



Qualtest Geotechnical & Laboratory

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Geotechnical Investigation Detention Basins Report Monarch Glen ROL4 Flagstone

March 26, 2025

Presented To

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**Geotechnical Investigation
Detention Basins Report
Monarch Glen ROL4, Flagstone**

Geotechnical Report

Report Ref. No.: 7960 – 24-231

March 26, 2025

MIRVAC

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1 INTRODUCTION

It is understood that Mirvac plans to construct Bio-Retention Basins to service the proposed Mirvac's Monarch Glen Residential Development Project in Flagstone. The site for the proposed basins is located on the allotment with real property description Lot 3 on RP 45236 and forms part of the broader development limits.

To progress the design of the ROL4 basins, Charlie Resolved on behalf of Mirvac (The Client) commissioned Qualtest Geotechnical & Laboratory (Qualtest) to undertake a test pitting/drilling program and subsequent laboratory testing to assess the subsurface conditions and provide the geotechnical properties of the encountered materials to inform the design of the basins.

The test pitting/borehole drilling works were undertaken on February 18 & 19, 2025. The works were generally undertaken in accordance with Qualtest's fee proposal with reference number QGQ24-152 – 5560 Rev C, dated February 10, 2025.

Qualtest's commission also included geotechnical assessments targeting other aspects of the development; however, the findings of these investigations are presented under separate covers.

The geographical location of the basins' site is shown in the aerial photograph presented in *Figure 1*.

This geotechnical report provides details of the investigation methodology, field/laboratory works conducted, our findings, and recommendations with respect to the proposed retention basins.

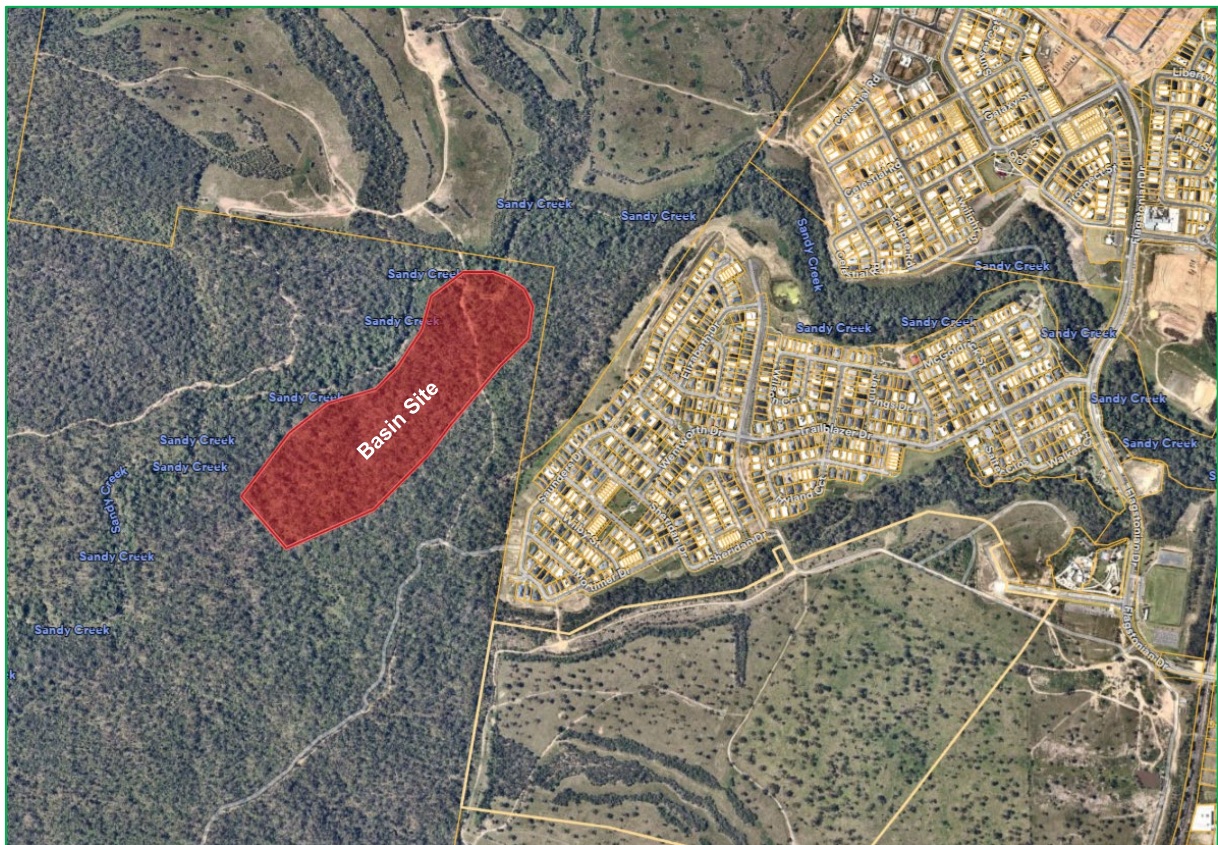
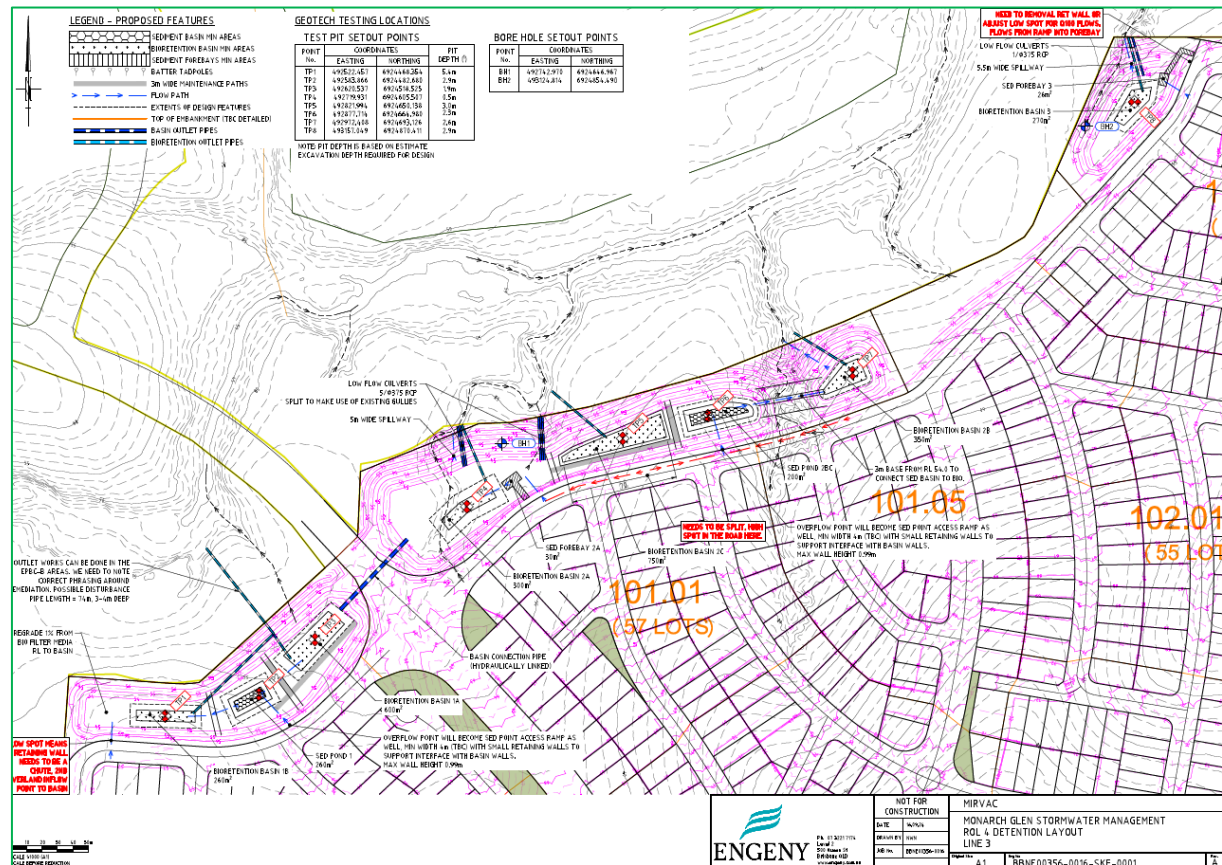


Figure 1: Approximate Site Area Highlighted in Red

1.1 Proposed Development

As part of the stormwater management system of the Monarch Glen development, Sediment and Bio-Retention Basins are planned for the area identified as ROL4. The proposed layout of these basins is shown in the Engeny Layout Plan with Drawing No.: BBNE00356-0016-SKE-0001, dated 16/09/24.

An Excerpt of the plan is presented in *Figure 2*.



- Large bulk samples of representative materials shall be taken from each test pit. A minimum of two (2) bulk samples shall be taken from each test pit. A small bag sub-sample of the bulk sample shall be taken and sealed against moisture loss. Note where residual soil and weathered rock are encountered in a single test pit a bulk sample of each material type (soil and weathered rock) shall be collected;
- Photographs of each test pit and material spoil piles shall also form a part of the sample record;

Note that test pitting shall be conducted until practical refusal or maximum depth, and the reason for termination shall be recorded in the test pit log. Boreholes should be to a depth of 2m or refusal.

Insitu Testing

1. Dynamic Cone Penetrometer (DCP) Testing

The Contractor shall conduct DCP testing at the test pit and borehole locations nominated in the plan. The testing shall be conducted in accordance with AS1289.6.3.2;

The Contractor shall undertake DCP testing. The DCP testing shall be undertaken from the surface level prior to excavating the test pit (if applicable). DCP testing shall be conducted until refusal (> 30 blows / 100mm) or to a maximum depth of 2 metres;

2. Soak Away Testing

The Contractor shall conduct soak-away testing at test pit locations. Following the initial geotechnical investigation, the Engineer shall be notified of the as-built location of the test pits and will assess ground conditions before advising on the depth of soak-away testing **[HOLD POINT]**. A new identical hole shall be dug adjacent to the as-built location of the existing test pit. At the completion of the test pit excavation, the pits shall be filled to the depth nominated by the Engineer. The initial depth to water shall be recorded. The Contractor shall record the depth to water at regular intervals during the day to allow an assessment of infiltration rate. Bunding shall be installed around the perimeter of the test pit to an appropriate standard to prevent unauthorised personnel from accessing the open pit. The bunding shall remain in place for the duration of the test period. The soak-away test shall be completed in a single day with the test pits backfilled prior to the end of the shift. Test pits shall not be left open overnight;

Lab Testing

The following tests will be undertaken on representative soil samples:

- Particle Size Distribution;
- Atterberg limits;
- Emerson Class;
- Standard Compaction (SMDD);
- Field Moisture Content;

Deliverables

The Contractor shall provide the Engineer with the following information:

- Test Pit/borehole logs (including eastings, northings, elevation (recorded in metres above height datum -m AHD) and digital copies of original hand-written logs and typed version);
- Sample Register;
- Geotechnical report including:
 1. Test reports for all in situ testing (DCP and soak away test);
 2. Test reports and laboratory test certificates for all laboratory testing;
 3. Photographs of each test pit excavation. Test pit photographs should show both the full in situ subsurface profile exposed in the pit wall and the excavated soil/rock type;
- Description of typical subsoil layers by project area; and
- Any other details relevant to the clear understanding of the information included in the above data reports.

2 METHODOLOGY

2.1 Standards

This investigation has predominantly been undertaken in line with the following Australian Standards:

- AS 1289 – Methods of testing soils for engineering purposes;
- AS 1289.6.3.1-2004 – Soil strength and consolidation tests – Determination of the penetration resistance of a soil – Standard Penetration Test (SPT); and
- AS 1726:2017 – Geotechnical Site Investigations.

2.2 Literature Review

An initial literature review was undertaken before conducting the site investigation, covering the site's geology and geomorphology, a review of documents provided by Charlie Resolved/Mirvac, and a search for any other information that was publicly available.

2.2.1 Information Provided

Mirvac/Charlie Resolved provided the following documents to aid the investigation:

- Geotechnical Brief – Contained in an email received from Adam Porter, dated 13/02/2025;
- Geotechnical Brief – Documents attached to the above email detailing the required updated geotechnical scope for the project - Prepared by Engeny; and
- Location Layout Plan – Attached to above email – Monarch Glen Stormwater Management ROL4 Detention Layout Line 3, Drg No. BBNE00356-0016-SKE 001A, Dated 16/09/24.

2.2.2 Previous Reports

At the time of writing the report, Qualtest is unaware of any previous geotechnical report for the site.

2.3 Site Geology

The NationalMap Detailed Surface Geology map (1:100k) shows that the site is underlain by the Gatton Sandstone (Jbmg) geological unit. This early Jurassic-era unit is reported to be an arenite-dominant unit containing lithic labile and feldspathic labile sandstone.

An extract from the Detailed Surface Geology map showing the site is presented in *Figure 3*.



Figure 3: The Detailed Surface Geology of the Proposed Detention Basins' Site Highlighted Red

2.4 Site Description

The site is part of Mirvac's Monarch Glen development in the suburb of Flagstone QLD within the Logan City Council area, approximately 38km from Brisbane's CBD.

The area subjected to this investigation is a parcel of land sandwiched between Sandy Creek to the west and recently developed Flagstone residential developments to the east.

At the time of the investigation, the site was generally noted to be well-vegetated by a dense forest with several tracks crisscrossing the area. The topography was generally recorded as gently to steeply sloping hills and valleys with occasional eroded gullies.

Figure 4 (a, b) are photographs taken on the day of the investigation showing the site conditions.



Figure 4: Photographs Showing the General Site Conditions

2.5 Underground Services

All test locations were “cleared” for any underground services before drilling commenced.

2.6 Geotechnical Investigation

The number and location of the boreholes and test pits were specified in the geotechnical brief provided to Qualtest. Onsite, all test holes were pegged enabling easy and accurate identification of test locations.

Two (2) deep boreholes BBH1 and BBH2 were drilled to a nominal target depth of 10.0m. These two holes were advanced using a 12t truck-mounted Hyrapower Scout drill rig, equipped solid auger and NLMC rock coring technique as well as in-situ standard penetration test (SPT) apparatus. At auger refusal depths, rock coring commenced and extended to the target depth. Rocks were stored in core boxes and photographed for future reference.

For the test pits, a 30t Zaxis excavator was used to excavate 8 locations to refusal depths between 1.4 to 3.8m bgl.

The geotechnical brief provided the GPS coordinates (Eastings and Northings) of all test pits/holes, and this is reproduced in *Table 1*.

For laboratory testing, soil samples, including topsoil and residual soils were collected and transported to Qualtest laboratory for testing. The rock cores were also tested for strength through a point load testing program to address the scope of work.

The sample register as requested by the client is appended in Attachment 1, while Attachment 2 shows the test pit photographs.

The boreholes and test pits were logged by Qualtest's Geotechnical Engineer per Australian Standard AS 1726-2017.

All boreholes and test pits were backfilled with spoil won from the drilling/excavation operations onsite.

Figures 5 show the location of the basins boreholes/test pits as plotted on aerial photographs of the site.

Table 1: Coordinates of Borehole/Test Pit Locations

BH ID	UTM - Zone	Easting (m)	Northing (m)	Termination Depth (m)
BBH1	56J	492758.20	6924593.24	10.23 ^(TD)
BBH2	56J	493186.67	6924857.58	10.30 ^(TD)
BTP1	56J	492513.64	6924454.67	1.8 ^(R)
BTP2	56J	492547.24	6924439.26	3.6 ^(R)
BTP3	56J	492646.15	6924498.08	2.7 ^(R)
BTP4	56J	492716.73	6924577.02	3.8 ^(R)
BTP5	56J	492821.65	6924636.28	1.4 ^(R)
BTP6	56J	492877.06	6924624.13	1.5 ^(R)
BTP7	56J	492983.61	6924677.25	2.2 ^(R)
BTP8	56J	493158.57	6924852.99	2.6 ^(R)

R = refusal, TD = target depth

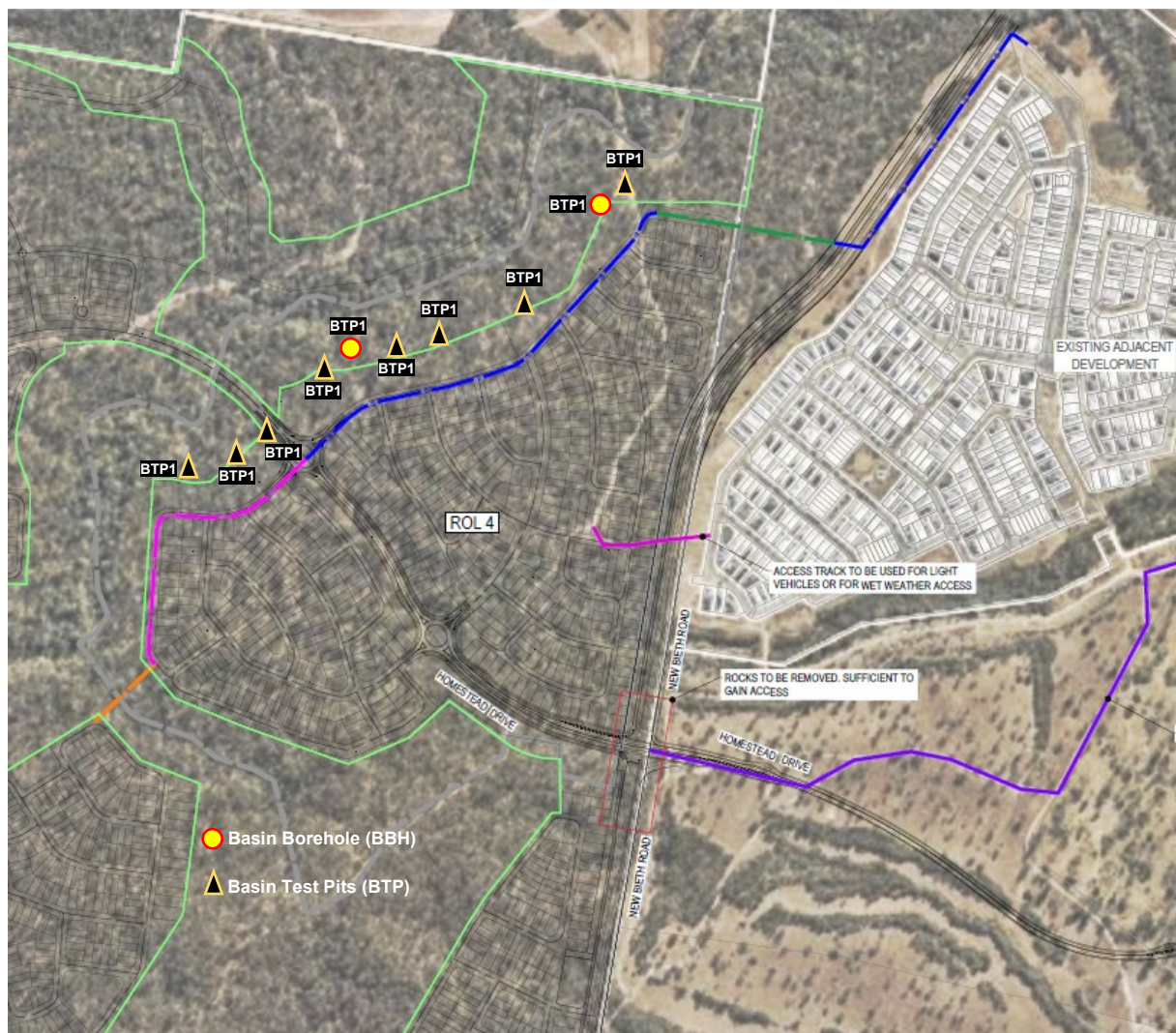


Figure 5: Site Plan Showing Approximate Basins Test Locations

2.7 Subsurface Conditions

The detailed subsurface conditions encountered in the boreholes and test pits are recorded on the engineering logs and are presented in *Appendix A*.

In general, the boreholes/test pits show relatively thick topsoil/fill overlying thin residual soils, which in turn overlie extremely weathered materials that graded into moderately weathered to fresh sandstone bedrock with depth. The residual soils have generally been described as sandy clay, medium plasticity, brown mottled grey, very stiff to hard, moist < PL.

The subsurface profile is further described as follows:

<i>Topsoil</i>	Encountered in all boreholes/test pits and described as silty sand, fine to medium-grained, grey, loose to medium dense, dry, with organic matter and extended to about 0.3m bgl across site.
<i>Fill</i>	Encountered in BBH2 only and extending to about 0.8m bgl, described as silty sand, fine to coarse-grained, pale brown, loose to medium dense, dry, low plasticity silt.
<i>Residual / Extremely Weathered Sandstone</i>	Observed in all boreholes/test pits below the topsoil or fill and continued to various depths averaging at about 1.8m. The materials were generally described as sandy clay, low plasticity, very stiff to hard. These materials transitioned into weathered sandstone rock with increasing depth.
<i>Weathered Sandstone (Moderately or Better)</i>	Encountered in all boreholes/test pits underneath the residual soils and extended to various drill/excavation depths. At depths greater than auger refusal, the sandstone bedrock was observed to be at least moderately weathered rock and becoming fresh with increasing depth. Fresh sandstone rock was encountered at various depths from about 3.5m to up to 7.0m bgl with low to high strength, indistinctly bedded.

2.8 Standard Penetration Testing (SPT)

At each borehole location, SPT testing was undertaken at 1m intervals, starting at 1m depth. The results of the SPT tests are included in the borehole logs attached in *Appendix A*. *Table 2* provides average SPT N values for the material types encountered in the boreholes.

Table 2: Average SPT values for encountered material types.

BH ID	Depth (m)	Material Type	Average SPT N value
BBH1	0.5 – 0.95	Residual Soils - Hard	43
BBH1	2.0 – 2.45	Residual Soils - Hard	55
BBH1	3.0 – 3.45	Residual Soils - Hard	42
BBH2	1.5 – 1.83	Extremely Weathered Rock	>50

2.9 Groundwater

Free groundwater or seepage was not encountered in any of the drilled boreholes or excavated test pits to termination logs. However, at depths greater than 8.8m, Qualtest is unable to ascertain the presence of otherwise of groundwater. This is because auger drilling was replaced with NLMC rock coring technique which extended to about 10.0m depth.

It is most likely that excavations to depths of about 8.8m will not encounter groundwater. Nonetheless, it is noted that groundwater conditions may vary with seasonal/tidal climatic conditions and will depend on the subsurface conditions and soil types encountered during excavation.

2.10 Geotechnical Model

A preliminary geotechnical model of the subsurface conditions encountered based on the borehole/test pit profiles is presented in *Table 3*.

Table 3: Preliminary Geotechnical Model Based on Borehole/Test Pit Profiles

BH ID	Topsoil (m)	Fill (m)	Residual / Extremely Weathered Sandstone (m)	≥ Moderately Weathered Rock (m)	Termination Depth (m)
BBH1	0.0 – 0.20	NE	0.20 – 8.80	8.80 – 10.23	10.2 ^(TD)
BBH2	0.0 – 0.30	0.0 – 0.80	0.80 – 2.30	2.30 – 10.30	10.3 ^(TD)
BTP1	0.0 – 0.30	NE	0.30 – 1.30	1.30 – 1.80	1.8 ^(R)
BTP2	0.0 – 0.30	NE	0.30 – 1.90	1.90 – 3.60	3.6 ^(R)
BTP3	0.0 – 0.30	NE	0.30 – 1.90	1.90 – 2.70	2.7 ^(R)
BTP4	0.0 – 0.30	NE	0.30 – 1.80	1.80 – 3.80	3.8 ^(R)
BTP5	0.0 – 0.30	NE	0.30 – 0.80	0.80 – 1.40	1.4 ^(R)
BTP6	0.0 – 0.30	NE	0.30 – 0.80	0.80 – 1.50	1.5 ^(R)
BTP7	0.0 – 0.35	NE	0.35 – 1.00	1.00 – 2.20	2.2 ^(R)
BTP8	0.0 – 0.30	NE	0.30 – 2.00	2.00 – 2.60	2.6 ^(R)
<i>R = refusal, TD = target depth</i>					

3 LABORATORY TESTING AND RESULTS

Selected soil samples were tested for geotechnical properties at Qualtest's NATA-accredited laboratory in Brisbane in accordance with relevant Australian Standards (AS). Tests outside the scope of Qualtest laboratory were outsourced.

The quantity and type of laboratory tests performed in this investigation are summarised in *Table 4*.

Table 4: Laboratory Testing Program

Laboratory Test	Material type	Quantity	Reference Standard
Particle Size Distribution Test	XW / RS	4	AS1289.3.6.1
Atterberg Limits Test	XW / RS	4	AS1289.3.2.1, 3.1.2, 3.3.1, 3.4.1
Emerson Class Test	XW / RS	4	AS1289.3.8.1
Shrink-Swell Test	US	N/A	AS1289.7.1.1
Soil Permeability Test	RS	3	AS1289.6.7.2
Standard Proctor Compaction Test	XW / RS	4	AS1289.5.1.1
Moisture Content Test	XW / RS	4	AS 1289.2.1.1
<i>XW = extremely weathered, RS = residual soils, US = unable to sample (too gravelly), N/A = not applicable</i>			

The detailed laboratory test certificates for the investigation are presented in *Appendix B*.

3.1 Particle Size Distribution and Moisture Content

The behaviour of coarse-grained soils (sands and gravels) can be predicted by classifying the soil in terms of its particle size distribution (PSD). AS 1726-2017 denotes soils with fine contents ($\leq 75 \mu\text{m}$) greater than or equal to 35% will behave geomechanically as fine-grained soil and, therefore, are to be described as cohesive soils.

Soil samples recovered from BTP1, BTP3, BTP5 and BTP7 were tested for particle size distribution. The results of the particle size distribution tests conducted on the selected samples are presented in *Table 5*. The results indicate the presence of predominantly clay-based soils with coarse-grained soils at the test locations.

Table 5: Results of the Particle Size Distribution Tests

BH ID	Sample Depth (m)	Material Type	Grading (%)		
			Gravel	Sand	Fines
BTP1	1.0 – 1.2	Sandy Clay	0	51	49
BTP3	0.7 – 0.9	Sandy Clay	1	52	47
BTP5	0.6 – 0.8	Clayey Sand	7	68	25
BTP7	2.0 – 2.2	Gravelly Sand, with Clay	30	64	6
<i>Fines = silt + clay</i>					

3.2 Atterberg Limits

The behaviour of fine-grained soils (silts and clays) can be predicted by classifying the soil in terms of its plasticity. Plasticity is broadly described as either "High", "Medium", or "Low".

The 'Plasticity Index' of soil is the range of moisture contents where the soil exhibits plastic behaviour. Soils with a plasticity Index greater than 25% are often referred to as high plasticity.

The Atterberg limits of soil samples recovered BTP1, BTP3, BTP5, and BTP7 were tested for Atterberg limits, including linear shrinkage. The test results show that the clay-based layers are of low plasticity with a weighted plasticity index range of 161 to 1739%.

Table 6 presents the results of the Atterberg Limits tests. While Figure 6 shows the USCS soil classification scheme in graphical form. The results show low plasticity soils.

Table 6: Results of the Atterberg Limits Tests

BH ID	Sample Depth, m	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Linear Shrinkage (%)	WPI (%)
BTP1	1.0 – 1.2	30	11	19	10.5	1739
BTP3	0.7 – 0.9	27	12	15	11.0	1417
BTP5	0.6 – 0.8	32	18	14	8.0	1148
BTP7	2.0 – 2.2	26	22	4	4.0	161

WPI: weighted plasticity index

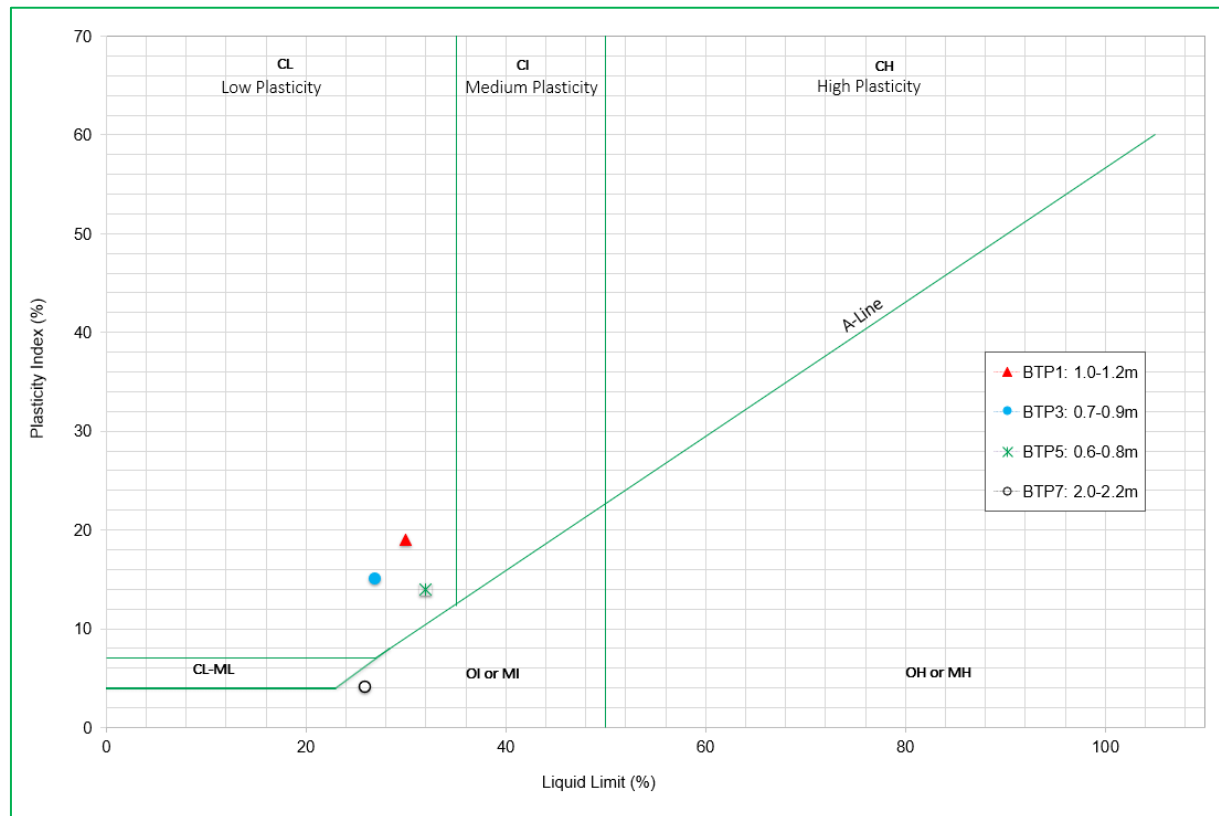


Figure 6: Soil Classification Based on the USCS Code

3.3 Emerson Class Number Test

When brought into contact with water, soil can release silt and clay particles into suspension and increase the turbidity of water. Turbid water in soils indicates susceptibility to erosion.

The Emerson Class Number can measure the potential of soil to release silt and clay particles to suspension. The values range from one (high potential) to eight (low potential). Classes 1 to 3 are considered dispersive, Class 4 indicates the presence of carbonate or gypsum and is slightly dispersive, Classes 5 and 6 are considered non-dispersive, and Classes 7 and 8 are water-stable soils (nonslaking), but if it swells (Class 7), retain its original size and shape (Class 8).

Emerson classification testing was conducted on four (4) samples with the results summarised in *Table 7*, which indicate the presence of highly dispersive soil characteristics.

Table 7: Results of Emerson Class Number Test

BH ID	Sample Depth (m)	Material Type	Emerson Class Number	Remarks
BTP1	1.0 – 1.2	Sandy Clay	2	Highly Dispersive
BTP3	0.7 – 0.9	Sandy Clay	3	Dispersive
BTP5	0.6 – 0.8	Sandy Clay	2	Highly Dispersive
BTP7	2.0 – 2.2	Gravelly Sand, with Clay	1	Highly Dispersive

3.4 Soil Permeability

Soil permeability, also termed hydraulic conductivity, refers to the rate at which soil allows water to flow through it due to its grain structure and void spaces. Knowing how easily water can travel through soil structure is important for engineering purposes.

Several laboratory test methods exist to determine the permeability of soils. The two most common are “the constant head permeability test method” and “the falling head permeability test method”.

The falling head permeability test method was adopted to determine the coefficient of permeability (k) of soil samples recovered from BTP2, BTP4, and BTP6 in the laboratory.

The results of the tests are presented in *Table 8* and indicate very low permeable clays.

Table 8: Summary of Laboratory Soil Permeability Test Result

BH ID	Sample Depth, m	Material Description	MDD (t/m ³)	OMC (%)	Coefficient of Permeability (k), cm/s
BTP2	1.4 – 1.5	Sandy Clay	1.83	13.5	5.0×10^{-10}
BTP4	2.4 – 2.6	Sandy Clay	1.86	10.5	2.0×10^{-9}
BTP6	0.6 – 0.9	Sandy Clay	1.83	13.0	1.0×10^{-8}
MDD = maximum dry density, OMC = optimum moisture content					

3.5 Moisture Content

Soil moisture is the weight or volume of water molecules around the soil's particles and is expressed as a percentage of the overall combined weight. Moisture content or water content in soil is a critical parameter that has a significant impact on the engineering behaviour of soil. It influences the strength, stability, and compaction properties of soil, making it an essential factor in geotechnical engineering and construction projects. The moisture content test is a standard procedure to determine the amount of water present in a given soil sample.

The primary objective of the moisture content test is to quantify the water content in a soil sample. The results of this test provide valuable information for geotechnical engineers, helping them to understand

the soil's behaviour, classify soil types, assess bearing capacity, and design foundations, retaining walls, and embankments. Therefore, determining moisture content is essential for construction projects.

The results of the moisture content test samples are summarised below in *Table 9* and indicate fairly low moisture contents at the time of sampling.

Table 9: Summary of Soil Moisture Content

BH ID	Sample depth (m)	Material Description	Moisture Content (%)
BTP1	1.0 – 1.2	Sandy Clay	12.7
BTP3	0.7 – 0.9	Sandy Clay	8.3
BTP5	0.6 – 0.8	Sandy Clay	10.0
BTP7	2.0 – 2.2	Gravelly Sand, with Clay	6.1

3.6 Standard Compaction

To provide reference data for site during a Level 1 compaction supervision, the maximum dry density (MDD) and the optimum moisture content (OMC) of the onsite samples were determined in the laboratory.

Test samples were obtained from BTP1, BTP3, BTP5, and BTP7 and the results returned MDD of approximately 1.8t/m³ and 13% OMC, as presented in *Table 10*.

Table 10: Summary of Standard Proctor Compaction Test Results

BH ID	Sample Depth, m	Material Description	MDD (t/m ³)	OMC (%)
BTP1	1.0 – 1.2	Sandy Clay	1.78	14.0
BTP3	0.7 – 0.9	Sandy Clay	1.84	12.5
BTP5	0.6 – 0.8	Sandy Clay	1.83	14.5
BTP7	2.0 – 2.2	Gravelly Sand, with Clay	1.87	11.5
<i>MDD = maximum dry density, OMC = optimum moisture content</i>				

4 Geotechnical Engineering Commentary

Based on our understanding of the proposed project, the following sections have been provided to assist with the geotechnical aspects of the design and construction of the proposed basins.

4.1 Soil Dispersion

When brought into contact with water, soil can release silt and clay particles into suspension and increase the turbidity of water. Turbid water in soils indicates susceptibility to erosion.

The Emerson Class Number can measure the potential of soil to release silt and clay particles to suspension. The values range from one (high potential) to eight (low potential). Classes 1 to 3 are considered dispersive, Class 4 indicates the presence of carbonate or gypsum and is slightly dispersive when disturbed, Classes 5 and 6 are considered non-dispersive, and Classes 7 and 8 are water-stable soils (non-slaking), but if it swells (Class 7), retain its original size and shape (Class 8).

Emerson classification testing was conducted on samples collected at BTP1, BTP3, BTP5, and BTP7. The Emerson Class Number for the tested samples returned 1 to 3, indicative of complete and partial dispersive characteristics as shown in *Table 7* above.

It is understood that a Dispersive Soil Management Plan (DSMP) for the site is been prepared by others.

It is expected that the DSMP will present details of dispersive soil treatment methods, erosion and sediment control measures. However, the following are general recommendations for managing erosion and sediment control at the site.

- External water flows should be diverted around or away from the site.
- Excavations/exposed soils and stockpiles should be stabilised (lime or gypsum)/protected.
- Sediment fences and other sediment trapping devices should be placed strategically at downslope boundaries and perimeters of stockpiles/work areas.

4.2 Soil Permeability

As part of the investigation, Qualtest completed laboratory permeability testing of the residual/extremely weathered sandstone materials recovered from BTP2, BTP4, and BTP6. The falling head permeability test method was adopted and the results returned 5.0×10^{-10} , 5.0×10^{-9} , and 1.0×10^{-8} cm/s, respectively, indicative of practically impermeable materials within the tested samples.

4.3 Bulking Factor

The bulking factor is the ratio or percentage of the volume change of excavated material to the volume of the original volume before excavation.

Bulking occurs when soil is excavated. One cubic metre of insitu material expands and does not always translate into one cubic metre of fill when placed and compacted on the site. Bulking can significantly affect the balance of cut and fill volumes and, hence, the cost of the earthworks.

Excavation increases the volume of material. It is, therefore, necessary to use a bulking factor to determine the volume of material that will be created by excavation. The bulking factor is defined as:

$$\text{Bulking Factor} = \frac{\text{Volume after Excavation}}{\text{Volume before Excavation}}$$

Based on experience, engineering judgement, laboratory demonstrations, and published typical values (Look, 2014), *Table 11* provides estimated bulking factors for the material types encountered on the site.

Table 7: Bulking Factors

Material	Bulking Factor for Transportation
Residual Clay / Extremely Weathered Sandstone	1.30
≥ Moderately Weathered Sandstone	1.60

Typical wastage of approximately 5% by volume may be adopted.

4.4 Groundwater

Groundwater nor seepage was observed during the drilling/excavation activities. Auger drilling at borehole BBH1 was extended to 8.8m without encountering groundwater. Therefore, the depth of groundwater around BBH1 is considered to be greater than 8.8m bgl.

The exact depth of the groundwater table is unknown at this stage.

4.5 Compaction Parameters

As part of this investigation, the Standard Proctor test was conducted for four (4) soil samples. The maximum dry density and optimum moisture content were determined per *Table 12*.

Together with published literature (e.g., AS 4678-2002, Cater and Bentley 1991), the bulk density of the site materials is presented in *Table 12*.

4.6 Effective Friction Angle and Cohesion

The internal friction angle of the existing materials with a plasticity index of about 19% was determined using graphical correlations proposed by Ladd et al. (1977) and Bjerrum and Simons (1960). The cohesion values were then estimated based on the friction angles and guided by AS4678-2002.

Table 12: Recommended Geotechnical Material Design Parameters

Material	Geotechnical Design Parameters						
	Maximum Dry Density (t/m ³)	Bulk Density (t/m ³)	Drained Cohesion (kPa)	Angle of Friction (°)	ko	ka	kp
Residual Soils / XW / HW Sandstone (0.3 – 2m bgl)	1.8	1.9	5	28	0.53	0.36	2.77
≥ MW Sandstone or Better (>2.0m)	2.0	2.1	15	35	0.43	0.27	3.69

4.7 Earthwork Recommendations

All earthwork procedures should be carried out in a responsible manner in accordance with AS.3798-2007 “Guidelines on Earthworks for Commercial and Residential Developments”. The earthworks contractor should familiarise themselves with the site conditions.

Given the subsurface profile encountered on site and taking into consideration the proposed earthworks operations, the following geotechnical comments are provided:

4.7.1 Stripping Depths

Topsoil was encountered at all borehole/test pit locations. Based on the observed subsurface profile across the basins’ footprints, topsoil thickness is expected to vary from 0.3 to about 0.35m.

The topsoil should be removed and stockpiled for future use.

4.7.2 Excavability

Bulk excavation to a depth of 2.0m beneath the existing ground surface at the site will require the removal of very stiff to hard clay-based residual soils/extremely weathered sandstone.

Depth to moderately weathered sandstone rock (low to medium-strength) varies between 1.4 and 3.6m bgl. It is expected that 8 to 14t+ excavators fitted with general-purpose/toothed buckets will be required to excavate the overburden soils and extremely to highly weathered sandstone rock (~ 2.0m bgl).

At depths greater than ~2.0m, the strength of the sandstone rock increases significantly. Therefore, a 20 to 36t+ excavator fitted with a toothed bucket or ripper may be required, which is equivalent to a D7 to D9 Dozer.

4.7.3 Reuse of Materials

Reuse of the site materials, including the existing fill is permitted, provided the materials are placed under a Level 1 supervision and testing program, and do not contain topsoil, organics and other deleterious materials.

However, the use of these site-won materials as fill (say dam embankment) may be placing dispersive soils and, therefore, treatment of the upper 0.3m layer should be considered.

4.7.4 Trafficability

At the time of the field investigation, trafficability was considered to be good due to dry weather conditions. However, water-softened upper soils should be expected with persistent rain events, resulting in poor trafficability conditions following clearing and grubbing, including the unpaved access road leading to the site. Gravel surfacing of this road should be considered prior to the commencement of work.

Maintaining adequate drainage conditions is also essential. It should be ensured that runoff is diverted away from the construction areas to prevent the ponding of water.

4.7.5 Safe Batter Angles

Batters can be constructed to the following short- and long-term gradients presented in *Table 13*. The short-term is deemed to be no longer than a 2-week period, and following wet weather (rainfall), the short-term batter slopes would need to be reassessed for stability.

Permanent batters should be covered by topsoil, mulched, and vegetated to prevent drying and cracking. Further assessment of the batter angles may be required once the exact geometry and materials have been finalised.

Temporary or permanent cuts and batters exceeding 1.5m in height should be inspected prior to allowing workers at the base.

Table 8: Recommendations for Cut and Fill Batters

Material	Short term	Long term
Controlled Fill	27° (1V:2H)	18° (1V:3H)
Residual Soils / XW to HW Sandstone	27° (1V:2H)	18° (1V:3H)
Moderately Weathered Rock or Better	45° (1V:1H)	27° (1V:2H)

4.7.6 Subgrade Preparation and Compaction Standards

All earthworks should be carried out by experienced contractors in general accordance with AS3798-2007 (Guidelines on Earthworks for Commercial and Residential Developments). Quality control of the Earthworks should be carried out under Level One Inspection and Testing as defined in AS3798 Section 8 by Qualtest Laboratory.

Materials won from cuts are suitable for use as controlled fill. Materials won from cuts are likely to be residual soils and weathered sandstone.

The following earthworks procedures can be considered by the Civil Engineer and Earthworks Contractor:

- Clearing, grubbing, and stripping should be carried out in stages to minimise exposure of the highly dispersive soils;
- Remove topsoil and stockpile for future use;
- All fill should be placed in thin layers (200mm max Loose) and compacted to a density ratio of 98% for basin embankments, Standard at moisture contents of OMC +/- 2%. However, for 5.0m fill depths (or greater), materials should be compacted at 100%. Each fill layer is to be keyed into existing slopes if applicable;

- Particular attention to the maximum particle size is required. Ideally, the maximum particle size should be limited to 150mm and be well-graded. Rock fragments unable to be broken down during placement and compaction are to be removed from the fill area;
- Testing of the placed and compacted fill should be carried out at frequencies defined in AS3798 Table 8.1 for Type 1 Earthworks; and
- The exposed base of the basins if within soil must be rolled to seal any cracks. If terminated on rock, a capping layer should be used on the rock surface.

4.8 Soak-Away Test

The soak-away field testing was outside the scope of work hence it was not conducted. However, Qualtest is available to carry out this field testing if required by the client.

We will appreciate if the client proposes a detailed test methodology for the site as this varies from client to client.

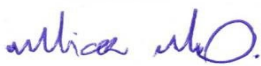
5 Disclaimer

This report has been prepared on behalf of and for the exclusive use of Mirvac and its partners per the scope of work outlined in Proposal QGQ24-152 – 5560 Rev C, dated February 10, 2025. This report is not intended for and should not be relied upon by any third party. In preparing this report, Qualtest relied upon information provided by Mirvac. This report, or sections from this report, should not be used as part of a specification for a project without review and agreement by Qualtest.

Interpretations and recommendations provided in the report are based on the ground conditions at the site, only at the specific testing locations, and then only to the depths investigated and at the time the work was carried out. This is because ground conditions are subject to change from place to place and with time due to geological processes and/or because of human influences. The advice provided by Qualtest is based on the conditions encountered onsite at the time of the investigation. If different ground conditions are encountered following the issuance of this draft report, Qualtest should be notified so that further advice can be provided.

Should you require further information regarding the above, please do not hesitate to contact this office.

Yours faithfully,



MICHAEL MORRISON

For and on behalf of

QUALTEST LABORATORY PTY LTD

Attachment 1: Sample Register

Attachment 2: Test Pit Photographs

Appendix A: Engineering Logs

Appendix B: Laboratory Test Results



DENNIS ALAZIGHA, RPEQ 22169



Attachment 1

Sample Register for Basin Testholes

Sample Register for Basin Testholes

BH ID	Sample depth (m)	Sample Size	Sample Description	Test method
BTP1	0.0 - 0.3	Medium bag	Topsoil	
BTP1	1.0 - 1.2	Large	Residual Clay	PI/PSD/Emerson/Compaction
BTP1	1.0 - 1.2	Small subsample		Moisture content
BTP1	1.7 - 1.8	Large	Rock	
BTP1	1.7 - 1.8	Small subsample		
BTP2	0.0 - 0.3	Medium bag	Topsoil	
BTP2	1.4 - 1.5	Large	Residual Clay	
BTP2	1.4 - 1.5	Small subsample		
BTP2	3.3 - 3.5	Large	Rock	
BTP2	3.3 - 3.5	Small subsample		
BTP3	0.0 - 0.3	Medium bag	Topsoil	
BTP3	0.7 - 0.9	Large	Residual Clay	
BTP3	0.7 - 0.9	Small subsample		PI/PSD/Emerson/Compaction
BTP3	2.5 - 2.7	Large	Rock	Moisture content
BTP3	2.5 - 2.7	Small subsample		
BTP4	0.0 - 0.3	Medium bag	Topsoil	
BTP4	0.8 - 1.0	Large	Residual Clay	
BTP4	0.8 - 1.0	Small subsample		
BTP4	2.4 - 2.6	Large	Rock	
BTP4	2.4 - 2.6	Small subsample		
BTP5	0.0 - 0.3	Medium bag	Topsoil	
BTP5	0.6 - 0.8	Large	Residual Clay	PI/PSD/Emerson/Compaction
BTP5	0.6 - 0.8	Small subsample		Moisture content
BTP5	1.2 - 1.3	Large	Rock	
BTP5	1.2 - 1.3	Small subsample		
BTP6	0.0 - 0.3	Medium bag	Topsoil	
BTP6	0.6 - 0.9	Large	Residual Clay	
BTP6	0.6 - 0.9	Small subsample		
BTP6	1.3 - 1.5	Large	Rock	
BTP6	1.3 - 1.5	Small subsample		

BH ID	Sample depth (m)	Sample Size	Sample Description	Test method
BTP7	0.0 - 0.3	Medium bag	Topsoil	
BTP7	0.4 - 0.6	Large	Residual Clay	
BTP7	0.4 - 0.6	Small subsample		
BTP7	2.0 - 2.2	Large	Rock	PI/PSD/Emerson/Compaction
BTP7	2.0 - 2.2	Small subsample		Moisture content
BTP8	0.0 - 0.3	Medium bag	Topsoil	
BTP8	1.0 - 1.2	Large	Residual Clay	
BTP8	1.0 - 1.2	Small subsample		
BTP8	2.0 - 2.5	Large	Rock	
BTP8	2.0 - 2.5	Small subsample		
BTP8	1.4 - 1.5	Small bag	Residual Clay	
BBH1	0.0 - 0.10	Small Bag	Topsoil	
BBH1	1.5 - 1.95	Small Bag	Residual/rock	
BBH1	3.0 - 3.45	Small Bag	Residual/rock	
BBH1	4.5 - 4.95	Small Bag	Residual/rock	
BBH1	6.0 - 6.45	Small Bag	Residual/rock	
BBH1	7.5 - 7.95	Small Bag	Residual/rock	
BBH2	0.0 - 0.50	Small Bag	Topsoil	
BBH2	1.5 - 1.95	Small Bag	Residual/rock	

Attachment 2

Test Pit Photographs



BTP1



BTP1



BTP2



BTP 2



BTP2



BTP3



BTP3



BTP3



BTP4



BTP4



BTP4



BTP5



BTP5



BTP5



BTP6



BTP6



BTP6



BTP7



BTP7



BTP8



BTP8



BTP8



APPENDIX A

Engineering Logs



Qualtest Laboratory
Est. 1987

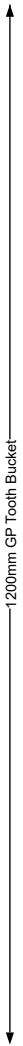
UTM : 56J	Excavator : Zaxis 330	Job Number : 24-231
Easting (m) : 492513.64	Excavator Supplier : ECS Civil Services	Client : Mirvac C
Northing (m) : 6924454.67	Logged By : KD	Project : Geotechnical Investigation Monarch Glen
Ground Elevation : Not Surveyed	Reviewed By : DA	Location : Wyatt Road, Undullah
Total Depth : 1.8 m BGL	Date : 18/02/2025	Loc Comment :

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Moisture	Material Description	Consistency/Density	Samples	Testing	Remarks
		0.3	Topsoil		SM	D	Silty SAND: fine to medium grained, medium dense, grey, dry.	MD	D:		
		1	Residual		CI	w < PL	Sandy CLAY: medium plasticity, hard, brown mottled grey, fine to medium grained sand, w < pl.	H	D:		
		1.3	Rock		SST	D	Clayey SAND: fine to medium grained, dense to very dense, brown mottled grey, with cobbles and clay zones (extremely to moderately weathered sandstone).	D-VD	D:		Ripper used from 1.2m
							BTP1 refusal at 1.8m				

METHOD EX Excavator bucket R Ripper HA Hand auger PT Push tube SON Sonic drilling AH Air hammer PS Percussion sampler AS Short spiral auger AD/V Solid flight auger:V-Bit AD/T Solid flight auger:TC-Bit HFA Hollow flight auger WB Washbore drilling RR Rock roller	PENETRATION VE Very Easy(No Resistance) E Easy F Firm H Hard VH Very Hard(Refusal) WATER  Water Level on Date  Water inflow  Water outflow	FIELD TESTS SPT - Standard Penetration Test PP - Hand/Pocket Penetrometer DCP - Dynamic Cone Penetrometer PSP - Perth Sand Penetrometer MC - Moisture Content PBT - Plate Bearing Test IMP - Borehole Impression Test PID - Photo Ionisation Detector VS - Vane Shear; P=Peak, R=residual (unconnected kPa)	SAMPLES B - Bulk disturbed sample D - Disturbed sample ES - Environmental sample U - Thin wall tube "undisturbed" MOISTURE D - Dry M - Moist W - Wet PL - plastic limit LL - liquid limit W - Moisture content	SOIL CONSISTENCY VS - Very soft S - Soft F - Firm St - Stiff Vst - Very stiff H - Hard RELATIVE DENSITY VL - Very loose L - Loose MD - Medium dense D - Dense VD - Very dense
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Refer to explanatory notes for details of abbreviations and basis of descriptions

UTM : 56J	Excavator : Zaxis 330	Job Number : 24-231
Easting (m) : 492547.24	Excavator Supplier : ECS Civil Services	Client : Mirvac C
Northing (m) : 6924439.26	Logged By : KD	Project : Geotechnical Investigation Monarch Glen
Ground Elevation : Not Surveyed	Reviewed By : DA	Location : Wyatt Road, Undullah
Total Depth : 3.6 m BGL	Date : 18/02/2025	Loc Comment :

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Moisture	Material Description	Consistency/Density	Samples	Testing	Remarks
		0.3	Topsoil		SM	D	Silty SAND: fine to medium grained, medium dense, grey, dry.	MD	D:		
		1	Residual		CI	w < PL	Sandy CLAY: medium plasticity, hard, brown mottled grey, medium grained sand, w < pl.	H	D:		
		1.9									
		2	Rock		SST	D	Silty SAND: fine to coarse grained, very dense, brown, with cobbles and clay zones (extremely to moderately weathered sandstone).	VD	D:		
		3									Ripper used from 2.7m
							BTP2 Terminated at 3.6m (not much progress)				

METHOD EX Excavator bucket R Ripper HA Hand auger PT Push tube SON Sonic drilling AH Air hammer PS Percussion sampler AS Short spiral auger AD/V Solid flight auger:V-Bit AD/T Solid flight auger:TC-Bit HFA Hollow flight auger WB Washbore drilling RR Rock roller	PENETRATION VE Very Easy(No Resistance) E Easy F Firm H Hard VH Very Hard(Refusal) WATER  Water Level on Date  Water inflow  Water outflow	FIELD TESTS SPT - Standard Penetration Test PP - Hand/Pocket Penetrometer DCP - Dynamic Cone Penetrometer PSP - Perth Sand Penetrometer MC - Moisture Content PBT - Plate Bearing Test IMP - Borehole Impression Test PID - Photo Ionisation Detector VS - Vane Shear; P=Peak, R=residual (unconnected kPa)	SAMPLES B - Bulk disturbed sample D - Disturbed sample ES - Environmental sample U - Thin wall tube "undisturbed" MOISTURE D - Dry M - Moist W - Wet PL - plastic limit LL - liquid limit W - Moisture content	SOIL CONSISTENCY VS - Very soft S - Soft F - Firm St - Stiff VSt - Very stiff H - Hard RELATIVE DENSITY VL - Very loose L - Loose MD - Medium dense D - Dense VD - Very dense
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Refer to explanatory notes for details of abbreviations and basis of descriptions

UTM : 56J	Excavator : Zaxis 330	Job Number : 24-231
Easting (m) : 492646.15	Excavator Supplier : ECS Civil Services	Client : Mirvac C
Northing (m) : 6924498.08	Logged By : KD	Project : Geotechnical Investigation Monarch Glen
Ground Elevation : Not Surveyed	Reviewed By : DA	Location : Wyatt Road, Undullah
Total Depth : 2.7 m BGL	Date : 18/02/2025	Loc Comment :

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Moisture	Material Description	Consistency/Density	Samples	Testing	Remarks
		0.3	Topsoil		SM	D	Silty SAND: fine to medium grained, medium dense, grey, dry.	MD	D:		
		1	Residual		CI	w < PL	Sandy CLAY: medium plasticity, very stiff to hard, brown mottled grey, fine to coarse grained sand, w < pl.	VSt-H	D:		
		1.9									
		2	Rock		SST		Silty SAND: fine to coarse grained, dense to very dense, brown, with cobbles and clay zones (extremely to moderately weathered sandstone).	D-VD	D:		Ripper used from 1.9m
							BTP3 refusal at 2.7m				

METHOD EX Excavator bucket R Ripper HA Hand auger PT Push tube SON Sonic drilling AH Air hammer PS Percussion sampler AS Short spiral auger AD/V Solid flight auger:V-Bit AD/T Solid flight auger:TC-Bit HFA Hollow flight auger WB Washbore drilling RR Rock roller	PENETRATION VE Very Easy(No Resistance) E Easy F Firm H Hard VH Very Hard(Refusal) WATER  Water Level on Date  Water inflow  Water outflow	FIELD TESTS SPT - Standard Penetration Test PP - Hand/Pocket Penetrometer DCP - Dynamic Cone Penetrometer PSP - Perth Sand Penetrometer MC - Moisture Content PBT - Plate Bearing Test IMP - Borehole Impression Test PID - Photo Ionisation Detector VS - Vane Shear; P=Peak, R=residual (unconnected kPa)	SAMPLES B - Bulk disturbed sample D - Disturbed sample ES - Environmental sample U - Thin wall tube "undisturbed" MOISTURE D - Dry M - Moist W - Wet PL - plastic limit LL - liquid limit W - Moisture content	SOIL CONSISTENCY VS - Very soft S - Soft F - Firm St - Stiff VSt - Very stiff H - Hard RELATIVE DENSITY VL - Very loose L - Loose MD - Medium dense D - Dense VD - Very dense
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Refer to explanatory notes for details of abbreviations and basis of descriptions



Job Number : 24-231
Client : Mirvac C
Project : Geotechnical Investigation Monarch Glen
Location : Wyatt Road, Undullah
Loc Comment :

METHOD		PENETRATION		FIELD TESTS		SAMPLES		SOIL CONSISTENCY	
EX	Excavator bucket	VE	Very Easy(No Resistance)	SPT	- Standard Penetration Test	B	- Bulk disturbed sample	VS	- Very soft
R	Ripper	E	Easy	PP	- Hand/Pocket Penetrometer	D	- Disturbed sample	S	- Soft
HA	Hand auger	F	Firm	DCP	- Dynamic Cone Penetrometer	ES	- Environmental sample	F	- Firm
PT	Push tube	H	Hard	PSP	- Perth Sand Penetrometer	U	- Thin wall tube "undisturbed"	St	- Stiff
SON	Sonic drilling	VH	Very Hard(Refusal)	MC	- Moisture Content			VSt	- Very stiff
AH	Air hammer			PBT	- Plate Bearing Test			H	- Hard
PS	Percussion sampler	WATER		IMP	- Borehole Impression Test	MOISTURE			
AS	Short spiral auger		Water Level on Date	PID	- Photo Ionisation Detector	D	- Dry		
AD/V	Solid flight auger:V-Bit		Water inflow	VS	- Vane Shear; P=Peak, R=residual (unconnected kPa)	M	- Moist	VL	- Very loose
AD/T	Solid flight auger:TC-Bit		Water outflow			W	- Wet	L	- Loose
HFA	Hollow flight auger					PL	- plastic limit	MD	- Medium dense
WB	Washbore drilling					LL	- liquid limit	D	- Dense
RR	Rock roller					W	- Moisture content	VD	- Very dense

Qualtest

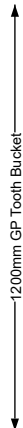
UTM : 56J	Excavator : Zaxis 330	Job Number : 24-231
Easting (m) : 492821.65	Excavator Supplier : ECS Civil Services	Client : Mirvac C
Northing (m) : 6924636.28	Logged By : KD	Project : Geotechnical Investigation Monarch Glen
Ground Elevation : Not Surveyed	Reviewed By : DA	Location : Wyatt Road, Undullah
Total Depth : 1.4 m BGL	Date : 18/02/2025	Loc Comment :

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Moisture	Material Description	Consistency/Density	Samples	Testing	Remarks
1200mm GP Tooth Bucket		0.3	Topsoil		SM	D	Silty SAND: fine to medium grained, medium dense, grey, dry.	MD	D:		
		0.8	Residual		CI	w < PL	Sandy CLAY: medium plasticity, hard, grey mottled brown black, fine to medium grained sand, w < pl.	H	D:		
		1	Rock		SST	D	Silty SAND: fine to coarse grained, very dense, brown, with cobbles (extremely to moderately weathered sandstone).	VD	D:		Ripper used from 1m

BTP5 refusal at 1.4m											
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METHOD EX Excavator bucket R Ripper HA Hand auger PT Push tube SON Sonic drilling AH Air hammer PS Percussion sampler AS Short spiral auger AD/V Solid flight auger:V-Bit AD/T Solid flight auger:TC-Bit HFA Hollow flight auger WB Washbore drilling RR Rock roller	PENETRATION VE Very Easy(No Resistance) E Easy F Firm H Hard VH Very Hard(Refusal) WATER  Water Level on Date  Water inflow  Water outflow	FIELD TESTS SPT - Standard Penetration Test PP - Hand/Pocket Penetrometer DCP - Dynamic Cone Penetrometer PSP - Perth Sand Penetrometer MC - Moisture Content PBT - Plate Bearing Test IMP - Borehole Impression Test PID - Photo Ionisation Detector VS - Vane Shear; P=Peak, R=residual (unconnected kPa)	SAMPLES B - Bulk disturbed sample D - Disturbed sample ES - Environmental sample U - Thin wall tube "undisturbed" MOISTURE D - Dry M - Moist W - Wet PL - plastic limit LL - liquid limit W - Moisture content	SOIL CONSISTENCY VS - Very soft S - Soft F - Firm St - Stiff VSt - Very stiff H - Hard RELATIVE DENSITY VL - Very loose L - Loose MD - Medium dense D - Dense VD - Very dense
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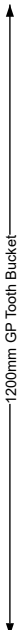
UTM : 56J	Excavator : Zaxis 330	Job Number : 24-231
Easting (m) : 492877.06	Excavator Supplier : ECS Civil Services	Client : Mirvac C
Northing (m) : 6924624.13	Logged By : KD	Project : Geotechnical Investigation Monarch Glen
Ground Elevation : Not Surveyed	Reviewed By : DA	Location : Wyatt Road, Undullah
Total Depth : 1.5 m BGL	Date : 18/02/2025	Loc Comment :

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Moisture	Material Description	Consistency/Density	Samples	Testing	Remarks
		0.3	Topsoil		SM	D	Silty SAND: fine to medium grained, medium dense, grey, dry.	MD	D:		
		1	Residual		CI	w < PL	Sandy CLAY: medium plasticity, very stiff to hard, brown mottled grey, fine to medium grained sand, w < pl.	VSt-H	D:		
		1.2	Rock		SST	D	Silty SAND: fine to coarse grained, very dense, brown, with cobbles (extremely to moderately weathered sandstone).	VD	D:		Ripper used from 1.2m

BTP6 refusal at 1.5m											
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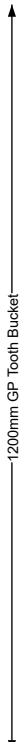
METHOD EX Excavator bucket R Ripper HA Hand auger PT Push tube SON Sonic drilling AH Air hammer PS Percussion sampler AS Short spiral auger AD/V Solid flight auger:V-Bit AD/T Solid flight auger:TC-Bit HFA Hollow flight auger WB Washbore drilling RR Rock roller	PENETRATION VE Very Easy(No Resistance) E Easy F Firm H Hard VH Very Hard(Refusal) WATER  Water Level on Date  Water inflow  Water outflow	FIELD TESTS SPT - Standard Penetration Test PP - Hand/Pocket Penetrometer DCP - Dynamic Cone Penetrometer PSP - Perth Sand Penetrometer MC - Moisture Content PBT - Plate Bearing Test IMP - Borehole Impression Test PID - Photo Ionisation Detector VS - Vane Shear; P=Peak, R=residual (unconnected kPa)	SAMPLES B - Bulk disturbed sample D - Disturbed sample ES - Environmental sample U - Thin wall tube "undisturbed" MOISTURE D - Dry M - Moist W - Wet PL - plastic limit LL - liquid limit W - Moisture content	SOIL CONSISTENCY VS - Very soft S - Soft F - Firm St - Stiff VSt - Very stiff H - Hard RELATIVE DENSITY VL - Very loose L - Loose MD - Medium dense D - Dense VD - Very dense
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UTM : 56J	Excavator : Zaxis 330	Job Number : 24-231
Easting (m) : 492983.61	Excavator Supplier : ECS Civil Services	Client : Mirvac C
Northing (m) : 6924677.25	Logged By : KD	Project : Geotechnical Investigation Monarch Glen
Ground Elevation : Not Surveyed	Reviewed By : DA	Location : Wyatt Road, Undullah
Total Depth : 2.2 m BGL	Date : 18/02/2025	Loc Comment :

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Moisture	Material Description	Consistency/Density	Samples	Testing	Remarks
		0.35	Topsoil		SM	D	Silty SAND: fine to medium grained, medium dense, grey, dry.	MD	D:		
		1	Residual		CI	w < PL	Sandy CLAY: medium plasticity, very stiff, brown mottled grey, fine to medium grained sand, w < pl.	VSt	D:		
		2	Rock		SST	D	Silty SAND: fine to coarse grained, very dense, brown, with cobbles (extremely to moderately weathered sandstone).	VD	D:		Ripper used from 1.2m
							BTP7 refusal at 2.2m				

METHOD	PENETRATION	FIELD TESTS	SAMPLES	SOIL CONSISTENCY
EX Excavator bucket R Ripper HA Hand auger PT Push tube SON Sonic drilling AH Air hammer PS Percussion sampler AS Short spiral auger AD/V Solid flight auger:V-Bit AD/T Solid flight auger:TC-Bit HFA Hollow flight auger WB Washbore drilling RR Rock roller	VE Very Easy(No Resistance) E Easy F Firm H Hard VH Very Hard(Refusal) WATER  Water Level on Date  Water inflow  Water outflow	SPT - Standard Penetration Test PP - Hand/Pocket Penetrometer DCP - Dynamic Cone Penetrometer PSP - Perth Sand Penetrometer MC - Moisture Content PBT - Plate Bearing Test IMP - Borehole Impression Test PID - Photo Ionisation Detector VS - Vane Shear; P=Peak, R=residual (unconnected kPa)	B - Bulk disturbed sample D - Disturbed sample ES - Environmental sample U - Thin wall tube "undisturbed" MOISTURE D - Dry M - Moist W - Wet PL - plastic limit LL - liquid limit W - Moisture content	VS - Very soft S - Soft F - Firm St - Stiff VSt - Very stiff H - Hard RELATIVE DENSITY VL - Very loose L - Loose MD - Medium dense D - Dense VD - Very dense

UTM : 56J	Excavator : Zaxis 330	Job Number : 24-231
Easting (m) : 493158.57	Excavator Supplier : ECS Civil Services	Client : Mirvac C
Northing (m) : 6924852.99	Logged By : KD	Project : Geotechnical Investigation Monarch Glen
Ground Elevation : Not Surveyed	Reviewed By : DA	Location : Wyatt Road, Undullah
Total Depth : 2.6 m BGL	Date : 18/02/2025	Loc Comment :

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Moisture	Material Description	Consistency/Density	Samples	Testing	Remarks
		0.3	Topsoil		SM	D	Silty SAND: fine to medium grained, medium dense, grey, dry.	MD	D:		
		1.2	Residual		CI	w < PL	Sandy CLAY: medium plasticity, stiff, brown mottled grey, fine to medium grained sand, w < pl.	St	D:		
		2.2	Residual		CL-CI	w < PL	Sandy CLAY: low to medium plasticity, pale brown mottled grey, w < pl.		D:		
			Rock		SST		Silty SAND: fine to coarse grained, very dense, brown, with cobbles (extremely to moderately weathered sandstone).	VD	D:		ripper used at 2m
							BTP8 refusal at 2.6m				

METHOD EX Excavator bucket R Ripper HA Hand auger PT Push tube SON Sonic drilling AH Air hammer PS Percussion sampler AS Short spiral auger AD/V Solid flight auger:V-Bit AD/T Solid flight auger:TC-Bit HFA Hollow flight auger WB Washbore drilling RR Rock roller	PENETRATION VE Very Easy(No Resistance) E Easy F Firm H Hard VH Very Hard(Refusal) WATER  Water Level on Date  Water inflow  Water outflow	FIELD TESTS SPT - Standard Penetration Test PP - Hand/Pocket Penetrometer DCP - Dynamic Cone Penetrometer PSP - Perth Sand Penetrometer MC - Moisture Content PBT - Plate Bearing Test IMP - Borehole Impression Test PID - Photo Ionisation Detector VS - Vane Shear; P=Peak, R=residual (unconnected kPa)	SAMPLES B - Bulk disturbed sample D - Disturbed sample ES - Environmental sample U - Thin wall tube "undisturbed" MOISTURE D - Dry M - Moist W - Wet PL - plastic limit LL - liquid limit W - Moisture content	SOIL CONSISTENCY VS - Very soft S - Soft F - Firm St - Stiff VSt - Very stiff H - Hard RELATIVE DENSITY VL - Very loose L - Loose MD - Medium dense D - Dense VD - Very dense
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Refer to explanatory notes for details of abbreviations and basis of descriptions

UTM : 56J	Drill Rig : Hydrapower scout	Job Number : 24-231
Easting (m) : 492758.20	Driller Supplier : Applied Geotech Drilling	Client : Mirvac C
Northing (m) : 6924593.24	Logged By : KD	Project : Geotechnical Investigation Monarch Glen
Ground Elevation : Not Surveyed	Reviewed By : DA	Location : Wyatt Road, Undullah
Total Depth : 10.23 m BGL	Date : 19/02/2025	Loc Comment :

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Moisture	Material Description	Consistency/Density	Samples	Testing	Remarks
										SPT	
		0.2	Topsoil		SM	D	Silty SAND: fine to medium grained, medium dense, grey, dry.	MD	SPT Sample:		
		1	Residual		CI	w < PL	Sandy CLAY: medium plasticity, very stiff to hard, brown mottled grey, fine to medium grained sand, w < pl.	VSt-H		13,22,21 (N=43)	
		2							SPT Sample:	16,25,30 (N=>50)	
		3	Residual		SC	D	Clayey SAND: fine to medium grained, dense, brown mottled grey, dry, low plasticity clay.	D	SPT Sample:	14,18,24 (N=42)	
		3.9	Rock		SST	D	Silty SAND: fine to coarse grained, very	VD			

METHOD EX Excavator bucket R Ripper HA Hand auger PT Push tube SON Sonic drilling AH Air hammer PS Percussion sampler AS Short spiral auger AD/V Solid flight auger:V-Bit AD/T Solid flight auger:TC-Bit HFA Hollow flight auger WB Washbore drilling RR Rock roller	PENETRATION VE Very Easy(No Resistance) E Easy F Firm H Hard VH Very Hard(Refusal) WATER  Water Level on Date  Water inflow  Water outflow	FIELD TESTS SPT - Standard Penetration Test PP - Hand/Pocket Penetrometer DCP - Dynamic Cone Penetrometer PSP - Perth Sand Penetrometer MC - Moisture Content PBT - Plate Bearing Test IMP - Borehole Impression Test PID - Photo Ionisation Detector VS - Vane Shear; P=Peak, R=residual (unconnected kPa)	SAMPLES B - Bulk disturbed sample D - Disturbed sample ES - Environmental sample U - Thin wall tube "undisturbed" MOISTURE D - Dry M - Moist W - Wet PL - plastic limit LL - liquid limit W - Moisture content	SOIL CONSISTENCY VS - Very soft S - Soft F - Firm St - Stiff VSt - Very stiff H - Hard RELATIVE DENSITY VL - Very loose L - Loose MD - Medium dense D - Dense VD - Very dense
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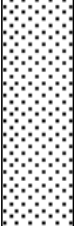
Refer to explanatory notes for details of abbreviations and basis of descriptions

UTM : 56J	Drill Rig : Hydrapower scout	Job Number : 24-231
Easting (m) : 492758.20	Driller Supplier : Applied Geotech Drilling	Client : Mirvac C
Northing (m) : 6924593.24	Logged By : KD	Project : Geotechnical Investigation Monarch Glen
Ground Elevation : Not Surveyed	Reviewed By : DA	Location : Wyatt Road, Undullah
Total Depth : 10.23 m BGL	Date : 19/02/2025	Loc Comment :

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Moisture	Material Description	Consistency/Density	Samples	Testing	Remarks
										SPT	
		5	Rock		SST	D	Silty SAND: fine to coarse grained, very dense, grey mottled brown.	VD			
									SPT Sample:	15,20,25 (N=45)	
									SPT Sample:	12,18,30 (N=48)	
									SPT Sample:	21,27,30/110mm (N=>50)	

METHOD EX Excavator bucket R Ripper HA Hand auger PT Push tube SON Sonic drilling AH Air hammer PS Percussion sampler AS Short spiral auger AD/V Solid flight auger:V-Bit AD/T Solid flight auger:TC-Bit HFA Hollow flight auger WB Washbore drilling RR Rock roller	PENETRATION VE Very Easy(No Resistance) E Easy F Firm H Hard VH Very Hard(Refusal) WATER  Water Level on Date  Water inflow  Water outflow	FIELD TESTS SPT - Standard Penetration Test PP - Hand/Pocket Penetrometer DCP - Dynamic Cone Penetrometer PSP - Perth Sand Penetrometer MC - Moisture Content PBT - Plate Bearing Test IMP - Borehole Impression Test PID - Photo Ionisation Detector VS - Vane Shear; P=Peak, R=residual (unconnected kPa)	SAMPLES B - Bulk disturbed sample D - Disturbed sample ES - Environmental sample U - Thin wall tube "undisturbed" MOISTURE D - Dry M - Moist W - Wet PL - plastic limit LL - liquid limit W - Moisture content	SOIL CONSISTENCY VS - Very soft S - Soft F - Firm St - Stiff VSt - Very stiff H - Hard RELATIVE DENSITY VL - Very loose L - Loose MD - Medium dense D - Dense VD - Very dense
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UTM : 56J	Drill Rig : Hydrapower scout	Job Number : 24-231
Easting (m) : 492758.20	Driller Supplier : Applied Geotech Drilling	Client : Mirvac C
Northing (m) : 6924593.24	Logged By : KD	Project : Geotechnical Investigation Monarch Glen
Ground Elevation : Not Surveyed	Reviewed By : DA	Location : Wyatt Road, Undullah
Total Depth : 10.23 m BGL	Date : 19/02/2025	Loc Comment :

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Moisture	Material Description	Consistency/Density	Samples	Testing	Remarks
										SPT	
		8.8	Rock		SST	D	Silty SAND: fine to coarse grained, very dense, grey mottled brown.	VD			
											Washbore refusal
							Commenced Coring at 8.8m				

METHOD EX Excavator bucket R Ripper HA Hand auger PT Push tube SON Sonic drilling AH Air hammer PS Percussion sampler AS Short spiral auger AD/V Solid flight auger:V-Bit AD/T Solid flight auger:TC-Bit HFA Hollow flight auger WB Washbore drilling RR Rock roller	PENETRATION VE Very Easy(No Resistance) E Easy F Firm H Hard VH Very Hard(Refusal) WATER  Water Level on Date  Water inflow  Water outflow	FIELD TESTS SPT - Standard Penetration Test PP - Hand/Pocket Penetrometer DCP - Dynamic Cone Penetrometer PSP - Perth Sand Penetrometer MC - Moisture Content PBT - Plate Bearing Test IMP - Borehole Impression Test PID - Photo Ionisation Detector VS - Vane Shear; P=Peak, R=residual (unconnected kPa)	SAMPLES B - Bulk disturbed sample D - Disturbed sample ES - Environmental sample U - Thin wall tube "undisturbed" MOISTURE D - Dry M - Moist W - Wet PL - plastic limit LL - liquid limit W - Moisture content	SOIL CONSISTENCY VS - Very soft S - Soft F - Firm St - Stiff VSt - Very stiff H - Hard RELATIVE DENSITY VL - Very loose L - Loose MD - Medium dense D - Dense VD - Very dense
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UTM : 56J	Drill Rig : Hydrapower scout	Job Number : 24-231
Easting (m) : 492758.20	Driller Supplier : Applied Geotech Drilling	Client : Mirvac C
Northing (m) : 6924593.24	Logged By : KD	Project : Geotechnical Investigation Monarch Glen
Ground Elevation : Not Surveyed	Reviewed By : DA	Location : Wyatt Road, Undullah
Total Depth : 10.23 m BGL	Date : 19/02/2025	Loc Comment :

Coring			Water	Elevation (m)	Depth (m)	Graphic Log	Material Description	Weathering	Estimated Strength					Defect Spacing (mm)				Core Run	Defect Description type, inclination, planarity, roughness, coating, thickness
Drilling Method	TCR (%)	RQD (%)							VLS	LS	MS	HS	VHS	EHS	30	100	300		
							Commenced Coring at 8.8m												
NMLC	TCR = 100%	RQD = 100%			9		SANDSTONE: fine to medium grained, grey mottled brown, medium strength.	MW-SW								Run 1	P J, 8°, PL, RO, CL, C J, 2°, PL, RO, STN, C J, 2°, RO, STN, C		
					10		BBH1 Terminated at 10.23m												

METHOD EX Excavator bucket R Ripper HA Hand auger PT Push tube SON Sonic drilling AH Air hammer PS Percussion sampler AS Short spiral auger AD/V Solid flight auger:V-Bit AD/T Solid flight auger:TC-Bit HFA Hollow flight auger WB Washbore drilling RR Rock roller	PENETRATION VE Very Easy(No Resistance) E Easy F Firm H Hard VH Very Hard(Refusal) WATER  Water Level on Date  Water inflow  Water outflow	FIELD TESTS SPT - Standard Penetration Test PP - Hand/Pocket Penetrometer DCP - Dynamic Cone Penetrometer PSP - Perth Sand Penetrometer MC - Moisture Content PBT - Plate Bearing Test IMP - Borehole Impression Test PID - Photo Ionisation Detector VS - Vane Shear; P=Peak, R=residual (unconnected kPa)	SAMPLES B - Bulk disturbed sample D - Disturbed sample ES - Environmental sample U - Thin wall tube "undisturbed" MOISTURE D - Dry M - Moist W - Wet PL - plastic limit LL - liquid limit W - Moisture content	SOIL CONSISTENCY VS - Very soft S - Soft F - Firm St - Stiff VSt - Very stiff H - Hard RELATIVE DENSITY VL - Very loose L - Loose MD - Medium dense D - Dense VD - Very dense
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Refer to explanatory notes for details of abbreviations and basis of descriptions

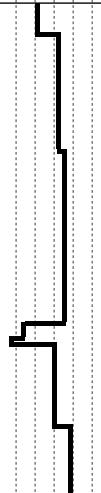
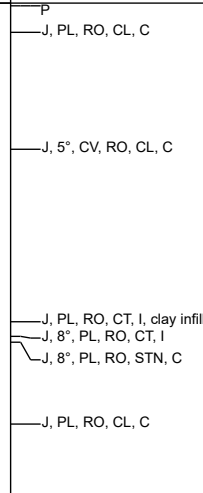


Job Number : 24-231
Client : Mirvac C
Project : Geotechnical Investigation Monarch Glen
Location : Wyatt Road, Undullah
Loc Comment :

		2.0						Commenced Coring at 2.3m				
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Qualtest

UTM : 56J	Drill Rig : Hydrapower scout	Job Number : 24-231
Easting (m) : 493186.67	Driller Supplier : Applied Geotech Drilling	Client : Mirvac C
Northing (m) : 6924857.58	Logged By : KD	Project : Geotechnical Investigation Monarch Glen
Ground Elevation : Not Surveyed	Reviewed By : DA	Location : Wyatt Road, Undullah
Total Depth : 10.3 m BGL	Date : 19/02/2025	Loc Comment :

Coring			Water	Elevation (m)	Depth (m)	Graphic Log	Material Description	Weathering	Estimated Strength					Defect Spacing (mm)				Core Run	Defect Description type, inclination, planarity, roughness, coating, thickness
Drilling Method	TCR (%)	RQD (%)							VLS	LS	MS	HS	VHS	EHS	30	100	300		
					1														
					2														
							Commenced Coring at 2.3m												
NMLC	TCR = 100%	RQD = 98.33%			3		SANDSTONE: fine to medium grained, brown mottled grey, medium to high strength.	MW-SW				Run 1							

METHOD EX Excavator bucket R Ripper HA Hand auger PT Push tube SON Sonic drilling AH Air hammer PS Percussion sampler AS Short spiral auger AD/V Solid flight auger:V-Bit AD/T Solid flight auger:TC-Bit HFA Hollow flight auger WB Washbore drilling RR Rock roller		PENETRATION VE Very Easy(No Resistance) E Easy F Firm H Hard VH Very Hard(Refusal) WATER  Water Level on Date  Water inflow  Water outflow		FIELD TESTS SPT - Standard Penetration Test PP - Hand/Pocket Penetrometer DCP - Dynamic Cone Penetrometer PSP - Perth Sand Penetrometer MC - Moisture Content PBT - Plate Bearing Test IMP - Borehole Impression Test PID - Photo Ionisation Detector VS - Vane Shear; P=Peak, R=residual (unconnected kPa)		SAMPLES B - Bulk disturbed sample D - Disturbed sample ES - Environmental sample U - Thin wall tube "undisturbed" MOISTURE D - Dry M - Moist W - Wet PL - plastic limit LL - liquid limit W - Moisture content		SOIL CONSISTENCY VS - Very soft S - Soft F - Firm St - Stiff VSt - Very stiff H - Hard RELATIVE DENSITY VL - Very loose L - Loose MD - Medium dense D - Dense VD - Very dense	
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Refer to explanatory notes for details of abbreviations and basis of descriptions

UTM : 56J
Easting (m) : 493186.67
Northing (m) : 6924857.58
Ground Elevation : Not Surveyed
Total Depth : 10.3 m BGL

Drill Rig : Hydrapower scout
Driller Supplier : Applied Geotech Drilling
Logged By : KD
Reviewed By : DA
Date : 19/02/2025

Job Number : 24-231
Client : Mirvac C
Project : Geotechnical Investigation Monarch Glen
Location : Wyatt Road, Undullah
Loc Comment :

Coring			Water	Elevation (m)	Depth (m)	Graphic Log	Material Description	Weathering	Estimated Strength					Defect Spacing (mm)	Core Run	Defect Description type, inclination, planarity, roughness, coating, thickness
Drilling Method	TCR (%)	RQD (%)							VLS	LS	MS	HS	VHS			
↑ NMLC ↓	TCR = 100%	RQD = 98.33%			5		SANDSTONE: fine to medium grained, brown mottled grey, medium to high strength.	MW-SW							Run 1	J, 60°, PL, RO, VN, C
	TCR = 100%	RQD = 94.56%			6											
					7		SANDSTONE: fine to medium grained, grey, high strength.	SW-F							Run 2	J, 30°, PL, RO, STN, C J, 10°, PL, RO, STN, J, 5°, PL, RO, STN, C

METHOD	PENETRATION	FIELD TESTS	SAMPLES	SOIL CONSISTENCY
EX Excavator bucket R Ripper HA Hand auger PT Push tube SON Sonic drilling AH Air hammer PS Percussion sampler AS Short spiral auger AD/V Solid flight auger: V-Bit AD/T Solid flight auger: TC-Bit HFA Hollow flight auger WB Washbore drilling RR Rock roller	VE Very Easy (No Resistance) E Easy F Firm H Hard VH Very Hard (Refusal) WATER  Water Level on Date  Water inflow  Water outflow	SPT - Standard Penetration Test PP - Hand/Pocket Penetrometer DCP - Dynamic Cone Penetrometer PSP - Perth Sand Penetrometer MC - Moisture Content PBT - Plate Bearing Test IMP - Borehole Impression Test PID - Photo Ionisation Detector VS - Vane Shear; P=Peak, R=residual (unconnected kPa)	B - Bulk disturbed sample D - Disturbed sample ES - Environmental sample U - Thin wall tube "undisturbed" MOISTURE D - Dry M - Moist W - Wet PL - plastic limit LL - liquid limit W - Moisture content	VS - Very soft S - Soft F - Firm St - Stiff VSt - Very stiff H - Hard RELATIVE DENSITY VL - Very loose L - Loose MD - Medium dense D - Dense VD - Very dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

UTM : 56J	Drill Rig : Hydrapower scout	Job Number : 24-231
Easting (m) : 493186.67	Driller Supplier : Applied Geotech Drilling	Client : Mirvac C
Northing (m) : 6924857.58	Logged By : KD	Project : Geotechnical Investigation Monarch Glen
Ground Elevation : Not Surveyed	Reviewed By : DA	Location : Wyatt Road, Undullah
Total Depth : 10.3 m BGL	Date : 19/02/2025	Loc Comment :

Coring			Water	Elevation (m)	Depth (m)	Graphic Log	Material Description	Weathering	Estimated Strength					Defect Spacing (mm)					Core Run	Defect Description type, inclination, planarity, roughness, coating, thickness
Drilling Method	TCR (%)	RQD (%)							VLS	LS	MS	HS	VHS	EHS	30	100	300	1000		
NMLC	TCR = 100%	RQD = 94.56%																		

METHOD EX Excavator bucket R Ripper HA Hand auger PT Push tube SON Sonic drilling AH Air hammer PS Percussion sampler AS Short spiral auger AD/V Solid flight auger:V-Bit AD/T Solid flight auger:TC-Bit HFA Hollow flight auger WB Washbore drilling RR Rock roller		PENETRATION VE Very Easy(No Resistance) E Easy F Firm H Hard VH Very Hard(Refusal) WATER  Water Level on Date  Water inflow  Water outflow		FIELD TESTS SPT - Standard Penetration Test PP - Hand/Pocket Penetrometer DCP - Dynamic Cone Penetrometer PSP - Perth Sand Penetrometer MC - Moisture Content PBT - Plate Bearing Test IMP - Borehole Impression Test PID - Photo Ionisation Detector VS - Vane Shear; P=Peak, R=residual (unconnected kPa)		SAMPLES B - Bulk disturbed sample D - Disturbed sample ES - Environmental sample U - Thin wall tube "undisturbed" MOISTURE D - Dry M - Moist W - Wet PL - plastic limit LL - liquid limit W - Moisture content		SOIL CONSISTENCY VS - Very soft S - Soft F - Firm St - Stiff VSt - Very stiff H - Hard RELATIVE DENSITY VL - Very loose L - Loose MD - Medium dense D - Dense VD - Very dense	
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Refer to explanatory notes for details of abbreviations and basis of descriptions



APPENDIX B

Laboratory Test Certificates



Qualtest Laboratory
Est. 1987

Material Test Report

Report Number: 24-231-2A
Issue Number: 1
Date Issued: 24/03/2025
Client: CHARLIE RESOLVED
37/14 ARGYLE STREET, ALBION QLD 4010
Contact: ADAM PORTER
Project Number: 24-231
Project Name: GEOTECHNICAL INVESTIGATION - INTERNAL ROHL 1
Project Location: MONARCH GLEN RESIDENTIAL, WYATT ROAD
UNDULLAH
Work Request: 2367
Sample Number: S2367A
Date Sampled: 28/02/2025
Dates Tested: 11/03/2025 - 19/03/2025
Sampling Method: AS 1289.1.2.1 6.5.3 - Power auger drilling
Preparation Method: AS 1289.1.1 - Sampling and Preparation of Soils
Remarks: BASIN TESTING BASIN TESTING
Sample Location: BTP1, Depth: 1.0-1.2M



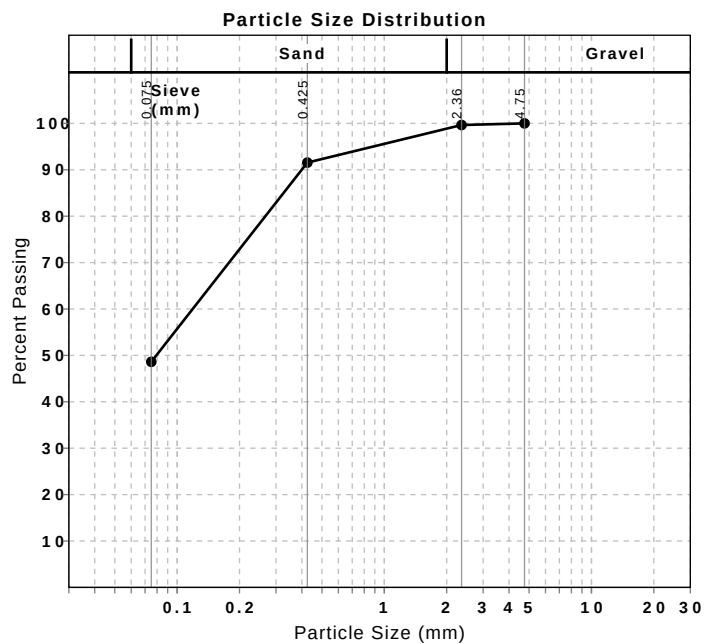
Qualtest Laboratory Pty Ltd
Brisbane Laboratory
2 / 40 Boyland Ave Cooper Plains QLD 4108
Phone: 0417 011 515
Email: rhys@qualtestgeo.com

Accredited for compliance with ISO/IEC 17025 - Testing



Approved Signatory: Rhys Mitchell
Field Technician
NATA Accredited Laboratory Number: 2316

Particle Size Distribution (AS1289 3.6.1)					
Sieve	Passed %	Passing Limits		Retained %	Retained Limits
4.75 mm	100			0	
2.36 mm	100			0	
0.425 mm	92			8	
0.075 mm	49			43	



Material Test Report

Report Number: 24-231-2A
Issue Number: 1
Date Issued: 24/03/2025
Client: CHARLIE RESOLVED
37/14 ARGYLE STREET, ALBION QLD 4010
Contact: ADAM PORTER
Project Number: 24-231
Project Name: GEOTECHNICAL INVESTIGATION - INTERNAL ROHL 1
Project Location: MONARCH GLEN RESIDENTIAL, WYATT ROAD
UNDULLAH
Work Request: 2367
Sample Number: S2367B
Date Sampled: 28/02/2025
Dates Tested: 11/03/2025 - 19/03/2025
Sampling Method: AS 1289.1.2.1 6.5.3 - Power auger drilling
Preparation Method: AS 1289.1.1 - Sampling and Preparation of Soils
Remarks: BASIN TESTING BASIN TESTING
Sample Location: BTP3, Depth: 0.7-0.9M



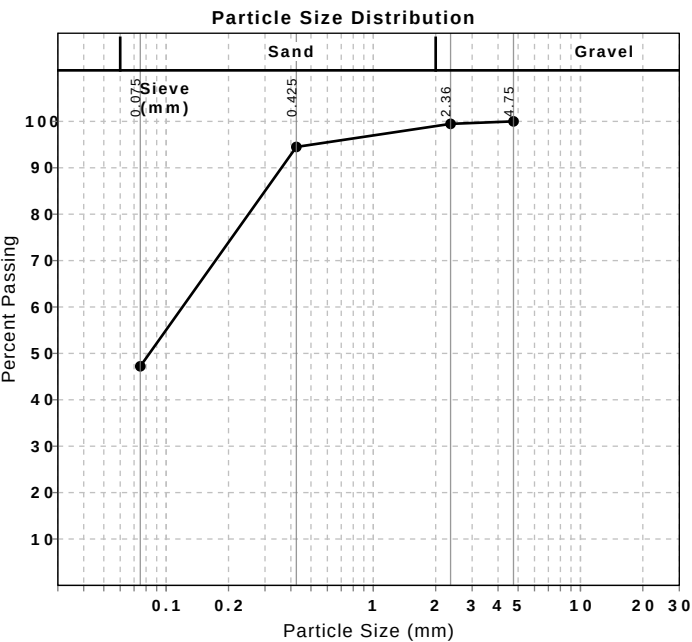
Qualtest Laboratory Pty Ltd
Brisbane Laboratory
2 / 40 Boyland Ave Cooper Plains QLD 4108
Phone: 0417 011 515
Email: rhys@qualtestgeo.com

Accredited for compliance with ISO/IEC 17025 - Testing



Approved Signatory: Rhys Mitchell
Field Technician
NATA Accredited Laboratory Number: 2316

Particle Size Distribution (AS1289 3.6.1)					
Sieve	Passed %	Passing Limits		Retained %	Retained Limits
4.75 mm	100			0	
2.36 mm	99			1	
0.425 mm	94			5	
0.075 mm	47			47	



Material Test Report

Report Number: 24-231-2A
Issue Number: 1
Date Issued: 24/03/2025
Client: CHARLIE RESOLVED
37/14 ARGYLE STREET, ALBION QLD 4010
Contact: ADAM PORTER
Project Number: 24-231
Project Name: GEOTECHNICAL INVESTIGATION - INTERNAL ROHL 1
Project Location: MONARCH GLEN RESIDENTIAL, WYATT ROAD
UNDULLAH
Work Request: 2367
Sample Number: S2367C
Date Sampled: 28/02/2025
Dates Tested: 11/03/2025 - 19/03/2025
Sampling Method: AS 1289.1.2.1 6.5.3 - Power auger drilling
Preparation Method: AS 1289.1.1 - Sampling and Preparation of Soils
Remarks: BASIN TESTING BASIN TESTING
Sample Location: BTP5, Depth: 0.6-0.8M



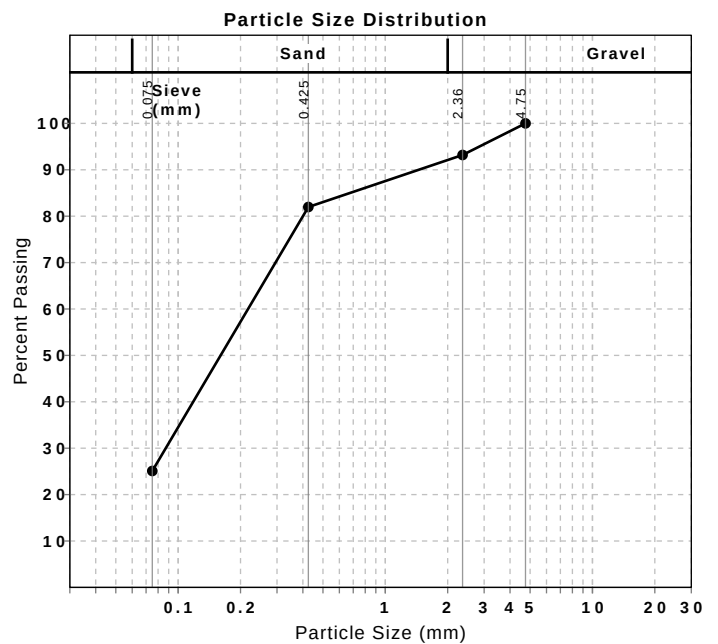
Qualtest Laboratory Pty Ltd
Brisbane Laboratory
2 / 40 Boyland Ave Cooper Plains QLD 4108
Phone: 0417 011 515
Email: rhys@qualtestgeo.com

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Approved Signatory: Rhys Mitchell
Field Technician
NATA Accredited Laboratory Number: 2316

Particle Size Distribution (AS1289 3.6.1)					
Sieve	Passed %	Passing Limits		Retained %	Retained Limits
4.75 mm	100			0	
2.36 mm	93			7	
0.425 mm	82			11	
0.075 mm	25			57	



Material Test Report

Report Number: 24-231-2A
Issue Number: 1
Date Issued: 24/03/2025
Client: CHARLIE RESOLVED
37/14 ARGYLE STREET, ALBION QLD 4010
Contact: ADAM PORTER
Project Number: 24-231
Project Name: GEOTECHNICAL INVESTIGATION - INTERNAL ROHL 1
Project Location: MONARCH GLEN RESIDENTIAL, WYATT ROAD
UNDULLAH
Work Request: 2367
Sample Number: S2367D
Date Sampled: 28/02/2025
Dates Tested: 11/03/2025 - 18/03/2025
Sampling Method: AS 1289.1.2.1 6.5.3 - Power auger drilling
Preparation Method: AS 1289.1.1 - Sampling and Preparation of Soils
Remarks: BASIN TESTING BASIN TESTING
Sample Location: BTP7, Depth: 2.0-2.2M



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Brisbane Laboratory
2 / 40 Boyland Ave Cooper Plains QLD 4108
Phone: 0417 011 515
Email: rhys@qualtestgeo.com

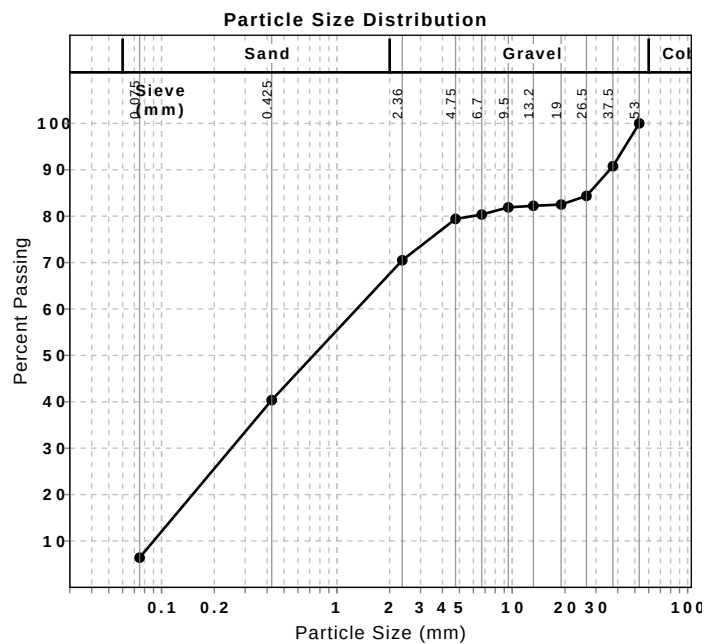
Accredited for compliance with ISO/IEC 17025 - Testing



Approved Signatory: Rhys Mitchell
Field Technician
NATA Accredited Laboratory Number: 2316

Particle Size Distribution (AS1141.11.1)

Sample Washing	Sample was Washed				
	Sieve	Passed %	Passing Limits	Retained %	Retained Limits
	53 mm	100		0	
	37.5 mm	91		9	
	26.5 mm	84		6	
	19 mm	83		2	
	13.2 mm	82		0	
	9.5 mm	82		0	
	6.7 mm	80		2	
	4.75 mm	79		1	
	2.36 mm	70		9	
	0.425 mm	40		30	
	0.075 mm	6		34	



Material Test Report

Report Number: 24-231-2B
Issue Number: 1
Date Issued: 24/03/2025
Client: CHARLIE RESOLVED
37/14 ARGYLE STREET, ALBION QLD 4010
Contact: ADAM PORTER
Project Number: 24-231
Project Name: GEOTECHNICAL INVESTIGATION - INTERNAL ROHL 1
Project Location: MONARCH GLEN RESIDENTIAL, WYATT ROAD
UNDULLAH
Work Request: 2367
Sample Number: S2367A
Date Sampled: 28/02/2025
Dates Tested: 11/03/2025 - 20/03/2025
Sampling Method: AS 1289.1.2.1 6.5.3 - Power auger drilling
Preparation Method: AS 1289.1.1 - Sampling and Preparation of Soils
Remarks: Atterberg Limits testing completed at Brisbane Laboratory
Site No. 2309 BASIN TESTING
Sample Location: BTP1, Depth: 1.0-1.2M

Atterberg Limit (AS1289 3.9.2 & 3.2.1 & 3.3.2)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Retained 0.425 (%)	8		
Liquid Limit (%)	30		
Plastic Limit (%)	11		
Plasticity Index (%)	19		
Weighted Plasticity Index (%)	1739		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.9.2		
Linear Shrinkage (%)	10.5		
Cracking Crumbling Curling	Curling		



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Approved Signatory: Rhys Mitchell
Field Technician

NATA Accredited Laboratory Number: 2316

Material Test Report

Report Number: 24-231-2B
Issue Number: 1
Date Issued: 24/03/2025
Client: CHARLIE RESOLVED
37/14 ARGYLE STREET, ALBION QLD 4010
Contact: ADAM PORTER
Project Number: 24-231
Project Name: GEOTECHNICAL INVESTIGATION - INTERNAL ROHL 1
Project Location: MONARCH GLEN RESIDENTIAL, WYATT ROAD
UNDULLAH
Work Request: 2367
Sample Number: S2367B
Date Sampled: 28/02/2025
Dates Tested: 11/03/2025 - 20/03/2025
Sampling Method: AS 1289.1.2.1 6.5.3 - Power auger drilling
Preparation Method: AS 1289.1.1 - Sampling and Preparation of Soils
Remarks: Atterberg Limits testing completed at Brisbane Laboratory
Site No. 2309 BASIN TESTING
Sample Location: BTP3, Depth: 0.7-0.9M

Atterberg Limit (AS1289 3.9.2 & 3.2.1 & 3.3.2)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Retained 0.425 (%)	5		
Liquid Limit (%)	27		
Plastic Limit (%)	12		
Plasticity Index (%)	15		
Weighted Plasticity Index (%)	1417		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.9.2		
Linear Shrinkage (%)	11.0		
Cracking Crumbling Curling	Curling		



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Material Test Report

Report Number: 24-231-2B
Issue Number: 1
Date Issued: 24/03/2025
Client: CHARLIE RESOLVED
37/14 ARGYLE STREET, ALBION QLD 4010
Contact: ADAM PORTER
Project Number: 24-231
Project Name: GEOTECHNICAL INVESTIGATION - INTERNAL ROHL 1
Project Location: MONARCH GLEN RESIDENTIAL, WYATT ROAD
UNDULLAH
Work Request: 2367
Sample Number: S2367C
Date Sampled: 28/02/2025
Dates Tested: 11/03/2025 - 20/03/2025
Sampling Method: AS 1289.1.2.1 6.5.3 - Power auger drilling
Preparation Method: AS 1289.1.1 - Sampling and Preparation of Soils
Remarks: Atterberg Limits testing completed at Brisbane Laboratory
Site No. 2309 BASIN TESTING
Sample Location: BTP5, Depth: 0.6-0.8M

Atterberg Limit (AS1289 3.9.2 & 3.2.1 & 3.3.2)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Retained 0.425 (%)	11		
Liquid Limit (%)	32		
Plastic Limit (%)	18		
Plasticity Index (%)	14		
Weighted Plasticity Index (%)	1148		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.9.2		
Linear Shrinkage (%)	8.0		
Cracking Crumbling Curling	Curling		



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NATA Accredited Laboratory Number: 2316

Material Test Report

Report Number: 24-231-2B
Issue Number: 1
Date Issued: 24/03/2025
Client: CHARLIE RESOLVED
37/14 ARGYLE STREET, ALBION QLD 4010
Contact: ADAM PORTER
Project Number: 24-231
Project Name: GEOTECHNICAL INVESTIGATION - INTERNAL ROHL 1
Project Location: MONARCH GLEN RESIDENTIAL, WYATT ROAD
UNDULLAH
Work Request: 2367
Sample Number: S2367D
Date Sampled: 28/02/2025
Dates Tested: 11/03/2025 - 20/03/2025
Sampling Method: AS 1289.1.2.1 6.5.3 - Power auger drilling
Preparation Method: AS 1289.1.1 - Sampling and Preparation of Soils
Remarks: Atterberg Limits testing completed at Brisbane Laboratory
Site No. 2309 BASIN TESTING
Sample Location: BTP7, Depth: 2.0-2.2M

Atterberg Limit (AS1289 3.9.2 & 3.2.1 & 3.3.2)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Retained 0.425 (%)			
Liquid Limit (%)	26		
Plastic Limit (%)	22		
Plasticity Index (%)	4		
Weighted Plasticity Index (%)	161		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.9.2		
Linear Shrinkage (%)	4.0		
Cracking Crumbling Curling	None		



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Field Technician

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Material Test Report

Report Number: 24-231-2C
Issue Number: 1
Date Issued: 24/03/2025
Client: CHARLIE RESOLVED
37/14 ARGYLE STREET, ALBION QLD 4010
Contact: ADAM PORTER
Project Number: 24-231
Project Name: GEOTECHNICAL INVESTIGATION - INTERNAL ROHL 1
Project Location: MONARCH GLEN RESIDENTIAL, WYATT ROAD
UNDULLAH
Work Request: 2367
Sample Number: S2367A
Date Sampled: 28/02/2025
Dates Tested: 11/03/2025 - 18/03/2025
Sampling Method: AS 1289.1.2.1 6.5.3 - Power auger drilling
Preparation Method: AS 1289.1.1 - Sampling and Preparation of Soils
Remarks: BASIN TESTING
Sample Location: BTP1, Depth: 1.0-1.2M



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NATA Accredited Laboratory Number: 2316

Emerson Class Number of a Soil (AS 1289 3.8.1)		Min	Max
Emerson Class	2		
Soil Description	Sandy Clay		
Nature of Water	Distilled		
Temperature of Water (°C)	24		

Material Test Report

Report Number: 24-231-2C
Issue Number: 1
Date Issued: 24/03/2025
Client: CHARLIE RESOLVED
37/14 ARGYLE STREET, ALBION QLD 4010
Contact: ADAM PORTER
Project Number: 24-231
Project Name: GEOTECHNICAL INVESTIGATION - INTERNAL ROHL 1
Project Location: MONARCH GLEN RESIDENTIAL, WYATT ROAD
UNDULLAH
Work Request: 2367
Sample Number: S2367B
Date Sampled: 28/02/2025
Dates Tested: 11/03/2025 - 18/03/2025
Sampling Method: AS 1289.1.2.1 6.5.3 - Power auger drilling
Preparation Method: AS 1289.1.1 - Sampling and Preparation of Soils
Remarks: BASIN TESTING
Sample Location: BTP3, Depth: 0.7-0.9M



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Emerson Class Number of a Soil (AS 1289 3.8.1)		Min	Max
Emerson Class	3		
Soil Description	Sandy Clay		
Nature of Water	Distilled		
Temperature of Water (°C)	24		

Material Test Report

Report Number: 24-231-2C
Issue Number: 1
Date Issued: 24/03/2025
Client: CHARLIE RESOLVED
37/14 ARGYLE STREET, ALBION QLD 4010
Contact: ADAM PORTER
Project Number: 24-231
Project Name: GEOTECHNICAL INVESTIGATION - INTERNAL ROHL 1
Project Location: MONARCH GLEN RESIDENTIAL, WYATT ROAD
UNDULLAH
Work Request: 2367
Sample Number: S2367C
Date Sampled: 28/02/2025
Dates Tested: 11/03/2025 - 18/03/2025
Sampling Method: AS 1289.1.2.1 6.5.3 - Power auger drilling
Preparation Method: AS 1289.1.1 - Sampling and Preparation of Soils
Remarks: BASIN TESTING
Sample Location: BTP5, Depth: 0.6-0.8M



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Emerson Class Number of a Soil (AS 1289 3.8.1)		Min	Max
Emerson Class	2		
Soil Description	Sandy Clay		
Nature of Water	Distilled		
Temperature of Water (°C)	24		

Material Test Report

Report Number: 24-231-2C
Issue Number: 1
Date Issued: 24/03/2025
Client: CHARLIE RESOLVED
37/14 ARGYLE STREET, ALBION QLD 4010
Contact: ADAM PORTER
Project Number: 24-231
Project Name: GEOTECHNICAL INVESTIGATION - INTERNAL ROHL 1
Project Location: MONARCH GLEN RESIDENTIAL, WYATT ROAD
UNDULLAH
Work Request: 2367
Sample Number: S2367D
Date Sampled: 28/02/2025
Dates Tested: 11/03/2025 - 18/03/2025
Sampling Method: AS 1289.1.2.1 6.5.3 - Power auger drilling
Preparation Method: AS 1289.1.1 - Sampling and Preparation of Soils
Remarks: BASIN TESTING
Sample Location: BTP7, Depth: 2.0-2.2M



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Emerson Class Number of a Soil (AS 1289 3.8.1)		Min	Max
Emerson Class	1		
Soil Description	Sandy Gravel		
Nature of Water	Distilled		
Temperature of Water (°C)	24		

Material Test Report

Report Number: 24-231-2D
Issue Number: 1
Date Issued: 24/03/2025
Client: CHARLIE RESOLVED
37/14 ARGYLE STREET, ALBION QLD 4010
Contact: ADAM PORTER
Project Number: 24-231
Project Name: GEOTECHNICAL INVESTIGATION - INTERNAL ROHL 1
Project Location: MONARCH GLEN RESIDENTIAL, WYATT ROAD
UNDULLAH
Work Request: 2367
Sample Number: S2367A
Date Sampled: 28/02/2025
Dates Tested: 11/03/2025 - 17/03/2025
Sampling Method: AS 1289.1.2.1 6.5.3 - Power auger drilling
Preparation Method: AS 1289.1.1 - Sampling and Preparation of Soils
Remarks: BASIN TESTING
Sample Location: BTP1, Depth: 1.0-1.2M



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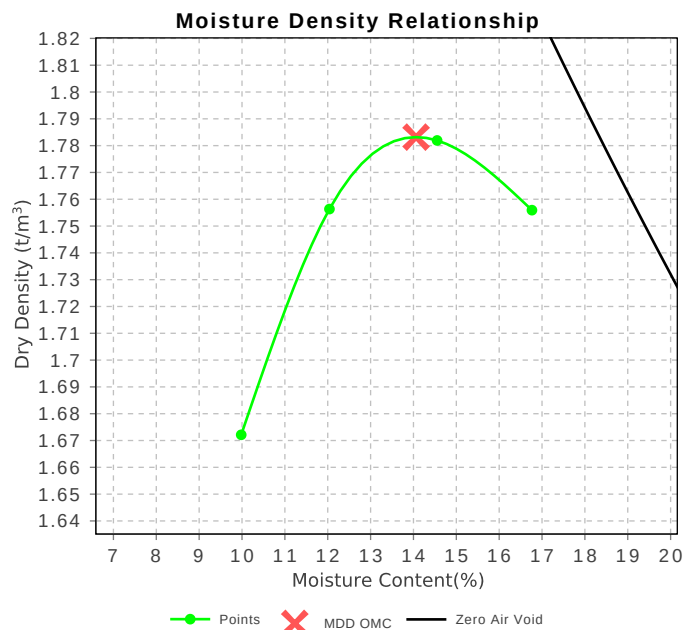
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Field Technician

NATA Accredited Laboratory Number: 2316

Dry Density - Moisture Relationship (AS 1289 5.1.1 & 2.1.1)		Min	Max
Mould Type	1 LITRE MOULD A		
Compaction	Standard		
Maximum Dry Density (t/m ³)	1.78		
Optimum Moisture Content (%)	14.0		
Oversize Sieve (mm)	19.0		
Oversize Material Wet (%)	0		
Method used to Determine Plasticity	Visual		
Curing Hours (h)	74.0		
Moisture Content (AS 1289 2.1.1)			
Moisture Content (%)		12.6	



Material Test Report

Report Number: 24-231-2D
Issue Number: 1
Date Issued: 24/03/2025
Client: CHARLIE RESOLVED
37/14 ARGYLE STREET, ALBION QLD 4010
Contact: ADAM PORTER
Project Number: 24-231
Project Name: GEOTECHNICAL INVESTIGATION - INTERNAL ROHL 1
Project Location: MONARCH GLEN RESIDENTIAL, WYATT ROAD
UNDULLAH
Work Request: 2367
Sample Number: S2367B
Date Sampled: 28/02/2025
Dates Tested: 11/03/2025 - 20/03/2025
Sampling Method: AS 1289.1.2.1 6.5.3 - Power auger drilling
Preparation Method: AS 1289.1.1 - Sampling and Preparation of Soils
Remarks: BASIN TESTING
Sample Location: BTP3, Depth: 0.7-0.9M



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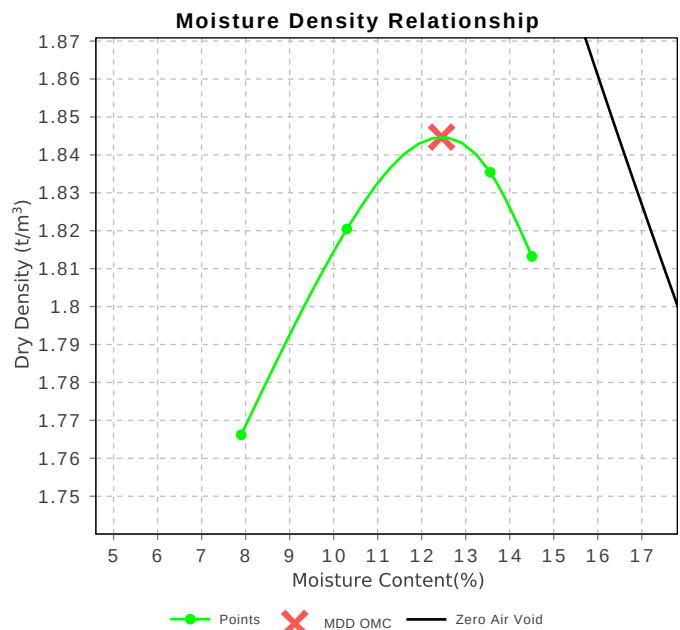
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Approved Signatory: Rhys Mitchell
Field Technician

NATA Accredited Laboratory Number: 2316

Dry Density - Moisture Relationship (AS 1289 5.1.1 & 2.1.1)		Min	Max
Mould Type	1 LITRE MOULD A		
Compaction	Standard		
Maximum Dry Density (t/m ³)	1.84		
Optimum Moisture Content (%)	12.5		
Oversize Sieve (mm)	19.0		
Oversize Material Wet (%)	0		
Method used to Determine Plasticity	Visual		
Curing Hours (h)	52.0		
Moisture Content (AS 1289 2.1.1)			
Moisture Content (%)			9.3



Material Test Report

Report Number: 24-231-2D
Issue Number: 1
Date Issued: 24/03/2025
Client: CHARLIE RESOLVED
37/14 ARGYLE STREET, ALBION QLD 4010
Contact: ADAM PORTER
Project Number: 24-231
Project Name: GEOTECHNICAL INVESTIGATION - INTERNAL ROHL 1
Project Location: MONARCH GLEN RESIDENTIAL, WYATT ROAD
UNDULLAH
Work Request: 2367
Sample Number: S2367C
Date Sampled: 28/02/2025
Dates Tested: 11/03/2025 - 20/03/2025
Sampling Method: AS 1289.1.2.1 6.5.3 - Power auger drilling
Preparation Method: AS 1289.1.1 - Sampling and Preparation of Soils
Remarks: BASIN TESTING
Sample Location: BTP5, Depth: 0.6-0.8M



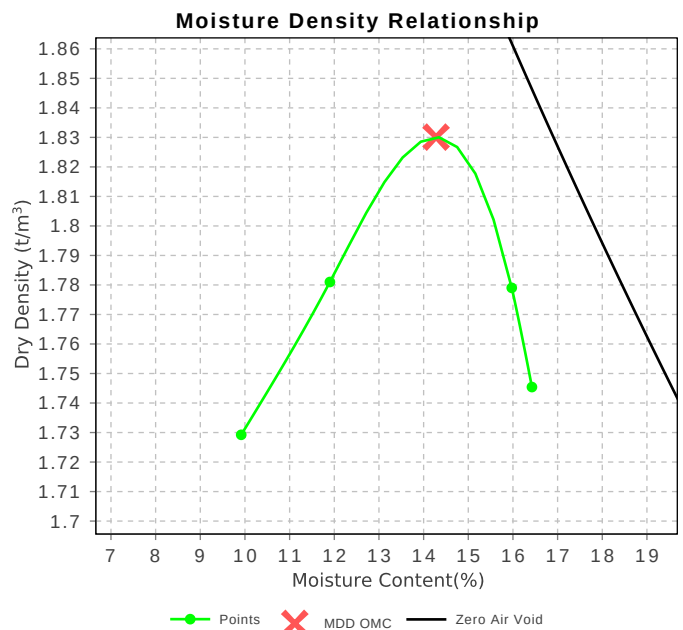
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Approved Signatory: Rhys Mitchell
Field Technician
NATA Accredited Laboratory Number: 2316

Dry Density - Moisture Relationship (AS 1289 5.1.1 & 2.1.1)		Min	Max
Mould Type	1 LITRE MOULD A		
Compaction	Standard		
Maximum Dry Density (t/m ³)	1.83		
Optimum Moisture Content (%)	14.5		
Oversize Sieve (mm)	19.0		
Oversize Material Wet (%)	0		
Method used to Determine Plasticity	Visual		
Curing Hours (h)	52.3		
Moisture Content (AS 1289 2.1.1)			
Moisture Content (%)			9.9



Material Test Report

Report Number: 24-231-2D
Issue Number: 1
Date Issued: 24/03/2025
Client: CHARLIE RESOLVED
37/14 ARGYLE STREET, ALBION QLD 4010
Contact: ADAM PORTER
Project Number: 24-231
Project Name: GEOTECHNICAL INVESTIGATION - INTERNAL ROHL 1
Project Location: MONARCH GLEN RESIDENTIAL, WYATT ROAD
UNDULLAH
Work Request: 2367
Sample Number: S2367D
Date Sampled: 28/02/2025
Dates Tested: 11/03/2025 - 20/03/2025
Sampling Method: AS 1289.1.2.1 6.5.3 - Power auger drilling
Preparation Method: AS 1289.1.1 - Sampling and Preparation of Soils
Remarks: BASIN TESTING
Sample Location: BTP7, Depth: 2.0-2.2M



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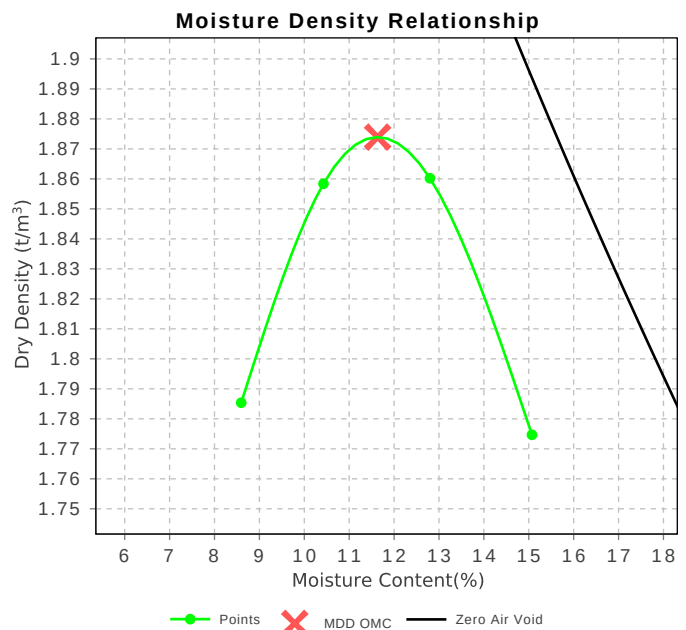
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Field Technician

NATA Accredited Laboratory Number: 2316

Dry Density - Moisture Relationship (AS 1289 5.1.1 & 2.1.1)		Min	Max
Mould Type	1 LITRE MOULD A		
Compaction	Standard		
Maximum Dry Density (t/m ³)	1.87		
Optimum Moisture Content (%)	11.5		
Oversize Sieve (mm)	19.0		
Oversize Material Wet (%)	9		
Method used to Determine Plasticity	Visual		
Curing Hours (h)	26.0		
Moisture Content (AS 1289 2.1.1)			
Moisture Content (%)		6.8	



Material Test Report

Report Number: 24-231-2E
Issue Number: 1
Date Issued: 24/03/2025
Client: CHARLIE RESOLVED
37/14 ARGYLE STREET, ALBION QLD 4010
Contact: ADAM PORTER
Project Number: 24-231
Project Name: GEOTECHNICAL INVESTIGATION - INTERNAL ROHL 1
Project Location: MONARCH GLEN RESIDENTIAL, WYATT ROAD
UNDULLAH
Work Request: 2367
Date Sampled: 28/02/2025
Dates Tested: 11/03/2025 - 17/03/2025
Sampling Method: AS 1289.1.2.1 6.5.3 - Power auger drilling
Preparation Method: AS 1289.1.1 - Sampling and Preparation of Soils
Location: 1 Wyatt Road Undullah



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Approved Signatory: Rhys Mitchell
Field Technician

NATA Accredited Laboratory Number: 2316

Moisture Content AS 1289 2.1.1					
Sample Number	Sample Location	Moisture Content (%)	Min	Max	Material
S2367A	BTP1, Depth: 1.0-1.2M	12.7 %	**	**	**
S2367B	BTP3, Depth: 0.7-0.9M	8.3 %	**	**	**
S2367C	BTP5, Depth: 0.6-0.8M	10.0 %	**	**	**
S2367D	BTP7, Depth: 2.0-2.2M	6.1 %	**	**	**

Material Test Report

Report Number: 24-231-4
Issue Number: 2 - This version supersedes all previous issues
Reissue Reason:
Date Issued: 24/03/2025
Client: CHARLIE RESOLVED
37/14 ARGYLE STREET, ALBION QLD 4010
Contact: ADAM PORTER
Project Number: 24-231
Project Name: GEOTECHNICAL INVESTIGATION - INTERNAL ROHL 1
Project Location: MONARCH GLEN RESIDENTIAL, WYATT ROAD
UNDULLAH
Work Request: 2368
Sample Number: S2368B
Date Sampled: 28/02/2025
Dates Tested: 11/03/2025 - 18/03/2025
Sampling Method: AS 1289.1.2.1 6.5.3 - Power auger drilling
Preparation Method: AS 1289.1.1 - Sampling and Preparation of Soils
Remarks: GEOTECHNICAL TESTING GEOTECHNICAL TESTING
Sample Location: BTP2, Depth: 1.4-1.5M



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Approved Signatory: David Taylor
Soil Technician
NATA Accredited Laboratory Number: 2316

Falling Head Permeability (AS 1289 6.7.2 & 2.1.1)		Min	Max
Coefficient of Permeability (m/sec)	5×10^{-12}		
Method of Compactive Effort	Standard		
Method used to Determine MDD	AS 1289 5.1.1 & 2.1.1		
Maximum Dry Density (t/m^3)	1.83		
Optimum Moisture Content (%)	13.5		
Field Moisture Content (%)	11.4		
Sieve for Oversize (mm)	19		
Oversize Material (%)	0		
Laboratory Density Ratio (%)	104.0		
Laboratory Moisture Ratio (%)	100.0		
Surcharges and Pressure Applied	2.87		

Material Test Report

Report Number: 24-231-4
Issue Number: 2 - This version supersedes all previous issues
Reissue Reason:
Date Issued: 24/03/2025
Client: CHARLIE RESOLVED
37/14 ARGYLE STREET, ALBION QLD 4010
Contact: ADAM PORTER
Project Number: 24-231
Project Name: GEOTECHNICAL INVESTIGATION - INTERNAL ROHL 1
Project Location: MONARCH GLEN RESIDENTIAL, WYATT ROAD
UNDULLAH
Work Request: 2368
Sample Number: S2368D
Date Sampled: 28/02/2025
Dates Tested: 11/03/2025 - 18/03/2025
Sampling Method: AS 1289.1.2.1 6.5.3 - Power auger drilling
Preparation Method: AS 1289.1.1 - Sampling and Preparation of Soils
Remarks: GEOTECHNICAL TESTING GEOTECHNICAL TESTING
Sample Location: BTP4, Depth: 2.4-2.6M



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Approved Signatory: David Taylor
Soil Technician
NATA Accredited Laboratory Number: 2316

Falling Head Permeability (AS 1289 6.7.2 & 2.1.1)		Min	Max
Coefficient of Permeability (m/sec)	5×10^{-11}		
Method of Compactive Effort	Standard		
Method used to Determine MDD	AS 1289 5.1.1 & 2.1.1		
Maximum Dry Density (t/m^3)	1.86		
Optimum Moisture Content (%)	10.5		
Field Moisture Content (%)	6.8		
Sieve for Oversize (mm)	19		
Oversize Material (%)	0		
Laboratory Density Ratio (%)	102.5		
Laboratory Moisture Ratio (%)	100.9		
Surcharges and Pressure Applied	2.87		

Material Test Report

Report Number: 24-231-4
Issue Number: 2 - This version supersedes all previous issues
Reissue Reason:
Date Issued: 24/03/2025
Client: CHARLIE RESOLVED
37/14 ARGYLE STREET, ALBION QLD 4010
Contact: ADAM PORTER
Project Number: 24-231
Project Name: GEOTECHNICAL INVESTIGATION - INTERNAL ROHL 1
Project Location: MONARCH GLEN RESIDENTIAL, WYATT ROAD
UNDULLAH
Work Request: 2368
Sample Number: S2368F
Date Sampled: 28/02/2025
Dates Tested: 11/03/2025 - 18/03/2025
Sampling Method: AS 1289.1.2.1 6.5.3 - Power auger drilling
Preparation Method: AS 1289.1.1 - Sampling and Preparation of Soils
Remarks: GEOTECHNICAL TESTING GEOTECHNICAL TESTING
Sample Location: BTP6, Depth: 0.6-0.9M



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Soil Technician
NATA Accredited Laboratory Number: 2316

Falling Head Permeability (AS 1289 6.7.2 & 2.1.1)		Min	Max
Coefficient of Permeability (m/sec)	1×10^{-10}		
Method of Compactive Effort	Standard		
Method used to Determine MDD	AS 1289 5.1.1 & 2.1.1		
Maximum Dry Density (t/m^3)	1.83		
Optimum Moisture Content (%)	13.0		
Field Moisture Content (%)	10.7		
Sieve for Oversize (mm)	19		
Oversize Material (%)	0		
Laboratory Density Ratio (%)	98.7		
Laboratory Moisture Ratio (%)	100.4		
Surcharges and Pressure Applied	2.87		