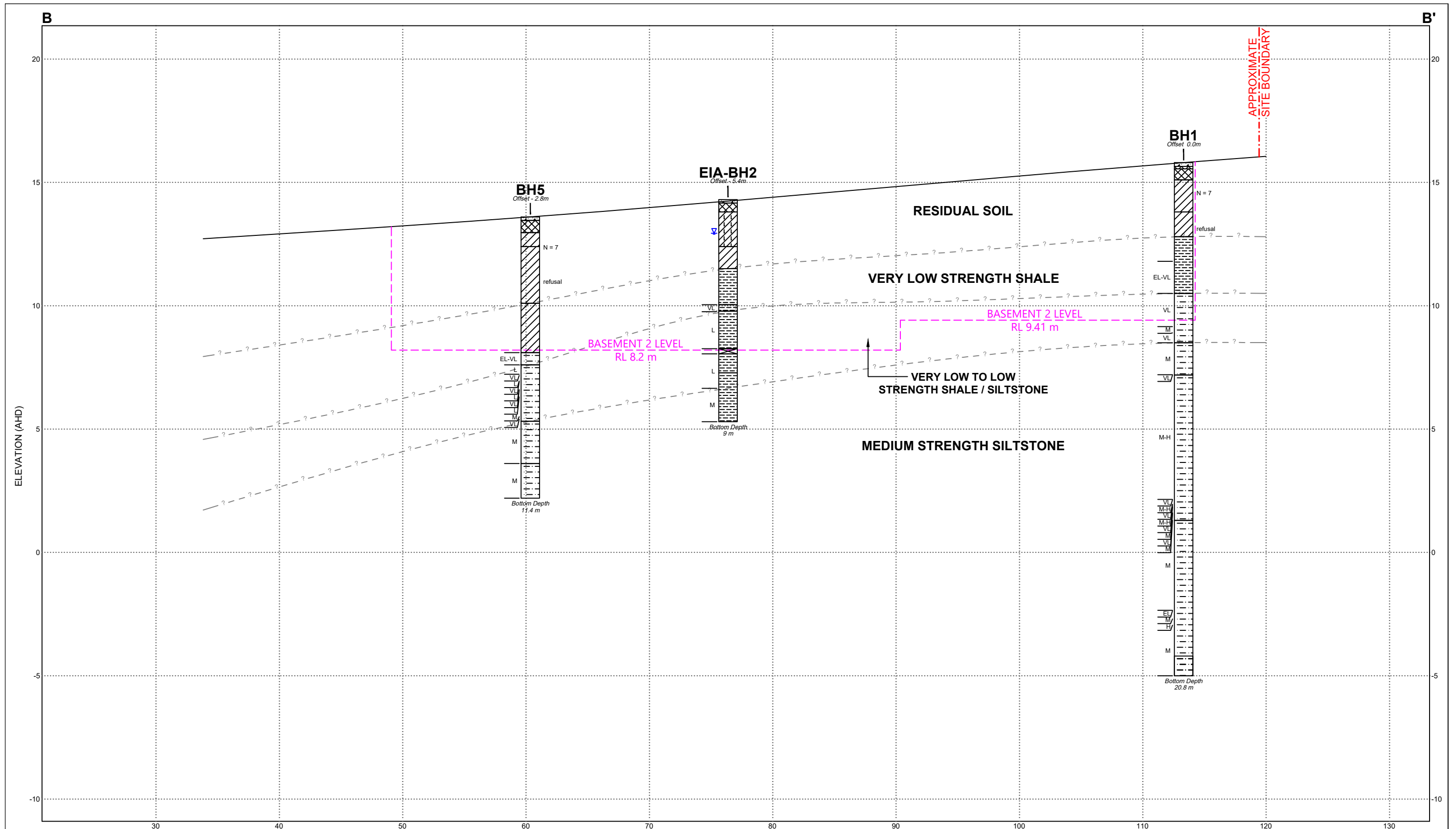
**NOTES:**

- Subsurface conditions are accurate at the borehole locations only. Variations in subsurface conditions may occur between borehole locations. Interpreted strata boundaries are approximate and should be used as a guide only.
- Summary logs only and should be read in conjunction with detailed logs.
- Horizontal and vertical scales are not equal.
- RLs of tests done by Environmental Investigations Australia were not provided and were approximated from the Survey Plan by Total Surveying Solutions, Job No. 210481 (Dated 09.03.2021)

|                      |   |
|----------------------|---|
| <b>ROCK STRENGTH</b> | <b>TESTS / OTHER</b>                      |
| EL - Extremely Low   | N - Standard penetration test value       |
| VL - Very Low        | - ? - - Interpreted geotechnical boundary |
| L - Low              | ∇ - Water level                           |
| M - Medium           |   |
| H - High             |   |
| VH - Very High       |   |



|  |                                    |   |  |
|--|------------------------------------|---|--|
| <p><b>Douglas Partners</b><br/>Geotechnics   Environment   Groundwater</p> | CLIENT: P75 Investments Pty Ltd    | TITLE: <b>Interpreted Geotechnical Cross-Section A-A'</b> | PROJECT No: 209825.00  |
|  | OFFICE: Sydney                     | DRAWN BY: MG  | DRAWING No: 2  |
|  | SCALE: 1:300 (H)<br>1:150 (V) @ A3 | DATE: 17.11.2021  | <b>Proposed Mixed-Use Development</b><br><b>75-85 Mary Street, St Peters</b> |



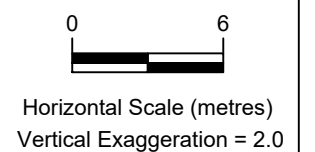
**LEGEND**

|  |           |  |            |
|--|-----------|--|------------|
|  | Core Loss |  | Shale      |
|  | Clay      |  | Siltstone  |
|  | Concrete  |  | Silty Clay |
|  | Filling   |  |            |

**NOTES:**

- Subsurface conditions are accurate at the borehole locations only. Variations in subsurface conditions may occur between borehole locations. Interpreted strata boundaries are approximate and should be used as a guide only.
- Summary logs only and should be read in conjunction with detailed logs.
- Horizontal and vertical scales are not equal.
- RLs of tests done by Environmental Investigations Australia were not provided and were approximated from the Survey Plan by Total Surveying Solutions, Job No. 210481 (Dated 09.03.2021)

|                      |   |
|----------------------|---|
| <b>ROCK STRENGTH</b> | <b>TESTS / OTHER</b>                      |
| EL - Extremely Low   | N - Standard penetration test value       |
| VL - Very Low        | - ? - - Interpreted geotechnical boundary |
| L - Low              | ∇ - Water level                           |
| M - Medium           |   |
| H - High             |   |
| VH - Very High       |   |



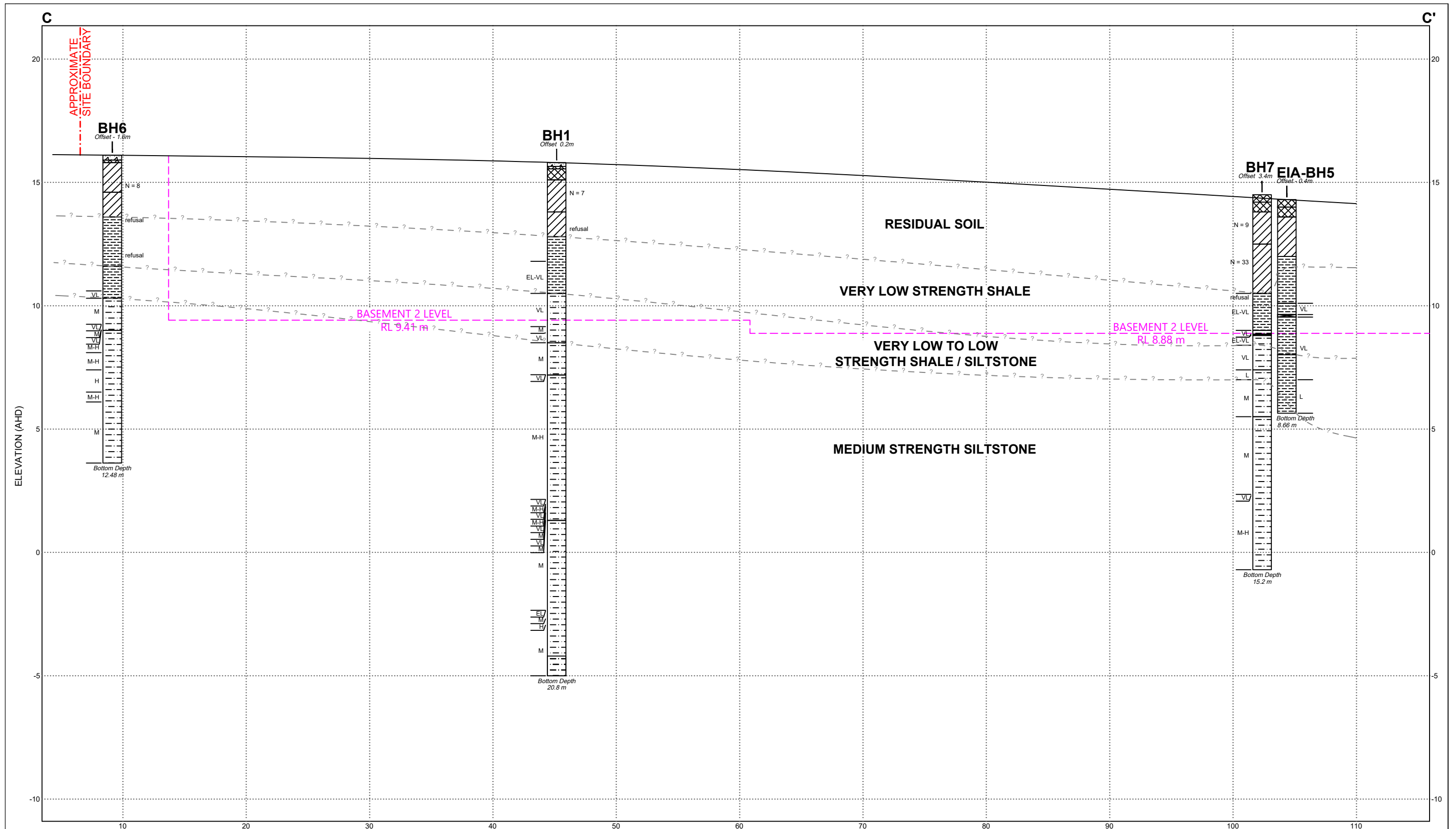
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| CLIENT: P75 Investments Pty Ltd    |                  |
| OFFICE: Sydney                     | DRAWN BY: MG     |
| SCALE: 1:300 (H)<br>1:150 (V) @ A3 | DATE: 17.11.2021 |

**TITLE: Interpreted Geotechnical Cross-Section B-B'**

**Proposed Mixed-Use Development**

**75-85 Mary Street, St Peters**

|             |           |
|-------------|-----------|
| PROJECT No: | 209825.00 |
| DRAWING No: | 3         |
| REVISION:   | 0         |



**LEGEND**

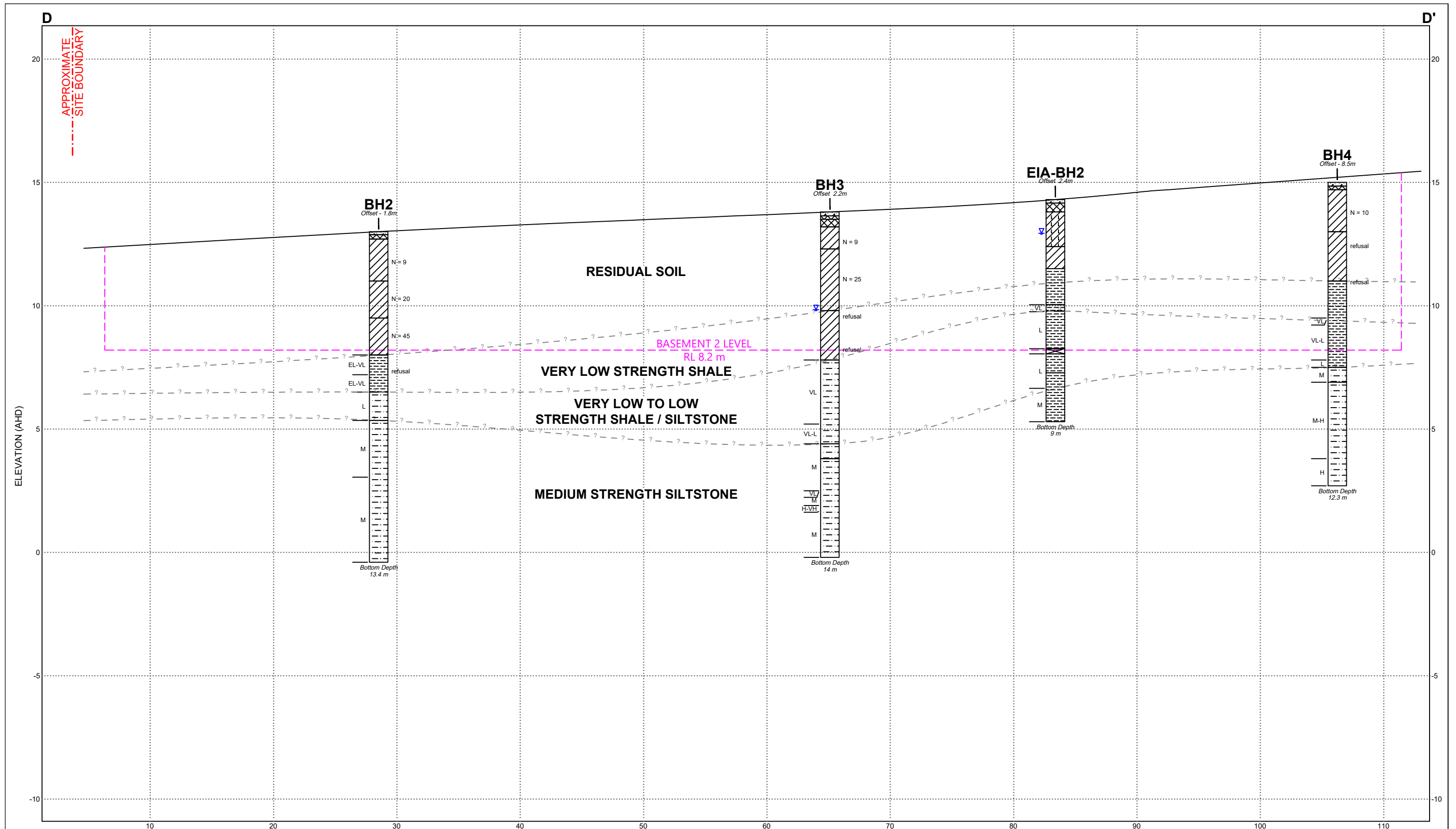
|  |           |  |           |
|--|-----------|--|-----------|
|  | Core Loss |  | Mudstone  |
|  | Clay      |  | Shale     |
|  | Concrete  |  | Siltstone |
|  | Filling   |  |           |

**NOTES:**

- Subsurface conditions are accurate at the borehole locations only. Variations in subsurface conditions may occur between borehole locations. Interpreted strata boundaries are approximate and should be used as a guide only.
- Summary logs only and should be read in conjunction with detailed logs.
- Horizontal and vertical scales are not equal.
- RLs of tests done by Environmental Investigations Australia were not provided and were approximated from the Survey Plan by Total Surveying Solutions, Job No. 210481 (Dated 09.03.2021)

|                      |   |  |
|----------------------|---|--|
| <b>ROCK STRENGTH</b> | <b>TESTS / OTHER</b>                      | <br>Horizontal Scale (metres)<br>Vertical Exaggeration = 2.0 |
| EL - Extremely Low   | N - Standard penetration test value       |  |
| VL - Very Low        | - ? - - Interpreted geotechnical boundary |  |
| L - Low              | - Water level                             |  |
| M - Medium           |   |  |
| H - High             |   |  |
| VH - Very High       |   |  |

|  |                                    |   |                                     |               |
|--|------------------------------------|---|-------------------------------------|---------------|
| <br><b>Douglas Partners</b><br>Geotechnics   Environment   Groundwater | CLIENT: P75 Investments Pty Ltd    | TITLE: <b>Interpreted Geotechnical Cross-Section C-C'</b> | PROJECT No: 209825.00               |               |
|  | OFFICE: Sydney                     | DRAWN BY: MG  | Proposed Mixed-Use Development      | DRAWING No: 4 |
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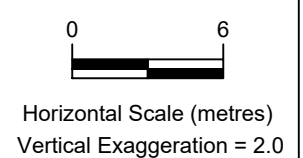
**LEGEND**

|  |           |  |            |
|--|-----------|--|------------|
|  | Core Loss |  | Shale      |
|  | Clay      |  | Siltstone  |
|  | Concrete  |  | Silty Clay |
|  | Filling   |  |            |

**NOTES:**

- Subsurface conditions are accurate at the borehole locations only. Variations in subsurface conditions may occur between borehole locations. Interpreted strata boundaries are approximate and should be used as a guide only.
- Summary logs only and should be read in conjunction with detailed logs.
- Horizontal and vertical scales are not equal.
- RLs of tests done by Environmental Investigations Australia were not provided and were approximated from the Survey Plan by Total Surveying Solutions, Job No. 210481 (Dated 09.03.2021)

|                      |   |
|----------------------|---|
| <b>ROCK STRENGTH</b> | <b>TESTS / OTHER</b>                        |
| EL - Extremely Low   | N - Standard penetration test value         |
| VL - Very Low        | - ? - - - Interpreted geotechnical boundary |
| L - Low              | ∇ - Water level                             |
| M - Medium           |   |
| H - High             |   |
| VH - Very High       |   |



|  |                                    |                  |   |                       |
|--|------------------------------------|------------------|---|-----------------------|
| <p><b>Douglas Partners</b><br/>Geotechnics   Environment   Groundwater</p> | CLIENT: P75 Investments Pty Ltd    |                  | <b>TITLE: Interpreted Geotechnical Cross-Section D-D'</b><br><b>Proposed Mixed-Use Development</b><br><b>75-85 Mary Street, St Peters</b> | PROJECT No: 209825.00 |
|  | OFFICE: Sydney                     | DRAWN BY: MG     |   | DRAWING No: 5         |
|  | SCALE: 1:300 (H)<br>1:150 (V) @ A3 | DATE: 17.11.2021 |   | REVISION: 0           |

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## **Appendix C**

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Borehole Logs



## Sampling

Sampling is carried out during drilling or test pitting to allow engineering examination (and laboratory testing where required) of the soil or rock.

Disturbed samples taken during drilling provide information on colour, type, inclusions and, depending upon the degree of disturbance, some information on strength and structure.

Undisturbed samples are taken by pushing a thin-walled sample tube into the soil and withdrawing it to obtain a sample of the soil in a relatively undisturbed state. Such samples yield information on structure and strength, and are necessary for laboratory determination of shear strength and compressibility. Undisturbed sampling is generally effective only in cohesive soils.

## Test Pits

Test pits are usually excavated with a backhoe or an excavator, allowing close examination of the in-situ soil if it is safe to enter into the pit. The depth of excavation is limited to about 3 m for a backhoe and up to 6 m for a large excavator. A potential disadvantage of this investigation method is the larger area of disturbance to the site.

## Large Diameter Augers

Boreholes can be drilled using a rotating plate or short spiral auger, generally 300 mm or larger in diameter commonly mounted on a standard piling rig. The cuttings are returned to the surface at intervals (generally not more than 0.5 m) and are disturbed but usually unchanged in moisture content. Identification of soil strata is generally much more reliable than with continuous spiral flight augers, and is usually supplemented by occasional undisturbed tube samples.

## Continuous Spiral Flight Augers

The borehole is advanced using 90-115 mm diameter continuous spiral flight augers which are withdrawn at intervals to allow sampling or in-situ testing. This is a relatively economical means of drilling in clays and sands above the water table. Samples are returned to the surface, or may be collected after withdrawal of the auger flights, but they are disturbed and may be mixed with soils from the sides of the hole. Information from the drilling (as distinct from specific sampling by SPTs or undisturbed samples) is of relatively low

reliability, due to the remoulding, possible mixing or softening of samples by groundwater.

## Non-core Rotary Drilling

The borehole is advanced using a rotary bit, with water or drilling mud being pumped down the drill rods and returned up the annulus, carrying the drill cuttings. Only major changes in stratification can be determined from the cuttings, together with some information from the rate of penetration. Where drilling mud is used this can mask the cuttings and reliable identification is only possible from separate sampling such as SPTs.

## Continuous Core Drilling

A continuous core sample can be obtained using a diamond tipped core barrel, usually with a 50 mm internal diameter. Provided full core recovery is achieved (which is not always possible in weak rocks and granular soils), this technique provides a very reliable method of investigation.

## Standard Penetration Tests

Standard penetration tests (SPT) are used as a means of estimating the density or strength of soils and also of obtaining a relatively undisturbed sample. The test procedure is described in Australian Standard 1289, Methods of Testing Soils for Engineering Purposes - Test 6.3.1.

The test is carried out in a borehole by driving a 50 mm diameter split sample tube under the impact of a 63 kg hammer with a free fall of 760 mm. It is normal for the tube to be driven in three successive 150 mm increments and the 'N' value is taken as the number of blows for the last 300 mm. In dense sands, very hard clays or weak rock, the full 450 mm penetration may not be practicable and the test is discontinued.

The test results are reported in the following form.

- In the case where full penetration is obtained with successive blow counts for each 150 mm of, say, 4, 6 and 7 as:  
4,6,7  
N=13
- In the case where the test is discontinued before the full penetration depth, say after 15 blows for the first 150 mm and 30 blows for the next 40 mm as:  
15, 30/40 mm

# Sampling Methods

The results of the SPT tests can be related empirically to the engineering properties of the soils.

## **Dynamic Cone Penetrometer Tests / Perth Sand Penetrometer Tests**

Dynamic penetrometer tests (DCP or PSP) are carried out by driving a steel rod into the ground using a standard weight of hammer falling a specified distance. As the rod penetrates the soil the number of blows required to penetrate each successive 150 mm depth are recorded. Normally there is a depth limitation of 1.2 m, but this may be extended in certain conditions by the use of extension rods. Two types of penetrometer are commonly used.

- Perth sand penetrometer - a 16 mm diameter flat ended rod is driven using a 9 kg hammer dropping 600 mm (AS 1289, Test 6.3.3). This test was developed for testing the density of sands and is mainly used in granular soils and filling.
- Cone penetrometer - a 16 mm diameter rod with a 20 mm diameter cone end is driven using a 9 kg hammer dropping 510 mm (AS 1289, Test 6.3.2). This test was developed initially for pavement subgrade investigations, and correlations of the test results with California Bearing Ratio have been published by various road authorities.



## Description and Classification Methods

The methods of description and classification of soils and rocks used in this report are generally based on Australian Standard AS1726:2017, Geotechnical Site Investigations. In general, the descriptions include strength or density, colour, structure, soil or rock type and inclusions.

## Soil Types

Soil types are described according to the predominant particle size, qualified by the grading of other particles present:

| Type    | Particle size (mm) |
|---------|--------------------|
| Boulder | >200               |
| Cobble  | 63 - 200           |
| Gravel  | 2.36 - 63          |
| Sand    | 0.075 - 2.36       |
| Silt    | 0.002 - 0.075      |
| Clay    | <0.002             |

The sand and gravel sizes can be further subdivided as follows:

| Type          | Particle size (mm) |
|---------------|--------------------|
| Coarse gravel | 19 - 63            |
| Medium gravel | 6.7 - 19           |
| Fine gravel   | 2.36 – 6.7         |
| Coarse sand   | 0.6 - 2.36         |
| Medium sand   | 0.21 - 0.6         |
| Fine sand     | 0.075 - 0.21       |

Definitions of grading terms used are:

- Well graded - a good representation of all particle sizes
- Poorly graded - an excess or deficiency of particular sizes within the specified range
- Uniformly graded - an excess of a particular particle size
- Gap graded - a deficiency of a particular particle size with the range

The proportions of secondary constituents of soils are described as follows:

In fine grained soils (>35% fines)

| Term      | Proportion of sand or gravel | Example                   |
|-----------|------------------------------|---------------------------|
| And       | Specify                      | Clay (60%) and Sand (40%) |
| Adjective | >30%                         | Sandy Clay                |
| With      | 15 – 30%                     | Clay with sand            |
| Trace     | 0 - 15%                      | Clay with trace sand      |

In coarse grained soils (>65% coarse)

- with clays or silts

| Term      | Proportion of fines | Example                   |
|-----------|---------------------|---------------------------|
| And       | Specify             | Sand (70%) and Clay (30%) |
| Adjective | >12%                | Clayey Sand               |
| With      | 5 - 12%             | Sand with clay            |
| Trace     | 0 - 5%              | Sand with trace clay      |

In coarse grained soils (>65% coarse)

- with coarser fraction

| Term      | Proportion of coarser fraction | Example                     |
|-----------|--------------------------------|-----------------------------|
| And       | Specify                        | Sand (60%) and Gravel (40%) |
| Adjective | >30%                           | Gravelly Sand               |
| With      | 15 - 30%                       | Sand with gravel            |
| Trace     | 0 - 15%                        | Sand with trace gravel      |

The presence of cobbles and boulders shall be specifically noted by beginning the description with 'Mix of Soil and Cobbles/Boulders' with the word order indicating the dominant first and the proportion of cobbles and boulders described together.

# Soil Descriptions

## Cohesive Soils

Cohesive soils, such as clays, are classified on the basis of undrained shear strength. The strength may be measured by laboratory testing, or estimated by field tests or engineering examination. The strength terms are defined as follows:

| Description | Abbreviation | Undrained shear strength (kPa) |
|-------------|--------------|--------------------------------|
| Very soft   | VS           | <12                            |
| Soft        | S            | 12 - 25                        |
| Firm        | F            | 25 - 50                        |
| Stiff       | St           | 50 - 100                       |
| Very stiff  | VSt          | 100 - 200                      |
| Hard        | H            | >200                           |
| Friable     | Fr           | -                              |

## Cohesionless Soils

Cohesionless soils, such as clean sands, are classified on the basis of relative density, generally from the results of standard penetration tests (SPT), cone penetration tests (CPT) or dynamic penetrometers (PSP). The relative density terms are given below:

| Relative Density | Abbreviation | Density Index (%) |
|------------------|--------------|-------------------|
| Very loose       | VL           | <15               |
| Loose            | L            | 15-35             |
| Medium dense     | MD           | 35-65             |
| Dense            | D            | 65-85             |
| Very dense       | VD           | >85               |

## Soil Origin

It is often difficult to accurately determine the origin of a soil. Soils can generally be classified as:

- Residual soil - derived from in-situ weathering of the underlying rock;
- Extremely weathered material – formed from in-situ weathering of geological formations. Has soil strength but retains the structure or fabric of the parent rock;
- Alluvial soil – deposited by streams and rivers;

- Estuarine soil – deposited in coastal estuaries;
- Marine soil – deposited in a marine environment;
- Lacustrine soil – deposited in freshwater lakes;
- Aeolian soil – carried and deposited by wind;
- Colluvial soil – soil and rock debris transported down slopes by gravity;
- Topsoil – mantle of surface soil, often with high levels of organic material.
- Fill – any material which has been moved by man.

## Moisture Condition – Coarse Grained Soils

For coarse grained soils the moisture condition should be described by appearance and feel using the following terms:

- Dry (D) Non-cohesive and free-running.
- Moist (M) Soil feels cool, darkened in colour.  
Soil tends to stick together.  
Sand forms weak ball but breaks easily.
- Wet (W) Soil feels cool, darkened in colour.  
Soil tends to stick together, free water forms when handling.

## Moisture Condition – Fine Grained Soils

For fine grained soils the assessment of moisture content is relative to their plastic limit or liquid limit, as follows:

- 'Moist, dry of plastic limit' or 'w < PL' (i.e. hard and friable or powdery).
- 'Moist, near plastic limit' or 'w ≈ PL' (i.e. soil can be moulded at moisture content approximately equal to the plastic limit).
- 'Moist, wet of plastic limit' or 'w > PL' (i.e. soils usually weakened and free water forms on the hands when handling).
- 'Wet' or 'w ≈ LL' (i.e. near the liquid limit).
- 'Wet' or 'w > LL' (i.e. wet of the liquid limit).



## Rock Strength

Rock strength is defined by the Unconfined Compressive Strength and it refers to the strength of the rock substance and not the strength of the overall rock mass, which may be considerably weaker due to defects.

The Point Load Strength Index  $Is_{(50)}$  is commonly used to provide an estimate of the rock strength and site specific correlations should be developed to allow UCS values to be determined. The point load strength test procedure is described by Australian Standard AS4133.4.1-2007. The terms used to describe rock strength are as follows:

| Strength Term  | Abbreviation | Unconfined Compressive Strength MPa | Point Load Index * $Is_{(50)}$ MPa |
|----------------|--------------|-------------------------------------|------------------------------------|
| Very low       | VL           | 0.6 - 2                             | 0.03 - 0.1                         |
| Low            | L            | 2 - 6                               | 0.1 - 0.3                          |
| Medium         | M            | 6 - 20                              | 0.3 - 1.0                          |
| High           | H            | 20 - 60                             | 1 - 3                              |
| Very high      | VH           | 60 - 200                            | 3 - 10                             |
| Extremely high | EH           | >200                                | >10                                |

\* Assumes a ratio of 20:1 for UCS to  $Is_{(50)}$ . It should be noted that the UCS to  $Is_{(50)}$  ratio varies significantly for different rock types and specific ratios should be determined for each site.

## Degree of Weathering

The degree of weathering of rock is classified as follows:

| Term   | Abbreviation | Description   |
|--|--------------|---|
| Residual Soil  | RS           | Material is weathered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are no longer visible, but the soil has not been significantly transported.  |
| Extremely weathered  | XW           | Material is weathered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are still visible  |
| Highly weathered   | HW           | The whole of the rock material is discoloured, usually by iron staining or bleaching to the extent that the colour of the original rock is not recognisable. Rock strength is significantly changed by weathering. Some primary minerals have weathered to clay minerals. Porosity may be increased by leaching, or may be decreased due to deposition of weathering products in pores. |
| Moderately weathered   | MW           | The whole of the rock material is discoloured, usually by iron staining or bleaching to the extent that the colour of the original rock is not recognisable, but shows little or no change of strength from fresh rock.   |
| Slightly weathered   | SW           | Rock is partially discoloured with staining or bleaching along joints but shows little or no change of strength from fresh rock.  |
| Fresh  | FR           | No signs of decomposition or staining.  |
| Note: If HW and MW cannot be differentiated use DW (see below) |              |   |
| Distinctly weathered   | DW           | Rock strength usually changed by weathering. The rock may be highly discoloured, usually by iron staining. Porosity may be increased by leaching or may be decreased due to deposition of weathered products in pores.  |

# Rock Descriptions

## Degree of Fracturing

The following classification applies to the spacing of natural fractures in diamond drill cores. It includes bedding plane partings, joints and other defects, but excludes drilling breaks.

| Term               | Description   |
|--------------------|---|
| Fragmented         | Fragments of <20 mm   |
| Highly Fractured   | Core lengths of 20-40 mm with occasional fragments                      |
| Fractured          | Core lengths of 30-100 mm with occasional shorter and longer sections   |
| Slightly Fractured | Core lengths of 300 mm or longer with occasional sections of 100-300 mm |
| Unbroken           | Core contains very few fractures  |

## Rock Quality Designation

The quality of the cored rock can be measured using the Rock Quality Designation (RQD) index, defined as:

$$\text{RQD \%} = \frac{\text{cumulative length of 'sound' core sections} > 100 \text{ mm long}}{\text{total drilled length of section being assessed}}$$

where 'sound' rock is assessed to be rock of low strength or stronger. The RQD applies only to natural fractures. If the core is broken by drilling or handling (i.e. drilling breaks) then the broken pieces are fitted back together and are not included in the calculation of RQD.

## Stratification Spacing

For sedimentary rocks the following terms may be used to describe the spacing of bedding partings:

| Term                | Separation of Stratification Planes |
|---------------------|-------------------------------------|
| Thinly laminated    | < 6 mm                              |
| Laminated           | 6 mm to 20 mm                       |
| Very thinly bedded  | 20 mm to 60 mm                      |
| Thinly bedded       | 60 mm to 0.2 m                      |
| Medium bedded       | 0.2 m to 0.6 m                      |
| Thickly bedded      | 0.6 m to 2 m                        |
| Very thickly bedded | > 2 m                               |

# Symbols & Abbreviations

# Douglas Partners



## Introduction

These notes summarise abbreviations commonly used on borehole logs and test pit reports.

## Drilling or Excavation Methods

|      |                          |
|------|--------------------------|
| C    | Core drilling            |
| R    | Rotary drilling          |
| SFA  | Spiral flight augers     |
| NMLC | Diamond core - 52 mm dia |
| NQ   | Diamond core - 47 mm dia |
| HQ   | Diamond core - 63 mm dia |
| PQ   | Diamond core - 81 mm dia |

## Water

|   |             |
|---|-------------|
| ▷ | Water seep  |
| ▽ | Water level |

## Sampling and Testing

|                 |                                |
|-----------------|--------------------------------|
| A               | Auger sample                   |
| B               | Bulk sample                    |
| D               | Disturbed sample               |
| E               | Environmental sample           |
| U <sub>50</sub> | Undisturbed tube sample (50mm) |
| W               | Water sample                   |
| pp              | Pocket penetrometer (kPa)      |
| PID             | Photo ionisation detector      |
| PL              | Point load strength Is(50) MPa |
| S               | Standard Penetration Test      |
| V               | Shear vane (kPa)               |

## Description of Defects in Rock

The abbreviated descriptions of the defects should be in the following order: Depth, Type, Orientation, Coating, Shape, Roughness and Other. Drilling and handling breaks are not usually included on the logs.

## Defect Type

|     |                 |
|-----|-----------------|
| B   | Bedding plane   |
| Cs  | Clay seam       |
| Cv  | Cleavage        |
| Cz  | Crushed zone    |
| Ds  | Decomposed seam |
| F   | Fault           |
| J   | Joint           |
| Lam | Lamination      |
| Pt  | Parting         |
| Sz  | Sheared Zone    |
| V   | Vein            |

## Orientation

The inclination of defects is always measured from the perpendicular to the core axis.

|    |                |
|----|----------------|
| h  | horizontal     |
| v  | vertical       |
| sh | sub-horizontal |
| sv | sub-vertical   |

## Coating or Infilling Term

|     |          |
|-----|----------|
| cln | clean    |
| co  | coating  |
| he  | healed   |
| inf | infilled |
| stn | stained  |
| ti  | tight    |
| vn  | veneer   |

## Coating Descriptor

|     |              |
|-----|--------------|
| ca  | calcite      |
| cbs | carbonaceous |
| cly | clay         |
| fe  | iron oxide   |
| mn  | manganese    |
| slt | silty        |

## Shape

|    |            |
|----|------------|
| cu | curved     |
| ir | irregular  |
| pl | planar     |
| st | stepped    |
| un | undulating |

## Roughness

|    |              |
|----|--------------|
| po | polished     |
| ro | rough        |
| sl | slickensided |
| sm | smooth       |
| vr | very rough   |



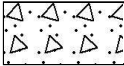

## Other

|     |            |
|-----|------------|
| fg  | fragmented |
| bnd | band       |
| qtz | quartz     |




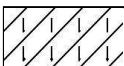



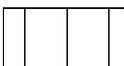
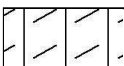
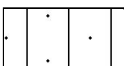

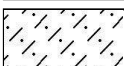
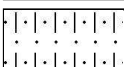



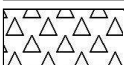
# Symbols & Abbreviations

## Graphic Symbols for Soil and Rock

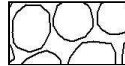
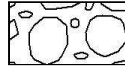

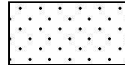
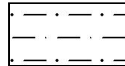
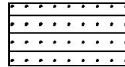
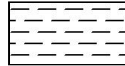

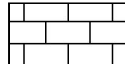
### General

|   |           |
|---|-----------|
|  | Asphalt   |
|  | Road base |
|  | Concrete  |
|  | Filling   |

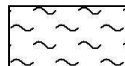
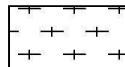
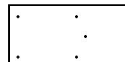
### Soils

|   |                   |
|---|-------------------|
|    | Topsoil           |
|    | Peat              |
|   | Clay              |
|  | Silty clay        |
|  | Sandy clay        |
|  | Gravelly clay     |
|  | Shaly clay        |
|  | Silt              |
|  | Clayey silt       |
|  | Sandy silt        |
|  | Sand              |
|  | Clayey sand       |
|  | Silty sand        |
|  | Gravel            |
|  | Sandy gravel      |
|  | Cobbles, boulders |
|  | Talus             |

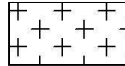
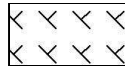
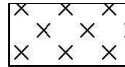
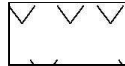

### Sedimentary Rocks

|   |                            |
|---|----------------------------|
|    | Boulder conglomerate       |
|    | Conglomerate               |
|    | Conglomeratic sandstone    |
|    | Sandstone                  |
|    | Siltstone                  |
|    | Laminite                   |
|    | Mudstone, claystone, shale |
|   | Coal                       |
|  | Limestone                  |

### Metamorphic Rocks

|   |                         |
|---|-------------------------|
|  | Slate, phyllite, schist |
|  | Gneiss                  |
|  | Quartzite               |

### Igneous Rocks

|   |                            |
|---|----------------------------|
|  | Granite                    |
|  | Dolerite, basalt, andesite |
|  | Dacite, epidote            |
|  | Tuff, breccia              |
|  | Porphyry                   |

# BOREHOLE LOG

**CLIENT:** P75 Investments Pty Ltd  
**PROJECT:** Proposed Mixed-Use Development  
**LOCATION:** 75-85 Mary Street, St Peters

**SURFACE LEVEL:** 15.8 AHD  
**EASTING:** 331152  
**NORTHING:** 6246001  
**DIP/AZIMUTH:** 90°/--

**BORE No:** BH1  
**PROJECT No:** 209825.00  
**DATE:** 18/10/2021  
**SHEET 1 OF 3**

| RL | Depth (m) | Description of Strata   | Degree of Weathering |    |    |    | Graphic Log | Rock Strength |    |        |          |     | Water | Fracture Spacing (m) | Discontinuities |      | Sampling & In Situ Testing |         |             |           |           |           |                       |
|----|-----------|---|----------------------|----|----|----|-------------|---------------|----|--------|----------|-----|-------|----------------------|-----------------|------|----------------------------|---------|-------------|-----------|-----------|-----------|-----------------------|
|    |           |   | EW                   | HW | MW | SW |             | FS            | FR | Ex Low | Very Low | Low |       |                      | Medium          | High | Very High                  | Ex High | B - Bedding | J - Joint | S - Shear | F - Fault | Type                  |
|    | 0.15      | CONCRETE SLAB   |                      |    |    |    |             |               |    |        |          |     |       |                      |                 |      |                            |         |             |           |           |           |                       |
|    | 0.25      | FILL/Sandy GRAVEL: medium to coarse, grey, igneous, moist   |                      |    |    |    |             |               |    |        |          |     |       |                      |                 |      |                            |         |             |           |           |           |                       |
|    | 0.7       | FILL/Silty CLAY: low plasticity, grey, approximately 30% silt and fine sand, trace igneous gravel, w~PL, apparently poorly compacted, moist   |                      |    |    |    |             |               |    |        |          |     |       |                      |                 |      |                            |         |             |           |           |           |                       |
|    | 1         | CLAY CH: high plasticity, pale grey brown, w~PL, firm, residual<br>Below 1.5m: becoming stiff   |                      |    |    |    |             |               |    |        |          |     |       |                      |                 |      |                            |         |             |           |           |           | 1,3,4<br>N = 7        |
|    | 2.0       | CLAY CI: medium plasticity, pale grey mottled brown, trace ironstone gravel, w<PL, very stiff then hard, residual<br>Below 2.6m: becoming hard  |                      |    |    |    |             |               |    |        |          |     |       |                      |                 |      |                            |         |             |           |           |           | 6,20,20/75<br>refusal |
|    | 3.0       | SHALE: pale grey and brown, very low strength, highly weathered, with iron cemented bands, Ashfield Shale   |                      |    |    |    |             |               |    |        |          |     |       |                      |                 |      |                            |         |             |           |           |           |                       |
|    | 4         |   |                      |    |    |    |             |               |    |        |          |     |       |                      |                 |      |                            |         |             |           |           |           |                       |
|    | 5.3       | SILTSTONE: grey, distinctly and indistinctly bedded/laminated, approximately 10-20% fine sandstone laminations, very low to low strength with medium strength bands, slightly weathered, slightly fractured, Ashfield Shale |                      |    |    |    |             |               |    |        |          |     |       |                      |                 |      |                            |         |             |           |           |           |                       |
|    | 7.3       | SILTSTONE: grey and pale grey, approximately 20% fine sandstone laminations, medium strength, fresh, slightly fractured, Ashfield Shale   |                      |    |    |    |             |               |    |        |          |     |       |                      |                 |      |                            |         |             |           |           |           |                       |
|    | 8.61      | SILTSTONE: grey and pale grey, approximately 20% fine sandstone laminations, medium to high strength, fresh, slightly fractured and unbroken, Ashfield Shale  |                      |    |    |    |             |               |    |        |          |     |       |                      |                 |      |                            |         |             |           |           |           |                       |

**RIG:** Rig 4 (Scout)      **DRILLER:** Rockwell      **LOGGED:** SI      **CASING:** HQ to 4.0m  
**TYPE OF BORING:** Diatube to 0.15m, Spiral Flight Auger (TC-bit) to 4.0m, NMLC Coring to 20.8m  
**WATER OBSERVATIONS:** No free groundwater observed whilst augering  
**REMARKS:** Standpipe installed to 9.0m (screen 3.0m-9.0m, PVC 0.1m-3.0m, Gravel 2.5m-9.0m, Bentonite 2.0m-2.5m, Backfill to 0.1m, gatic cover at top)

|     |                      |   |                         |       |  |
|-----|----------------------|---|-------------------------|-------|--|
| A   | Auger sample         | G | Gas sample              | PLD   | Photo ionisation detector (ppm)        |
| B   | Bulk sample          | P | Piston sample           | PL(A) | Point load axial test Is(50) (MPa)     |
| BLK | Block sample         | U | Tube sample (x mm dia.) | PL(D) | Point load diametral test Is(50) (MPa) |
| C   | Core drilling        | W | Water sample            | pp    | Pocket penetrometer (kPa)              |
| D   | Disturbed sample     | > | Water seep              | S     | Standard penetration test              |
| E   | Environmental sample | ≡ | Water level             | V     | Shear vane (kPa)                       |





# BOREHOLE LOG

**CLIENT:** P75 Investments Pty Ltd Proposed  
**PROJECT:** Mixed-Use Development  
**LOCATION:** 75-85 Mary Street, St Peters

**SURFACE LEVEL:** 15.8 AHD  
**EASTING:** 331152  
**NORTHING:** 6246001  
**DIP/AZIMUTH:** 90°/--

**BORE No:** BH1  
**PROJECT No:** 209825.00  
**DATE:** 18/10/2021  
**SHEET 3 OF 3**

| RL | Depth (m) | Description of Strata             | Degree of Weathering |    |    |    | Graphic Log | Rock Strength |    |        |          |     | Water | Fracture Spacing (m) | Discontinuities |      | Sampling & In Situ Testing |         |             |           |           |           |      |             |             |
|----|-----------|-----------------------------------|----------------------|----|----|----|-------------|---------------|----|--------|----------|-----|-------|----------------------|-----------------|------|----------------------------|---------|-------------|-----------|-----------|-----------|------|-------------|-------------|
|    |           |                                   | EW                   | HW | MW | SW |             | FS            | FR | Ex Low | Very Low | Low |       |                      | Medium          | High | Very High                  | Ex High | B - Bedding | J - Joint | S - Shear | F - Fault | Type | Core Rec. % | RQD %       |
|    | 20.8      | SILTSTONE: Refer to previous page |                      |    |    |    |             |               |    |        |          |     |       |                      |                 |      | 20m: J45°, pl, ro, cln     |         |             |           |           | C         | 100  | 97          | PL(A) = 0.7 |
|    | 21        | Bore discontinued at 20.8m        |                      |    |    |    |             |               |    |        |          |     |       |                      |                 |      |                            |         |             |           |           |           |      |             |             |
|    | 22        |                                   |                      |    |    |    |             |               |    |        |          |     |       |                      |                 |      |                            |         |             |           |           |           |      |             |             |
|    | 23        |                                   |                      |    |    |    |             |               |    |        |          |     |       |                      |                 |      |                            |         |             |           |           |           |      |             |             |
|    | 24        |                                   |                      |    |    |    |             |               |    |        |          |     |       |                      |                 |      |                            |         |             |           |           |           |      |             |             |
|    | 25        |                                   |                      |    |    |    |             |               |    |        |          |     |       |                      |                 |      |                            |         |             |           |           |           |      |             |             |
|    | 26        |                                   |                      |    |    |    |             |               |    |        |          |     |       |                      |                 |      |                            |         |             |           |           |           |      |             |             |
|    | 27        |                                   |                      |    |    |    |             |               |    |        |          |     |       |                      |                 |      |                            |         |             |           |           |           |      |             |             |
|    | 28        |                                   |                      |    |    |    |             |               |    |        |          |     |       |                      |                 |      |                            |         |             |           |           |           |      |             |             |
|    | 29        |                                   |                      |    |    |    |             |               |    |        |          |     |       |                      |                 |      |                            |         |             |           |           |           |      |             |             |
|    | 30        |                                   |                      |    |    |    |             |               |    |        |          |     |       |                      |                 |      |                            |         |             |           |           |           |      |             |             |

**RIG:** Rig 4 (Scout)                      **DRILLER:** Rockwell                      **LOGGED:** SI                      **CASING:** HQ to 4.0m  
**TYPE OF BORING:** Diatube to 0.15m, Spiral Flight Auger (TC-bit) to 4.0m, NMLC Coring to 20.8m  
**WATER OBSERVATIONS:** No free groundwater observed whilst augering  
**REMARKS:** Standpipe installed to 9.0m (screen 3.0m-9.0m, PVC 0.1m-3.0m, Gravel 2.5m-9.0m, Bentonite 2.0m-2.5m, Backfill to 0.1m, gatic cover at top)

| SAMPLING & IN SITU TESTING LEGEND |                      |       |  |
|-----------------------------------|----------------------|-------|--|
| A                                 | Auger sample         | G     | Gas sample                             |
| B                                 | Bulk sample          | P     | Piston sample                          |
| BLK                               | Block sample         | U     | Tube sample (x mm dia.)                |
| C                                 | Core drilling        | W     | Water sample                           |
| D                                 | Disturbed sample     | >     | Water seep                             |
| E                                 | Environmental sample | ≡     | Water level                            |
|                                   |                      | PID   | Photo ionisation detector (ppm)        |
|                                   |                      | PL(A) | Point load axial test Is(50) (MPa)     |
|                                   |                      | PL(D) | Point load diametral test Is(50) (MPa) |
|                                   |                      | gp    | Pocket penetrometer (kPa)              |
|                                   |                      | S     | Standard penetration test              |
|                                   |                      | V     | Shear vane (kPa)                       |



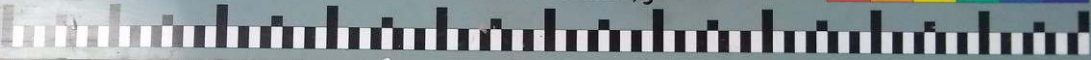
BORE: 1

PROJECT: 209825.00

October 2021



Project No: 209825.00  
BH ID: DP1  
Depth: 4.00 - 8.00 m  
Core Box No.: 1/3



ST PETERS 209825.00 BH-DP1 Start: 4.0 m

4.0  
m

5.0  
m

6.0  
m

7.0  
m

4.00 - 8.00 m

BORE: 1

PROJECT: 209825.00

October 2021



Project No: 209825.00  
BH ID: DP1  
Depth: 8.00 - 13.00 m  
Core Box No.: 2/4



8.0

9.0

10.0

11.0

12.0

8.00 - 13.00 m

BORE: 1

PROJECT: 209825.00

October 2021



Project No: 209825.00  
BH ID: DP 1  
Depth: 13.00 - 18.00m  
Core Box No.: 3/4



13.00 - 18.0

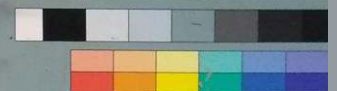
BORE: 1

PROJECT: 209825.00

October 2021



Project No: 209825.00  
BH ID: DP 1  
Depth: 18.00 - 20.85m  
Core Box No.: 4/4



18.00 - 20.85

# BOREHOLE LOG

**CLIENT:** P75 Investments Pty Ltd Proposed  
**PROJECT:** Mixed-Use Development  
**LOCATION:** 75-85 Mary Street, St Peters

**SURFACE LEVEL:** 13 AHD  
**EASTING:** 331167  
**NORTHING:** 6245934  
**DIP/AZIMUTH:** 90°/--

**BORE No:** BH2  
**PROJECT No:** 209825.00  
**DATE:** 21/10/2021  
**SHEET 1 OF 2**

| RL   | Depth (m) | Description of Strata   | Degree of Weathering |    |    |    |    | Graphic Log | Rock Strength |        |          |     |        | Water | Fracture Spacing (m) | Discontinuities |           | Sampling & In Situ Testing |             |           |           |           |                                |
|------|-----------|---|----------------------|----|----|----|----|-------------|---------------|--------|----------|-----|--------|-------|----------------------|-----------------|-----------|----------------------------|-------------|-----------|-----------|-----------|--------------------------------|
|      |           |   | EW                   | HW | MW | SW | FS |             | FR            | Ex Low | Very Low | Low | Medium |       |                      | High            | Very High | Ex High                    | B - Bedding | J - Joint | S - Shear | F - Fault | Type                           |
| 13.0 | 0.12      | CONCRETE SLAB   |                      |    |    |    |    |             |               |        |          |     |        |       |                      |                 |           |                            |             |           |           |           |                                |
| 13.0 | 0.3       | FILL/Sandy GRAVEL: medium to coarse, grey, coarse sand, moist<br>CLAY CH: high plasticity, pale grey brown, w~PL, firm to stiff, residual   |                      |    |    |    |    |             |               |        |          |     |        |       |                      |                 |           |                            | A           |           |           |           |                                |
| 13.0 | 1.0       |   |                      |    |    |    |    |             |               |        |          |     |        |       |                      |                 |           |                            | A           |           |           |           |                                |
| 13.0 | 2.0       | CLAY CI: medium plasticity, pale grey and mottled brown, trace ironstone gravel, very stiff, residual   |                      |    |    |    |    |             |               |        |          |     |        |       |                      |                 |           |                            | S           |           |           |           | 2.3,6<br>N = 9                 |
| 13.0 | 3.5       | CLAY CL: low plasticity, pale grey and red brown, approximately 20% ironstone gravel, hard, residual  |                      |    |    |    |    |             |               |        |          |     |        |       |                      |                 |           |                            | S           |           |           |           | 4.8,12<br>N = 20               |
| 13.0 | 5.0       | SHALE: pale grey and red brown, very low strength, with iron cemented bands, highly weathered, Ashfield Shale   |                      |    |    |    |    |             |               |        |          |     |        |       |                      |                 |           |                            | S           |           |           |           | 8,20,25<br>N = 45              |
| 13.0 | 6.5       | SILTSTONE: pale grey brown and grey, indistinct bedding/laminations, approximately 20% fine sandstone laminations, low strength, highly weathered, slightly fractured, Ashfield Shale                       |                      |    |    |    |    |             |               |        |          |     |        |       |                      |                 |           |                            | C           | 100       | 35        |           | PL(A) = 0.1                    |
| 13.0 | 7.65      | SILTSTONE: pale grey and dark grey, distinctly and indistinctly bedded and laminated, approximately 25% fine sandstone laminations, medium strength, fresh, slightly fractured and unbroken, Ashfield Shale |                      |    |    |    |    |             |               |        |          |     |        |       |                      |                 |           |                            | C           | 100       | 100       |           | PL(A) = 0.2<br><br>PL(A) = 0.8 |
| 13.0 | 9.0       |   |                      |    |    |    |    |             |               |        |          |     |        |       |                      |                 |           |                            | C           | 100       | 100       |           | PL(A) = 0.4                    |

**RIG:** Rig 4 (Scout)      **DRILLER:** Rockwell      **LOGGED:** SI      **CASING:** HQ to 5.0m

**TYPE OF BORING:** Diatube to 0.12m, Spiral Flight Auger (TC-bit) to 5.8m, NMLC Coring to 13.4m

**WATER OBSERVATIONS:** No free groundwater observed whilst augering

**REMARKS:** Standpipe installed to 9.0m (screen 3.0m-9.0m, PVC 0.1m-3.0m, Gravel 2.5m-9.0m, Bentonite 2.0m-2.5m, Backfill to 0.1m, gatic cover at top)

|                        |                           |  |
|------------------------|---------------------------|--|
| A Auger sample         | G Gas sample              | PLD Photo ionisation detector (ppm)          |
| B Bulk sample          | P Piston sample           | PL(A) Point load axial test Is(50) (MPa)     |
| BLK Block sample       | U Tube sample (x mm dia.) | PL(D) Point load diametral test Is(50) (MPa) |
| C Core drilling        | W Water sample            | pp Pocket penetrometer (kPa)                 |
| D Disturbed sample     | > Water seep              | S Standard penetration test                  |
| E Environmental sample | ≡ Water level             | V Shear vane (kPa)                           |



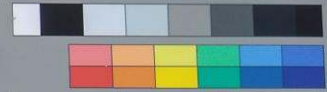
BORE: 2

PROJECT: 209825.00

October 2021



Project No: 209825.00  
BH ID: 84 DP2  
Depth: 5.80 - 10.00 m  
Core Box No.: 1/2



ST PETERS BH DP2 23/10/21  
209825.00 start 60m



5.80 - 10.00 m

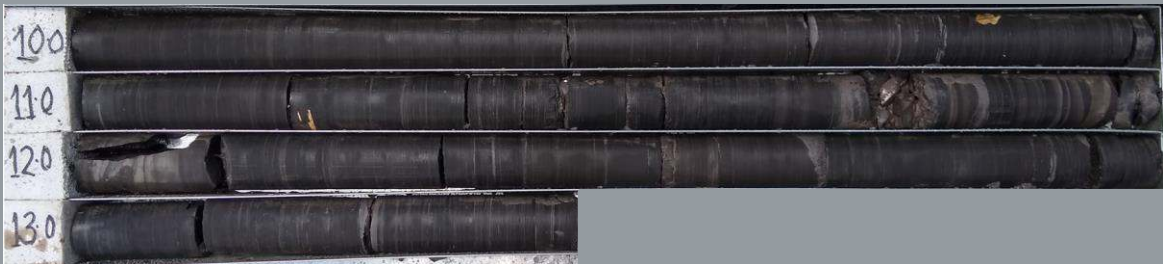
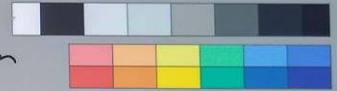
BORE: 2

PROJECT: 209825.00

October 2021



Project No: 209825.00  
BH ID: 84 DP2  
Depth: 10.00 - 13.40 m  
Core Box No.: 2/2



10.00 - 13.40 m



# BOREHOLE LOG

**CLIENT:** P75 Investments Pty Ltd Proposed  
**PROJECT:** Mixed-Use Development  
**LOCATION:** 75-85 Mary Street, St Peters

**SURFACE LEVEL:** 13.8 AHD  
**EASTING:** 331140  
**NORTHING:** 6245959  
**DIP/AZIMUTH:** 90°/--

**BORE No:** BH3  
**PROJECT No:** 209825.00  
**DATE:** 22/10/2021  
**SHEET 2 OF 2**

| RL | Depth (m) | Description of Strata   | Degree of Weathering       |    |    |    | Graphic Log | Rock Strength |    |        |          |     | Water | Fracture Spacing (m) | Discontinuities     |                              | Sampling & In Situ Testing |         |             |             |           |           |      |             |       |
|----|-----------|---|----------------------------|----|----|----|-------------|---------------|----|--------|----------|-----|-------|----------------------|---------------------|------------------------------|----------------------------|---------|-------------|-------------|-----------|-----------|------|-------------|-------|
|    |           |   | EW                         | HW | MW | SW |             | FS            | FR | Ex Low | Very Low | Low |       |                      | Medium              | High                         | Very High                  | Ex High | B - Bedding | J - Joint   | S - Shear | F - Fault | Type | Core Rec. % | RQD % |
|    |           | SILTSTONE: grey, trace fine sandstone laminations, indistinctly bedded, medium strength, slightly weathered then fresh, slightly fractured and unbroken, Ashfield Shale |                            |    |    |    |             |               |    |        |          |     |       | 0.01                 |                     |                              |                            |         |             |             |           |           |      |             |       |
|    | 11        |   |                            |    |    |    |             |               |    |        |          |     |       |                      |                     | 10.35m: B0°, cly co          | C                          | 100     | 73          | PL(A) = 0.3 |           |           |      |             |       |
|    |           |   |                            |    |    |    |             |               |    |        |          |     |       |                      |                     | 10.8m: J45°-70°, cu, ro, cln |                            |         |             |             |           |           |      |             |       |
|    |           |   |                            |    |    |    |             |               |    |        |          |     |       |                      |                     | 11.2m: J45°, pl, sm, cly     |                            |         |             |             |           |           |      |             |       |
|    |           |   |                            |    |    |    |             |               |    |        |          |     |       |                      |                     | 11.6m: J80°, un, ro, cln     |                            |         |             | PL(A) = 0.4 |           |           |      |             |       |
|    | 12        |   |                            |    |    |    |             |               |    |        |          |     |       |                      |                     | 11.82m: J45°, pl, sm, cln    |                            |         |             |             |           |           |      |             |       |
|    |           |   |                            |    |    |    |             |               |    |        |          |     |       |                      |                     | 11.9m: J90°, un, ro, cln     |                            |         |             |             |           |           |      |             |       |
|    |           |   |                            |    |    |    |             |               |    |        |          |     |       |                      | 12.00-12.08m: fg    |                              |                            |         |             |             |           |           |      |             |       |
|    |           |   |                            |    |    |    |             |               |    |        |          |     |       |                      | 12.1m: J90°, un, ro | C                            | 100                        | 96      | PL(A) = 0.6 |             |           |           |      |             |       |
|    |           |   |                            |    |    |    |             |               |    |        |          |     |       |                      |                     |                              |                            |         |             |             |           |           |      |             |       |
|    | 13        |   |                            |    |    |    |             |               |    |        |          |     |       |                      |                     |                              |                            |         |             |             |           |           |      |             |       |
|    |           |   |                            |    |    |    |             |               |    |        |          |     |       |                      |                     |                              |                            |         |             |             |           |           |      |             |       |
|    | 14        | 14.0  | Bore discontinued at 14.0m |    |    |    |             |               |    |        |          |     |       |                      |                     |                              |                            |         |             |             |           |           |      |             |       |
|    | 14.0      |   |                            |    |    |    |             |               |    |        |          |     |       |                      |                     |                              |                            |         |             |             |           |           |      |             |       |
|    |           |   |                            |    |    |    |             |               |    |        |          |     |       |                      |                     |                              |                            |         |             |             |           |           |      |             |       |
|    |           |   |                            |    |    |    |             |               |    |        |          |     |       |                      |                     |                              |                            |         |             |             |           |           |      |             |       |
|    | 15        |   |                            |    |    |    |             |               |    |        |          |     |       |                      |                     |                              |                            |         |             |             |           |           |      |             |       |
|    |           |   |                            |    |    |    |             |               |    |        |          |     |       |                      |                     |                              |                            |         |             |             |           |           |      |             |       |
|    |           |   |                            |    |    |    |             |               |    |        |          |     |       |                      |                     |                              |                            |         |             |             |           |           |      |             |       |
|    | 16        |   |                            |    |    |    |             |               |    |        |          |     |       |                      |                     |                              |                            |         |             |             |           |           |      |             |       |
|    |           |   |                            |    |    |    |             |               |    |        |          |     |       |                      |                     |                              |                            |         |             |             |           |           |      |             |       |
|    |           |   |                            |    |    |    |             |               |    |        |          |     |       |                      |                     |                              |                            |         |             |             |           |           |      |             |       |
|    | 17        |   |                            |    |    |    |             |               |    |        |          |     |       |                      |                     |                              |                            |         |             |             |           |           |      |             |       |
|    |           |   |                            |    |    |    |             |               |    |        |          |     |       |                      |                     |                              |                            |         |             |             |           |           |      |             |       |
|    |           |   |                            |    |    |    |             |               |    |        |          |     |       |                      |                     |                              |                            |         |             |             |           |           |      |             |       |
|    | 18        |   |                            |    |    |    |             |               |    |        |          |     |       |                      |                     |                              |                            |         |             |             |           |           |      |             |       |
|    |           |   |                            |    |    |    |             |               |    |        |          |     |       |                      |                     |                              |                            |         |             |             |           |           |      |             |       |
|    |           |   |                            |    |    |    |             |               |    |        |          |     |       |                      |                     |                              |                            |         |             |             |           |           |      |             |       |
|    | 19        |   |                            |    |    |    |             |               |    |        |          |     |       |                      |                     |                              |                            |         |             |             |           |           |      |             |       |
|    |           |   |                            |    |    |    |             |               |    |        |          |     |       |                      |                     |                              |                            |         |             |             |           |           |      |             |       |
|    |           |   |                            |    |    |    |             |               |    |        |          |     |       |                      |                     |                              |                            |         |             |             |           |           |      |             |       |

**RIG:** Rig 4 (Scout)      **DRILLER:** Rockwell      **LOGGED:** SI      **CASING:** HW to 6.0m  
**TYPE OF BORING:** Diatube to 0.16m, Spiral Flight Auger (TC-bit) to 6.0m, NMLC Coring to 14.0m  
**WATER OBSERVATIONS:** Free groundwater observed at 4.0m in SPT sample  
**REMARKS:**

| SAMPLING & IN SITU TESTING LEGEND |                      |       |  |
|-----------------------------------|----------------------|-------|--|
| A                                 | Auger sample         | G     | Gas sample                             |
| B                                 | Bulk sample          | P     | Piston sample                          |
| BLK                               | Block sample         | U     | Tube sample (x mm dia.)                |
| C                                 | Core drilling        | W     | Water sample                           |
| D                                 | Disturbed sample     | ▷     | Water seep                             |
| E                                 | Environmental sample | ≡     | Water level                            |
|                                   |                      | PLD   | Photo ionisation detector (ppm)        |
|                                   |                      | PL(A) | Point load axial test Is(50) (MPa)     |
|                                   |                      | PL(D) | Point load diametral test Is(50) (MPa) |
|                                   |                      | pp    | Pocket penetrometer (kPa)              |
|                                   |                      | S     | Standard penetration test              |
|                                   |                      | V     | Shear vane (kPa)                       |



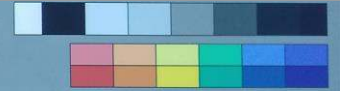
**BORE: 3**

**PROJECT: 209825.00**

**October 2021**



Project No: 209825.00  
BH ID: BH DP3  
Depth: 6.00 - 9.00 m  
Core Box No.: 1/3



ST PETERS 20982500 BH DP3 START 6.0M



**6.00 - 9.00 m**

**BORE: 3**

**PROJECT: 209825.00**

**October 2021**



Project No: 209825.00  
BH ID: BH DP3  
Depth: 9.00 - 13.00 m  
Core Box No.: 2/3



**9.00 - 13.00 m**

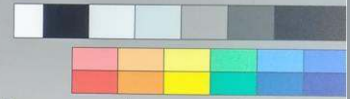
**BORE: 3**

**PROJECT: 209825.00**

**October 2021**



Project No: 209825-00  
BH ID: 8H DP3  
Depth: 13.00 - 14.00m  
Core Box No.: 3/3



**13.00 - 14.0**

# BOREHOLE LOG

**CLIENT:** P75 Investments Pty Ltd Proposed  
**PROJECT:** Mixed-Use Development  
**LOCATION:** 75-85 Mary Street, St Peters

**SURFACE LEVEL:** 15 AHD  
**EASTING:** 331121  
**NORTHING:** 6245997  
**DIP/AZIMUTH:** 90°/--

**BORE No:** BH4  
**PROJECT No:** 209825.00  
**DATE:** 22/10/2021  
**SHEET 1 OF 2**

| RL | Depth (m) | Description of Strata  | Degree of Weathering |    |    |    |    | Graphic Log | Rock Strength |        |          |     |        | Water | Fracture Spacing (m) | Discontinuities |           | Sampling & In Situ Testing |             |           |           |           |      |                |
|----|-----------|--|----------------------|----|----|----|----|-------------|---------------|--------|----------|-----|--------|-------|----------------------|-----------------|-----------|----------------------------|-------------|-----------|-----------|-----------|------|----------------|
|    |           |  | EW                   | HW | MW | SW | FS |             | FR            | Ex Low | Very Low | Low | Medium |       |                      | High            | Very High | Ex High                    | B - Bedding | J - Joint | S - Shear | F - Fault | Type | Core Rec. %    |
| 15 | 0.15      | CONCRETE PAVEMENT  |                      |    |    |    |    |             |               |        |          |     |        |       |                      |                 |           |                            |             |           |           |           |      |                |
|    | 0.3       | FILL/Sandy GRAVEL: medium to coarse, grey, igneous, coarse sand, moist   |                      |    |    |    |    |             |               |        |          |     |        |       |                      |                 |           |                            |             |           |           |           |      |                |
|    | 1         | CLAY CH: high plasticity, pale brown then mottled red pale grey, trace ironstone gravel, w~PL, stiff, residual   |                      |    |    |    |    |             |               |        |          |     |        |       |                      |                 |           |                            |             |           |           |           |      | 2.46<br>N = 10 |
|    | 2.0       | CLAY CL: medium plasticity, mottled red brown and pale grey, approximately 10% ironstone gravel, hard, residual  |                      |    |    |    |    |             |               |        |          |     |        |       |                      |                 |           |                            |             |           |           |           |      | 25/150 refusal |
|    | 4.0       | SHALE: pale grey and red brown, very low strength, highly weathered, Ashfield Shale  |                      |    |    |    |    |             |               |        |          |     |        |       |                      |                 |           |                            |             |           |           |           |      | 25/100 refusal |
|    | 5         | Below 5.0m: becoming very low to low strength  |                      |    |    |    |    |             |               |        |          |     |        |       |                      |                 |           |                            |             |           |           |           |      |                |
|    | 6         |  |                      |    |    |    |    |             |               |        |          |     |        |       |                      |                 |           |                            |             |           |           |           |      |                |
|    | 7.5       | SILTSTONE: grey, distinctly/indistinctly bedded and laminated, 20% fine sandstone lamination, medium strength, slightly weathered, slightly fractured, Ashfield Shale        |                      |    |    |    |    |             |               |        |          |     |        |       |                      |                 |           |                            |             |           |           |           |      | PL(A) = 0.2    |
|    | 8.1       | SILTSTONE: pale grey and dark grey, laminated, approximately 25% fine sandstone laminations, medium to high strength, fresh, slightly fractured and unbroken, Ashfield Shale |                      |    |    |    |    |             |               |        |          |     |        |       |                      |                 |           |                            |             |           |           |           |      | PL(A) = 0.6    |
|    | 9         |  |                      |    |    |    |    |             |               |        |          |     |        |       |                      |                 |           |                            |             |           |           |           |      | PL(A) = 1.1    |
|    |           |  |                      |    |    |    |    |             |               |        |          |     |        |       |                      |                 |           |                            |             |           |           |           |      | PL(A) = 0.8    |

**RIG:** Rig 4 (Scout)      **DRILLER:** Rockwell      **LOGGED:** SI      **CASING:** HQ to 5.5m  
**TYPE OF BORING:** Diatube to 0.15m, Spiral Flight Auger (TC-bit) to 5.5m, NMLC Coring to 12.3m  
**WATER OBSERVATIONS:** No free groundwater observed whilst augering  
**REMARKS:**

| SAMPLING & IN SITU TESTING LEGEND |                      |       |  |
|-----------------------------------|----------------------|-------|--|
| A                                 | Auger sample         | G     | Gas sample                             |
| B                                 | Bulk sample          | P     | Piston sample                          |
| BLK                               | Block sample         | U     | Tube sample (x mm dia.)                |
| C                                 | Core drilling        | W     | Water sample                           |
| D                                 | Disturbed sample     | >     | Water seep                             |
| E                                 | Environmental sample | ≡     | Water level                            |
|                                   |                      | PLD   | Photo ionisation detector (ppm)        |
|                                   |                      | PL(A) | Point load axial test Is(50) (MPa)     |
|                                   |                      | PL(D) | Point load diametral test Is(50) (MPa) |
|                                   |                      | gp    | Pocket penetrometer (kPa)              |
|                                   |                      | S     | Standard penetration test              |
|                                   |                      | V     | Shear vane (kPa)                       |



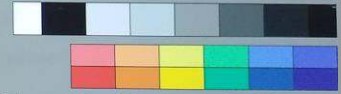
BORE: 4

PROJECT: 209825.00

October 2021



Project No: 209825.00  
BH ID: BH DP4  
Depth: 5.50 - 10.00 m  
Core Box No.: 1/2



5.50 - 10.00 m

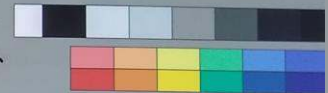
BORE: 4

PROJECT: 209825.00

October 2021



Project No: 209825.00  
BH ID: BH DP4  
Depth: 10.00 - 12.30 m  
Core Box No.: 2/2



10.00 - 12.30 m

# BOREHOLE LOG

**CLIENT:** P75 Investments Pty Ltd Proposed  
**PROJECT:** Mixed-Use Development  
**LOCATION:** 75-85 Mary Street, St Peters

**SURFACE LEVEL:** 13.6 AHD  
**EASTING:** 331114  
**NORTHING:** 6245964  
**DIP/AZIMUTH:** 90°/--

**BORE No:** BH5  
**PROJECT No:** 209825.00  
**DATE:** 25/10/2021  
**SHEET 1 OF 2**

| RL | Depth (m) | Description of Strata  | Degree of Weathering |    |    |    | Graphic Log | Rock Strength |          |     |        |      | Water | Fracture Spacing (m) | Discontinuities |         | Sampling & In Situ Testing |           |           |           |                     |
|----|-----------|--|----------------------|----|----|----|-------------|---------------|----------|-----|--------|------|-------|----------------------|-----------------|---------|----------------------------|-----------|-----------|-----------|---------------------|
|    |           |  | EW                   | HW | SW | FR |             | Ex Low        | Very Low | Low | Medium | High |       |                      | Very High       | Ex High | B - Bedding                | J - Joint | S - Shear | F - Fault | Type                |
|    | 0.14      | CONCRETE PAVEMENT: coarse aggregate, no reinforcement bars   |                      |    |    |    | X           |               |          |     |        |      |       |                      |                 |         |                            |           |           |           |                     |
|    | 0.64      | FILL/Sandy CLAY: high plasticity, dark grey, trace gravel, w~PL, appears soft  |                      |    |    |    | /           |               |          |     |        |      |       |                      |                 |         |                            |           |           |           |                     |
|    | 1.2       | CLAY CH: high plasticity, brown, w~PL, appears stiff, residual   |                      |    |    |    | /           |               |          |     |        |      |       |                      |                 |         |                            |           |           |           |                     |
|    | 1.2       | CLAY CH: high plasticity, pale grey mottled red, w~PL, appears stiff, residual   |                      |    |    |    | /           |               |          |     |        |      |       |                      |                 |         |                            |           |           |           | 2,3,4<br>N = 7      |
|    | 1.2       | Below 1.50m: medium plasticity, w<PL   |                      |    |    |    | /           |               |          |     |        |      |       |                      |                 |         |                            |           |           |           |                     |
|    | 2.5       | Below 2.50m: red pale grey mottled, residual   |                      |    |    |    | /           |               |          |     |        |      |       |                      |                 |         |                            |           |           |           | 8,17/110<br>refusal |
|    | 2.7       | Below 2.70m: pale grey   |                      |    |    |    | /           |               |          |     |        |      |       |                      |                 |         |                            |           |           |           |                     |
|    | 3.5       | CLAY Cl: medium plasticity, pale grey brown, w<PL, apparently hard, residual (extremely weathered shale)   |                      |    |    |    | /           |               |          |     |        |      |       |                      |                 |         |                            |           |           |           |                     |
|    | 5.5       | SILTSTONE: pale grey and brown, frequent clay seam, very low strength, extremely to highly weathered, Ashfield Shale                                 |                      |    |    |    | /           |               |          |     |        |      |       |                      |                 |         |                            |           |           |           |                     |
|    | 6.0       | Below 5.80m: red mottled grey  |                      |    |    |    | /           |               |          |     |        |      |       |                      |                 |         |                            |           |           |           |                     |
|    | 6.0       | SILTSTONE: grey and dark grey mottled orange, very low and low to medium strength, highly weathered, fractured to slightly fractured, Ashfield Shale |                      |    |    |    | /           |               |          |     |        |      |       |                      |                 |         |                            |           |           |           | PL(A) = 0.2         |
|    | 6.4       |  |                      |    |    |    | /           |               |          |     |        |      |       |                      |                 |         |                            |           |           |           |                     |
|    | 6.45      |  |                      |    |    |    | /           |               |          |     |        |      |       |                      |                 |         |                            |           |           |           |                     |
|    | 6.63      |  |                      |    |    |    | /           |               |          |     |        |      |       |                      |                 |         |                            |           |           |           |                     |
|    | 7.0       |  |                      |    |    |    | /           |               |          |     |        |      |       |                      |                 |         |                            |           |           |           |                     |
|    | 7.0       |  |                      |    |    |    | /           |               |          |     |        |      |       |                      |                 |         |                            |           |           |           | PL(A) = 0.5         |
|    | 8.05      |  |                      |    |    |    | /           |               |          |     |        |      |       |                      |                 |         |                            |           |           |           |                     |
|    | 8.11      |  |                      |    |    |    | /           |               |          |     |        |      |       |                      |                 |         |                            |           |           |           |                     |
|    | 8.14      |  |                      |    |    |    | /           |               |          |     |        |      |       |                      |                 |         |                            |           |           |           | PL(A) = 0.6         |
|    | 8.28      | SILTSTONE: dark grey, medium strength, slightly weathered, slightly fractured and unbroken, Ashfield Shale   |                      |    |    |    | /           |               |          |     |        |      |       |                      |                 |         |                            |           |           |           |                     |
|    | 9.3       |  |                      |    |    |    | /           |               |          |     |        |      |       |                      |                 |         |                            |           |           |           |                     |
|    | 9.38      |  |                      |    |    |    | /           |               |          |     |        |      |       |                      |                 |         |                            |           |           |           |                     |
|    | 9.4       |  |                      |    |    |    | /           |               |          |     |        |      |       |                      |                 |         |                            |           |           |           | PL(A) = 0.6         |

**RIG:** Rig 4 (Scout)      **DRILLER:** Rockwell      **LOGGED:** AN      **CASING:** HQ to 5.5m  
**TYPE OF BORING:** Diatube to 0.14m, Spiral Flight Auger (TC-bit) to 6.0m, NMLC Coring to 11.4m  
**WATER OBSERVATIONS:** No free groundwater observed whilst augering  
**REMARKS:** Standpipe installed to 9.0m (screen 3.0m-9.0m, PVC 0.1m-3.0m, Gravel 2.5m-9.0m, Bentonite 2.0m-2.5m, Backfill to ground level, Gatic cover at top)

|                        |                           |  |
|------------------------|---------------------------|--|
| A Auger sample         | G Gas sample              | PLD Photo ionisation detector (ppm)          |
| B Bulk sample          | P Piston sample           | PL(A) Point load axial test Is(50) (MPa)     |
| BLK Block sample       | U Tube sample (x mm dia.) | PL(D) Point load diametral test Is(50) (MPa) |
| C Core drilling        | W Water sample            | gp Pocket penetrometer (kPa)                 |
| D Disturbed sample     | W Water seep              | S Standard penetration test                  |
| E Environmental sample | W Water level             | V Shear vane (kPa)                           |



# BOREHOLE LOG

**CLIENT:** P75 Investments Pty Ltd Proposed  
**PROJECT:** Mixed-Use Development  
**LOCATION:** 75-85 Mary Street, St Peters

**SURFACE LEVEL:** 13.6 AHD  
**EASTING:** 331114  
**NORTHING:** 6245964  
**DIP/AZIMUTH:** 90°/--

**BORE No:** BH5  
**PROJECT No:** 209825.00  
**DATE:** 25/10/2021  
**SHEET 2 OF 2**

| RL | Depth (m) | Description of Strata                                  | Degree of Weathering |    |    |    | Graphic Log | Rock Strength |    |        |          |     | Water | Fracture Spacing (m) | Discontinuities  |      | Sampling & In Situ Testing |         |             |           |           |           |             |
|----|-----------|--|----------------------|----|----|----|-------------|---------------|----|--------|----------|-----|-------|----------------------|------------------|------|----------------------------|---------|-------------|-----------|-----------|-----------|-------------|
|    |           |  | EW                   | HW | MW | SW |             | FS            | FR | Ex Low | Very Low | Low |       |                      | Medium           | High | Very High                  | Ex High | B - Bedding | J - Joint | S - Shear | F - Fault | Type        |
|    |           | SILTSTONE: dark grey, medium strength, fresh, unbroken |                      |    |    |    |             |               |    |        |          |     |       |                      | 10m: fg 20mm     |      |                            |         |             |           |           |           |             |
|    | 11        |  |                      |    |    |    |             |               |    |        |          |     |       |                      |                  |      |                            |         |             |           |           |           |             |
|    | 11.4      | Bore discontinued at 11.4m                             |                      |    |    |    |             |               |    |        |          |     |       |                      | 10.64m: B0°, cly | C    | 100                        | 78      |             |           |           |           | PL(A) = 0.7 |
|    | 12        |  |                      |    |    |    |             |               |    |        |          |     |       |                      |                  |      |                            |         |             |           |           |           | PL(A) = 0.5 |
|    | 13        |  |                      |    |    |    |             |               |    |        |          |     |       |                      |                  |      |                            |         |             |           |           |           |             |
|    | 14        |  |                      |    |    |    |             |               |    |        |          |     |       |                      |                  |      |                            |         |             |           |           |           |             |
|    | 15        |  |                      |    |    |    |             |               |    |        |          |     |       |                      |                  |      |                            |         |             |           |           |           |             |
|    | 16        |  |                      |    |    |    |             |               |    |        |          |     |       |                      |                  |      |                            |         |             |           |           |           |             |
|    | 17        |  |                      |    |    |    |             |               |    |        |          |     |       |                      |                  |      |                            |         |             |           |           |           |             |
|    | 18        |  |                      |    |    |    |             |               |    |        |          |     |       |                      |                  |      |                            |         |             |           |           |           |             |
|    | 19        |  |                      |    |    |    |             |               |    |        |          |     |       |                      |                  |      |                            |         |             |           |           |           |             |

**RIG:** Rig 4 (Scout)                      **DRILLER:** Rockwell                      **LOGGED:** AN                      **CASING:** HQ to 5.5m  
**TYPE OF BORING:** Diatube to 0.14m, Spiral Flight Auger (TC-bit) to 6.0m, NMLC Coring to 11.4m  
**WATER OBSERVATIONS:** No free groundwater observed whilst augering  
**REMARKS:** Standpipe installed to 9.0m (screen 3.0m-9.0m, PVC 0.1m-3.0m, Gravel 2.5m-9.0m, Bentonite 2.0m-2.5m, Backfill to ground level, Gatic cover at top)

| SAMPLING & IN SITU TESTING LEGEND |                      |       |  |
|-----------------------------------|----------------------|-------|--|
| A                                 | Auger sample         | G     | Gas sample                             |
| B                                 | Bulk sample          | P     | Piston sample                          |
| BLK                               | Block sample         | U     | Tube sample (x mm dia.)                |
| C                                 | Core drilling        | W     | Water sample                           |
| D                                 | Disturbed sample     | ▷     | Water seep                             |
| E                                 | Environmental sample | ≡     | Water level                            |
|                                   |                      | PLD   | Photo ionisation detector (ppm)        |
|                                   |                      | PL(A) | Point load axial test Is(50) (MPa)     |
|                                   |                      | PL(D) | Point load diametral test Is(50) (MPa) |
|                                   |                      | gp    | Pocket penetrometer (kPa)              |
|                                   |                      | S     | Standard penetration test              |
|                                   |                      | V     | Shear vane (kPa)                       |



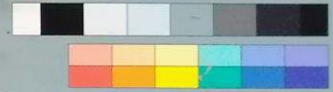
BORE: 5

PROJECT: 209825.00

October 2021



Project No: 209825.00  
BH ID: DP5  
Depth: 5.50 - 10.00 m  
Core Box No.: 1/2



5.50 - 10.00 m

BORE: 5

PROJECT: 209825.00

October 2021



Project No: 209825.00  
BH ID: DP5  
Depth: 10.0 - 11.40 m  
Core Box No.: 2/2



10.00 - 11.40 m



# BOREHOLE LOG

**CLIENT:** P75 Investments Pty Ltd Proposed  
**PROJECT:** Mixed-Use Development  
**LOCATION:** 75-85 Mary Street, St Peters

**SURFACE LEVEL:** 16.1 AHD  
**EASTING:** 331127  
**NORTHING:** 6246027  
**DIP/AZIMUTH:** 90°/--

**BORE No:** BH6  
**PROJECT No:** 209825.00  
**DATE:** 23/10/2021  
**SHEET 2 OF 2**

| RL    | Depth (m) | Description of Strata  | Degree of Weathering |    |    |    | Graphic Log | Rock Strength |    |        |          |     | Water | Fracture Spacing (m) | Discontinuities        |      | Sampling & In Situ Testing |         |             |           |           |           |             |             |
|-------|-----------|--|----------------------|----|----|----|-------------|---------------|----|--------|----------|-----|-------|----------------------|------------------------|------|----------------------------|---------|-------------|-----------|-----------|-----------|-------------|-------------|
|       |           |  | EW                   | HW | MW | SW |             | FS            | FR | Ex Low | Very Low | Low |       |                      | Medium                 | High | Very High                  | Ex High | B - Bedding | J - Joint | S - Shear | F - Fault | Type        | Core Rec. % |
| 6     |           | SILTSTONE: pale grey and dark grey, distinctly and indistinctly bedded and laminated, approximately 20-30% fine sandstone laminations, medium to high strength, fresh, slightly fractured and unbroken, Ashfield Shale (continued) |                      |    |    |    |             |               |    |        |          |     |       |                      | 10m: J80°, pl, sm, cln |      |                            |         |             | C         | 100       | 100       | PL(A) = 0.7 |             |
| 11    |           |  |                      |    |    |    |             |               |    |        |          |     |       |                      | 11.18m: B0°, cly co    |      |                            |         |             | C         | 100       | 100       | PL(A) = 0.8 |             |
| 12    |           |  |                      |    |    |    |             |               |    |        |          |     |       |                      |                        |      |                            |         |             |           |           |           |             |             |
| 12.48 |           | Bore discontinued at 12.48m  |                      |    |    |    |             |               |    |        |          |     |       |                      |                        |      |                            |         |             |           |           |           |             |             |
| 13    |           |  |                      |    |    |    |             |               |    |        |          |     |       |                      |                        |      |                            |         |             |           |           |           |             |             |
| 14    |           |  |                      |    |    |    |             |               |    |        |          |     |       |                      |                        |      |                            |         |             |           |           |           |             |             |
| 15    |           |  |                      |    |    |    |             |               |    |        |          |     |       |                      |                        |      |                            |         |             |           |           |           |             |             |
| 16    |           |  |                      |    |    |    |             |               |    |        |          |     |       |                      |                        |      |                            |         |             |           |           |           |             |             |
| 17    |           |  |                      |    |    |    |             |               |    |        |          |     |       |                      |                        |      |                            |         |             |           |           |           |             |             |
| 18    |           |  |                      |    |    |    |             |               |    |        |          |     |       |                      |                        |      |                            |         |             |           |           |           |             |             |
| 19    |           |  |                      |    |    |    |             |               |    |        |          |     |       |                      |                        |      |                            |         |             |           |           |           |             |             |

**RIG:** Rig 4 (Scout)                      **DRILLER:** Rockwell                      **LOGGED:** SI                      **CASING:** HQ to 5.5m  
**TYPE OF BORING:** Diatube (200mm) to 0.20m, Spiral Flight Auger (TC-bit) to 5.5m, NMLC Coring to 12.48m  
**WATER OBSERVATIONS:** No free groundwater observed whilst augering  
**REMARKS:**

| SAMPLING & IN SITU TESTING LEGEND |                      |       |  |
|-----------------------------------|----------------------|-------|--|
| A                                 | Auger sample         | G     | Gas sample                             |
| B                                 | Bulk sample          | P     | Piston sample                          |
| BLK                               | Block sample         | U     | Tube sample (x mm dia.)                |
| C                                 | Core drilling        | W     | Water sample                           |
| D                                 | Disturbed sample     | >     | Water seep                             |
| E                                 | Environmental sample | ≡     | Water level                            |
|                                   |                      | PID   | Photo ionisation detector (ppm)        |
|                                   |                      | PL(A) | Point load axial test Is(50) (MPa)     |
|                                   |                      | PL(D) | Point load diametral test Is(50) (MPa) |
|                                   |                      | pp    | Pocket penetrometer (kPa)              |
|                                   |                      | S     | Standard penetration test              |
|                                   |                      | V     | Shear vane (kPa)                       |



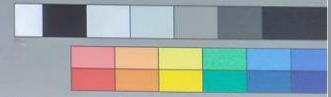
**BORE: 6**

**PROJECT: 209825.00**

**October 2021**



Project No: 209825-00  
BH ID: BH DP 6  
Depth: 5.50 - 10.00 m  
Core Box No.: 1/2



**5.50 - 10.00 m**

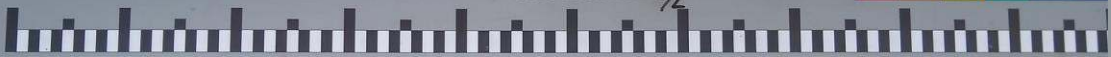
**BORE: 6**

**PROJECT: 209825.00**

**October 2021**



Project No: 209825-00  
BH ID: BH DP 6  
Depth: 10.00 - 12.48 m  
Core Box No.: 2/2



**10.00 - 12.48 m**



# BOREHOLE LOG

**CLIENT:** P75 Investments Pty Ltd Proposed  
**PROJECT:** Mixed-Use Development  
**LOCATION:** 75-85 Mary Street, St Peters

**SURFACE LEVEL:** 14.5 AHD  
**EASTING:** 331192  
**NORTHING:** 6245960  
**DIP/AZIMUTH:** 90°/--

**BORE No:** BH7  
**PROJECT No:** 209825.00  
**DATE:** 19/10/2021  
**SHEET 2 OF 2**

| RL | Depth (m)   | Description of Strata  | Degree of Weathering |    |    |    | Graphic Log | Rock Strength |    |        |          |     | Water | Fracture Spacing (m) | Discontinuities |      | Sampling & In Situ Testing |         |             |           |           |           |      |                           |
|----|-------------|--|----------------------|----|----|----|-------------|---------------|----|--------|----------|-----|-------|----------------------|-----------------|------|----------------------------|---------|-------------|-----------|-----------|-----------|------|---------------------------|
|    |             |  | EW                   | HW | MW | SW |             | FS            | FR | Ex Low | Very Low | Low |       |                      | Medium          | High | Very High                  | Ex High | B - Bedding | J - Joint | S - Shear | F - Fault | Type | Core Rec. %               |
|    | 11          | SILTSTONE: pale grey and dark grey, approximately 20% fine sandstone laminations, medium to high strength, fresh, slightly fractured and unbroken, Ashfield Shale <i>(continued)</i> |                      |    |    |    |             |               |    |        |          |     |       | 0.01                 |                 |      |                            |         |             |           | C         | 100       | 100  | PL(A) = 0.6               |
|    | 12          |  |                      |    |    |    |             |               |    |        |          |     |       |                      |                 |      |                            |         |             |           | C         | 100       | 100  | PL(A) = 0.3               |
|    | 12.08       |  |                      |    |    |    |             |               |    |        |          |     |       |                      |                 |      |                            |         |             |           | C         | 100       | 100  | 12.08m: J85°, pl, ro, cln |
|    | 12.15-12.20 |  |                      |    |    |    |             |               |    |        |          |     |       |                      |                 |      |                            |         |             |           | C         | 100       | 100  | 12.15-12.20m: fg          |
|    | 12.4        |  |                      |    |    |    |             |               |    |        |          |     |       |                      |                 |      |                            |         |             |           | C         | 100       | 100  | 12.4m: J80°, pl, ro, cln  |
|    | 12.55       |  |                      |    |    |    |             |               |    |        |          |     |       |                      |                 |      |                            |         |             |           |           |           |      | 12.55m: J80°, pl, ro, cln |
|    | 12.7        |  |                      |    |    |    |             |               |    |        |          |     |       |                      |                 |      |                            |         |             |           |           |           |      | 12.7m: J80°, pl, ro, cln  |
|    | 13.45       |  |                      |    |    |    |             |               |    |        |          |     |       |                      |                 |      |                            |         |             |           |           |           |      | 13.45m: J85°, un, ro, cln |
|    | 13          |  |                      |    |    |    |             |               |    |        |          |     |       |                      |                 |      |                            |         |             |           |           |           |      | PL(A) = 2.7               |
|    | 14          |  |                      |    |    |    |             |               |    |        |          |     |       |                      |                 |      |                            |         |             |           |           |           |      | PL(A) = 1                 |
|    | 15.2        | Bore discontinued at 15.2m   |                      |    |    |    |             |               |    |        |          |     |       |                      |                 |      |                            |         |             |           |           |           |      | PL(A) = 0.7               |
|    | 16          |  |                      |    |    |    |             |               |    |        |          |     |       |                      |                 |      |                            |         |             |           |           |           |      |                           |
|    | 17          |  |                      |    |    |    |             |               |    |        |          |     |       |                      |                 |      |                            |         |             |           |           |           |      |                           |
|    | 18          |  |                      |    |    |    |             |               |    |        |          |     |       |                      |                 |      |                            |         |             |           |           |           |      |                           |
|    | 19          |  |                      |    |    |    |             |               |    |        |          |     |       |                      |                 |      |                            |         |             |           |           |           |      |                           |

**RIG:** Rig 4 (Scout)                      **DRILLER:** Rockwell                      **LOGGED:** SI                      **CASING:** HW to 5.5m  
**TYPE OF BORING:** Spiral Flight Auger (TC-bit) to 5.5m, NMLC Coring to 15.2m  
**WATER OBSERVATIONS:** No free groundwater observed whilst augering  
**REMARKS:**

| SAMPLING & IN SITU TESTING LEGEND |                      |       |  |
|-----------------------------------|----------------------|-------|--|
| A                                 | Auger sample         | G     | Gas sample                             |
| B                                 | Bulk sample          | P     | Piston sample                          |
| BLK                               | Block sample         | U     | Tube sample (x mm dia.)                |
| C                                 | Core drilling        | W     | Water sample                           |
| D                                 | Disturbed sample     | W     | Water seep                             |
| E                                 | Environmental sample | W     | Water level                            |
|                                   |                      | PID   | Photo ionisation detector (ppm)        |
|                                   |                      | PL(A) | Point load axial test Is(50) (MPa)     |
|                                   |                      | PL(D) | Point load diametral test Is(50) (MPa) |
|                                   |                      | pp    | Pocket penetrometer (kPa)              |
|                                   |                      | S     | Standard penetration test              |
|                                   |                      | V     | Shear vane (kPa)                       |



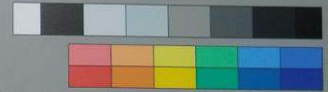
BORE: 7

PROJECT: 209825.00

October 2021



Project No: 209825.00  
BH ID: 84 DP7  
Depth: 5.50 - 9.00 m  
Core Box No.: 1/3



5.50 - 9.00 m

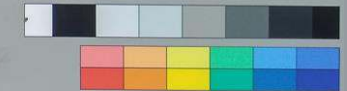
BORE: 7

PROJECT: 209825.00

October 2021



Project No: 209825.00  
BH ID: 84 DP7  
Depth: 9.00 - 13.00 m  
Core Box No.: 2/3



9.00 - 13.00 m

**BORE: 7**

**PROJECT: 209825.00**

**October 2021**



Project No: 209825.00  
BH ID: 84 DP7  
Depth: 13.00 - 15.20 m  
Core Box No.: 3/3



**13.00 - 15.20 m**

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## **Appendix D**

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Previous Borehole Logs

Project New Mixed Development  
 Location 75 Mary Street, St Peters NSW  
 Position Refer to Figure 2  
 Job No. E22317  
 Client Caliph

East 331111.5 m  
 North 6246011.1 m  
 Contractor Traccess Pty Ltd  
 Drill Rig Multi-Drill 3000  
 Inclination -90°

Sheet 1 OF 2  
 Date Started 24/9/14  
 Date Completed 24/9/14  
 Logged SK Date: 24/9/14  
 Checked AM Date: 9/10/14

| Drilling |                        |       | Sampling       |   |                       | Field Material Description |   |                         |             |         |                                       |                    |
|----------|------------------------|-------|----------------|---|-----------------------|----------------------------|---|-------------------------|-------------|---------|---------------------------------------|--------------------|
| METHOD   | PENETRATION RESISTANCE | WATER | DEPTH (metres) | SAMPLE OR FIELD TEST  | RECOVERED GRAPHIC LOG | USCS SYMBOL                | SOIL/ROCK MATERIAL DESCRIPTION  | MOISTURE CONDITION      | CONSISTENCY | DENSITY | STRUCTURE AND ADDITIONAL OBSERVATIONS |                    |
| AD/T     | -                      | GWNE  | 0              | 0.14  |                       |                            |   | FILL: CONCRETE; 140 mm. | -           | -       | -                                     | CONCRETE HARDSTAND |
|          |                        |       | 0.30           | BH1-1 ES<br>0.14-0.30 m<br>PID = 4.2 ppm<br>ASS1-1 ES<br>0.30-0.50 m<br>SPT 0.50 m<br>1.3, 4<br>N=7<br>BH1-2<br>PID = 176 ppm |                       | CH                         | FILL: Sandy CLAY; low plasticity, grey-brown, sand is fine to medium grained, with brick fragments, no odour.<br>CLAY: high plasticity, brown with red mottling, trace fine to medium, subrounded ironstone gravel, strong hydrocarbon odour. | D                       | -           | FILL    |                                       |                    |
|          |                        |       | 1.30           | ASS1-2 ES<br>1.30-1.50 m<br>SPT 1.50 m<br>5, 7, 10<br>N=17<br>BH1-3<br>PID = 8.1 ppm  |                       |                            | From 1.3 m, as above, grey with orange-red mottling, no odour.  | M (<PL)                 | -           | F - St  | RESIDUAL SOIL                         |                    |
|          |                        |       | 2.00           |   |                       |                            | From 1.3 m, as above, grey with orange-red mottling, no odour.  |                         | -           | Vst     |                                       |                    |
|          |                        |       | 2.40           |   |                       |                            | SHALE; brown-red, inferred extremely low strength, inferred extremely weathered.  |                         | -           |         | WEATHERED ROCK                        |                    |
|          |                        |       | 2.81           |   |                       |                            | From 2.4 m, as above, inferred very low strength, inferred distinctly weathered.  |                         | -           |         | ROCK                                  |                    |
|          |                        |       | 3              | SPT 2.80 m<br>3 HB<br>N=3/10mm<br>BH1-4   |                       |                            | Continued as Cored Borehole   |                         |             |         |                                       |                    |
|          |                        |       | 4              |   |                       |                            |   |                         |             |         |                                       |                    |
|          |                        |       | 5              |   |                       |                            |   |                         |             |         |                                       |                    |
|          |                        |       | 6              |   |                       |                            |   |                         |             |         |                                       |                    |
| 7        |                        |       |                |   |                       |                            |   |                         |             |         |                                       |                    |
| 8        |                        |       |                |   |                       |                            |   |                         |             |         |                                       |                    |
| 9        |                        |       |                |   |                       |                            |   |                         |             |         |                                       |                    |
| 10       |                        |       |                |   |                       |                            |   |                         |             |         |                                       |                    |

This borehole log should be read in conjunction with Environmental Investigations Australia's accompanying standard notes.

Project New Mixed Development  
 Location 75 Mary Street, St Peters NSW  
 Position Refer to Figure 2  
 Job No. E22317  
 Client Caliph

**BOREHOLE: BH1/MW1/ASS1**

East 331111.5 m Sheet 2 OF 2  
 North 6246011.1 m Date Started 24/9/14  
 Contractor Traccess Pty Ltd Date Completed 24/9/14  
 Drill Rig Multi-Drill 3000 Logged SK Date: 9/10/14  
 Inclination -90° Checked AM Date: 9/10/14

| Drilling |       |     |           |                |          | Field Material Description |  |            |                                   | Defect Information  |                             |    |     |      |      |  |  |  |  |
|----------|-------|-----|-----------|----------------|----------|----------------------------|--|------------|-----------------------------------|---|-----------------------------|----|-----|------|------|--|--|--|--|
| METHOD   | WATER | TCR | RDD (SCR) | DEPTH (metres) | DEPTH RL | GRAPHIC LOG                | ROCK / SOIL MATERIAL DESCRIPTION   | WEATHERING | INFERRED STRENGTH $I_{s(50)}$ MPa | DEFECT DESCRIPTION & Additional Observations  | AVERAGE DEFECT SPACING (mm) |    |     |      |      |  |  |  |  |
|          |       |     |           |                |          |                            |  |            |                                   |   | 10                          | 30 | 100 | 1000 | 5000 |  |  |  |  |
|          |       |     |           | 0              |          |                            |  |            |                                   |   |                             |    |     |      |      |  |  |  |  |
|          |       |     |           | 2.81           |          |                            | Continuation from non-cored borehole   |            |                                   |   |                             |    |     |      |      |  |  |  |  |
|          |       |     |           | 3.38           |          |                            | SHALE; bedding dipping 0-5 degrees, pale grey with medium to high strength ironstone bands up to 60 mm thick             | DW         |                                   | 2.81-3.00: HB<br>3.00-3.38: BPx8 0 - 5° PR RF Fe SN avg sp = 5-100 mm<br>3.03-3.06: CS 30 mm, gravel, fine-coarse, angular<br>3.07-3.08: CS 10 mm, gravel, fine-coarse, angular<br>3.10-3.11: DB<br>3.15-3.16: CS 10 mm, gravel, fine-medium, angular<br>3.24-3.25: CS 10 mm, gravel, fine-medium, angular<br>3.27: JT 0 - 10° UN S Fe SN<br>3.40-3.43: JT 0 - 60° CU RF Fe SN<br>3.44-3.95: BPx10 0 - 10° PR RF Fe SN avg sp = 10-100 mm<br>3.60-3.61: JT 30° ST RF Fe SN<br>3.66-3.68: JT 0 - 40° ST RF Fe SN<br>3.71-3.73: DS 20 mm, silt, low plasticity, firm.<br>3.83-3.85: DS 20 mm, silt, low plasticity, firm.<br>4.09-4.10: CS 10 mm, gravel, fine-medium, angular<br>4.18-5.02: BPx10 0 - 10° PR RF Fe SN avg sp = 10-60 mm<br>4.22-4.24: JT 45 - 90° CU RF Fe SN<br>4.28-4.32: CS 40 mm, gravel, medium-coarse, angular<br>4.36-4.42: JT 45 - 90° CU RF Fe SN<br>4.47-4.49: CS 20 mm, gravel, fine-medium, angular<br>4.52-4.59: JT 70° PR RF Fe SN<br>4.74-4.78: JT 40° PR RF Fe SN<br>4.83-4.84: CS 10 mm, gravel, fine-medium, angular<br>4.85-4.88: JT 70° PR RF Fe SN<br>4.93-4.94: CS 10 mm, gravel, fine-medium, angular<br>5.08-5.11: CS 30 mm, gravel, fine-medium, angular<br>5.13-5.17: JT 60° PR closed<br>5.17: BP 5° PR RF Fe SN<br>5.20: JT 20° PR RF Fe SN<br>5.23-5.26: CS 30 mm, gravel, medium-coarse, angular<br>5.26-5.27: DS 10 mm, silt, low plasticity, firm.<br>5.28-5.37: JT 70 - 80° PR RF Fe SN<br>5.30: JT 10 - 40° CU RF Fe SN<br>5.38-5.46: CS 80 mm, gravel, fine-medium, angular<br>5.47: BP 0° PR RF Fe SN<br>5.54-5.56: JT 80 - 90° UN RF Fe SN<br>5.57: BP 10° PR RF Fe SN<br>5.60-5.67: CS 70 mm, gravel, fine-medium, angular<br>5.77-5.78: CS 10 mm, gravel, fine-medium, angular<br>5.85-6.19: DZ 240 mm, gravelly clay, low plasticity, firm, gravel is medium-coarse, subangular<br>6.19-6.25: DB<br>6.26: DB<br>6.39-6.45: CS 60 mm, gravel, medium-coarse, angular<br>6.62: BP 0° PR RF Fe SN |                             |    |     |      |      |  |  |  |  |
|          |       |     |           | 4              |          |                            | SHALE; bedding dipping 0-10 degrees, <1-3 mm thick, average spacing = <1-2 mm, grey-dark grey with orange iron staining. |            |                                   |   |                             |    |     |      |      |  |  |  |  |
|          |       |     |           | 6.46           |          |                            | SHALE; bedding dipping 0-5 degrees, <1-3 mm thick, average spacing = <1-10 mm, dark grey-grey.                           | SW         |                                   |   |                             |    |     |      |      |  |  |  |  |
|          |       |     |           | 7.00           |          |                            | Hole Terminated at 7.00 m<br>Target depth reached.<br>Borehole converted to monitoring well.                             | FR         |                                   |   |                             |    |     |      |      |  |  |  |  |

EIA LIB 1.03.GLB Log IS AU CORED BOREHOLE.3 E22317.GPJ ->DrawingFile-> 17/10/2014 10:15 6:30:00.1 D:\get Lab and In Situ Tool - DGD [Lib: EIA 1.03 2014-07-05 P1: EIA 1.03 2014-07-05]

This borehole log should be read in conjunction with Environmental Investigations Australia's accompanying standard notes.



# REPORT OF BOREHOLE: BH1/MW1/ASS1

CLIENT: Caliph  
PROJECT: Preliminary Geotechnical Investigation  
LOCATION: 75 Mary Street, St Peters, NSW  
JOB NO: E22317

EAST: 331111.478 m  
NORTH: 6246011.117 m MGA94 Zone 56  
INCLINATION: -90°  
BOX: 1 of 1  
HOLE DEPTH: 7.00 m

DEPTH RANGE: 2.81 m to 7.00 m  
DRILL RIG: Multi-Drill 3000  
DRILLER: Tracess Pty Ltd  
LOGGED: SK  
CHECKED: AM  
DATE: 24/9/2014  
DATE: 9/10/2014



Project New Mixed Development  
 Location 75 Mary Street, St Peters NSW  
 Position Refer to Figure 2  
 Job No. E22317  
 Client Caliph

East 331128.4 m  
 North 6245971.2 m  
 Contractor Traccess Pty Ltd  
 Drill Rig Multi-Drill 3000  
 Inclination -90°

Sheet 1 OF 2  
 Date Started 23/9/14  
 Date Completed 23/9/14  
 Logged SK Date: 23/9/14  
 Checked AM Date: 9/10/14

| Drilling |                        |       | Sampling       |  |  | Field Material Description |   |                         |                     |                                       |                    |
|----------|------------------------|-------|----------------|--|--|----------------------------|---|-------------------------|---------------------|---------------------------------------|--------------------|
| METHOD   | PENETRATION RESISTANCE | WATER | DEPTH (metres) | SAMPLE OR FIELD TEST   | RECOVERED GRAPHIC LOG                    | USCS SYMBOL                | SOIL/ROCK MATERIAL DESCRIPTION  | MOISTURE CONDITION      | CONSISTENCY DENSITY | STRUCTURE AND ADDITIONAL OBSERVATIONS |                    |
| ADIT     | -                      | GWNE  | 0              | 0.14   | BH2-1 ES<br>0.14-0.40 m<br>PID = 0.1 ppm |                            | -   | FILL: CONCRETE; 140 mm. | -                   | -                                     | CONCRETE HARDSTAND |
|          |                        |       | 0.50           | SPT 0.50 m<br>1.1,0<br>N=1<br>ASS2-1 ES<br>0.50-0.95 m<br>BH2-2<br>PID = 1.1 ppm           |  | CH                         | FILL: Clayey SILT; high plasticity, dark grey, trace medium grained sand, with brick fragments, strong hydrocarbon odour.<br><br>Silty CLAY; high plasticity, dark grey with orange mottling, strong hydrocarbon odour. | M                       | VS-S                | RESIDUAL SOIL                         |                    |
|          |                        |       | 1.90           | SPT 1.50 m<br>1.2,6<br>N=8<br>ASS2-2 ES<br>1.50-1.95 m<br>BH2-3<br>PID = 0.2 ppm           |  | CI                         | CLAY; medium plasticity, orange with grey mottling, strong hydrocarbon odour.   | D                       | F-St                |                                       |                    |
|          |                        |       | 2.80           | SPT 3.00 m<br>21,30 HB<br>N=30/100mm<br>ASS2-3 ES<br>3.00-3.25 m<br>BH2-4<br>PID = 1.1 ppm |  | -                          | SHALE; red-brown, inferred extremely low strength, inferred extremely weathered.  | -                       | -                   | WEATHERED ROCK                        |                    |
|          |                        |       | 3.15           | SPT 4.00 m<br>5 HB<br>N=5/50mm<br>BH2-5  |  | -                          | From 3.15 m, as above, inferred very low strength, inferred distinctly weathered.   | -                       | -                   | ROCK                                  |                    |
|          |                        |       | 4              | 4.26   |  |                            | Continued as Cored Borehole   |                         |                     |                                       |                    |
|          |                        |       | 5              |  |  |                            |   |                         |                     |                                       |                    |
|          |                        |       | 6              |  |  |                            |   |                         |                     |                                       |                    |
|          |                        |       | 7              |  |  |                            |   |                         |                     |                                       |                    |
|          |                        |       | 8              |  |  |                            |   |                         |                     |                                       |                    |
|          |                        |       | 9              |  |  |                            |   |                         |                     |                                       |                    |
|          |                        |       | 10             |  |  |                            |   |                         |                     |                                       |                    |

This borehole log should be read in conjunction with Environmental Investigations Australia's accompanying standard notes.

Project New Mixed Development  
Location 75 Mary Street, St Peters NSW  
Position Refer to Figure 2  
Job No. E22317  
Client Caliph

**BOREHOLE: BH2/MW2/ASS2**

East 331128.4 m Sheet 2 OF 2  
North 6245971.2 m Date Started 23/9/14  
Contractor Traccess Pty Ltd Date Completed 23/9/14  
Drill Rig Multi-Drill 3000 Logged SK Date: 23/9/14  
Inclination -90° Checked AM Date: 9/10/14

| Drilling |       |     |           |                |          | Field Material Description |  |  |                              | Defect Information                           |   |  |  |
|----------|-------|-----|-----------|----------------|----------|----------------------------|--|--|------------------------------|--|---|--|--|
| METHOD   | WATER | TCR | ROD (SCR) | DEPTH (metres) | DEPTH RL | GRAPHIC LOG                | ROCK / SOIL MATERIAL DESCRIPTION   | WEATHERING   | INFERRED STRENGTH Is(50) MPa | DEFECT DESCRIPTION & Additional Observations |   | AVERAGE DEFECT SPACING (mm)            |  |
|          |       |     |           |                |          |                            |  | EL:0.03<br>V: 0.1<br>L: 0.3<br>H: 1<br>VH: 3<br>EH: 10 |                              |  |   | 10<br>30<br>100<br>300<br>1000<br>3000 |  |
|          |       |     |           | 0              |          |                            |  |  |                              |  |   |  |  |
|          |       |     |           | 1              |          |                            |  |  |                              |  |   |  |  |
|          |       |     |           | 2              |          |                            |  |  |                              |  |   |  |  |
|          |       |     |           | 3              |          |                            |  |  |                              |  |   |  |  |
|          |       |     |           | 4              |          |                            |  |  |                              |  |   |  |  |
|          |       |     |           | 4.26           |          |                            | Continuation from non-cored borehole   |  |                              |  |   |  |  |
|          |       |     |           | 4.52           |          |                            | SHALE; bedding dipping 0-5 degrees, pale grey.   | DW   |                              |  |   |  |  |
|          |       |     |           | 5              |          |                            | SHALE; bedding dipping 0-5 degrees, <1-3 mm thick, average spacing = 2-3 mm, grey with orange iron staining. |  |                              |  | 4.49: BP 0° PR RF Fe SN<br>4.54: BP 0° PR RF Fe SN<br>4.63: BP 0° PR RF Fe SN<br>4.82: BP 5° PR RF Fe SN<br>4.82-4.83: JT 20° PR RF Fe SN<br>4.88-4.89: CS 10 mm, gravel, fine-coarse, angular<br>5.15: BP 0° PR RF Fe SN<br>5.21-5.38: CZ 170 mm, gravel, fine-coarse, angular |  |  |
|          |       | 92  | 28 (57)   | 6              |          |                            | 6.04   |  |                              |  | 5.44-5.48: CS 40 mm, gravel, fine-coarse, angular-subangular<br>5.66-5.69: JT 45° PR RF Fe SN<br>5.69: BP 0° PR RF Fe SN<br>5.77-5.82: JT 5 - 70° UN RF Fe SN<br>5.82-5.84: JT 30 - 45° UN RF Fe SN<br>5.99: HB   |  |  |
|          |       |     |           | 6.25           |          |                            | CORE LOSS; 210 mm.   | -  |                              |  | 6.00-6.04: CS 40 mm, gravel, coarse, subangular<br>6.25-6.26: CS 10 mm, gravel, coarse, subangular<br>6.33: BP 0° PR RF Fe SN<br>6.37-6.43: DS 60 mm, clayey silt, high plasticity, soft-firm   |  |  |
|          |       |     |           | 7              |          |                            | 7.02   |  |                              |  | 6.44-6.48: JT 40° PR RF Fe SN<br>6.51-6.56: CS 50 mm, gravel, medium-coarse, subangular<br>6.67-6.70: DS 30 mm, clayey silt, high plasticity, soft-firm   |  |  |
|          |       |     |           | 8              |          |                            | SHALE; bedding dipping 0-5 degrees, <1-3 mm thick, average spacing = 2-3 mm, dark grey-grey.                 | SW<br>FR   |                              |  | 6.74: BP 0 - 5° PR RF Fe SN<br>6.81: BP 0° PR RF Fe SN<br>6.89-6.93: JT 30 - 60° UN RF Fe SN<br>6.93-7.00: CS 70 mm, gravel, coarse, angular<br>7.14-8.94: BPx10 0° PR RF CN avg sp = 300-400 mm  |  |  |
|          |       | 100 | 90 (98)   | 9              |          |                            | 9.00   |  |                              |  |   |  |  |
|          |       |     |           | 10             |          |                            | Hole Terminated at 9.00 m<br>Target depth reached.<br>Borehole converted to monitoring well.                 |  |                              |  |   |  |  |

This borehole log should be read in conjunction with Environmental Investigations Australia's accompanying standard notes.

| Drilling |                        |               | Sampling       |  |                                       | Field Material Description |  |  |                    | PIEZOMETER DETAILS |         |     |  |
|----------|------------------------|---------------|----------------|--|---------------------------------------|----------------------------|--|--|--------------------|--------------------|---------|-----|--|
| METHOD   | PENETRATION RESISTANCE | WATER         | DEPTH (metres) | DEPTH RL   | SAMPLE OR FIELD TEST                  | RECOVERED GRAPHIC LOG      | USCS SYMBOL  | SOIL/ROCK MATERIAL DESCRIPTION   | MOISTURE CONDITION | CONSISTENCY        | DENSITY | ID  |  |
|          |                        |               |                |  |                                       |                            |  |  |                    |                    |         | MW2 |  |
| ADIT     | -                      | GWNE          | 0              | 0.14   | BH2-1 ES 0.14-0.40 m<br>PID = 0.1 ppm |                            | -  | FILL: CONCRETE; 140 mm.  | -                  | -                  | -       |     |  |
|          |                        |               | 0.50           | SPT 0.50 m<br>1.10<br>N=1<br>ASS2-1 ES<br>0.50-0.95 m<br>BH2-2<br>PID = 1.1 ppm            |                                       | CH                         | Silty CLAY; high plasticity, dark grey with orange mottling, strong hydrocarbon odour.                       | M  | VS-S               |                    |         |     |  |
|          |                        |               | 1.90           | SPT 1.50 m<br>1.26<br>N=8<br>ASS2-2 ES<br>1.50-1.95 m<br>BH2-3<br>PID = 0.2 ppm            |                                       | CI                         | CLAY; medium plasticity, orange with grey mottling, strong hydrocarbon odour.                                | D  | F-St               |                    |         |     |  |
|          |                        |               | 2.80           |  |                                       |                            |  |  |                    |                    |         |     |  |
|          |                        |               | 3.15           | SPT 3.00 m<br>21,30 HB<br>N=30/100mm<br>ASS2-3 ES<br>3.00-3.25 m<br>BH2-4<br>PID = 1.1 ppm |                                       | -                          | SHALE; red-brown, inferred extremely low strength, inferred extremely weathered.                             |  |                    |                    |         |     |  |
|          |                        |               | 4.26           | SPT 4.00 m<br>5 HB<br>N=5/50mm<br>BH2-5<br>C 4.26-7.00 m                                   |                                       |                            | SHALE; bedding dipping 0-5 degrees, pale grey.   |  |                    |                    |         |     |  |
|          |                        |               | 4.52           |  |                                       |                            | SHALE; bedding dipping 0-5 degrees, <1-3 mm thick, average spacing = 2-3 mm, grey with orange iron staining. |  |                    |                    |         |     |  |
|          |                        |               | 5.00           |  |                                       |                            |  |  |                    |                    |         |     |  |
|          |                        |               | 6.04           |  |                                       |                            |  |  |                    |                    |         |     |  |
|          |                        |               | 6.25           |  |                                       |                            |  |  |                    |                    |         |     |  |
| NMLC     | -                      | 75-80% RETURN | 7              | 7.02   | C 7.00-9.00 m<br>7.00 m               |                            |  | SHALE; bedding dipping 0-5 degrees, <1-3 mm thick, average spacing = 2-3 mm, dark grey-grey. |                    |                    |         |     |  |
|          |                        |               | 7.82           |  |                                       |                            |  |  |                    |                    |         |     |  |
|          |                        |               | 9.00           |  |                                       |                            |  |  |                    |                    |         |     |  |
|          |                        |               | 9              |  |                                       |                            |  |  |                    |                    |         |     |  |
|          |                        |               | 10             |  |                                       |                            |  | Hole Terminated at 9.00 m<br>Target depth reached.<br>Borehole converted to monitoring well. |                    |                    |         |     |  |

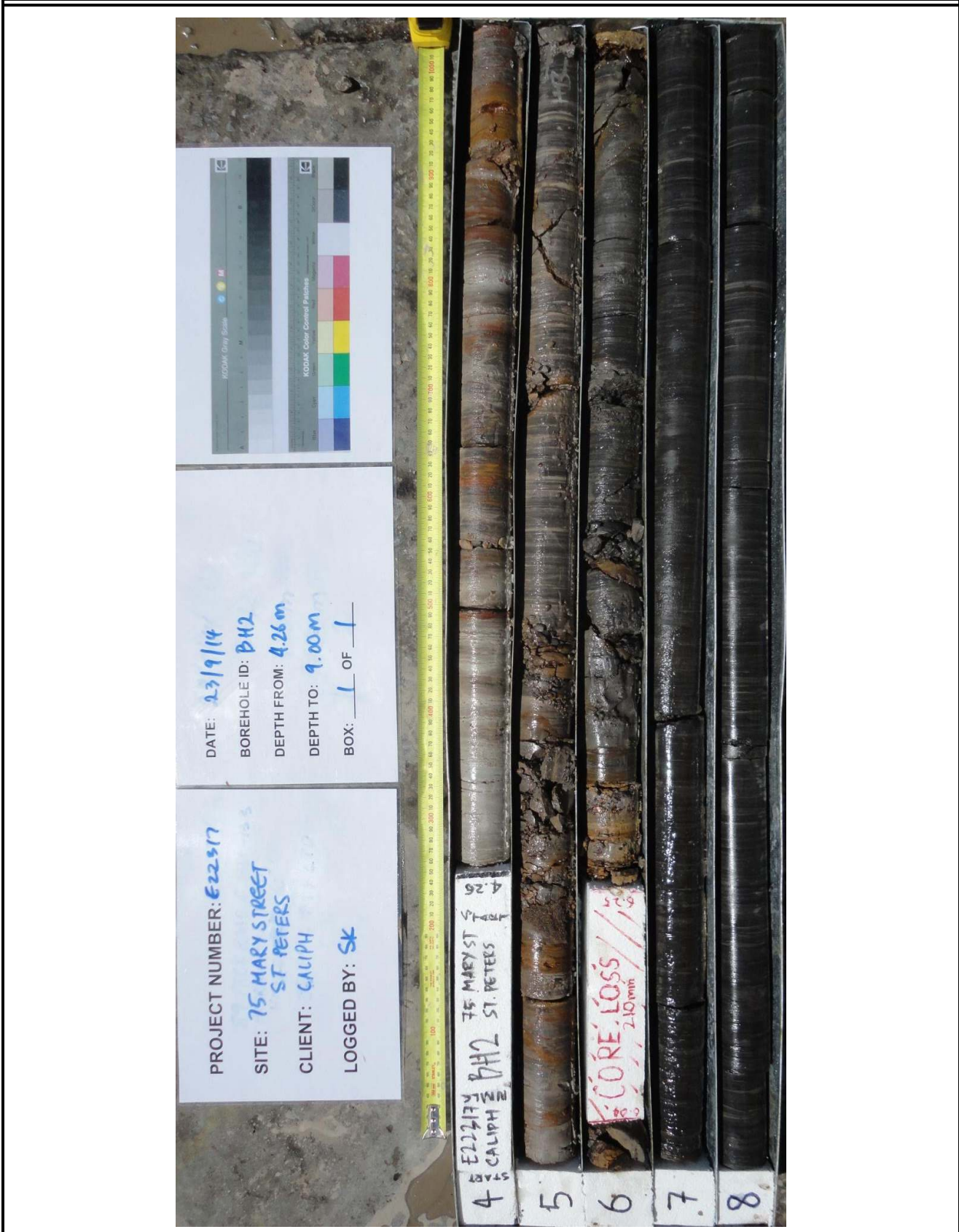
This borehole log should be read in conjunction with Environmental Investigations Australia's accompanying standard notes.

# REPORT OF BOREHOLE: BH2/MW2/ASS2

CLIENT: Caliph  
PROJECT: Preliminary Geotechnical Investigation  
LOCATION: 75 Mary Street, St Peters, NSW  
JOB NO: E22317

EAST: 331128.376 m  
NORTH: 6245971.168 m MGA94 Zone 56  
INCLINATION: -90°  
BOX: 1 of 1  
HOLE DEPTH: 9.00 m

DEPTH RANGE: 4.26 m to 9.00 m  
DRILL RIG: Multi-Drill 3000  
DRILLER: Tracess Pty Ltd  
LOGGED: SK DATE: 23/9/2014  
CHECKED: AM DATE: 9/10/2014



Project New Mixed Development  
 Location 75 Mary Street, St Peters NSW  
 Position Refer to Figure 2  
 Job No. E22317  
 Client Caliph

East 331107.4 m  
 North 6245935.7 m  
 Contractor Traccess Pty Ltd  
 Drill Rig Multi-Drill 3000  
 Inclination -90°

Sheet 1 OF 2  
 Date Started 25/9/14  
 Date Completed 25/9/14  
 Logged SK Date: 25/9/14  
 Checked AM Date: 9/10/14

| Drilling |                        |       | Sampling       |   | Field Material Description |             |  |                    |                     |                                       |
|----------|------------------------|-------|----------------|---|----------------------------|-------------|--|--------------------|---------------------|---------------------------------------|
| METHOD   | PENETRATION RESISTANCE | WATER | DEPTH (metres) | SAMPLE OR FIELD TEST  | RECOVERED GRAPHIC LOG      | USCS SYMBOL | SOIL/ROCK MATERIAL DESCRIPTION   | MOISTURE CONDITION | CONSISTENCY DENSITY | STRUCTURE AND ADDITIONAL OBSERVATIONS |
| DT       | -                      |       | 0              |   |                            |             | FILL: CONCRETE; 150 mm.  | -                  | -                   | CONCRETE HARDSTAND                    |
|          |                        |       | 0.15           |   |                            |             |  |                    |                     |                                       |
|          |                        |       | 0.40           | BH3-1 ES<br>0.20-0.40 m<br>PID = 12 ppm<br>ASS3-1 ES<br>0.40-0.50 m<br>SPT 0.50 m<br>2.3.6<br>N=9<br>BH3-2<br>PID = 0.8 ppm |                            | CH          | FILL: CLAY; high plasticity, grey-brown, with brick fragments, strong hydrocarbon odour.<br><br>CLAY; high plasticity, grey with red mottling, mild hydrocarbon odour. | M                  | -                   | FILL                                  |
|          | E                      | GWNE  | 1              |   |                            |             |  |                    | St                  | RESIDUAL SOIL                         |
|          |                        |       | 2.00           | SPT 1.50 m<br>7.7.10<br>N=17<br>ASS3-2<br>BH3-3<br>PID = 3.6 ppm  |                            |             |  |                    | Vst                 |                                       |
|          | F                      |       | 2.50           |   |                            |             | SHALE; grey with orange iron staining, inferred extremely low strength, inferred extremely weathered.  |                    |                     | WEATHERED ROCK                        |
|          | H                      |       | 3              |   |                            |             | From 2.5 m, as above, inferred very low strength, inferred distinctly weathered  |                    |                     | ROCK                                  |
|          |                        |       | 3.27           | SPT 3.00 m<br>25 HB<br>N=25/150mm<br>BH3-4<br>PID = 0.5 ppm   |                            |             |  |                    |                     |                                       |
|          |                        |       | 4              |   |                            |             | Continued as Cored Borehole  |                    |                     |                                       |
|          |                        |       | 5              |   |                            |             |  |                    |                     |                                       |
|          |                        |       | 6              |   |                            |             |  |                    |                     |                                       |
|          |                        |       | 7              |   |                            |             |  |                    |                     |                                       |
|          |                        |       | 8              |   |                            |             |  |                    |                     |                                       |
|          |                        |       | 9              |   |                            |             |  |                    |                     |                                       |
|          |                        |       | 10             |   |                            |             |  |                    |                     |                                       |

This borehole log should be read in conjunction with Environmental Investigations Australia's accompanying standard notes.

Project New Mixed Development  
Location 75 Mary Street, St Peters NSW  
Position Refer to Figure 2  
Job No. E22317  
Client Caliph

**BOREHOLE: BH3/MW3/ASS3**

East 331107.4 m Sheet 2 OF 2  
North 6245935.7 m Date Started 25/9/14  
Contractor Traccess Pty Ltd Date Completed 25/9/14  
Drill Rig Multi-Drill 3000 Logged SK Date: 9/10/14  
Inclination -90° Checked AM Date: 9/10/14

| Drilling |       |     |           |                | Field Material Description |             |   |   |                              | Defect Information  |  |                             |    |     |      |      |
|----------|-------|-----|-----------|----------------|----------------------------|-------------|---|---|------------------------------|---|--|-----------------------------|----|-----|------|------|
| METHOD   | WATER | TCR | RDD (SCR) | DEPTH (metres) | DEPTH RL                   | GRAPHIC LOG | ROCK / SOIL MATERIAL DESCRIPTION  | WEATHERING  | INFERRED STRENGTH Is(50) MPa | DEFECT DESCRIPTION & Additional Observations  |  | AVERAGE DEFECT SPACING (mm) |    |     |      |      |
|          |       |     |           |                |                            |             |   | EL <sub>0.03</sub><br>V <sub>0.1</sub><br>L <sub>0.3</sub><br>H <sub>1</sub><br>VH <sub>3</sub><br>EH <sub>10</sub> |                              |   |  | 10                          | 30 | 100 | 1000 | 5000 |
|          |       |     |           | 0              |                            |             |   |   |                              |   |  |                             |    |     |      |      |
|          |       |     |           | 3.27           |                            |             | Continuation from non-cored borehole  |   |                              |   |  |                             |    |     |      |      |
|          |       |     | 100 (47)  | 4              |                            |             | SHALE; bedding dipping 5-10 degrees, pale grey-grey with medium to high strength ironstone bands up to 60 mm thick.     | DW  |                              | 3.29: DB<br>3.37-3.39: DS 20 mm, sandy silt, medium plasticity, soft, sand is fine grained<br>3.43-3.44: DS 10 mm, silt, high plasticity, soft<br>3.49-3.53: DS 40 mm, silt, high plasticity, soft<br>3.54-3.87: BPx4 5 - 10° PR RF Fe SN avg sp = 5-30 mm<br>3.68-3.70: DS 20 mm, silt, high plasticity, soft<br>3.75-3.82: CS 70 mm, gravel, fine to medium, angular<br>3.89-3.95: DS 60 mm, silt, high plasticity, soft<br>4.00-4.04: DS 40 mm, silt, high plasticity, soft<br>4.12: JT 0 - 20° CU S Fe SN<br>4.41: BP 5° PR RF Fe SN<br>4.46-4.48: DS 20 mm, silt, high plasticity, soft<br>4.48-4.54: CS 60 mm, gravel, fine to medium, angular<br>4.62-4.67: DS 50 mm, silt, high plasticity, soft<br>4.67-4.76: DB<br>4.87: BP 5° PR RF Fe SN<br>4.95: JT 0 - 20° CU RF Fe SN<br>5.04-5.08: DS 40 mm, silt, high plasticity, soft<br>5.11: BP 10° PR RF Fe SN<br>5.13-5.18: DS 50 mm, silt, high plasticity, soft<br>5.24-5.25: DS 10 mm, silt, high plasticity, soft<br>5.25-5.28: CS 30 mm, gravel, fine to medium, angular<br>5.28-5.32: JT 60° closed<br>5.33-5.38: CS 50 mm, gravel, fine to medium, angular<br>5.56: DB<br>5.62: BP 10° PR RF Fe SN<br>5.63-5.65: CS 20 mm, gravel, medium to coarse, subangular |  |                             |    |     |      |      |
|          |       |     | 100 (31)  | 5              |                            |             | SHALE; bedding dipping 5-10 degrees, <1-2 mm thick, average spacing = 1-3 mm, grey-dark grey with orange iron staining. |   |                              |   |  |                             |    |     |      |      |
|          |       |     |           | 6.52           |                            |             | Hole Terminated at 6.52 m<br>Target depth reached.<br>Borehole converted to monitoring well.                            |   |                              | 5.69: JT 0° ST RF Fe SN<br>5.73-5.75: DS 20 mm, silt, high plasticity, soft<br>5.78: BP 5° PR RF Fe SN<br>5.81-5.95: CZ 140 mm, gravel, fine to medium, angular<br>6.00-6.08: CS 80 mm, gravel, coarse, angular<br>6.10-6.26: JT 20 - 90° UN RF Fe SN<br>6.11-6.16: JT 80° PR RF Fe SN<br>6.16: BP 5° PR RF Fe SN<br>6.30-6.52: HB  |  |                             |    |     |      |      |
|          |       |     |           | 7              |                            |             |   |   |                              |   |  |                             |    |     |      |      |
|          |       |     |           | 8              |                            |             |   |   |                              |   |  |                             |    |     |      |      |
|          |       |     |           | 9              |                            |             |   |   |                              |   |  |                             |    |     |      |      |
|          |       |     |           | 10             |                            |             |   |   |                              |   |  |                             |    |     |      |      |

This borehole log should be read in conjunction with Environmental Investigations Australia's accompanying standard notes.

Project New Mixed Development  
 Location 75 Mary Street, St Peters NSW  
 Position Refer to Figure 2  
 Job No. E22317  
 Client Caliph

East 331107.4 m  
 North 6245935.7 m  
 Contractor Tracess Pty Ltd  
 Drill Rig Multi-Drill 3000  
 Inclination -90°

Sheet 1 OF 1  
 Date Started 25/9/14  
 Date Completed 25/9/14  
 Logged SK Date: 25/9/14  
 Checked AM Date: 9/10/14

| Drilling |                        |       | Sampling       |   | Field Material Description |             |  |                    | PIEZOMETER DETAILS |         |     |                    |
|----------|------------------------|-------|----------------|---|----------------------------|-------------|--|--------------------|--------------------|---------|-----|--------------------|
| METHOD   | PENETRATION RESISTANCE | WATER | DEPTH (metres) | SAMPLE OR FIELD TEST  | RECOVERED GRAPHIC LOG      | USCS SYMBOL | SOIL/ROCK MATERIAL DESCRIPTION   | MOISTURE CONDITION | CONSISTENCY        | DENSITY | ID  | Static Water Level |
|          |                        |       | DEPTH RL       |   |                            |             |  |                    |                    |         | MW3 |                    |
| DT       | -                      |       | 0              |   |                            |             | FILL: CONCRETE; 150 mm.  | -                  | -                  | -       |     |                    |
|          |                        |       | 0.15           |   |                            |             |  |                    |                    |         |     |                    |
|          |                        |       | 0.40           | BH3-1 ES 0.20-0.40 m<br>PID = 12 ppm<br>ASS3-1 ES 0.40-0.50 m<br>SPT 0.50 m<br>2.3.6<br>N=9<br>BH3-2<br>PID = 0.8 ppm |                            | CH          | FILL: CLAY; high plasticity, grey-brown, with brick fragments, strong hydrocarbon odour.<br>CLAY; high plasticity, grey with red mottling, mild hydrocarbon odour. | M                  |                    |         |     |                    |
|          | E                      | GWNE  | 1              |   |                            |             |  |                    | St                 |         |     |                    |
|          |                        |       | 2.00           | SPT 1.50 m<br>7.7.10<br>N=17<br>ASS3-2<br>BH3-3<br>PID = 3.6 ppm  |                            |             | SHALE; grey with orange iron staining, inferred extremely low strength, inferred extremely weathered.  |                    |                    |         |     |                    |
|          | F                      |       | 2.50           |   |                            |             | From 2.5 m, as above, inferred very low strength, inferred distinctly weathered  |                    |                    |         |     |                    |
|          | H                      |       | 3              |   |                            |             |  |                    |                    |         |     |                    |
|          |                        |       | 3.27           | SPT 3.00 m<br>25 HB<br>N=25/150mm<br>BH3-4<br>PID = 0.5 ppm<br>C 3.27-4.79 m  |                            |             | SHALE; bedding dipping 5-10 degrees, pale grey-grey with orange iron staining.   |                    |                    |         |     |                    |
|          |                        |       | 4              |   |                            |             |  |                    |                    |         |     |                    |
|          |                        |       | 4.56           | 4.30 m  |                            |             | SHALE; bedding dipping 5-10 degrees, <1-2 mm thick, average spacing = 1-3 mm, grey-dark grey with orange iron staining.  |                    |                    |         |     |                    |
|          |                        |       | 5              | C 4.79-6.52 m   |                            |             |  |                    |                    |         |     |                    |
|          |                        |       | 6              | 5.40 m  |                            |             |  |                    |                    |         |     |                    |
|          |                        |       | 6.52           |   |                            |             |  |                    |                    |         |     |                    |
|          |                        |       | 7              |   |                            |             | Hole Terminated at 6.52 m<br>Target depth reached.<br>Borehole converted to monitoring well.   |                    |                    |         |     |                    |
|          |                        |       | 8              |   |                            |             |  |                    |                    |         |     |                    |
|          |                        |       | 9              |   |                            |             |  |                    |                    |         |     |                    |
|          |                        |       | 10             |   |                            |             |  |                    |                    |         |     |                    |

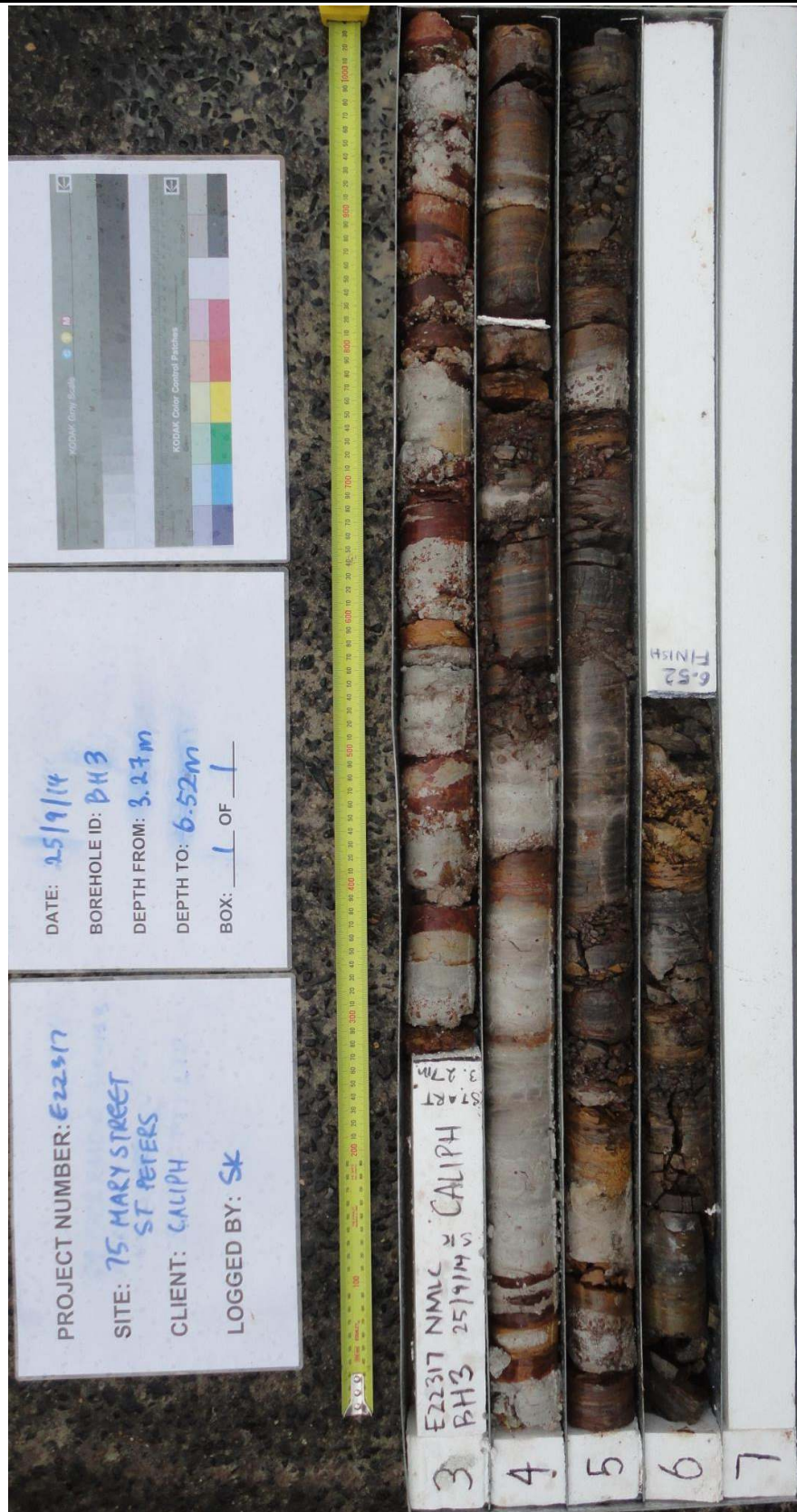
This borehole log should be read in conjunction with Environmental Investigations Australia's accompanying standard notes.

# REPORT OF BOREHOLE: BH3/MW3/ASS3

CLIENT: Caliph  
PROJECT: Preliminary Geotechnical Investigation  
LOCATION: 75 Mary Street, St Peters, NSW  
JOB NO: E22317

EAST: 331107.430 m  
NORTH: 6245935.749 m MGA94 Zone 56  
INCLINATION: -90°  
BOX: 1 of 1  
HOLE DEPTH: 6.52 m

DEPTH RANGE: 3.27 m to 6.52 m  
DRILL RIG: Multi-Drill 3000  
DRILLER: Traccess Pty Ltd  
LOGGED: SK DATE: 25/9/2014  
CHECKED: AM DATE: 9/10/2014



Project New Mixed Development  
 Location 75 Mary Street, St Peters NSW  
 Position Refer to Figure 2  
 Job No. E22317  
 Client Caliph

East 331071.8 m  
 North 6245975.2 m  
 Contractor Traccess Pty Ltd  
 Drill Rig Multi-Drill 3000  
 Inclination -90°

Sheet 1 OF 2  
 Date Started 24/9/14  
 Date Completed 24/9/14  
 Logged SK Date: 24/9/14  
 Checked AM Date: 9/10/14

| Drilling |                        |          | Sampling       |   |                       | Field Material Description  |                                |                    |                     |                                       |
|----------|------------------------|----------|----------------|---|-----------------------|---|--------------------------------|--------------------|---------------------|---------------------------------------|
| METHOD   | PENETRATION RESISTANCE | WATER    | DEPTH (metres) | SAMPLE OR FIELD TEST  | RECOVERED GRAPHIC LOG | USCS SYMBOL   | SOIL/ROCK MATERIAL DESCRIPTION | MOISTURE CONDITION | CONSISTENCY DENSITY | STRUCTURE AND ADDITIONAL OBSERVATIONS |
| ADT      | E                      | 25/09/14 | 0              |   |                       |   | FILL: ASPHALT; 30 mm.          | -                  | -                   | ROAD SURFACE FILL                     |
|          |                        |          | 0.30           | BH4-1 ES<br>0.30-0.40 m<br>PID = 11 ppm<br>SPT 0.50 m<br>1,2,3<br>N=5<br>BH4-2<br>PID = 180 ppm<br>ASS4-1 ES<br>1.00-1.20 m<br>SPT 1.50 m<br>2,2,6<br>N=8<br>BH4-3<br>PID = 122 ppm | CH                    | FILL: Silty GRAVEL; medium to coarse, angular gravel, inferred road base material, mild hydrocarbon odour.<br><br>Silty CLAY; high plasticity, grey with red mottling, trace fine to medium, subrounded ironstone gravel, trace rootlets, strong hydrocarbon odour. |                                | F                  | RESIDUAL SOIL       |                                       |
|          |                        |          | 2.50           | ASS4-2 ES<br>2.50-2.70 m  |                       | SHALE; grey with orange iron staining, inferred extremely low strength, inferred extremely weathered, mild hydrocarbon odour.   |                                | W                  | WEATHERED ROCK      |                                       |
|          |                        |          | 3.00           | SPT 3.00 m<br>30 HB<br>N=30/150mm<br>BH4-4<br>PID = 14 ppm  |                       | From 3.0 m, as above, inferred very low strength, inferred distinctly weathered, no odour.  |                                |                    | ROCK                |                                       |
|          |                        |          | 4.90           | ASS4-3 ES<br>4.30-4.50 m<br>SPT 4.50 m<br>11,19 HB<br>N=19/150mm<br>BH4-5<br>PID = 3.2 ppm  |                       | Continued as Cored Borehole   |                                |                    |                     |                                       |
|          |                        |          | 5              |   |                       |   |                                |                    |                     |                                       |
|          |                        |          | 6              |   |                       |   |                                |                    |                     |                                       |
|          |                        |          | 7              |   |                       |   |                                |                    |                     |                                       |
|          |                        |          | 8              |   |                       |   |                                |                    |                     |                                       |
|          |                        |          | 9              |   |                       |   |                                |                    |                     |                                       |
|          |                        |          | 10             |   |                       |   |                                |                    |                     |                                       |

This borehole log should be read in conjunction with Environmental Investigations Australia's accompanying standard notes.





# REPORT OF BOREHOLE: BH4/MW4/ASS4

CLIENT: Caliph  
PROJECT: Preliminary Geotechnical Investigation  
LOCATION: 75 Mary Street, St Peters, NSW  
JOB NO: E22317

EAST: 331071.812 m  
NORTH: 6245975.180 m MGA94 Zone 56  
INCLINATION: -90°  
BOX: 1 of 1  
HOLE DEPTH: 7.96 m

DEPTH RANGE: 4.90m to 7.96 m  
DRILL RIG: Multi-Drill 3000  
DRILLER: Traccess Pty Ltd  
LOGGED: SK DATE: 24/9/2014  
CHECKED: AM DATE: 9/10/2014



Project New Mixed Development  
 Location 75 Mary Street, St Peters NSW  
 Position Refer to Figure 2  
 Job No. E22317  
 Client Caliph

East 331192.6 m  
 North 6245953.9 m  
 Contractor Traccess Pty Ltd  
 Drill Rig Multi-Drill 3000  
 Inclination -90°

Sheet 1 OF 2  
 Date Started 23/9/14  
 Date Completed 23/9/14  
 Logged SK Date: 23/9/14  
 Checked AM Date: 9/10/14

| Drilling |                        |       | Sampling       |  |                       | Field Material Description |   |  |             |         |                                       |      |               |
|----------|------------------------|-------|----------------|--|-----------------------|----------------------------|---|--|-------------|---------|---------------------------------------|------|---------------|
| METHOD   | PENETRATION RESISTANCE | WATER | DEPTH (metres) | SAMPLE OR FIELD TEST   | RECOVERED GRAPHIC LOG | USCS SYMBOL                | SOIL/ROCK MATERIAL DESCRIPTION  | MOISTURE CONDITION   | CONSISTENCY | DENSITY | STRUCTURE AND ADDITIONAL OBSERVATIONS |      |               |
| ADIT     | E                      | GWNE  | 0              |  |                       |                            |   |  |             |         | ROAD SURFACE                          |      |               |
|          |                        |       | 0.30           | BH5-1 ES<br>0.20-0.30 m<br>PID = 80 ppm                          |                       |                            |   | FILL: gravelly SAND; fine to medium grained, brown, gravel is fine to coarse, subangular, strong hydrocarbon odour.  | D           |         |                                       | FILL |               |
|          |                        |       | 0.70           | BH5-2 D 0.30-0.40 m<br>PID = 52 ppm                              |                       |                            |   | FILL: Sandy CLAY; high plasticity, brown, sand is fine to medium grained, trace fine to medium, subrounded gravel, with brick fragments, mild hydrocarbon odour. |             |         |                                       |      |               |
|          |                        |       | 1              | ASS5-1 ES<br>0.40-0.50 m<br>SPT 0.50 m<br>2.2.2<br>N=4           |                       | CH                         | CLAY; high plasticity, grey mottled red, trace fine to medium, subrounded ironstone gravel, trace rootlets, mild hydrocarbon odour. |  |             | F       |                                       |      | RESIDUAL SOIL |
|          |                        |       | 2              | BH5-3<br>PID = 89 ppm<br>SPT 1.50 m<br>3.5.8<br>N=13             |                       |                            |   |  |             |         | St                                    |      |               |
|          |                        |       | 2.30           | ASS5-2 ES<br>1.50-1.95 m<br>BH5-4<br>PID = 138 ppm               |                       |                            |   |  |             | M (<PL) |                                       |      |               |
| H        |                        |       | 3              | SPT 3.00 m<br>13,25.5 HB<br>N=30/160mm<br>BH5-5<br>PID = 4.1 ppm |                       |                            | MUDSTONE; pale brown-orange, inferred extremely low strength, inferred extremely weathered, no odour.                               |  |             |         |                                       | ROCK |               |
|          |                        |       | 4              | SPT 4.00 m<br>4 HB<br>N=4/50mm<br>BH5-6                          |                       |                            |   | From 3.0 m, as above, inferred very low strength, inferred extremely weathered.  |             |         |                                       |      |               |
|          |                        |       | 4.20           |  |                       |                            | Continued as Cored Borehole   |  |             |         |                                       |      |               |
|          |                        |       | 5              |  |                       |                            |   |  |             |         |                                       |      |               |
|          |                        |       | 6              |  |                       |                            |   |  |             |         |                                       |      |               |
|          |                        |       | 7              |  |                       |                            |   |  |             |         |                                       |      |               |
|          |                        |       | 8              |  |                       |                            |   |  |             |         |                                       |      |               |
|          |                        |       | 9              |  |                       |                            |   |  |             |         |                                       |      |               |
|          |                        |       | 10             |  |                       |                            |   |  |             |         |                                       |      |               |

This borehole log should be read in conjunction with Environmental Investigations Australia's accompanying standard notes.

Project New Mixed Development  
Location 75 Mary Street, St Peters NSW  
Position Refer to Figure 2  
Job No. E22317  
Client Caliph

East 331192.6 m  
North 6245953.9 m  
Contractor Traccess Pty Ltd  
Drill Rig Multi-Drill 3000  
Inclination -90°

Sheet 2 OF 2  
Date Started 23/9/14  
Date Completed 23/9/14  
Logged SK Date: 23/9/14  
Checked AM Date: 9/10/14

# BOREHOLE: BH5/MW5/ASS5

| Drilling |       |     |           |                |          | Field Material Description |  |  |                              | Defect Information                           |  |  |  |
|----------|-------|-----|-----------|----------------|----------|----------------------------|--|--|------------------------------|--|--|--|--|
| METHOD   | WATER | TCR | RQD (SCR) | DEPTH (metres) | DEPTH RL | GRAPHIC LOG                | ROCK / SOIL MATERIAL DESCRIPTION   | WEATHERING   | INFERRED STRENGTH Is(50) MPa | DEFECT DESCRIPTION & Additional Observations |  | AVERAGE DEFECT SPACING (mm)            |  |
|          |       |     |           |                |          |                            |  | EL:0.03<br>V: 0.1<br>L: 0.3<br>H: 1<br>VH: 3<br>EH: 10 |                              |  |  | 10<br>30<br>100<br>300<br>1000<br>3000 |  |
|          |       |     |           | 0              |          |                            |  |  |                              |  |  |  |  |
|          |       |     |           | 1              |          |                            |  |  |                              |  |  |  |  |
|          |       |     |           | 2              |          |                            |  |  |                              |  |  |  |  |
|          |       |     |           | 3              |          |                            |  |  |                              |  |  |  |  |
|          |       |     |           | 4              |          |                            |  |  |                              |  |  |  |  |
|          |       |     |           | 4.20           |          |                            | Continuation from non-cored borehole   |  |                              |  |  |  |  |
|          |       |     |           | 4.66           |          |                            | MUDSTONE; bedding dipping 0-5 degrees, pale grey-pale brown.   | DW   |                              |  | 4.30-4.50: BPX5 0 - 5° PR S Fe SN avg sp = 10-100 mm   |  |  |
|          |       |     |           | 4.66           |          |                            | CORE LOSS; 100 mm.   | -  |                              |  | 4.60-4.66: DS 60 mm, silt, high plasticity, soft   |  |  |
|          |       |     |           | 5              |          |                            | MUDSTONE; bedding dipping 0-5 degrees, pale grey-pale brown.   | DW   |                              |  | 5.10-5.30: JT 50° PR S Fe SN<br>5.21: BP 0° PR S Fe SN<br>5.26-5.28: HB<br>5.34-5.44: BPX3 0° PR S Fe SN avg sp = 50 mm<br>5.54: JT 10° ST RF Fe SN<br>5.65-6.00: CZ 350 mm, gravel, coarse, subangular-angular  |  |  |
|          |       |     |           | 6              |          |                            | From 6.0 m, as above, pale grey-pale brown with orange iron staining.  |  |                              |  | 6.04: JT 0 - 30° UN RF Fe SN<br>6.16: BP 0° PR RF Fe SN<br>6.18-6.20: CS 20 mm, gravel, fine-medium, subrounded<br>6.23: BP 0° PR RF Fe SN<br>6.27: BP 0° PR RF Fe SN<br>6.29-6.33: CS 40 mm, gravel, fine-coarse, subrounded<br>6.39-6.47: DS 80 mm, silt, high plasticity, soft<br>6.53: HB<br>6.59: JT 20° ST RF Fe SN<br>6.62-6.67: DS 50 mm, silt, high plasticity, firm, trace gravel, medium-coarse, angular<br>6.74: DB<br>6.89: BP 0° PR RF Fe SN<br>7.11-7.22: BPX3 0 - 5° PR RF CN avg sp = 10-100 mm<br>7.35-7.37: JT 50° PR RF CN<br>7.37: BP 0° PR RF CN<br>7.37-7.60: JT 85° PR RF CN<br>7.47-7.68: BPX8 0 - 5° PR RF CN<br>7.73-7.75: CS 20 mm, gravel, fine-coarse, angular<br>7.76: BP 0° PR RF Fe SN<br>7.86: DB<br>8.10-8.20: JT 45 - 90° CU RF CN<br>8.14: BP 5° PR RF CN<br>8.22-8.40: JT 45 - 80° CU RF CN<br>8.29: JT 0° PR RF CN<br>8.42: DB<br>8.47: BP 10° PR RF CN |  |  |
|          |       |     |           | 6.00           |          |                            |  |  |                              |  |  |  |  |
|          |       |     |           | 6.29           |          |                            | SHALE; bedding dipping 0-10 degrees, <1-3 mm thick, average spacing = <1-3 mm, dark grey-grey with orange iron staining. | SW   |                              |  |  |  |  |
|          |       |     |           | 7              |          |                            |  |  |                              |  |  |  |  |
|          |       |     |           | 8              |          |                            |  |  |                              |  |  |  |  |
|          |       |     |           | 8.66           |          |                            | Hole Terminated at 8.66 m<br>Target depth reached.<br>Borehole converted to monitoring well.                             |  |                              |  |  |  |  |
|          |       |     |           | 9              |          |                            |  |  |                              |  |  |  |  |
|          |       |     |           | 10             |          |                            |  |  |                              |  | 9.58-8.66: DB  |  |  |

This borehole log should be read in conjunction with Environmental Investigations Australia's accompanying standard notes.

Project New Mixed Development  
 Location 75 Mary Street, St Peters NSW  
 Position Refer to Figure 2  
 Job No. E22317  
 Client Caliph

East 331192.6 m  
 North 6245953.9 m  
 Contractor Traccess Pty Ltd  
 Drill Rig Multi-Drill 3000  
 Inclination -90°

Sheet 1 OF 1  
 Date Started 23/9/14  
 Date Completed 23/9/14  
 Logged SK Date: 23/9/14  
 Checked AM Date: 9/10/14

| Drilling |                        |       | Sampling       |          |   | Field Material Description |             |  |                    | PIEZOMETER DETAILS |         |     |
|----------|------------------------|-------|----------------|----------|---|----------------------------|-------------|--|--------------------|--------------------|---------|-----|
| METHOD   | PENETRATION RESISTANCE | WATER | DEPTH (metres) | DEPTH RL | SAMPLE OR FIELD TEST  | RECOVERED GRAPHIC LOG      | USCS SYMBOL | SOIL/ROCK MATERIAL DESCRIPTION   | MOISTURE CONDITION | CONSISTENCY        | DENSITY | ID  |
|          |                        |       | 0              |          |   |                            |             |  |                    |                    |         | MW5 |
|          |                        |       | 0.30           |          | BH5-1 ES 0.20-0.30 m<br>PID = 80 ppm  |                            |             | FILL: gravelly SAND; fine to medium grained, brown, gravel is fine to coarse, subangular, strong hydrocarbon odour.  |                    |                    |         |     |
|          |                        |       | 0.70           |          | BH5-2 D 0.30-0.40 m<br>PID = 52 ppm   |                            |             | FILL; Sandy CLAY; high plasticity, brown, sand is fine to medium grained, trace fine to medium, subrounded gravel, with brick fragments, mild hydrocarbon odour. |                    |                    |         |     |
|          |                        |       | 1              |          | ASS5-1 ES<br>0.40-0.50 m<br>SPT 0.50 m<br>2.2.2<br>N=4<br>BH5-3<br>PID = 89 ppm   |                            | CH          | CLAY; high plasticity, grey mottled red, trace fine to medium, subrounded ironstone gravel, trace rootlets, mild hydrocarbon odour.                              |                    |                    |         |     |
|          |                        |       | 2              |          | SPT 1.50 m<br>3.5.8<br>N=13<br>ASS5-2 ES<br>1.50-1.95 m<br>BH5-4<br>PID = 138 ppm |                            |             |  |                    |                    |         |     |
|          |                        |       | 2.30           |          |   |                            |             | MUDSTONE; pale brown-orange, inferred extremely low strength, inferred extremely weathered, no odour.  |                    |                    |         |     |
|          |                        |       | 3              |          | SPT 3.00 m<br>13,25.5 HB<br>N=30/160mm<br>BH5-5<br>PID = 4.1 ppm                  |                            |             | From 3.0 m, as above, inferred very low strength, inferred extremely weathered.  |                    |                    |         |     |
|          |                        |       | 4              |          | SPT 4.00 m<br>4 HB<br>N=4/50mm<br>BH5-6<br>C 4.20-6.00 m                          |                            |             | MUDSTONE; bedding dipping 0-5 degrees, pale grey-pale brown.   |                    |                    |         |     |
|          |                        |       | 4.20           |          |   |                            |             | CORE LOSS; 100 mm.   |                    |                    |         |     |
|          |                        |       | 4.66           |          |   |                            |             | MUDSTONE; bedding dipping 0-5 degrees, pale grey-pale brown.   |                    |                    |         |     |
|          |                        |       | 5              |          | 5.45 m  |                            |             |  |                    |                    |         |     |
|          |                        |       | 6              |          | C 6.00-6.80 m   |                            |             | From 6.0 m, as above, pale grey-pale brown with orange iron staining.  |                    |                    |         |     |
|          |                        |       | 6.29           |          |   |                            |             | SHALE; bedding dipping 0-10 degrees, <1-3 mm thick, average spacing = <1-3 mm, dark grey-grey with orange iron staining.   |                    |                    |         |     |
|          |                        |       | 7              |          | C 6.80-8.66 m<br>6.89 m   |                            |             |  |                    |                    |         |     |
|          |                        |       | 8              |          | 7.86 m  |                            |             |  |                    |                    |         |     |
|          |                        |       | 8.66           |          |   |                            |             |  |                    |                    |         |     |
|          |                        |       | 9              |          |   |                            |             | Hole Terminated at 8.66 m<br>Target depth reached.<br>Borehole converted to monitoring well.   |                    |                    |         |     |
|          |                        |       | 10             |          |   |                            |             |  |                    |                    |         |     |

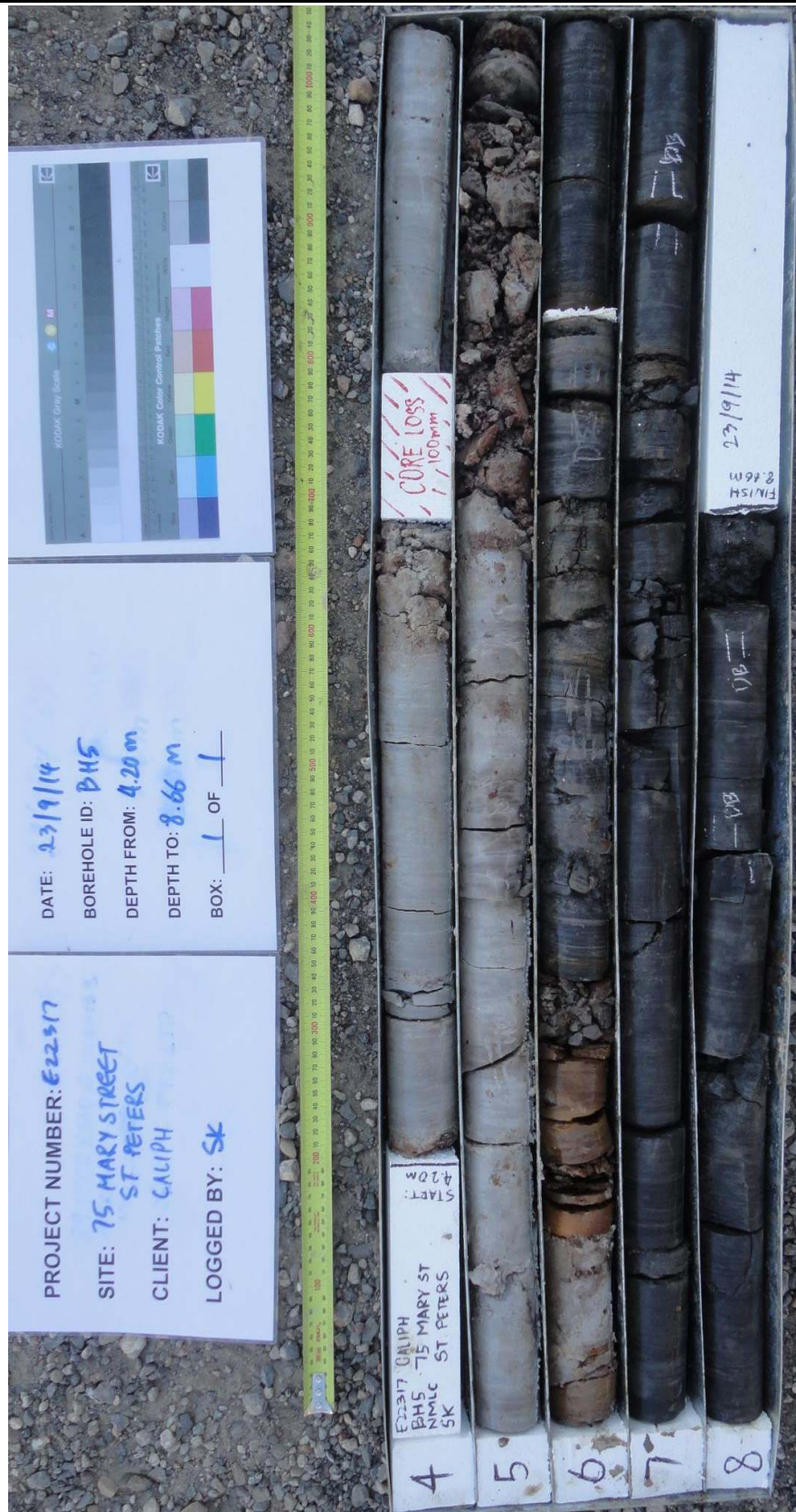
This borehole log should be read in conjunction with Environmental Investigations Australia's accompanying standard notes.

# REPORT OF BOREHOLE: BH5/MW5/ASS5




CLIENT: Caliph  
PROJECT: Preliminary Geotechnical Investigation  
LOCATION: 75 Mary Street, St Peters, NSW  
JOB NO: E22317

EAST: 331192.569 m  
NORTH: 6245953.870 m MGA94 Zone 56  
INCLINATION: -90°  
BOX: 1 of 1  
HOLE DEPTH: 8.66 m

DEPTH RANGE: 4.20 m to 8.66 m  
DRILL RIG: Multi-Drill 3000  
DRILLER: Traccess Pty Ltd  
LOGGED: SK DATE: 23/9/2014  
CHECKED: AM DATE: 9/10/2014-



|          |                               |             |                  |                |               |
|----------|-------------------------------|-------------|------------------|----------------|---------------|
| Project  | New Mixed Development         | East        | 331100.0 m       | Sheet          | 1 OF 2        |
| Location | 75 Mary Street, St Peters NSW | North       | 6245974.3 m      | Date Started   | 25/9/14       |
| Position | Refer to Figure 2             | Contractor  | Traccess Pty Ltd | Date Completed | 25/9/14       |
| Job No.  | E22317                        | Drill Rig   | Multi-Drill 3000 | Logged SK      | Date: 25/9/14 |
| Client   | Caliph                        | Inclination | -90°             | Checked AM     | Date: 9/10/14 |

| Drilling |                        |       | Sampling       |          | Field Material Description   |  |             |  |                    |             |         |                                       |
|----------|------------------------|-------|----------------|----------|--|--|-------------|--|--------------------|-------------|---------|---------------------------------------|
| METHOD   | PENETRATION RESISTANCE | WATER | DEPTH (metres) | DEPTH RL | SAMPLE OR FIELD TEST   | RECOVERED GRAPHIC LOG  | USCS SYMBOL | SOIL/ROCK MATERIAL DESCRIPTION   | MOISTURE CONDITION | CONSISTENCY | DENSITY | STRUCTURE AND ADDITIONAL OBSERVATIONS |
| DT       | -                      |       | 0              | 0.19     |  |  | -           | FILL: CONCRETE; 190 mm.  | -                  | -           | -       | CONCRETE HARDSTAND                    |
|          |                        |       |                | 0.40     | BH6-1 ES<br>0.20-0.40 m<br>PID = 0.2 ppm<br>SPT 0.50 m<br>1.2,3<br>N=5<br>BH6-2<br>PID = 0.5 ppm |   | CH          | FILL: Gravelly CLAY; medium plasticity, brown-dark brown, gravel is fine to medium, subangular, with brick fragments, no odour.<br><br>CLAY: high plasticity, grey-brown mottled red, trace fine to medium, subrounded ironstone gravel, no odour. | M                  | -           | -       | FILL<br>RESIDUAL SOIL                 |
|          | E                      | GWNE  | 1              | 1.80     | SPT 1.50 m<br>3.3,8<br>N=11<br>BH6-3<br>PID = 0.4 ppm  |   | -           | SHALE: red-grey with orange iron staining, inferred extremely low strength, inferred extremely weathered, no odour.  | D                  | F           | -       | WEATHERED ROCK                        |
| AD/T     | F                      |       | 2              | 3.00     | SPT 3.00 m<br>10 HB<br>N=10/20mm<br>BH6-4<br>SPT 3.30 m<br>5 HB<br>N=5/40mm<br>BH6-5             |  | -           | From 3.0 m, as above, inferred very low strength, inferred distinctly weathered.<br><br>From 3.3 m, as above, pale grey.   | -                  | -           | -       | ROCK                                  |
| H        |                        |       | 3              | 3.30     |  |  |             |  |                    |             |         |                                       |
|          |                        |       | 4              | 3.64     |  |  |             | Continued as Cored Borehole  |                    |             |         |                                       |
|          |                        |       | 5              |          |  |  |             |  |                    |             |         |                                       |
|          |                        |       | 6              |          |  |  |             |  |                    |             |         |                                       |
|          |                        |       | 7              |          |  |  |             |  |                    |             |         |                                       |
|          |                        |       | 8              |          |  |  |             |  |                    |             |         |                                       |
|          |                        |       | 9              |          |  |  |             |  |                    |             |         |                                       |
|          |                        |       | 10             |          |  |  |             |  |                    |             |         |                                       |

This borehole log should be read in conjunction with Environmental Investigations Australia's accompanying standard notes.

Project New Mixed Development  
Location 75 Mary Street, St Peters NSW  
Position Refer to Figure 2  
Job No. E22317  
Client Caliph

East 331100.0 m  
North 6245974.3 m  
Contractor Traccess Pty Ltd  
Drill Rig Multi-Drill 3000  
Inclination -90°

Sheet 2 OF 2  
Date Started 25/9/14  
Date Completed 25/9/14  
Logged SK Date: 9/10/14  
Checked AM Date: 9/10/14

| Drilling |       |     |           |                | Field Material Description |             |   |  |                              | Defect Information   |                             |    |     |      |      |
|----------|-------|-----|-----------|----------------|----------------------------|-------------|---|--|------------------------------|--|-----------------------------|----|-----|------|------|
| METHOD   | WATER | TCR | RDD (SCR) | DEPTH (metres) | DEPTH RL                   | GRAPHIC LOG | ROCK / SOIL MATERIAL DESCRIPTION  | WEATHERING   | INFERRED STRENGTH Is(50) MPa | DEFECT DESCRIPTION & Additional Observations   | AVERAGE DEFECT SPACING (mm) |    |     |      |      |
|          |       |     |           |                |                            |             |   | EL <sub>0.03</sub><br>VL <sub>0.1</sub><br>L <sub>0.3</sub><br>H <sub>1</sub><br>VH <sub>3</sub><br>EH <sub>10</sub> |                              |  | 10                          | 30 | 100 | 1000 | 5000 |
|          |       |     |           | 0              |                            |             |   |  |                              |  |                             |    |     |      |      |
|          |       |     |           | 3.64           |                            |             | Continuation from non-cored borehole  |  |                              |  |                             |    |     |      |      |
|          |       |     |           | 3.74           |                            |             | SHALE; bedding dipping 0-10 degrees, <1-1 mm thick, pale grey-grey with medium to high strength ironstone bands up to 20 mm thick.<br>CORE LOSS; 50 mm. | DW   |                              | 3.64-3.74: DB  |                             |    |     |      |      |
|          |       | 96  | 28 (55)   |                |                            |             | SHALE; bedding dipping 0-10 degrees, <1-1 mm thick, pale grey-grey with medium to high strength ironstone bands up to 80 mm thick.                      | DW   |                              | 3.86-4.84: BPx10 0 - 10° PR RF Fe SN avg sp = 20-100 mm  |                             |    |     |      |      |
|          |       |     |           | 5.05           |                            |             | SHALE; bedding dipping 0-10 degrees, <1-1 mm thick, average spacing = 1-3 mm, dark grey-grey with orange iron staining.                                 |  |                              | 4.22-4.25: CS 30 mm, gravel, fine-coarse, angular<br>4.37-4.41: HB<br>4.48: JT 15° PR RF Fe SN<br>4.52: JT 0 - 90° ST RF Fe SN<br>4.56-4.64: DS 80 mm, silt, high plasticity, stiff<br>4.66: JT 20° PR RF Fe SN<br>4.70: JT 0 - 40° UN RF Fe SN<br>4.72-4.77: DS 50 mm, silt, high plasticity, stiff<br>4.91: DB<br>4.94-5.02: DB<br>5.02-5.04: DS 20 mm, silt, high plasticity, stiff<br>5.14-6.29: BPx12 0 - 10° PR RF Fe SN avg sp = 30-100 mm<br>5.27: JT 30° closed<br>5.37-5.44: DS 70 mm, silt, high plasticity, stiff<br>5.62: JT 20° UN RF Fe SN<br>5.66: JT 30° PR RF Fe SN<br>5.71: JT 10° PR RF Fe SN<br>5.78-5.81: CS 30 mm, gravel, fine-coarse, angular-subangular<br>6.00-6.08: HB<br>6.15-6.16: JTx2 0 - 30° CU RF Fe SN<br>6.22-6.24: JT 5 - 30° CU RF Fe SN<br>6.22-6.34: JT 80 - 90° UN RF Fe SN<br>6.33-6.40: CS 70 mm, gravel, fine-coarse, angular-subangular<br>6.40: JT 30° PR RF Fe SN<br>6.42: JT 20 - 30° UN RF Fe SN<br>6.50-7.33: BPx9 0 - 10° PR RF CN avg sp = 30-100 mm<br>6.55-6.57: CS 20 mm, gravel, fine-coarse, angular-subangular |                             |    |     |      |      |
|          |       |     |           | 5.92           |                            |             | SHALE; bedding dipping 0-10 degrees, <1-2 mm thick, average spacing = <1-3 mm, dark grey-grey.  | SW   |                              |  |                             |    |     |      |      |
|          |       | 100 | 25 (44)   |                |                            |             |   |  |                              |  |                             |    |     |      |      |
|          |       |     |           | 7.73           |                            |             | Hole Terminated at 7.73 m<br>Target depth reached.<br>Backfilled with drilling spoil. Concrete capped.  | FR   |                              | 6.61: JT 20° PR RF CN<br>6.68: JT 10° PR RF CN<br>6.75-6.78: JT 30° PR RF CN<br>6.86: JT 40° PR RF CN<br>6.89-6.91: CS 20 mm, gravel, fine-coarse, angular-subangular<br>7.06: JT 0 - 20° UN RF CN<br>7.13-7.21: JT 60° PR RF CN<br>7.42-7.54: CZ 120 mm, gravel, fine-coarse, angular-subangular<br>7.54-7.60: DB   |                             |    |     |      |      |
|          |       |     |           | 8              |                            |             |   |  |                              |  |                             |    |     |      |      |
|          |       |     |           | 9              |                            |             |   |  |                              |  |                             |    |     |      |      |
|          |       |     |           | 10             |                            |             |   |  |                              |  |                             |    |     |      |      |

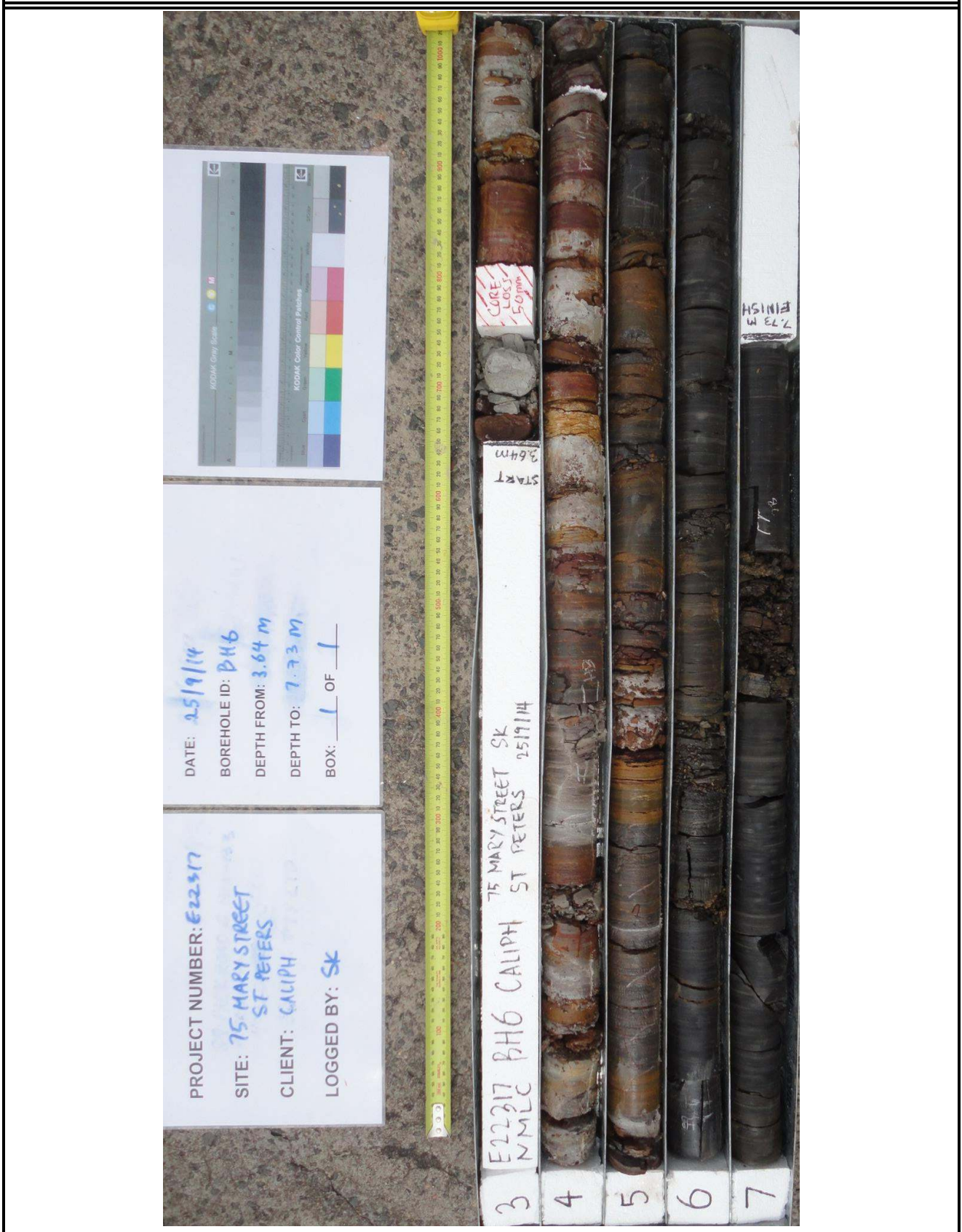
This borehole log should be read in conjunction with Environmental Investigations Australia's accompanying standard notes.

# REPORT OF BOREHOLE: BH6

CLIENT: Caliph  
PROJECT: Preliminary Geotechnical Investigation  
LOCATION: 75 Mary Street, St Peters, NSW  
JOB NO: E22317

EAST: 331100.047 m  
NORTH: 6245974.262 m MGA94 Zone 56  
INCLINATION: -90°  
BOX: 1 of 1  
HOLE DEPTH: 7.73 m

DEPTH RANGE: 3.64 m to 7.73 m  
DRILL RIG: Multi-Drill 3000  
DRILLER: Tracess Pty Ltd  
LOGGED: SK DATE: 25/9/2014  
CHECKED: AM DATE: 9/10/2014



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## **Appendix E**

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### Permeability Test Results

# Material Test Report

**Report Number:** 209825.00-1A  
**Issue Number:** 1  
**Date Issued:** 24/11/2021  
**Client:** GFM Investment Management Limited (Trustee for the GFM Home Trust)  
 Level 4, Sydney NSW 2000  
**Contact:** Ben Edwards  
**Project Number:** 209825.00  
**Project Name:** Proposed Mixed-Use Development  
**Project Location:** 75-85 Mary Street, St Peters NSW  
**Work Request:** 8491  
**Sample Number:** SY-8491A  
**Date Sampled:** 22/10/2021  
**Dates Tested:** 03/11/2021 - 22/11/2021  
**Sampling Method:** Sampled by Engineering Department  
*The results apply to the sample as received*  
**Sample Location:** BH4 (0.3-1.0m)  
**Material:** CLAY CH: high plasticity, pale brown then mottled red pale grey, trace ironstone gravel

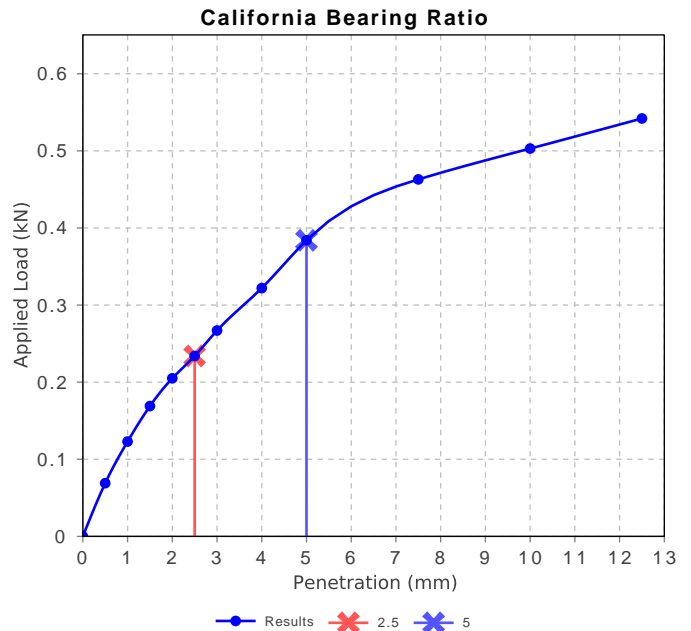


Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Mick Gref  
Senior Technician

Laboratory Accreditation Number: 828

| California Bearing Ratio (AS 1289 6.1.1 & 2.1.1) |                       | Min | Max |
|--|-----------------------|-----|-----|
| CBR taken at                                     | 5 mm                  |     |     |
| CBR %  | 2.0                   |     |     |
| Method of Compactive Effort                      | Standard              |     |     |
| Method used to Determine MDD                     | AS 1289 5.1.1 & 2.1.1 |     |     |
| Method used to Determine Plasticity              | Visual Assessment     |     |     |
| Maximum Dry Density (t/m <sup>3</sup> )          | 1.58                  |     |     |
| Optimum Moisture Content (%)                     | 21.0                  |     |     |
| Laboratory Density Ratio (%)                     | 99.5                  |     |     |
| Laboratory Moisture Ratio (%)                    | 103.0                 |     |     |
| Dry Density after Soaking (t/m <sup>3</sup> )    | 1.50                  |     |     |
| Field Moisture Content (%)                       | 29.3                  |     |     |
| Moisture Content at Placement (%)                | 21.9                  |     |     |
| Moisture Content Top 30mm (%)                    | 29.5                  |     |     |
| Moisture Content Rest of Sample (%)              | 25.6                  |     |     |
| Mass Surcharge (kg)                              | 4.5                   |     |     |
| Soaking Period (days)                            | 4                     |     |     |
| Curing Hours                                     | 148.7                 |     |     |
| Swell (%)  | 4.5                   |     |     |
| Oversize Material (mm)                           | 19                    |     |     |
| Oversize Material Included                       | Excluded              |     |     |
| Oversize Material (%)                            | 0.9                   |     |     |



# Material Test Report

**Report Number:** 209825.00-1A  
**Issue Number:** 1  
**Date Issued:** 24/11/2021  
**Client:** GFM Investment Management Limited (Trustee for the GFM Home Trust)  
 Level 4, Sydney NSW 2000  
**Contact:** Ben Edwards  
**Project Number:** 209825.00  
**Project Name:** Proposed Mixed-Use Development  
**Project Location:** 75-85 Mary Street, St Peters NSW  
**Work Request:** 8491  
**Sample Number:** SY-8491B  
**Date Sampled:** 22/10/2021  
**Dates Tested:** 03/11/2021 - 22/11/2021  
**Sampling Method:** Sampled by Engineering Department  
*The results apply to the sample as received*  
**Sample Location:** BH6 (0.3-0.5m)  
**Material:** CLAY CH: high plasticity, pale grey brown

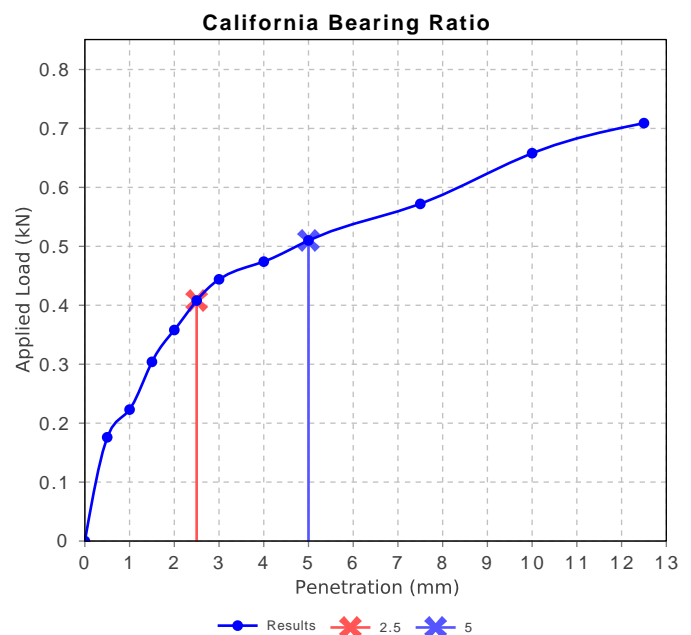


Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Mick Gref  
Senior Technician

Laboratory Accreditation Number: 828

| California Bearing Ratio (AS 1289 6.1.1 & 2.1.1) |                       | Min | Max |
|--|-----------------------|-----|-----|
| CBR taken at                                     | 2.5 mm                |     |     |
| CBR %  | 3.0                   |     |     |
| Method of Compactive Effort                      | Standard              |     |     |
| Method used to Determine MDD                     | AS 1289 5.1.1 & 2.1.1 |     |     |
| Method used to Determine Plasticity              | Visual Assessment     |     |     |
| Maximum Dry Density (t/m <sup>3</sup> )          | 1.48                  |     |     |
| Optimum Moisture Content (%)                     | 27.5                  |     |     |
| Laboratory Density Ratio (%)                     | 99.5                  |     |     |
| Laboratory Moisture Ratio (%)                    | 102.0                 |     |     |
| Dry Density after Soaking (t/m <sup>3</sup> )    | 1.46                  |     |     |
| Field Moisture Content (%)                       | 33.3                  |     |     |
| Moisture Content at Placement (%)                | 28.1                  |     |     |
| Moisture Content Top 30mm (%)                    | 31.2                  |     |     |
| Moisture Content Rest of Sample (%)              | 29.3                  |     |     |
| Mass Surcharge (kg)                              | 4.5                   |     |     |
| Soaking Period (days)                            | 4                     |     |     |
| Curing Hours                                     | 242.3                 |     |     |
| Swell (%)  | 0.5                   |     |     |
| Oversize Material (mm)                           | 19                    |     |     |
| Oversize Material Included                       | Excluded              |     |     |
| Oversize Material (%)                            | 0.3                   |     |     |



# Material Test Report

**Report Number:** 209825.00-1A  
**Issue Number:** 1  
**Date Issued:** 24/11/2021  
**Client:** GFM Investment Management Limited (Trustee for the GFM Home Trust)  
 Level 4, Sydney NSW 2000  
**Contact:** Ben Edwards  
**Project Number:** 209825.00  
**Project Name:** Proposed Mixed-Use Development  
**Project Location:** 75-85 Mary Street, St Peters NSW  
**Work Request:** 8491  
**Sample Number:** SY-8491C  
**Date Sampled:** 22/10/2021  
**Dates Tested:** 03/11/2021 - 22/11/2021  
**Sampling Method:** Sampled by Engineering Department  
*The results apply to the sample as received*  
**Sample Location:** BH5 (0.2-1.0m)  
**Material:** CLAY CH: high plasticity, brown

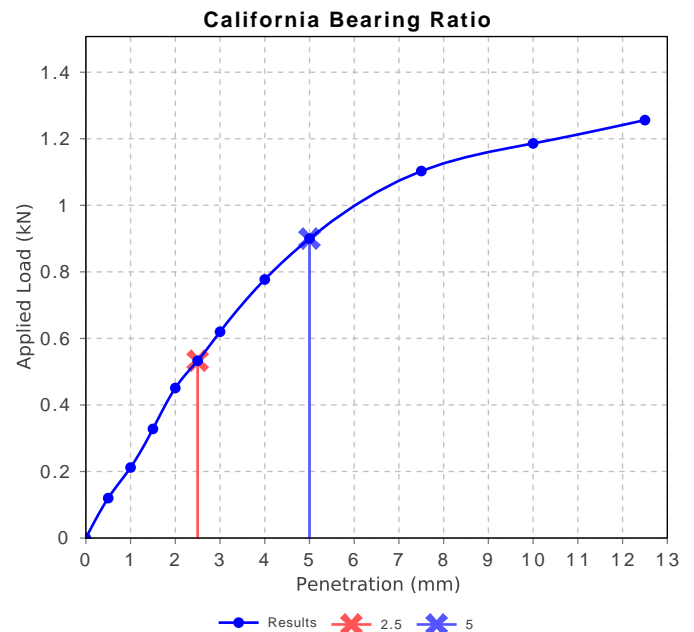


Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Mick Gref  
Senior Technician

Laboratory Accreditation Number: 828

| California Bearing Ratio (AS 1289 6.1.1 & 2.1.1) |                       | Min | Max |
|--|-----------------------|-----|-----|
| CBR taken at                                     | 5 mm                  |     |     |
| CBR %  | 4.5                   |     |     |
| Method of Compactive Effort                      | Standard              |     |     |
| Method used to Determine MDD                     | AS 1289 5.1.1 & 2.1.1 |     |     |
| Method used to Determine Plasticity              | Visual Assessment     |     |     |
| Maximum Dry Density (t/m <sup>3</sup> )          | 1.53                  |     |     |
| Optimum Moisture Content (%)                     | 24.5                  |     |     |
| Laboratory Density Ratio (%)                     | 100.0                 |     |     |
| Laboratory Moisture Ratio (%)                    | 100.0                 |     |     |
| Dry Density after Soaking (t/m <sup>3</sup> )    | 1.52                  |     |     |
| Field Moisture Content (%)                       | 29.7                  |     |     |
| Moisture Content at Placement (%)                | 24.6                  |     |     |
| Moisture Content Top 30mm (%)                    | 29.0                  |     |     |
| Moisture Content Rest of Sample (%)              | 25.9                  |     |     |
| Mass Surcharge (kg)                              | 4.5                   |     |     |
| Soaking Period (days)                            | 4                     |     |     |
| Curing Hours                                     | 172.4                 |     |     |
| Swell (%)  | 0.5                   |     |     |
| Oversize Material (mm)                           | 19                    |     |     |
| Oversize Material Included                       | Excluded              |     |     |
| Oversize Material (%)                            | 0.6                   |     |     |



# Material Test Report



Geotechnics | Environment | Groundwater

Douglas Partners Pty Ltd

Sydney Laboratory

96 Hermitage Road West Ryde NSW 2114

Phone: (02) 9809 0666

Email: [mick.gref@douglaspartners.com.au](mailto:mick.gref@douglaspartners.com.au)

**Report Number:** 209825.00-1A  
**Issue Number:** 1  
**Date Issued:** 24/11/2021  
**Client:** GFM Investment Management Limited (Trustee for the GFM Home Trust)  
Level 4, Sydney NSW 2000  
**Contact:** Ben Edwards  
**Project Number:** 209825.00  
**Project Name:** Proposed Mixed-Use Development  
**Project Location:** 75-85 Mary Street, St Peters NSW  
**Work Request:** 8491  
**Sample Number:** SY-8491D  
**Date Sampled:** 22/10/2021  
**Dates Tested:** 03/11/2021 - 15/11/2021  
**Sampling Method:** Sampled by Engineering Department  
*The results apply to the sample as received*  
**Sample Location:** **BH7 (1.9-2.0m)**  
**Material:** CLAY CH: high plasticity, pale grey brown, trace ironstone gravel



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A handwritten signature in blue ink, appearing to read 'Mick Gref'.

Approved Signatory: Mick Gref  
Senior Technician

Laboratory Accreditation Number: 828

| Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1) |            | Min | Max |
|--|------------|-----|-----|
| Sample History                                 | Oven Dried |     |     |
| Preparation Method                             | Dry Sieve  |     |     |
| Liquid Limit (%)                               | 57         |     |     |
| Plastic Limit (%)                              | 22         |     |     |
| <b>Plasticity Index (%)</b>                    | <b>35</b>  |     |     |

# Material Test Report

**Report Number:** 209825.00-1A  
**Issue Number:** 1  
**Date Issued:** 24/11/2021  
**Client:** GFM Investment Management Limited (Trustee for the GFM Home Trust)  
Level 4, Sydney NSW 2000  
**Contact:** Ben Edwards  
**Project Number:** 209825.00  
**Project Name:** Proposed Mixed-Use Development  
**Project Location:** 75-85 Mary Street, St Peters NSW  
**Work Request:** 8491  
**Sample Number:** SY-8491E  
**Date Sampled:** 22/10/2021  
**Dates Tested:** 03/11/2021 - 15/11/2021  
**Sampling Method:** Sampled by Engineering Department  
*The results apply to the sample as received*  
**Sample Location:** **BH5 (1.5-1.6m)**  
**Material:** CLAY CH: high plasticity, pale grey mottled red



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Approved Signatory: Mick Gref  
Senior Technician

Laboratory Accreditation Number: 828

| Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1) |            | Min | Max |
|--|------------|-----|-----|
| Sample History                                 | Oven Dried |     |     |
| Preparation Method                             | Dry Sieve  |     |     |
| Liquid Limit (%)                               | 53         |     |     |
| Plastic Limit (%)                              | 22         |     |     |
| <b>Plasticity Index (%)</b>                    | <b>31</b>  |     |     |

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## **Appendix F**

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Laboratory Test Results





