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Geotechnical Investigation
Providence West Residential Subdivision
Development - ROL2 and ROL3 Priority Areas
via Ripley Road, Ripley Valley

Prepared for
Stockland Development Pty Ltd
Project No. BG25-1039A
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geotechnical • geo-environmental • groundwater

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Drawing No. 1.03 Test Locations – ROL2 and ROL3

Appendix A Bore Report Sheets with Explanatory Notes (Current Investigation)
Appendix B Bore Report Sheets (Previous Investigation)
Appendix C Laboratory Test Report Sheets
Appendix D Seismic Refraction Tomography

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SECTION 1 - INTRODUCTION

1.1 Introduction

It is understood that Stockland Development Pty Ltd (Stockland) is proposing to develop the Providence West Residential Subdivision site located off Ripley Road in Ripley Valley. The proposed subdivision is to be constructed using cut to fill earthworks and will include over two thousand new residential lots, covering an area of approximately 250 hectares. The current investigation report has been prepared for priority areas ROL2 and ROL3 only. The location and extent of the overall subdivision development (red) and ROL2 and ROL3 Priority Areas (blue) are indicated in Figure 1.

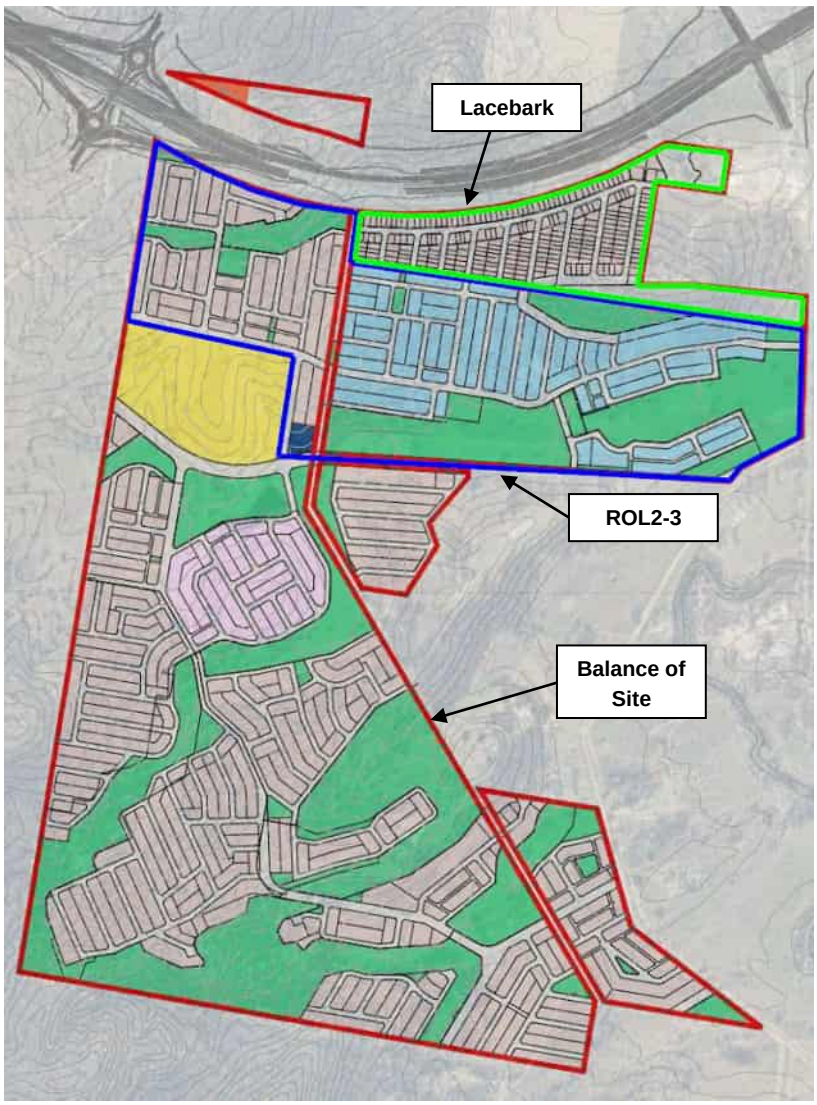


Figure 1: Development site location and extent of ROL2 and ROL 3 Priority Areas

At the time of the investigation bulk earthworks were being undertaken at the adjacent Lacebark development site (located immediately to the north-east of the proposed Providence West subdivision (annotated in green in Figure 1) including cut depths ranging between 2m and 5m in general, but up to 10.5m in some locations. At Lacebark, the depth to top of rock is understood to vary between 0.4m and 2.7m depth based on previous investigations, with 'strong rock' with limited fracturing encountered during cut earthworks operations resulting in significant excavation difficulties with associated additional construction costs.

1.2 Proposed Scope of Work

For the scope of the proposed works and anticipated ground conditions, it was proposed to undertake geotechnical investigation of the ROL2 and ROL3 Priority areas by:

- reviewing preliminary earthworks design drawings;
- drilling and sampling five bores to between 10m and 12m depth (including rock core drilling, if required) at accessible locations in the more elevated parts of the site;
- excavating and sampling twelve test pits in selected locations across the site;
- carrying out downhole seismic testing in open bores at three selected locations to between 10m to 12m depth;
- undertaking geophysical survey at selected locations to supplement bore and test pit data and assist with the assessment of rock excavatability across proposed cut areas;
- preparing a geotechnical report providing geotechnical design comments and input to high level costings based on available data; and
- preparation of a dispersive soils management plan (DSMP).

The DSMP has been prepared for the overall development site and is presented separately.

1.3 Commission

Based on the proposed nature of development, the anticipated subsurface conditions and the scope of the investigation work proposed, a fee to undertake the geotechnical investigation was presented in a proposal dated 31 March 2025. Butler Partners Pty Ltd (Butler Partners) was subsequently commissioned by Stockland Development Pty Ltd to conduct the geotechnical investigation as proposed. This report was first issued in draft for comments on 3 October 2025.

SECTION 2 - THE SITE

2.1 Background

Butler Partners has previously undertaken preliminary geotechnical investigation at the Lacebark development site (located immediately to the north-east of the Providence West ROL2 and ROL3 site). This investigation included the drilling and sampling five bores (Bores G1 to G5) to between 9m and 10m depth approximately and the results are given in the following report:

Preliminary Geotechnical Investigation
Providence Residential Subdivision Development
787 Ripley Road, Ripley Valley
Project No: 020-190F Dated: 17 December 2021

Butler Partners has also carried out additional geotechnical investigation at the Lacebark site (as part of the current excavatability assessment) and the results are contained in this report. The additional investigation comprised the drilling and sampling of two bores (Bores 1 and 2) to between 8m and 10m depth, at selected locations nominated by Shadforth's Civil (Shadforth) were 'strong rock' has been encountered in the area during cut earthworks operations. Downhole seismic testing was carried out in these bores.

Relevant Bore Report sheets from the previous geotechnical investigations are included in Appendix B and relevant factual laboratory test data and in-situ testing from the reports are included herein.

2.2 Site Description

The ROL2 and ROL3 Priority Areas site in bounded to the north by the Centennial Highway and the Lacebark site, Ripley Road and Watsons Road to the east, the "Balance of Site" portion of the Providence West to the south, and continuing acreage land to the west.

At the time of the investigation, the site was largely undeveloped and was occupied by livestock. The site was generally densely vegetated with medium to tall trees located in the elevated sections and grasses and shrubs covering the low-lying areas to the south and southeast. The ground surface level across the site generally slopes non-uniformly downwards in all directions from a ridgeline located near the northern boundary of the site. Ground surface levels vary from a high of approximately RL90m (along the ridgeline), to a low of approximately RL55m (along the southeastern boundary of the site). Three panoramic views of the site taken at the time of the fieldwork are given in Photograph 1 to Photograph 3.



Photograph 1: Panoramic view of the site looking north towards site from near south-eastern boundary



Photograph 2: Panoramic view of the site looking south from Bore 4



Photograph 3: Panoramic view of the site looking south from Bore 6

2.3 Geology

Reference to the Geological Survey of Queensland's 1:100 000 geological series Ipswich sheet indicates that the site is located in an area mapped as Early Jurassic deposits (comprising lithic or feldspathic, labile to sublabile sandstone, siltsone, shale and coal) bordering Quaternary Beds (comprising sand, silt, gravel and clay).

SECTION 3 - FIELDWORK

3.1 Drilling and Sampling Methods

The current investigation included the drilling and sampling of seven bores (Bores 1 to 7), with truck mounted Jacro 350 and Hydrapower Scout drillings rigs. Bores 1 and 2 were drilled in 'hard rock' excavation areas of the Lacebark site for excavatability comparison. The bores were drilled using a combination of solid flight augers, washbore drilling and NMLC coring techniques to a maximum depth of 12.1m. Strata identification was based on the inspection of cuttings recovered on the augers and in the circulation fluid during washbore drilling, supplemented with inspection of 'disturbed' Standard Penetration Test (SPT) samples and the inspection of rock core samples.

On completion of drilling, all bores were backfilled with spoil and the surface reinstated and/or plugged.

3.2 Test Pits

The investigation also included the excavation of twelve test pits (Test Pits 1 to 6, 13, 14, 20 and 24 to 26) with a track mounted Kobelco SK135 excavator, to depths varying between approximately 0.8m and 3.6m, using a combination of 1800mm wide mud bucket and 600mm wide toothed bucket, supplemented by the use of a single tyne ripper as required. Strata identification was from the inspection of spoil recovered in the bucket, together with the inspection (at shallow depth) of the test pit walls. Hand 'pocket' penetrometer readings were taken, where possible, in cohesive strata to assist with soil strength classification.

Following completion, the test pits were backfilled and track-rolled to surface compact the backfill.

3.3 Dynamic Cone Penetrometer Testing

A dynamic cone penetrometer (DCP) test was undertaken adjacent to each test pit location (to depths between 0.1m and 2.0m), to assist with the assessment of soil strength.

3.4 Downhole Seismic Testing

The down-hole method was adopted to measure the distribution (with depth) of shear wave velocity in the ground in Bores 2, 4, 5 and 6. Shear wave velocity measurement was also attempted in Bores 1 (within the Lacebark site) but, due to significant background noise produced by earthwork and air drilling operations taking place at the time of testing, the data set recorded at this location is considered unreliable and has not been included in the report. Testing in the bores was typically undertaken at 1m depth intervals to bore termination depth. Due to significant background noise produced by earthworks and air drilling operations taking place on the nearby Lacebark site to the north at the time of testing, the data set recorded below 7m depth in Bore 6 is also considered unreliable and has not been included in the report.

The system is primarily composed of a triaxial down-hole geophone, a data logger and a shear wave source on the ground surface. The shear wave was set up by impacting a wooden plank placed near the bore and 'clamped' to the ground with a heavy vertical load to keep it in place when being impacted by a hammer. The shear wave thus generated propagates towards the down-hole geophone, which is temporarily fixed to the bore side wall. The particle velocity of the ground medium surrounding the geophone is picked up by the geophone and recorded by the data logger. In order to determine the time interval from the hammer impact to the first arrival of the shear wave at the geophone, an additional sensor was attached to the wooden plank to pick up the wave motion in the plank, which was then used to trigger the data logger. The basic configuration of the test method is shown in Figure 2. A tabulation of shear wave velocity with geophone depth at each bore location is given in Table 1 and the measured waveforms are plotted in Figure 4 to Figure 6.

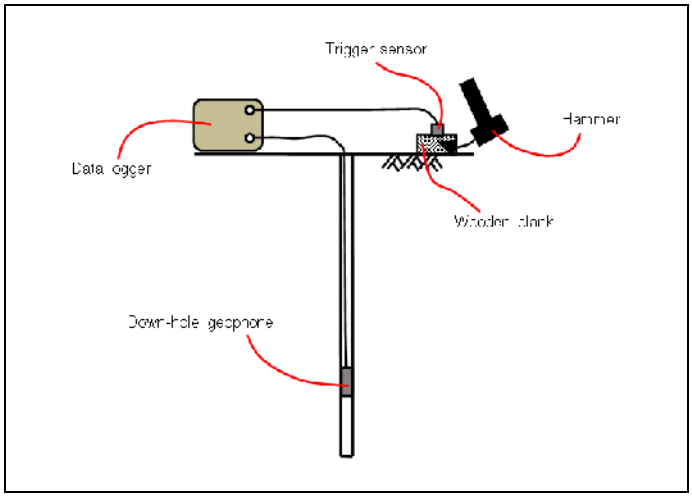


Figure 2: Illustration of Shear Wave Velocity Measuring Method

Table 1: Measured Shear Wave Velocity

Test Location	Depth (m)	Shear Wave Velocity (v_s) (m/sec)
Bore 2 (from RL83.6m) [Lacebark]	1.0	546
	2.0	758
	3.0	924
	4.0	2055
	5.0	1394
	6.0	1612
	7.0	1693
	8.0	639
	9.0	1140
	10.0	1482
Bore 4 (from RL91.7m)	1.0	225
	2.0	3606
	3.0	1803
	4.0	3606
	5.0	1442
	6.0	1030
	7.0	3606
	8.0	2404
	9.0	1202
	10.0	515
	11.0	288
Bore 5 (from RL79.3m)	1.0	476
	2.0	2404
	3.0	656
	4.0	2404
	5.0	1442
	6.0	1803
	7.0	801
	8.0	2404
	9.0	1202
	10.0	476
Bore 6 (from RL89.6m)	1.0	206
	2.0	2404
	3.0	1442
	4.0	2404
	5.0	2404
	6.0	2404

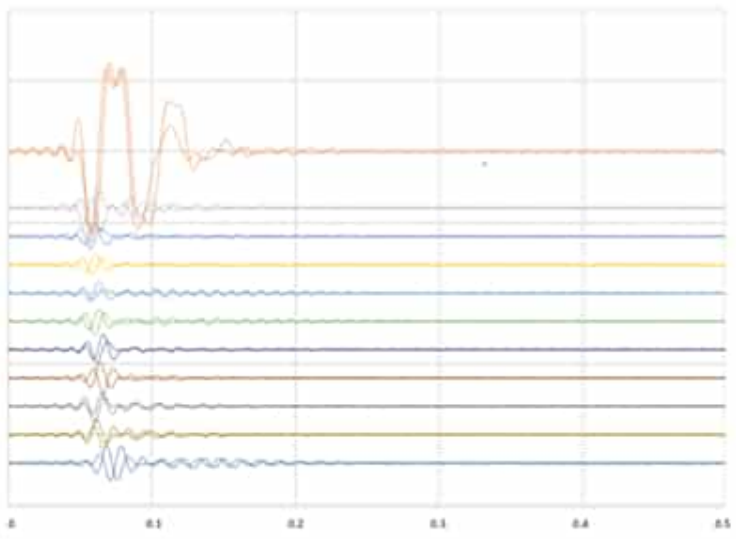


Figure 3: Measured Waveforms from Bore 2

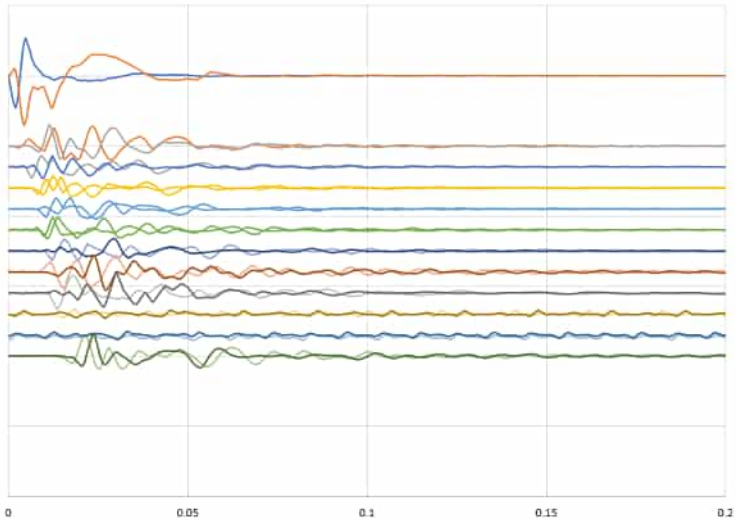


Figure 4: Measured Waveforms from Bore 4

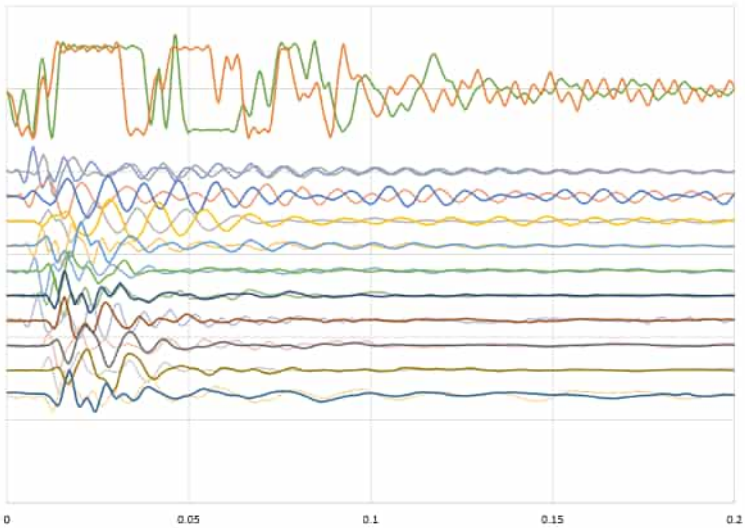


Figure 5: Measured Waveforms from Bore 5

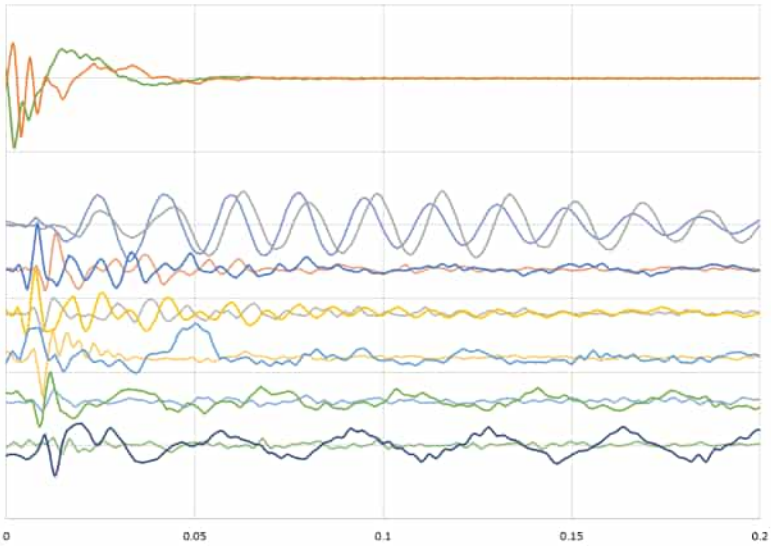


Figure 6: Measured Waveforms from Bore 6

3.5 Seismic Refraction

The seismic refraction method provides an assessment of the rock level and the associated seismic velocities and enables an assessment of the weathering and/or strength of the underlying rock. The seismic refraction method is based on the critical refraction of seismic waves at interfaces across which the seismic velocity increases. It is the standard method for shallow rock mapping and excavatability assessment and has the advantage that seismic velocity information is also obtained in addition to the location of the interfaces.

Seismic refraction data was acquired with a Dolang DBS280 24-channel digital enhancement seismograph. Acquisition parameters for the seismograph were set at a sampling frequency of 7812hertz with a record length of 131 milliseconds to capture the P-wave arrival. Seismic data was backed up daily and stored on digital medium for post processing.

A sensor interval of 3m was used with 4.5Hz geophones rigidly coupled to the ground with 75mm tapered spikes on the geophone base that were pressed firmly into the soil. A 3m to 4m shot point spacing was used with seismic energy provided over land by striking a sledgehammer on an aluminium plate successively until a clear first break arrival was observable on the seismic record. A summary of the surveyed seismic lines is given in Table 1 and presented graphically in Drawing No.1.01.

Table 2: Summary of Seismic Refraction Lines

Line ID	Nearest Bore	Start of Line (Easting/Northing/Elevation)	End of Line (Easting/Northing/Elevation)
L1	Bore 4	479156.56 / 6936569.51 (RL89.4m)	479145.30 / 6936483.65 (RL89.7m)
L2		479145.11 / 6936483.60 (RL89.6m)	479134.50 / 6936396.55 (RL80.4m)
L3	Bore 5	479506.32 / 6936579.88 (RL80.6m)	479589.73 / 6936547.78 (RL75.4m)
L4		479589.73 / 6936547.78 (RL75.4m)	479672.34 / 6936519.68 (RL66.6m)
L5	Bore 6	479826.48 / 6936657.14 (RL82.5m)	479811.24 / 6936744.15 (RL89.8m)
L6		479840.47 / 6936570.19 (RL71.5m)	479826.49 / 6936657.20 (RL82.5m)

3.6 Test Locations and Supervision

The test locations were set out in the field using a handheld GPS and are shown approximately on Drawing No. 1.01 attached. The ground surface level at each test location was determined in the field using a GNSS positioning device.

An experienced geotechnical engineer set out the bore locations, logged the stratigraphy encountered in the bores, directed the in-situ sampling and testing program and supervised the fieldwork.

SECTION 4 - INVESTIGATION RESULTS

4.1 Subsurface Conditions

The subsurface conditions encountered in the bores and test pits are given on Bore and Test Pit Report Sheets included in Appendix A, using classification and descriptive terms defined in the accompanying notes (which are based on Australian Standard AS1726 – 1993). It should be noted that the rock types indicated on the bore and test pit report sheets are based on visual assessment only; no petrographic analysis has been undertaken for confirmation.

For a description of the stratigraphy encountered in the bores and test pits, the bore and test pit report sheets should be consulted. However, in very broad summary, the subsurface conditions at the test locations generally comprised a discontinuous layer of silty sand from ground surface in the majority of the test locations that varied from very loose to very dense, in general, the layer was up t0 0.3m thick but extended to greater depth in some locations. In some of the bores and test pits, the silt sand was underlain by firm to hard silty/sandy clays and very loose to very dense clayey sands. The soils were underlain by weathered sandstone that varied in strength from extremely low to high strength. Some limited thickness layers of conglomerate were encountered (Bore 2 and Bore 5).

'Strength inversions' (i.e., weaker material underlying stronger material) were encountered in some of the bore locations. For example, very low strength sandstone was encountered underlying medium to high strength sandstone at 8.3m depth in Bore 2 and medium strength sandstone was encountered below 10.5m depth in Bore 3 underlying medium to high strength sandstone.

4.2 Groundwater

Free groundwater was not encountered during the auger drilling of the bores and could not be observed once washbore drilling was commenced. Free groundwater was also not observed in any of the test pits during excavation. It should be noted that the groundwater levels can vary seasonally and with the prevailing weather. If construction is to be undertaken at a significant time following this investigation and/or following significant 'wet' weather, it would be prudent to confirm groundwater levels prior to construction.

4.3 Laboratory Testing - Point Load Strength

Selected rock core samples recovered from the bores were tested for measurement of rock strength, using Point Load Strength Index [Is(50)] test methods and the results indicate that the rock samples tested vary from very low strength to high strength. The results are tabulated with depth on the attached Point Load Strength Index Test Reports and are summarised on the Bore Report sheets.

4.4 Shear Wave Velocity

The interpretation of shear wave velocity measurement in the downhole seismic tests was based on the assumption of a layered ground profile in which the shear wave velocity is assumed to be a constant within each layer. The shear wave velocity is determined from the top layer gradually downwards. The shear wave path does not usually take a straight line from the source to the down-hole geophone, instead it changes direction at the interface between two layers. Therefore, the actual path of the shear wave first recorded by the down-hole geophone must be determined according to the shear wave velocity of each layer above the position of the geophone.

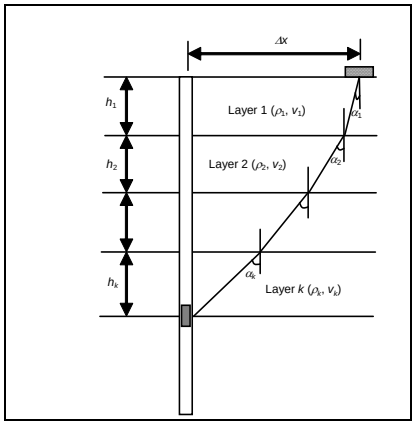


Figure 7: Definition of Parameters for Determining Shear Wave Velocity

To determine the shear wave velocity of *k*th layer (refer Figure 7), assuming that the shear wave velocity of layers 1 (top layer) to *k*-1 are known, Equation 2 can be used to define the wave path:

$$\Delta x = h_1 \tan\alpha_1 + h_2 \tan\alpha_2 + \ldots + h_k \tan\alpha_k \qquad (2)$$

where Δx is the distance from the wave source to the down-hole geophone and h_1, h_2, …, and h_k are the thickness of sub-layers. All angles are inter-related as follows:

$$\frac{\sin\alpha_1}{v_1} = \frac{\sin\alpha_2}{v_2} = \ldots = \frac{\sin\alpha_k}{v_k} \qquad (3)$$

where v_1, v_2, …, v_k are the shear wave velocity of sub-layers. Note that the value of velocity v_k has to be assumed while the shear wave velocity of all the sub-layers above it are already known. Adjusting the angle α_1 until Equation 2 is satisfied and thus determined wave path is compatible with the assumed shear wave velocity v_k.

A new shear wave velocity can then be determined as:

$$v_k = \frac{h_k}{\left[\Delta t - \left(\frac{h_1}{v_1\cos\alpha_1} + \frac{h_2}{v_2\cos\alpha_2} + \ldots + \frac{h_{k-1}}{v_{k-1}\cos\alpha_{k-1}}\right)\right]\cos\alpha_k} \qquad (4)$$

where Δt is the measured time interval for the shear wave to propagate from the source to the measuring position. Generally, the value of v_k from Equation 4 is not the same as that assumed in Equation 2. Therefore, an iteration procedure is needed to obtain a consistent v_k. The iteration consists of substituting v_k from Equation 4 back into Equations 3 and 2 to determine a new wave path, which results in another v_k from Equation 4. This process continues until no significant change occurs in the value of v_k.

The interpreted results of the insitu shear wave determinations for Bores 2, 4 to 6 are plotted with depth in Figure 8.

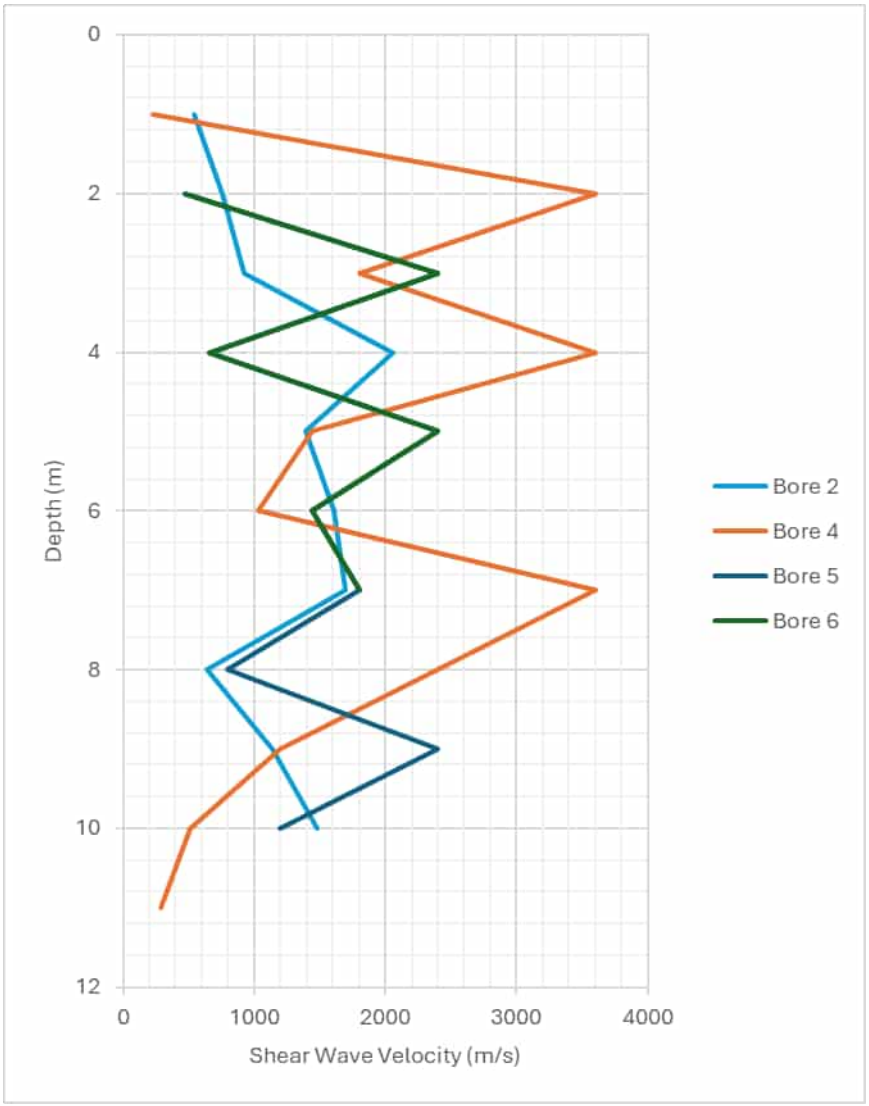


Figure 8: Shear Wave Velocity with Depth – Bores 2, 4 to 6

4.5 Seismic Refraction

The interpretation of the shear wave velocity profiles was based on the seismic refraction survey data using the Refrapy software, a Python-based inversion package. The application method involved picking first-arrival travel times from the seismic records and applying a tomographic inversion algorithm to solve for subsurface velocity structure. The inversion iteratively adjusts the velocity model to minimise the misfit between observed and calculated travel times, yielding a two-dimensional shear wave velocity section with depth. From this, representative velocity–depth profiles were extracted at selected locations near Bores 4, 5 and 6 to characterise material stiffness and stratigraphy.

Plots of these results are included in Appendix D.

SECTION 5 - GEOTECHNICAL DESIGN DISCUSSION

5.1 Ground Model

The results of the current and previous geotechnical investigations indicate that the site is generally underlain (at the bore and test pit locations) by a surface layer of silty sand and generally shallow depth of silt/sandy clay and clayey sand soils overlying extremely low to high strength sandstone. 'Strength inversions' were encountered within the sandstone at some of the bore locations. Free groundwater was not encountered during the auger drilling of the bores nor was it encountered during the excavation of the test pits, however, groundwater levels would be expected to vary with season and prevailing weather. In these ground conditions, geotechnical design of the proposed building will need to consider (at least) the following:

- earthworks, excavatability, and on site trafficability after disturbance of the site at excavated levels;
- groundwater control;
- soil reactivity and ground surface movements;
- suitable foundation options;
- geotechnical design parameters;
- pavement design parameters;
- parameters for design of footings; and
- anticipated construction aspects.

Discussion of geotechnical design parameters, as well as general design and construction recommendations and suggestions are detailed in the following sections.

5.2 Earthworks

5.2.1 Site Preparation

Site preparation in movement sensitive areas should involve the stripping of weeds/grass, organic near surface soils/surface 'silts' (topsoils), any uncontrolled fill and the removal of any shrubs/trees (as far in advance of construction as possible).

'Silts' are very moisture sensitive; will be very difficult to compact (and to compact over) without 'very tight' moisture control; will lose considerable strength when 'over-wet'; and will be dispersive and readily erodable. However, provided that all organic matter is removed and the silts are properly compacted to an appropriate dry density ratio (refer Section 5.2.4) it may not be necessary to remove all 'silts', prior to placement of fill over. It will be necessary to undertake location specific engineering inspections to confirm the actual depth of 'silt' (topsoil) stripping required.

Any 'soft spots' encountered in the final excavated subgrade should be either tyned, dried then recompacted, or excavated and replaced with compacted select fill.

5.2.2 Excavatability

The final bulk excavation depths have not yet been determined; however, it is likely to be approximately 8m to 10m (in elevated areas of the site) for the proposed subdivision development. Based on the results of the fieldwork, it is anticipated that excavation to approximately to up to 10m depth will likely encounter soils overlying extremely low to high strength rock, particularly in the northern area below around 10m depth (RL 5.6m) in Bore 3.

Bulk excavation of fill, soils and extremely low to very low strength rock should be readily achieved using large hydraulic excavators (e.g. 30 tonne), supplemented with single tyne ripping in low strength rock. Bulk excavation of any medium strength rock will require the use of heavy ripping with large (e.g. 40 tonne to 50 tonne) plant and/or heavy hydraulic rock breaking and low production rates are anticipated. Subject to the frequency of jointing in the rock and its strength, blasting may also be required to fracture the rock, prior to ripping.

All confined and detailed excavation (e.g. pad footings/service trenches etc.) in medium strength or stronger rock will also require heavy rock breakers and very low production rates and high plant wear should be allowed for in high strength (or stronger) rock unless controlled blasting is used. Due to the anticipated nature of the rock jointing, some 'over break' should be expected.

As a preliminary guide to assess the excavatability of the rock encountered in the bores, the results of the point load strength index testing in conjunction with assessment of defect spacing in rock core samples recovered from all bores, have been plotted onto the Pettifer and Fookes chart[1], (shown in Figure 9) which provides an assessment of rock excavatability based on this data

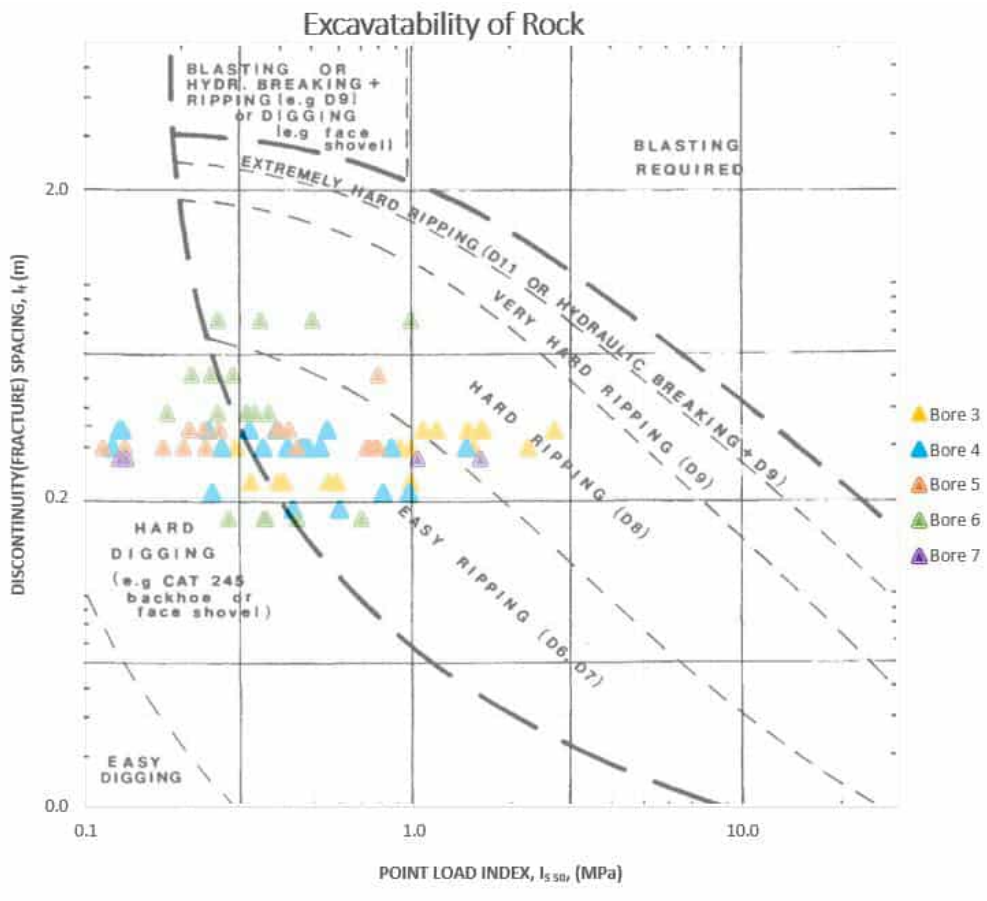


Figure 9: Correlation of excavatability based on Point Load Strength and rock defect spacing (Based on Pettifer and Fookes chart)

The correlation of excavatability given in Figure 9 generally indicates that 'hard digging' to 'easy ripping' should be expected in upper 6m to 8m (below existing ground surface levels at the bore locations), with 'hard ripping' likely expected below 8m and to the bore termination depth (at the bore locations). It should be

[1] The Geological Society' Quarterly Journal of Engineering Geology, Publication No. 0481-2085/94 (1994) A revision of the graphical method for assessing the excavatability of rock– Figure 10.

noted that successful mechanical ripping would require the use of a large dozer (e.g. Cat D8 Dozer) and freedom to rip in all directions. If this is not possible, it is likely that rock breakers will be required in lieu of ripping.

Allowance for blasting could also be considered, but will require careful design and consideration given the close proximity to other buildings/structures, etc.

Due to the inherent jointing and bedding planes contained in the rock, over break should be allowed for in pricing.

Based on past experience in similar ground conditions, the maximum depths of bulk excavation using various methods have been preliminarily estimated at the locations of bores and the estimated depths are summarised in Table 3. The depths contained in the table must be read in conjunction with the Bore Report sheets, noting in particular, the maximum drilled depth of each bore. The excavatability of rock is critically dependent upon the depth of weathering, the nature and distribution of rock defects (i.e. persistent joints, sheared, extremely to highly weathered or highly fractured zones) and strength, the 'size' of the excavation, the availability, capacity and 'condition' of plant, operator experience and any site-specific limitations (e.g. available excavation size).

Table 3: Preliminary Estimated Bulk Excavation Method Transition Depths at Cored Bore Locations

Excavation Method	Estimated Transition Depth Below Ground Surface (m) Between One Excavation Method and Another for 'Economic Bulk Excavation'						
	Bore						
	1	2	3	4	5	6	7
Hydraulic Excavator ▼ D11 Ripping	1 – 2	1 – 2	1 – 2	1 – 2	1 – 2	1 – 2	6 – 7
▼ Heavy Rock Breaker	2 – 3	7 - 8	2 – 3	2 - 3	5 - 7	1 – 2	10 – 11
▼ Blasting							

Consideration should be given in selecting suitable excavation methods/plant to the potential of encountering 'harder' rock below bore termination depths, and at 'shallower' depth intermediate to the bore locations.

All confined excavations should be fully supported or battered/benched to a stable angle to ensure personnel safety.

5.2.3 Use of Cut for Fill

Except for 'silts' and any soils that are organic, over-wet or contain over-size (i.e. >75mm) particles/deleterious materials, the soil and weathered rock materials encountered in the bores should be suitable for re-use as structural and bulk fill, provided expansive behaviour can be tolerated or designed for, where reactive materials are used and near surface 'silts' and any 'clean' sands are blended with clay soils to improve their compaction properties. The existing fill materials are expected to generally be unsuitable for reuse, unless significantly processed.

It is strongly suggested that any 'silt' materials (probably mainly topsoils) not be used as structural fill without removal of the organic matter and thorough mixing with bulk excavated soils, as the 'silts' are very moisture sensitive, will be very difficult to compact (and to compact over) without 'very tight' moisture control, will lose considerable strength when 'over-wet', and could be dispersive. However, it is anticipated that once all

organic material is removed from 'silts', the organic free soil could be used for non-structural fill (without blending), provided that the potential compaction difficulties nominated can be accepted/tolerated.

The sandy clays and clayey sands encountered in the bores are considered to generally have a moderate to high potential for shrink-swell movements associated with change in moisture content, especially (but not only), if they are recompacted. It should be noted that heavily compacting reactive fill, particularly at a moisture content below Standard Optimum moisture content (OMC) should be avoided as potentially significant expansion could occur on 'wetting up'.

5.2.4 Fill Compaction

All fill required to support settlement sensitive structures/features should be 'controlled' under 'Level 1' geotechnical supervision and testing, as set out in Section 8 of AS3798-2007 *Guidelines on earthworks for commercial and residential developments*, placed in layers not greater than 250mm (loose thickness) and be uniformly compacted to the minimum dry density ratios nominated in Table 4.

Table 4: Subgrade and Fill Compaction

Location		Minimum Dry Density Ratio
Floor Slab and Foundation Support (Level 1 Control)		100% (Standard compaction)
Pavement Subgrade	- >500mm below subgrade level - top 500mm of subgrade	98% (Standard compaction) 100% (Standard compaction)
General Fill (non-structural support)		95% (Standard compaction)

Reactive clay material should be avoided for use as fill, if possible. However, if its use cannot be avoided, any reactive material used as fill should be placed and maintained at a moisture content of not drier than Standard optimum moisture content in order to reduce potential shrink-swell movements. It should be noted that over-compacting reactive clay fill (particularly at a moisture content below optimum) should be avoided as potentially significant expansion could occur on 'wetting up'. Due allowance must be made in design and detailing for reactive fill movements if reactive fill is used.

5.2.5 Trafficability

To assist with site trafficability, consideration should be given to the placement of a coarse granular working surface over exposed soils in areas requiring all weather access. The required layer thickness will depend on the type of plant proposed to traffic the site and should be determined on a case by case basis however, a layer thickness of approximately 0.2m would be anticipated for 'light' equipment. Such a layer would also help seal the exposed subgrade from moisture loss and reduce potential subgrade swell movements on 'wetting up'.

5.2.6 Site Drainage

During construction, the site should be graded such that water is readily shed and does not collect and pond over the site, otherwise softening of the subgrade will occur, especially under construction plant and heavy vehicle traffic.

5.3 Cut Slope Stability

Battering of slopes in rock is critically dependent upon rock strength, the extent of fracturing, presence of persistent joints, joint characteristics (e.g. dip, direction, infill type), groundwater/drainage control measures installed, etc., and stable batters would need to be confirmed by geological structure mapping at the time of construction unless relatively 'flat' batters are adopted.

Based on the results of the rock core recovered, results of previous investigations undertaken across the Ripley area and site observations, the adoption of design batter slopes will need to consider the highly variable rock conditions that will be encountered, and the potential for instability to exist, even in slopes cut

at relatively flat angles. It is strongly recommended that batter slope design be 'flexible' such that batter angles can be flattened or positive support can be provided as required during construction.

For the purposes of preliminary design, unsurcharged batters to approximately 4m in height could possibly be formed at the permanent batter angles given in Table 5, subject to future confirmation by mapping/analysis and detailed inspection and assessment during excavation. At these batter slopes, some minor movement at and behind the slope crest, as well as some localised instability within batter faces (in weathered zones or along adverse jointing within the rock if present), should be expected. Allowances should be made for provision of flatter batter angles or providing support (e.g. retaining walls, passive dowels or anchors in large zones of potential instability, and provision of rock-fall mesh, shotcrete and/or rock catch fences to control 'smaller' individual rock falls) in zones of unstable materials (that can only be) identified during inspection/assessment. In general, the flatter the batter angles adopted, the lower the risk of instability occurring.

Table 5: Preliminary Batter Slopes in Rock (Unsurcharged, Horizontal Ground Behind Crest)

Material	Batter Angle for Individual Slopes To 4-6 m High
Stiff Clays/Clayey Silts[(1)]	1.0V : 2.5H
Dense Clayey Sand	1.0V : 3.0H
Extremely weathered, extremely low strength rock	1.0V : 2.5H
Distinctly weathered, very low to low strength rock	1.0V : 1.0H[(2)]
Slightly Weathered, medium to very high strength rock	1 5V : 1.0H[(2)]

(1) For unslickensided soils; stable batter slopes for slickensided soils will be flatter and must be assessed on a location by location basis, based on the frequency of occurrence of the slickensides at the location

(2) Stability of rock slopes will be governed by rock jointing and it may be possible to adopt steeper slopes, possibly in conjunction with

All batter slopes excavated (and any fill batters) should be protected from weathering, erosion and groundwater seepage and should be inspected by an experienced engineer during earthworks to confirm stability and revise batter slopes, if required.

5.4 Retaining Wall Pressures

Where excavation sides cannot be battered, the excavation sides will need to be continuously supported to prevent instability. Anchoring or bracing may be required, and due consideration should be given in design where existing services or buildings are located close to the proposed excavation.

An estimate of retaining wall pressures for 'flexible' and 'rigid', temporary or permanent, walls can be obtained for drained conditions and horizontal retained ground, using a triangular pressure distribution in conjunction with the parameters given in *Table 6.*

Table 6: Retaining Wall Design Parameters

Material Type	Strength/ Density	Total Weight (t/m^3)	Flexible Wall 'Active' Pressure Coefficient (k_a)	Rigid Wall 'At Rest' Pressure Coefficient (k_o)
Clayey Sand	loose	1.8	0.35	0.55
	medium dense	1.9	0.30	0.45
	dense	1.9	0.25	0.40
	very dense	2.0	0.20	0.35
Sandy/Silty Clay	stiff/hard	1.9	0.35	0.50
Rock	extremely low	1.9	0.35	0.50
	very low	2.1	0.30	0.45
	low	2.2	0.25	0.35

Due allowance must be included (as appropriate) for groundwater pressure, surcharge effects from adjacent structures and/or construction loading, backfill compaction stresses, the effects of any sloping retained materials, reactive soil/fill pressures etc.

Consideration should be given in retaining wall design to the potential for elevated groundwater levels to occur during or following prolonged 'wet' weather. For permanent walls, considerations should be given to elevated groundwater levels due to blocked drainage etc.; drain design should incorporate free draining backfill and slotted pipe discharging into a sealed disposal system.

Consideration must also be given in wall design to adjacent buildings/structures/services/construction loads, which could introduce additional load into the retaining walls.

5.5 Deep Fill Settlement

As a preliminary guide, potential fill settlements under a 10 kPa surface loading for fill depths up to 8m, have been preliminarily estimated for a range of depths for both cohesive soil and hard rock (Level 1 controlled) fill, to provide a preliminary guide to the relative stiffness of the two potential types of fill, underlain by relatively incompressible weathered rock. The lower and upper ends of the preliminary settlement ranges given in *Table 7* have been based on the potential variability in the stiffness of the fill and must be confirmed when actual fill sources have been confirmed. The settlement estimates do not include any allowance for reactive fill movement.

Table 7: Preliminary Settlement Estimates Under 10kPa Surface Loading for Varying Fill Depths

Level 1 Controlled Fill Depth (m)	Preliminary Settlement Estimate (mm)*	
	Cohesive Soil	Well Graded Strong Rock Fill
1	1 – 2	1
2	2 – 6	1 – 2
4	7 – 18	4 – 7
6	15 – 38	7 – 13
8	26 – 66	13 – 26

* Range based on controlled fill underlain by essentially incompressible weathered rock (to be confirmed)

The settlement modulus values adopted for the preliminary settlement estimates were 10MPa and 25MPa for cohesive soil fill and 30MPa and 60MPa for well graded rock fill (both placed under Level 1 control), with total bulk density values of 1.8m^3 and 2.2m^3 respectively.

5.6 Reactive Ground Movements

The potential order of characteristic surface movements (y_s) that could occur at the site has been assessed based on the information and methods presented in AS2870 (which assumes soil shrinking and swelling due to change in soil moisture content through 'normal' seasonal moisture variations). Potential characteristic surface movements have been estimated based on the method described in AS2870 using the following equation:

$$y_s = \frac{1}{100}\sum_{n=1}^{N}\left(\alpha.I_{ss}.\Delta u.h\right)_n \qquad —$$

where y_s is the characteristic surface movement, in millimetres;
α is the lateral restraint factor;
I_{ss} is the shrink-swell index (refer Table 8 for values adopted);
$\overline{\Delta u}$ is the soil suction change averaged over the thickness of the layer under consideration (taken as 1.2pF at the ground surface in Ripley Valley and reducing linearly to zero at the design depth of suction change);
h is the thickness of layer under consideration, in millimetres; and
N is the number of soil layers within the design depth of suction change (H_s), which has been taken as 2.3m in Ripley Valley.

As a preliminary guide to the potential order of magnitude of reactive ground movement at the site, characteristic surface movement (y_s) values have been preliminarily estimated using the estimated shrink-swell index values given in Table 8.

Table 8: Estimated Shrink Swell Index Values Used for y_s Calculations

Material	Adopted Shrink-Swell Index - Iss (%/pF)
Silty/Gravelly Sand	0.1
Clayey Sand	1.0 – 2.0
Sandy/Silty Clay	2.0 – 3.5
Extremely low strength Rock	0.5 – 1.5
Very low strength (and stronger) Rock	0.0

The estimated characteristic surface movements (y_s) would be expected to vary from less than 10mm in areas of cut rock subgrade up to 50mm to 60mm in areas underlain by silty/sandy clays that extend to the full depth of seasonal moisture variation.

The reactivity of any fill (and shrink-swell movements) should be assessed once sources are known, if control of reactive fill material is required. It is also strongly suggested that any reactive fill (including natural site clays), used at the site be tested to confirm reactivity following completion of earthworks, if confirmation of the preliminary estimated shrink-swell movements is required.

If imported fill materials are proposed, characteristic surface movements could vary significantly from those estimated above, and the reactivity of any imported fill (and shrink-swell movements) should be assessed once sources are known. It is also strongly suggested that all reactive fill be tested following placement to enable confirmation of the estimated shrink-swell movements given above.

The natural strata profile encountered in the bores is expected to have a potential for 'low' to 'high' reactive movement under normal seasonal effects, ***if soil moisture content/suction change can occur***. However, existing or future vegetation, fill, earthworks or 'abnormal' moisture conditions could potentially result in significant changes to site reactivity. Careful consideration should be given where controlled fill is placed over a natural soil subgrade as higher characteristic movements than those nominated above could potentially apply (as AS2870 indicates that the ratio of lateral restrained to unrestrained movement will increase), unless fill reactivity is significantly less than that of the existing site soils. If filling of the site is proposed, a revised assessment of reactive soil movements would be required, taking into account the actual reactivity, compaction and depth of fill used.

It should also be noted that abnormal subgrade moisture variations could potentially result in adverse, non-uniform reactive movements that are significantly greater than those nominated above for 'normal' seasonal moisture changes. The risk of 'abnormal' movement occurring could be reduced by taking measures to ensure 'stable' moisture conditions.

5.7 Temporary Excavation Support Systems

All excavations should be temporarily supported or battered back to maintain stability. Where excavation sides cannot be battered (and/or instability cannot be tolerated), the excavation sides will need to be supported to prevent instability. Due consideration must be given in design where existing services, buildings etc. are located close to the proposed excavation.

Suitable excavation support systems will depend on the excavation depth and width. In the ground conditions generally encountered in the bores and test pits it would be expected that steel 'trench shields' would be appropriate for confined excavations. For relatively shallow confined excavations, driven steel sheet piles may also be suitable, but significant driving difficulties would generally be expected in the natural site ground conditions. Driven sheet piles would be unlikely to be suitable for use in weathered rock (and possibly hard clays and dense sands), unless pre-excavation methods were adopted to facilitate installation.

Soil/rock nails with shotcrete/precast concrete facing may be suitable for use in deep/wide excavations, subject to the strength of soil/rock and the movement sensitivity existing behind the cut face.

5.8 Groundwater Control

Groundwater was not encountered in any of the bores during auger drilling and was not encountered during excavation of the test pits. However, groundwater levels can vary seasonally, with prevailing weather conditions and with significant vegetation.

Temporary groundwater control measures required during construction will depend on the location, depth and stratigraphy etc. at each excavation location. However, in general terms, groundwater control in open excavation would be expected to comprise at least, pumping from sumps in 'clay' soils (and potentially pumping from wells in deep excavation) and spear point dewatering systems in 'sands'.

5.9 Foundations

The ground profile to be adopted for foundation design should be based on the results of the closest bore or test pit, modified according to proposed bulk earthworks levels and the results of any observations made during any prior, nearby in-ground construction work.

Foundation selection will be dependent upon structural loadings, the tolerance of structures to movement (including settlement under structural load and shrink-swell movements), type and magnitude of loadings, groundwater conditions at the time of construction, etc.

To minimise the risk of unacceptable differential movements, it is recommended that all foundations for individual structures be supported in similar quality materials (e.g. footings should not found partly in fill or soil and partly in rock, unless potential differential settlements can be tolerated or designed for between the footings).

It should be noted that soil 'strength inversions' with depth were encountered in numerous bores, the presence of which may adversely affect foundation performance where foundations are designed based on strength parameters for 'stronger' soil and control measures are not instigated to ensure that 'weaker' zones do not go undetected beneath foundations. The potential presence of strength inversions should be taken into account when selecting foundation bearing pressures and founding depths.

An experienced geotechnical engineer should inspect all footing excavations prior to casting to ensure bearing capacity at foundation level is adequate and to confirm final footing dimensions. All footing excavations should be clean, dry and free of loose/softened materials prior to casting.

5.9.1 Strip and Pad Footings

Design of strip and pad footings could be based on the maximum working bearing pressures nominated in Table 9. The bearing pressures given for clay soils are for clays that are not slickensided; if slickensides are present the working bearing pressures given in Table 9 would need to be adjusted (downwards), based on the frequency of slickensides at any given foundation location.

Table 9: Maximum Working Stress Design Parameters for Strip and Pad Footings

Material	Consistency/Strength	Maximum Bearing Pressure (kPa) [1]
Silty/Sandy Clay	Stiff very stiff hard	100 150 250
Clayey Sand [2]	medium dense dense	100 250
Rock	extremely low very low low medium	350 700 1,200 2,500

[1] Not underlain by 'softer' material
[2] Preliminary only – subject to footing dimensions, founding depth and groundwater level

5.9.2 Bored Piles

Bored pile design could be based on the maximum allowable working end bearing and shaft adhesion values nominated in Table 10. The bearing pressures given for clay soils are for clays that are not slickensided; if slickensides are present the working bearing pressures given in Table 10 would need to be adjusted (downwards), based on the frequency of slickensides at any given foundation location.

Ultimate stress bearing pressures can be obtained by multiplying the working stress values by 2.5. All bored pile foundation excavations should be inspected by an experienced engineer during drilling to confirm the adequacy of the bearing capacity of founding materials and hence final pile dimensions. It will be necessary to carefully consider the effects on foundation performance if weathered rock of 'lesser strength' is located below founding level.

Table 10: Working Shaft/End Bearing Capacity for Bored Pile Design

Material	Strength[1]	Shaft Adhesion (kPa)	End Bearing[2] (kPa)
Controlled Fill - Level 1 (100% Standard) – silty sandy clay fill	-	10	-
Silty/Sandy Clay	stiff very stiff hard	10 15 20	150 200 300
Clayey Sand [2] [3]	medium dense dense very dense	10 20 30	150 300 450
Rock	extremely low very low low medium	25 60 150 300	400 800 1,500 3,000[4]

[1] Refer to attached soil and rock classification sheets
[2] For pile length to pile diameter ratio >4.0 in founding strata and no 'softer' underlying materials
[3] Preliminary only – subject to footing size; values given are for no disturbance
[4] Maximum allowable working base bearing pressures should be limited to not greater than 2,500kPa if core drilling of footing bases (to confirm the quality of founding strata in the critical zone of stress influence) is not carried out

The design of piles and ground beams must allow for potential uplift due to reactive soils, if moisture content/suction change is possible in reactive founding materials. Even if moisture change is effectively prevented, some movement will occur in controlled reactive clays during moisture content equilibration.

5.10 Foundation Settlement

Actual foundation settlements must be checked by analysis once footing sizes and loads are confirmed, taking into account the presence and frequency of slickensides, if relevant.

5.10.1 Strip and Pad Footings

At the values of stress nominated in Table 9 preliminary estimates of individual footing settlements (due to structural loads only), would not be expected to exceed 1.0% to 1.5% of footing width for properly constructed pad footings, or 2.0% to 2.5% of footing width for properly constructed strip footings.

5.10.2 Bored Piles

At the values of stress nominated in Table 10 preliminary estimates of individual bored pile toe settlement (due to structural loads only), would not be expected to exceed 0.5% to 0.7% of pile diameter for properly constructed bored piles.

5.11 Pavement Subgrade Design Parameters

Pavement subgrade properties will vary significantly over the site following bulk earthworks and testing will be required at the time of construction in order to confirm design values in particular locations/areas. For the purposes of initial costing and preliminary pavement design the subgrade values given in Table 11 may be adopted, which are based on the assumption that the subgrade is prepared in accordance with Section 5.2.

Reactive subgrade materials should not be allowed to 'dry out', otherwise significant softening and soil-swell movements on 'wetting up' could potentially occur.

Table 11: Preliminary Subgrade Design Values

Subgrade Material	CBR (%)[(1)]	Modulus of Subgrade Reaction (kPa/mm)*
Silty Clay (natural or controlled fill)	2 – 4	20 – 30
Sandy Clay (natural or controlled fill)	3 – 8	25 – 45
Clayey/Silty Sand (natural or controlled fill)	5 – 10	35 – 55
Sandstone (extremely low to very low)[(2)]	5 – 10 (undisturbed) 4 – 7 (disturbed)	35 – 55 30 – 40
Siltstone/Mudstone (extremely low to very low)[+]	4 – 8 (undisturbed) 2 – 3 (disturbed)	30 – 45 20 – 25

(1) For transient loading only;
(2) May break down to clay under the action of construction plant

An approximate estimate of subgrade modulus (E) can be obtained for a subgrade compacted to 100% Standard dry density ratio by the use of the following correlation[2] with CBR:

E (MPa) = 10 CBR (%)

The above relationship is not suitable for use in any application other than for pavements under traffic load.

Any 'weathered' rock in the subgrade may break down significantly under the action of the general excavation equipment and tracked plant. As a result, if extremely low to very low/low strength rock is exposed at subgrade level or is used as fill, recompaction will result in a 'clayey' subgrade with properties significantly degraded below those of undisturbed rock.

[2] Shell (1978) Pavement Design Manual

Due to the reactive nature of the soils and extremely weathered rock underlying the site, it is suggested that on-ground slabs are fully doweled and joints between slabs sealed to minimise potential damage from surface movements caused by subgrade moisture content variations. Allowance should be made in design for the effect of differential slab movements (due to reactive soil behaviour) if slabs are cast over different subgrade types.

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RICARDO ZANNIN-PESCE
Associate

Reviewed by
MIKE NEIGHBOUR
Principal



LEGEND

- Test Pit
- Bore
- Bore with Downhole Seismic Test
- Seismic Refraction Test Path
- ROL2 and ROL3 Site Boundary
- Lacebark Site Boundary

Reference: NearMap Imagery dated 19/06/2025.

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PROJECT
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PROJECT ADDRESS
via Ripley Road, Ripley Valley

CLIENT
Stockland Development Pty Ltd

SCALE AT A3:

0 200 400m

REV.	DATE	ISSUE	APP.
A	1/10/2025	INITIAL RELEASE	RZP

DRAWING
Test Locations - ROL2 and ROL3 and Lacebark

REPORT
GI

PROJECT No.
BG25-1039A

DRAWING No.
1.03

File Location: p:\projects 2025\b - brisbane\bg25-1039a - ripley valley, 787 ripley road (providence west)\graphics\drawings\bg25-1039a-gi-1.03(a) - test locations - rol2 and rol3.dwg Saved on 10/3/2025 12:57:08 PM By: whull

Important Information about Your

Geotechnical Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical engineering study conducted for a civil engineer may not fulfill the needs of a construction contractor or even another civil engineer. Because each geotechnical engineering study is unique, each geotechnical engineering report is unique, prepared *solely* for the client. No one except you should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you —* should apply the report for any purpose or project except the one originally contemplated.

Read the Full Report

Serious problems have occurred because those relying on a geotechnical engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

A Geotechnical Engineering Report Is Based on A Unique Set of Project-Specific Factors

Geotechnical engineers consider a number of unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical engineering report that was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light industrial plant to a refrigerated warehouse,
- elevation, configuration, location, orientation, or weight of the proposed structure,
- composition of the design team, or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical engineering report is based on conditions that existed at the time the study was performed. *Do not rely on a geotechnical engineering report* whose adequacy may have been affected by: the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, earthquakes, or groundwater fluctuations. *Always* contact the geotechnical engineer before applying the report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ—sometimes significantly—from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are *Not* Final

Do not overrely on the construction recommendations included in your report. *Those recommendations are not final,* because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations only by observing actual

subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's recommendations if that engineer does not perform construction observation.*

A Geotechnical Engineering Report Is Subject to Misinterpretation

Other design team members' misinterpretation of geotechnical engineering reports has resulted in costly problems. Lower that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical engineering report. Reduce that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

Give Contractors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure contractors have sufficient time* to perform additional study. Only then might you be in a position to give contractors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and contractors do not recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations" many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform a *geoenvironmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical engineering report does not usually relate any geoenvironmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own geoenvironmental information, ask your geotechnical consultant for risk management guidance. *Do not rely on an environmental report prepared for someone else.*

Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, a number of mold prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; ***none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.***

Rely, on Your ASFE-Member Geotechncial Engineer for Additional Assistance

Membership in ASFE/The Best People on Earth exposes geotechnical engineers to a wide array of risk management techniques that can be of genuine benefit for everyone involved with a construction project. Confer with your ASFE-member geotechnical engineer for more information.

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APPENDIX A

BORE REPORT SHEETS WITH EXPLANATORY NOTES (CURRENT INVESTIGATION)

BORE REPORT

BORE 1

Client: Stockland Development Pty Ltd
Project: Providence West Residential Subdivision Development
Location: via Ripley Road, Ripley Valley
Project No: BG25-1039A

Page No: 1 of 1
Date: 14 April 2025
Ground Surface Level: RL82.3m*

Depth (m)	Description	RL (m)	Lithology	Structures	Average Number of Defects/m	Sample Type	Sample Depth (m)	Is(50) (MPa)	Core Recovery (%)	RQD (%)	Test Results
0		82.3									
	SANDSTONE (MW) - low to medium strength, orangey-brown, fine to coarse grained, slightly fractured			0.3m,J,5,vii,clean,2mm			0.2	0.21(d) 0.35(a)			
1	- fine to medium grained	81.0		0.76m,J,15,vii,clean,1mm 0.86m,J,3,vii,clean,2mm	2	C		0.25(d) 0.35(a)	100	96	
2		80.0		2.3m,J,15,vii,Cl,4mm			2.65	0.24(d) 0.30(a)			
3	- medium strength, unbroken	79.0			0	C		0.40(d) 0.36(a)	100	100	
4		78.0						0.32(d) 0.53(a)			
5		77.0					5.6				
6	- slightly fractured - pale brown	76.0		6.54m,J,3,vii,clean,2mm	1-2	C		0.34(d) 0.42(a) 0.29(d) 0.57(a)	100	100	
7		75.0		7.7m,J,10,vii,Cl,4mm				0.55(d) 0.73(a)			
8	End of Bore at 8.15 m	74.0		8.1m,J,5,vii,Cl,3mm			8.15	0.48(d) 0.84(a)			
9		73.0									
10											

D	Disturbed Sample	S	Standard Penetration Test (SPT)	E	Environmental Sample	Is(50)	Point Load Test Result (MPa)
U	Undisturbed Tube (50mm dia)	HB	SPT Hammer Bouncing	Up	Pushtube Sample	(d)	Diametral Test
B	Bulk Sample	( )	No Sample Recovery	C	NMLC Coring	(a)	Axial Test
pp	Pocket Penetrometer Test (kPa)	V	Vane Shear Strength, Uncorrected (kPa)			(i)	Lump Test

Rig: Hydrapower Scout
Logged by: DH
Drilling Method: Auger to 0.2m depth, then NMLC
Co-Ordinates E: 479814
Groundwater: No free groundwater encountered during auger drilling
Co-Ordinates N: 6936876
Remarks: *Ground surface level and coordinates determined in the field using a Trimble GNSS positioning device.

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CORE PHOTOGRAPHS

Client:	Stockland Development Pty Ltd	**Bore:** 1
Project:	Providence West Residential Subdivision Development	
Location:	via Ripley Road, Ripley Valley	
Project No.:	BG25-1039A	
Date:	14 April 2025	**Ground Surface Level:** RL82.3m



BORE REPORT

BORE 2

Client: Stockland Development Pty Ltd
Project: Providence West Residential Subdivision Development
Location: via Ripley Road, Ripley Valley
Project No: BG25-1039A

Page No: 1 of 1
Date: 14 April 2025
Ground Surface Level: RL83.6m*

Depth (m)	Description	RL (m)	Lithology	Structures	Average Number of Defects/m	Sample Type	Sample Depth (m)	Is(50) (MPa)	Core Recovery (%)	RQD (%)	Test Results
0	***SANDSTONE (MW)*** - low strength, orange-brown, medium grained	83.6									
		83.0					0.5	0.08(d) 0.07(a)			
1	***CONGLOMERATE (MW)*** - extremely low to very low strength, orange-brown, fine to medium gravel inclusions			1.09m,J,3,vii,clean,3mm 1.18m,J,3,viii,Cl,30mm				0.06(d) 0.30(a)			
		82.0		1.70m,J,5,vii,Cl,5mm	2-3	C			100	96	
2	***SANDSTONE (MW)*** - low to medium strength, pale orange-brown, fine to coarse grained, fractured to slightly fractured			2.20m,J,2,vii,clean,8mm							
		81.0		2.59m,J,10,vii,clean,5mm 2.80m,J,5,vii,clean,10mm			2.74	0.23(d) 0.44(a)			
3	- fine to medium grained			3.03m,J,10,vi,clean,5mm							
	- medium to coarse grained			3.22m,J,25,vii,clean,9mm 3.30m,J,25,vii,clean,5mm							
	- fine to medium grained	80.0		3.39m,J,25,vii,clean,3mm 3.50m,J,25,vii,clean,2mm				0.30(d) 0.38(a)			
4	- coarse grained, trace of medium gravel			4.18m,J,1,vii,clean,1mm	4-5	C		0.63(d) 0.86(a)	100	97	
	- fine to medium grained	79.0		4.51m,J,3,vii,clean,2mm 4.82m,J,3,vii,clean,2mm							
5				4.92m,J,3,vii,clean,2mm				0.14(d) 0.14(a)			
	- coarse grained, trace of fine gravel	78.0		5.53m,J,1,vii,Cl,4mm 5.57m,J,3,vii,clean,4mm							
6	- medium grained			5.82m,J,15,vii,clean,10mm			5.8				
	- pale grey				4						
	- fine to coarse grained, mottled orange-brown, trace of fine to medium gravel	77.0		6.35m,J,5,vii,clean,2mm 6.48m,J,5,vii,clean,2mm 6.51m,J,5,vii,clean,3mm			6.6				
7	- fine to medium grained				0	C		0.58(d) 1.10(a) 0.93(d) 1.35(a)	100	97	
		76.0									
8	- very low strength			8.34m,J,5,vii,Cl,10mm 8.47m,J,15,vii,clean,10mm			8.3				
		75.0		8.52m,J,45,vii,clean,3mm 8.64m,J,30,vii,clean,3mm 8.71m,J,40,vii,clean,3mm	5						
9	- low to medium strength, medium grained			8.98m,J,5,vii,clean,2mm			8.82	0.05(d) 0.10(a)			
		74.0		9.53m,J,25,vii,clean,4mm	1-2	C			100	86	
10	- fine to coarse grained							0.17(d) 0.28(a) 0.38(d) 0.40(a)			
	End of Bore at 10.15 m						10.15				

D	Disturbed Sample	S	Standard Penetration Test (SPT)	E	Environmental Sample	Is(50)	Point Load Test Result (MPa)
U	Undisturbed Tube (50mm dia)	HB	SPT Hammer Bouncing	Up	Pushtube Sample	(d)	Diametral Test
B	Bulk Sample	( )	No Sample Recovery	C	NMLC Coring	(a)	Axial Test
pp	Pocket Penetrometer Test (kPa)	V	Vane Shear Strength, Uncorrected (kPa)			(i)	Lump Test

Rig: Hydrapower Scout
Logged by: DH
Drilling Method: Auger to 0.5m depth, then NMLC
Co-Ordinates E: 479558
Groundwater: No free groundwater encountered during auger drilling
Co-Ordinates N: 6936891
Remarks: *Ground surface level and coordinates determined in the field using a Trimble GNSS positioning device.

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CORE PHOTOGRAPHS

Client:	Stockland Development Pty Ltd	**Bore:** 2
Project:	Providence West Residential Subdivision Development	
Location:	via Ripley Road, Ripley Valley	
Project No.:	BG25-1039A	
Date:	14 April 2025	**Ground Surface Level:** RL83.6m



BORE REPORT

BORE 3

Client: Stockland Development Pty Ltd
Project: Providence West Residential Subdivision Development
Location: via Ripley Road, Ripley Valley
Project No: BG25-1039A

Page No: 1 of 2
Date: 6/7 August 2025
Ground Surface Level: RL89.0m*

Depth (m)	Description	RL (m)	Lithology	Structures	Average Number of Defects/m	Sample Type	Sample Depth (m)	Is(50) (MPa)	Core Recovery (%)	RQD (%)	Test Results
0		89.0									
	SILTY SAND (SM) - brown-orange, fine to medium grained sand					S	0.5				20,20,22 N=44
1	***SANDSTONE (XW)*** - extremely low to very low strength, brown-orange with grey mottling, fine to medium grained	88.0					0.95				
						S	1.5				20,30/130mm
2	***SANDSTONE (DW)*** - very low strength, slightly fractured	87.0		2.03m,J,90,i,clean,2mm			1.78	0.09(a)			
				2.66m,J,90,i,clean,2mm							
3	***SANDSTONE (HW)*** - medium to high strength, brown	86.0		2.86m,J,70,i,clean,2mm 3.05m,J,90,i,clean,3mm 3.24m,J,80,i,clean,<1mm 3.45m,J,80,i,clean,<1mm 3.53m,J,70,i,clean,2mm 3.71m,J,80,i,clean,1mm 3.81m,J,70,i,clean,2mm	4-5	C		0.5(d) 0.32(a) 1.0(d) 0.6(a)	100	73	
4		85.0		4.06m,J,70,i,clean,7mm 4.22m,J,70,iv,clean,10mm			4.0				
5		84.0		4.88m,J,70,ii,clean,2mm 5.04m,J,80,i,clean,2mm 5.35m,J,80,iv,clean,1mm				0.28(d)			
				5.56-6.88m,J,80,i,clean,1mm(6)	3-4	C			100	72	
6		83.0						2.2(d) 1.5(a)			
								1.0(d) 0.9(a)			
7		82.0					7.07				
				7.27m,J,80,i,clean,2mm 7.45m,J,80,i,clean,1mm 7.52m,J,60,ii,clean,1mm 7.72m,J,70,ii,clean,4mm							
8		81.0		8.20m,J,90,ii,clean,1mm				1.6(d) 1.2(a)			
				8.56m,J,90,ii,clean,1mm	3	C			100	87	
9		80.0						1.1(d) 1.5(a)			
	SANDSTONE (SW) - grey, fine to medium grained			9.49m,J,70,i,clean,1mm 9.66m,J,70,i,clean,1mm 9.86m,J,70,i,clean,1mm							
10		79.0					10.05	1.6(d)			

D	Disturbed Sample	S	Standard Penetration Test (SPT)	E	Environmental Sample	Is(50)	Point Load Test Result (MPa)
U	Undisturbed Tube (50mm dia)	HB	SPT Hammer Bouncing	Up	Pushtube Sample	(d)	Diametral Test
B	Bulk Sample	( )	No Sample Recovery	C	NMLC Coring	(a)	Axial Test
pp	Pocket Penetrometer Test (kPa)	V	Vane Shear Strength, Uncorrected (kPa)			(i)	Lump Test

Rig: Hydrapower Scout
Drilling Method: Auger drilling to 1.5m depth, casing to 1.5m depth, then NMLC
Groundwater: No free groundwater encountered during auger drilling
Remarks: *Ground surface level and coordinates determined in field using a GNSS positioning device

Logged by: WH
Co-Ordinates E: 479039
Co-Ordinates N: 6937090

BORE REPORT

BORE 3

Client: Stockland Development Pty Ltd
Project: Providence West Residential Subdivision Development
Location: via Ripley Road, Ripley Valley
Project No: BG25-1039A

Page No: 2 of 2
Date: 6/7 August 2025
Ground Surface Level: RL89.0m*

Depth (m)	Description	RL (m)	Lithology	Structures	Average Number of Defects/m	Sample Type	Sample Depth (m)	Is(50) (MPa)	Core Recovery (%)	RQD (%)	Test Results
11	***SANDSTONE (SW)*** - medium strength, brown-grey, fine to medium grained	78.0		10.51m,J,90,i,clean,1mm 10.68m,J,90,i,clean,1mm 10.86m,J,90,ii,clean,5mm 11.07m,J,70,i,clean,2mm 11.29m,J,90,i,clean,2mm 11.33m,J,90,i,clean,2mm 11.40m,J,80,i,clean,1mm 11.49m,J,80,i,clean,4mm 11.94m,J,90,i,clean,3mm	4-5	C		2.7(a) 0.4(d) 0.4(a)	100	85	
12	End of Bore at 12.1 m	77.0					12.1	0.5(d) 0.6(a)			
13		76.0									
14		75.0									
15		74.0									
16		73.0									
17		72.0									
18		71.0									
19		70.0									
20		69.0									

D	Disturbed Sample	S	Standard Penetration Test (SPT)	E	Environmental Sample
U	Undisturbed Tube (50mm dia)	HB	SPT Hammer Bouncing	Up	Pushtube Sample
B	Bulk Sample	( )	No Sample Recovery	C	NMLC Coring
pp	Pocket Penetrometer Test (kPa)	V	Vane Shear Strength, Uncorrected (kPa)		

Is(50)	Point Load Test Result (MPa)
(d)	Diametral Test
(a)	Axial Test
(i)	Lump Test

Rig: Hydrapower Scout
Logged by: WH
Drilling Method: Auger drilling to 1.5m depth, casing to 1.5m depth, then NMLC
Co-Ordinates E: 479039
Groundwater: No free groundwater encountered during auger drilling
Co-Ordinates N: 6937090
Remarks: *Ground surface level and coordinates determined in field using a GNSS positioning device

CORE PHOTOGRAPHS

Client:	Stockland Development Pty Ltd	**Bore:** 3
Project:	Providence West Residential Subdivision Development	
Location:	via Ripley Road, Ripley Valley	
Project No.:	BG25-1039A	
Date:	6/7 August 2025	**Ground Surface Level:** RL89.0m



BORE REPORT

BORE 4

Client: Stockland Development Pty Ltd
Project: Providence West Residential Subdivision Development
Location: via Ripley Road, Ripley Valley
Project No: BG25-1039A

Page No: 1 of 2
Date: 6 August 2025
Ground Surface Level: RL91.7m*

Depth (m)	Description	RL (m)	Lithology	Structures	Average Number of Defects/m	Sample Type	Sample Depth (m)	Is(50) (MPa)	Core Recovery (%)	RQD (%)	Test Results
0		91.7									
	SILTY SAND (SM) - grey-brown, fine to medium grained sand					S	0.5				9,30/130mm
1	***CLAYEY SAND (SC)*** - medium dense, orange-brown, fine to medium grained sand	91.0		0.96m,J,70,i,clean,3mm			0.78	0.26(d) 0.5(a)			
2	***SANDSTONE (XW)*** - low to medium strength, orange-brown, fine to medium grained, slightly fractured	90.0		1.82m,J,70,ii,clean,>1mm 1.93m,J,70,iv,clean,1mm 2.04m,J,70,iv,clean,1mm	3-4	C		0.12(d) 0.35(a)	100	90	
		89.0		2.55m,J,80,iv,clean,1mm 2.58m,J,80,iv,clean,1mm 2.59-2.64m,J,70,iv,clean,50mm 2.71-2.82m,J,90,ii,clean,1mm			2.66				
3	***SANDSTONE (HW)*** - low to medium strength, unbroken			3.50m,J,80,iv,clean,<1mm							
		88.0						0.13(d) 0.13(a)			
4	- medium strength, slightly fractured			4.30m,J,80,i,clean,1mm	3	C		0.5(d) 0.31(a)	100	82	
		87.0		4.53m,J,80,i,clean,1mm 4.67m,J,70,i,clean,2mm 4.97m,J,80,i,clean,3mm							
5				5.15m,J,80,i,clean,1mm 5.26m,J,70,i,clean,1mm				0.4(d) 0.23(a)			
				5.52m,J,70,iv,clean,1mm			5.6				
		86.0		5.79m,J,60,iv,clean,2mm 5.86m,J,70,ii,Qtz,3mm							
6								0.5(d) 0.4(a)			
		85.0									
7				7.08m,J,50,ii,clean,2mm 7.18m,J,90,iii,clean,20mm 7.27m,J,80,i,clean,4mm 7.55m,J,80,i,clean,3mm	3-4	C		0.5(d) 0.5(a)	100	70	
		84.0									
8				8.13m,J,90,i,clean,3mm 8.18m,J,80,i,clean,2mm 8.22m,J,60,i,clean,3mm 8.28m,J,70,i,clean,3mm				1.4(d) 0.8(a)			
		83.0		8.76m,J,80,i,clean,2mm 8.90m,J,70,iv,clean,2mm			8.6				
9	- dark brown-red with orange mottling, fine to coarse grained, fractured			9.08-9.20m,J,80,i,Ca,3mm 9.28m,J,60,i,clean,3mm 9.38m,J,60,i,clean,3mm 9.43-9.77m,J,90,i,clean,2mm	4-6	C		0.8(d) 0.24(a)	100	47	
		82.0									
10				9.91m,J,70,i,clean,1mm 10.05-10.6m,J,70,iv,clean,3mm							

D	Disturbed Sample	S	Standard Penetration Test (SPT)	E	Environmental Sample	Is(50)	Point Load Test Result (MPa)
U	Undisturbed Tube (50mm dia)	HB	SPT Hammer Bouncing	Up	Pushtube Sample	(d)	Diametral Test
B	Bulk Sample	( )	No Sample Recovery	C	NMLC Coring	(a)	Axial Test
pp	Pocket Penetrometer Test (kPa)	V	Vane Shear Strength, Uncorrected (kPa)			(i)	Lump Test

Rig: Hydrapower Scout
Logged by: WH
Drilling Method: Auger drilling to 0.5m depth, casing to 0.5m depth, then NMLC
Co-Ordinates E: 479181
Groundwater: No free groundwater encountered during auger drilling
Co-Ordinates N: 6936635
Remarks: *Ground surface level and coordinates determined in field using a GNSS positioning device

BORE REPORT

BORE 4

Client: Stockland Development Pty Ltd
Project: Providence West Residential Subdivision Development
Location: via Ripley Road, Ripley Valley
Project No: BG25-1039A

Page No: 2 of 2
Date: 6 August 2025
Ground Surface Level: RL91.7m*

Depth (m)	Description	RL (m)	Lithology	Structures	Average Number of Defects/m	Sample Type	Sample Depth (m)	Is(50) (MPa)	Core Recovery (%)	RQD (%)	Test Results
11	***SANDSTONE (MW)*** - medium strength, dark brown-red with orange mottling, fine to coarse grained, fractured	81.0		10.77m,J,70,i,clean,5mm 10.90-11.84m,J,80,i,clean,3mm			10.85	1.0(d)			
					5-6	C			91	52	
12		80.0						0.4(d) 0.6(a)			
	End of Bore at 12 m						12.0				
13		79.0									
14		78.0									
15		77.0									
16		76.0									
17		75.0									
18		74.0									
19		73.0									
20		72.0									

D	Disturbed Sample	S	Standard Penetration Test (SPT)	E	Environmental Sample	Is(50)	Point Load Test Result (MPa)
U	Undisturbed Tube (50mm dia)	HB	SPT Hammer Bouncing	Up	Pushtube Sample	(d)	Diametral Test
B	Bulk Sample	( )	No Sample Recovery	C	NMLC Coring	(a)	Axial Test
pp	Pocket Penetrometer Test (kPa)	V	Vane Shear Strength, Uncorrected (kPa)			(i)	Lump Test

Rig: Hydrapower Scout
Logged by: WH
Drilling Method: Auger drilling to 0.5m depth, casing to 0.5m depth, then NMLC
Co-Ordinates E: 479181
Groundwater: No free groundwater encountered during auger drilling
Co-Ordinates N: 6936635
Remarks: *Ground surface level and coordinates determined in field using a GNSS positioning device

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CORE PHOTOGRAPHS

Client:	Stockland Development Pty Ltd	**Bore:** 4
Project:	Providence West Residential Subdivision Development	
Location:	via Ripley Road, Ripley Valley	
Project No.:	BG25-1039A	
Date:	6 August 2025	**Ground Surface Level:** RL91.7m



BORE REPORT

BORE 5

Client: Stockland Development Pty Ltd
Project: Providence West Residential Subdivision Development
Location: via Ripley Road, Ripley Valley
Project No: BG25-1039A

Page No: 1 of 2
Date: 4/5 August 2025
Ground Surface Level: RL79.3m*

Depth (m)	Description	RL (m)	Structures	Average Number of Defects/m	Sample Type	Sample Depth (m)	Is(50) (MPa)	Core Recovery (%)	RQD (%)	Test Results
0		79.3								
	SILTY SAND (SM) - brown, fine to medium grained sand				S	0.5				5,7,7 N=14
1	***SANDY CLAY (CI-CH)*** - stiff, brown-orange, fine to medium grained sand					0.55				
	SANDSTONE (DW) - very low strength, brown-orange, fine to coarse grained, with quartz veins, slightly fractured	78.0	1.72-1.91m,clay band	3-5	C		0.08(d) 0.06(a)	100	81	
2							0.06(d) 0.05(a)			
		77.0	2.50m,J,80,ii,qtz,2mm							
	SANDSTONE (HW) - low strength, pale brown-orange, medium to coarse grained		2.52m,J,60,ii,clean,2mm 2.63m,J,75,i,clean,2mm 2.65m,J,75,i,clean,2mm 2.72m,J,90,ii,qtz,2mm 2.83m,J,80,i,clean,2mm			2.7				
3		76.0	3.22m,J,90,i,qtz,2mm 3.70m,J,90,i,clean,2mm							
			3.73m,J,90,i,clean,2mm	3-4	C		0.17(d) 0.20(a)	100	65	
4			4.23m,J,80,i,clean,3mm							
		75.0	4.31m,J,90,i,qtz,3mm 4.67m,J,90,i,clean,2mm				0.08(d) 0.13(a)			
5	***CONGLOMERATE (HW)*** - low strength, dark grey-brown with orange mottling, medium to coarse grained, fractured to highly fractured		4.87m,J,80,i,clean,2mm 5.08m,J,70,i,clean,2mm 5.14-5.18m,crush seam							
		74.0	5.26m,J,80,ii,clean,2mm 5.43m,J,90,i,clean,1mm			5.45	0.11(d) 0.23(a)			
			5.63m,J,80,i,clean,2mm 5.83m,J,80,i,clean,2mm							
6			5.95m,J,80,i,clean,1mm 6.03m,J,80,ii,clean,1mm				0.4(d) 0.25(a)			
		73.0	6.12m,J,80,ii,clean,2mm 6.50m,J,90,i,Ca,1mm							
7			7.03m,J,80,ii,clean,1mm	3	C			100	82	
	SANDSTONE (MW) - medium strength, brown-orange, fine to medium grained, slightly fractured	72.0								
			7.88m,J,80,i,clean,2mm							
8			7.98m,J,70,i,clean,2mm				0.23(d) 0.21(a)			
		71.0	8.37m,J,80,i,Ca,1mm 8.42m,J,80,ii,clean,3mm			8.45	0.4(d) 0.4(a)			
9			8.89m,J,70,ii,clean,2mm 9.01m,J.80,ii,clean,1mm							
		70.0		3-4	C			100	83	
			9.69m,J,70,i,Ca,2mm							
10							0.8(d)			

D	Disturbed Sample	S	Standard Penetration Test (SPT)	E	Environmental Sample	Is(50)	Point Load Test Result (MPa)
U	Undisturbed Tube (50mm dia)	HB	SPT Hammer Bouncing	Up	Pushtube Sample	(d)	Diametral Test
B	Bulk Sample	( )	No Sample Recovery	C	NMLC Coring	(a)	Axial Test
pp	Pocket Penetrometer Test (kPa)	V	Vane Shear Strength, Uncorrected (kPa)			(i)	Lump Test

Rig: Hydrapower Scout
Logged by: WH
Drilling Method: Auger drilling to 0.5m depth, casing to 0.5m depth, then NMLC
Co-Ordinates E: 479521
Groundwater: No free groundwater encountered during auger drilling
Co-Ordinates N: 6936573
Remarks: *Ground surface level and coordinates determined in field using a GNSS positioning device

BORE REPORT

BORE 5

Client: Stockland Development Pty Ltd
Project: Providence West Residential Subdivision Development
Location: via Ripley Road, Ripley Valley
Project No: BG25-1039A

Page No: 2 of 2
Date: 4/5 August 2025
Ground Surface Level: RL79.3m*

Depth (m)	Description	RL (m)	Lithology	Structures	Average Number of Defects/m	Sample Type	Sample Depth (m)	Is(50) (MPa)	Core Recovery (%)	RQD (%)	Test Results
11	***SANDSTONE (MW)*** - medium strength, brown-orange, fine to medium grained, slightly fractured	69.0		10.33m,J,90,i,Ca,3mm 10.55m,J,90,i,Ca,2mm 10.63m,J,80,i,Ca,2mm 10.64m,J,80,i,Ca,2mm	3-4	C		0.7(a) 0.4(d) 0.7(a)	100	83	
		68.0		11.41m,J,90,i,clean,2mm			11.45	0.8(d)			
12				11.84m,J,85,ii,clean,2mm	2	C		0.8(a)	100	98	
	End of Bore at 12 m	67.0					12.0				
13		66.0									
14		65.0									
15		64.0									
16		63.0									
17		62.0									
18		61.0									
19		60.0									
20											

D	Disturbed Sample	S	Standard Penetration Test (SPT)	E	Environmental Sample	Is(50)	Point Load Test Result (MPa)
U	Undisturbed Tube (50mm dia)	HB	SPT Hammer Bouncing	Up	Pushtube Sample	(d)	Diametral Test
B	Bulk Sample	( )	No Sample Recovery	C	NMLC Coring	(a)	Axial Test
pp	Pocket Penetrometer Test (kPa)	V	Vane Shear Strength, Uncorrected (kPa)			(i)	Lump Test

Rig: Hydrapower Scout
Drilling Method: Auger drilling to 0.5m depth, casing to 0.5m depth, then NMLC
Groundwater: No free groundwater encountered during auger drilling
Remarks: *Ground surface level and coordinates determined in field using a GNSS positioning device

Logged by: WH
Co-Ordinates E: 479521
Co-Ordinates N: 6936573

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CORE PHOTOGRAPHS

Client:	Stockland Development Pty Ltd	**Bore:** 5
Project:	Providence West Residential Subdivision Development	
Location:	via Ripley Road, Ripley Valley	
Project No.:	BG25-1039A	
Date:	4/5 August 2025	**Ground Surface Level:** RL79.3m



BORE REPORT

BORE 6

Client: Stockland Development Pty Ltd
Project: Providence West Residential Subdivision Development
Location: via Ripley Road, Ripley Valley
Project No: BG25-1039A

Page No: 1 of 2
Date: 5 August 2025
Ground Surface Level: RL89.6m*

Depth (m)	Description	RL (m)	Lithology	Structures	Average Number of Defects/m	Sample Type	Sample Depth (m)	Is(50) (MPa)	Core Recovery (%)	RQD (%)	Test Results
0		89.6									
	SILTY SAND (SM) - brown, fine to medium grained sand						0.5				
		89.0				S					5,7,7 N=14
1	***SANDY CLAY (CL)*** - firm, grey-orange with red mottling, fine to medium grained sand						0.95 1.1				
	SANDSTONE (XW) - medium strength, brown-orange, fine to coarse grained, fractured			1.48m,J,90,i,clean,2mm 1.60m,J,90,ii,clean,1mm 1.63m,J,90,ii,clean,1mm 1.74m,J,90,ii,Qtz,4mm 1.84m,J,80,iv,clean,1mm				0.4(d) 0.06(a)			
2		88.0									
	SANDSTONE (HW) - grey			2.53-2.60m,crush zone 2.64-2.98m,J,90,i,clean,1mm	5-7	C		0.35(d) 0.7(a)	100	57	
	- brown-orange, fine to medium grained, slightly fractured	87.0		3.07m,J,90,i,Qtz,3mm 3.19m,J,60,iv,clean,2mm 3.37m,J,60,iv,clean,2mm 3.4-3.45m,J,60,i,clean,1mm(5) 3.54-3.78m,J,70,i,clean,1mm(5)				0.4(d) 0.27(a)			
3	- fine to coarse grained, fractured										
		86.0									
4	- slightly fractured to unbroken						3.95				
		85.0						0.31(d) 0.31(a)			
5								0.4(d) 0.25(a)			
		84.0		5.46m,J,90,i,clean,2mm	2-4	C			100	95	
6	***SANDSTONE (MW)*** - low to medium strength, brown-orange, fine grained, slightly fractured to unbroken			6.04m,J,80,i,clean,1mm 6.05m,J,80,i,clean,1mm							
		83.0		6.61m,J,90,i,clean,2mm 6.81m,J,80,i,clean,2mm				0.18(d) 0.33(a)			
7							7.0				
		82.0		7.70m,J,90,i,Mn,1mm				0.28(d) 0.21(a)			
8				8.39m,J,80,ii,clean,<1mm	2	C		0.08(d) 0.24(a)	100	87	
	- fine to medium grained	81.0									
9				8.91m,J,80,i,clean,2mm							
				9.38m,J,80,i,clean,2mm 9.52m,J,80,i,clean,4mm							
		80.0									
10				9.90-9.96m,crush seam			10.0				

D	Disturbed Sample	S	Standard Penetration Test (SPT)	E	Environmental Sample	Is(50)	Point Load Test Result (MPa)
U	Undisturbed Tube (50mm dia)	HB	SPT Hammer Bouncing	Up	Pushtube Sample	(d)	Diametral Test
B	Bulk Sample	( )	No Sample Recovery	C	NMLC Coring	(a)	Axial Test
pp	Pocket Penetrometer Test (kPa)	V	Vane Shear Strength, Uncorrected (kPa)			(i)	Lump Test

Rig: Hydrapower Scout
Logged by: WH
Drilling Method: Auger drilling to 1.1m depth, casing to 1.0m depth, then NMLC
Co-Ordinates E: 479824
Groundwater: No free groundwater encountered during auger drilling
Co-Ordinates N: 6936743
Remarks: *Ground surface level and coordinates determined in field using a GNSS positioning device

BORE REPORT

BORE 6

Client: Stockland Development Pty Ltd
Project: Providence West Residential Subdivision Development
Location: via Ripley Road, Ripley Valley
Project No: BG25-1039A

Page No: 2 of 2
Date: 5 August 2025
Ground Surface Level: RL89.6m*

Depth (m)	Description	RL (m)	Lithology	Structures	Average Number of Defects/m	Sample Type	Sample Depth (m)	Is(50) (MPa)	Core Recovery (%)	RQD (%)	Test Results
11	***SANDSTONE (MW)*** - medium strength, brown-orange, fine to medium grained, slightly fractured to unbroken	79.0		11.15m,J,90,i,clean,4mm 11.33m,J,90,i,clean,2mm	1-2	C		0.5(d) 1.0(a) 0.34(d) 0.25(a)	100	85	
12	End of Bore at 12 m	78.0					12.0				
13		77.0									
14		76.0									
15		75.0									
16		74.0									
17		73.0									
18		72.0									
19		71.0									
20		70.0									

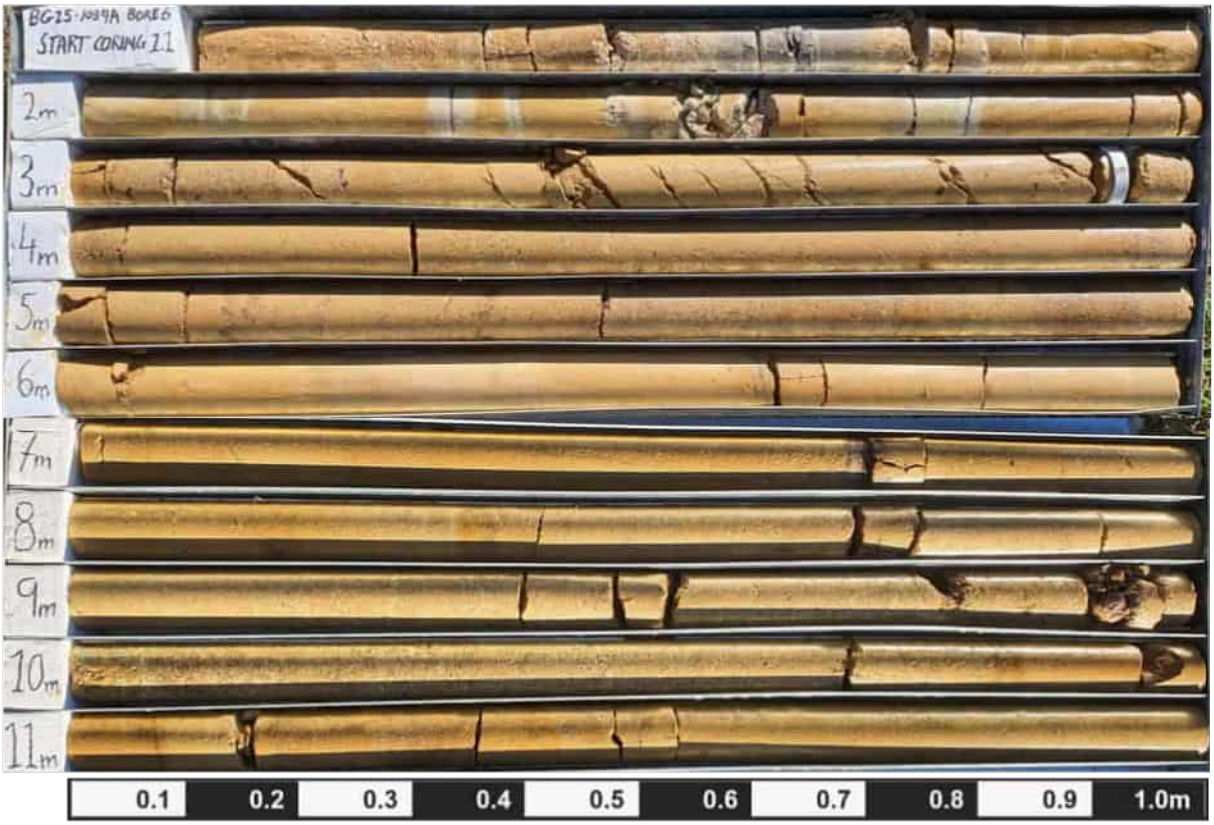
D	Disturbed Sample	S	Standard Penetration Test (SPT)	E	Environmental Sample	Is(50)	Point Load Test Result (MPa)
U	Undisturbed Tube (50mm dia)	HB	SPT Hammer Bouncing	Up	Pushtube Sample	(d)	Diametral Test
B	Bulk Sample	( )	No Sample Recovery	C	NMLC Coring	(a)	Axial Test
pp	Pocket Penetrometer Test (kPa)	V	Vane Shear Strength, Uncorrected (kPa)			(i)	Lump Test

Rig: Hydrapower Scout
Logged by: WH
Drilling Method: Auger drilling to 1.1m depth, casing to 1.0m depth, then NMLC
Co-Ordinates E: 479824
Groundwater: No free groundwater encountered during auger drilling
Co-Ordinates N: 6936743
Remarks: *Ground surface level and coordinates determined in field using a GNSS positioning device

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CORE PHOTOGRAPHS

Client:	Stockland Development Pty Ltd	**Bore:** 6
Project:	Providence West Residential Subdivision Development	
Location:	via Ripley Road, Ripley Valley	
Project No.:	BG25-1039A	
Date:	5 August 2025	**Ground Surface Level:** RL89.6m



BORE REPORT

BORE 7

Client: Stockland Development Pty Ltd
Project: Providence West Residential Subdivision Development
Location: via Ripley Road, Ripley Valley
Project No: BG25-1039A

Page No: 1 of 2
Date: 25 June 2025
Ground Surface Level: RL54.3m*

Depth (m)	Description	RL (m)	Lithology	Structures	Average Number of Defects/m	Sample Type	Sample Depth (m)	Is(50) (MPa)	Core Recovery (%)	RQD (%)	Test Results
0	***SANDY CLAY (CL)*** - stiff, brown, fine to medium grained sand	54.3				D	0.0				
						D	0.25				
						D/S	0.5				3,5,5 N=10
						D/S	0.75				
1	***SILTY CLAY (CH)*** - very stiff, pale brown pale grey, with fine grained sand	53.0				D	0.95				
						D	1.0				
						D	1.25				
						U	1.5				pp=450
2	***SANDY CLAY (CL)*** - hard, grey mottled orange, fine grained sand	52.0					1.8				
3	- grey	51.0				S	3.0				12,17,21 N=38
							3.45				
4	- hard	50.0				S	4.5				17,30/140mm
							4.79				
5		49.0									
6	***SANDSTONE (XW)*** - very low to low strength, brown, fine to medium grained	48.0				S	6.0				30/75mm
							6.075				
7		47.0				S	7.5				30/70mm
							7.6				
8		46.0									
9	- grey brown	45.0				S	9.0				30/145mm
							9.145				
10											

D	Disturbed Sample	S	Standard Penetration Test (SPT)	E	Environmental Sample
U	Undisturbed Tube (50mm dia)	HB	SPT Hammer Bouncing	Up	Pushtube Sample
B	Bulk Sample	( )	No Sample Recovery	C	NMLC Coring
pp	Pocket Penetrometer Test (kPa)	V	Vane Shear Strength, Uncorrected (kPa)		

Is(50)	Point Load Test Result (MPa)
(d)	Diametral Test
(a)	Axial Test
(i)	Lump Test

Rig: Jacro 350
Logged by: AH
Drilling Method: Auger drilling to 3m depth, washbore to 12m depth, then NMLC
Co-Ordinates E: 480142
Groundwater: No free groundwater encountered during auger drilling
Co-Ordinates N: 6936342
Remarks: *Ground surface level and coordinates determined in field using a GNSS positioning device

BORE REPORT

BORE 7

Client: Stockland Development Pty Ltd
Project: Providence West Residential Subdivision Development
Location: via Ripley Road, Ripley Valley
Project No: BG25-1039A

Page No: 2 of 2
Date: 25 June 2025
Ground Surface Level: RL54.3m*

Depth (m)	Description	RL (m)	Lithology	Structures	Average Number of Defects/m	Sample Type	Sample Depth (m)	Is(50) (MPa)	Core Recovery (%)	RQD (%)	Test Results
11	***SANDSTONE (MW)*** - medium strength, grey mottled orange, trace clay band	44.0		10.66,J,5°,vii,clean,1mm 10.73,J,5°,viii,clean,1mm 10.82,J,5°,viii,clean,1mm 10.9,J,5°,viii,clean,16mm 10.97,J,5°,vii,clean,10mm 11.45,J,5°,vii,clean,1mm 11.8,J,5°,vii,clean,1mm	3-5	C	10.5 12.0	0.13(d) 0.13(a) 1.0(d) 1.6(a)	100	80	
12	***SANDSTONE (SW)*** - high strength, grey mottled orange, fine grained sand	43.0									
	End of Bore at 12 m	42.0									
13		41.0									
14		40.0									
15		39.0									
16		38.0									
17		37.0									
18		36.0									
19		35.0									
20											

D	Disturbed Sample	S	Standard Penetration Test (SPT)	E	Environmental Sample	Is(50)	Point Load Test Result (MPa)
U	Undisturbed Tube (50mm dia)	HB	SPT Hammer Bouncing	Up	Pushtube Sample	(d)	Diametral Test
B	Bulk Sample	( )	No Sample Recovery	C	NMLC Coring	(a)	Axial Test
pp	Pocket Penetrometer Test (kPa)	V	Vane Shear Strength, Uncorrected (kPa)			(i)	Lump Test

Rig: Jacro 350
Drilling Method: Auger drilling to 3m depth, washbore to 12m depth, then NMLC
Groundwater: No free groundwater encountered during auger drilling
Remarks: *Ground surface level and coordinates determined in field using a GNSS positioning device

Logged by: AH
Co-Ordinates E: 480142
Co-Ordinates N: 6936342

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CORE PHOTOGRAPHS

Client:	Stockland Development Pty Ltd	**Bore:** 7
Project:	Providence West Residential Subdivision Development	
Location:	via Ripley Road, Ripley Valley	
Project No.:	BG25-1039A	
Date:	25 June 2025	**Ground Surface Level:** RL54.3m



TEST PIT REPORT

TEST PIT 1

Client: Stockland Development Pty Ltd
Project: Providence West Residential Subdivision Development
Location: via Ripley Road, Ripley Valley
Project No: BG25-1039A

Page No: 1 of 1
Date: 30 June 2025
Ground Surface Level: RL51.8m*

Depth (m)	Description	RL (m)	Lithology	Sample Type	Depth (m)	Test Results
		51.8				
0	***SANDY CLAY (CI)*** - firm, grey, fine grained sand			D	0.0	pp=90
	CLAYEY SAND (SC) - very loose to loose, pale brown grey mottled orange, fine to medium grained				0.3	
	- medium dense			D	0.5	
		51.0			0.8	
1	- dense, interbedded with sandy clay bands					
	- very dense			D	1.5	
		50.0			1.8	
2						
				D	2.4	
					2.7	
		49.0				
	End of Test Pit at 2.8 m					
3						

D	**Disturbed Sample**	**E**	**Environmental Sample**	**pp**	**Pocket Penetrometer Test (kPa)**
B	**Bulk Sample**	**U**	**Undisturbed Tube (50mm diameter)**	**Is(50)**	**Point Load Test Result (MPa)**
V	**Vane Shear Strength (Uncorrected)kPa**	**A**	**Asbestos**		

Excavator: 14t Kobelco
Bucket Size: 1800mm
Groundwater: No free groundwater encountered during excavation
Remarks: *Approximate ground surface level interpolated from QSpatial LiDAR 1m contour data

Logged by: AH
Co-Ordinates E: 480094
Co-Ordinates N: 6936391

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TEST PIT PHOTOGRAPHS

Client:	Stockland Development Pty Ltd	**Test Pit:** 1
Project:	Providence West Residential Subdivision Development	
Location:	via Ripley Road, Ripley Valley	
Project No.:	BG25-1039A	**Ground Surface Level:** RL51.8m
Date:	30 June 2025	**Depth:** 0.0 – 2.8m



Photograph 1: Spoil



Photograph 2: Spoil



Photograph 3: Spoil



Photograph 4: Side Wall

TEST PIT REPORT

TEST PIT 2

Client: Stockland Development Pty Ltd
Project: Providence West Residential Subdivision Development
Location: via Ripley Road, Ripley Valley
Project No: BG25-1039A

Page No: 1 of 1
Date: 30 June 2025
Ground Surface Level: RL59.3m*

Depth (m)	Description	RL (m)	Lithology	Sample Type	Depth (m)	Test Results
0		59.3				
	SILTY SAND (SM) - medium dense, brown, fine grained sand			D	0.0	
	- pale brown	59.0		D	0.3	
	- dense, red, fine to medium grained			D	0.5	
					0.8	
1		58.0				
				D	1.5	
	- red-orange				1.8	
2		57.0				
					3.0	
3	- grey-orange mottled red			D		
		56.0			3.3	
	End of Test Pit at 3.6 m					
4						

D	**Disturbed Sample**	**E**	**Environmental Sample**	**pp**	**Pocket Penetrometer Test (kPa)**
B	**Bulk Sample**	**U**	**Undisturbed Tube (50mm diameter)**	**Is(50)**	**Point Load Test Result (MPa)**
V	**Vane Shear Strength (Uncorrected)kPa**	**A**	**Asbestos**		

Excavator: 14t Kobelco
Bucket Size: 1800mm
Groundwater: No free groundwater encountered during excavation
Logged by: AH
Co-Ordinates E: 480126
Co-Ordinates N: 6936580
Remarks: *Ground surface level and coordinates determined in field using a GNSS positioning device

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TEST PIT PHOTOGRAPHS

Client:	Stockland Development Pty Ltd	**Test Pit:** 2
Project:	Providence West Residential Subdivision Development	
Location:	via Ripley Road, Ripley Valley	
Project No.:	BG25-1039A	**Ground Surface Level:** RL60.2m
Date:	30 June 2025	**Depth:** 0.0 – 3.6m



Photograph 1: Spoil



Photograph 2: Spoil



Photograph 3: Side Wall

TEST PIT REPORT

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TEST PIT 3

Client: Stockland Development Pty Ltd
Project: Providence West Residential Subdivision Development
Location: via Ripley Road, Ripley Valley
Project No: BG25-1039A

Page No: 1 of 1
Date: 30 June 2025
Ground Surface Level: RL83.1m*

Depth (m)	Description	RL (m)	Lithology	Sample Type	Depth (m)	Test Results
0		83.1				
	SILTY SAND (SM) - very loose to loose, brown, fine grained			D	0.0	
	- medium dense to dense, pale brown			D	0.2	
	- orange-grey			D	0.5	
	SANDSTONE (XW) - very low strength, orange mottled pale brown, fine to medium grained			D	0.65	
					0.8	
	End of Test Pit at 0.8 m (Bucket refusal)					
1		82.0				
2		81.0				
3						

D	Disturbed Sample	E	Environmental Sample	pp	Pocket Penetrometer Test (kPa)
B	Bulk Sample	U	Undisturbed Tube (50mm diameter)	Is(50)	Point Load Test Result (MPa)
V	Vane Shear Strength (Uncorrected)kPa	A	Asbestos		

Excavator: 14t Kobelco
Bucket Size: 1800mm
Groundwater: No free groundwater encountered during excavation
Logged by: AH
Co-Ordinates E: 479847
Co-Ordinates N: 6936664
Remarks: *Ground surface level and coordinates determined in field using a GNSS positioning device

TEST PIT PHOTOGRAPHS

Client:	Stockland Development Pty Ltd	**Test Pit:** 3
Project:	Providence West Residential Subdivision Development	
Location:	via Ripley Road, Ripley Valley	
Project No.:	BG25-1039A	**Ground Surface Level:** RL83.7m
Date:	30 June 2025	**Depth:** 0.0 – 0.65m



Photograph 1: Spoil



Photograph 2: Side Wall

TEST PIT REPORT

TEST PIT 4

Client: Stockland Development Pty Ltd
Project: Providence West Residential Subdivision Development
Location: via Ripley Road, Ripley Valley
Project No: BG25-1039A

Page No: 1 of 1
Date: 30 June 2025
Ground Surface Level: RL68.1m*

Depth (m)	Description	RL (m)	Lithology	Sample Type	Depth (m)	Test Results
		68.1				
0	***SILTY SAND (SM)***				0.0	
	- very loose to loose, brown, fine to medium grained			D		
					0.3	
	- medium dense, brown mottled orange			D		
					0.5	
				D		
	SANDSTONE (XW)				0.8	
	- low strength, orange mottled brown, fine to medium grained			D	0.9	
1	End of Test Pit at 0.9 m					
	(Bucket Refusal)	67.0				
2		66.0				
3						

D	**Disturbed Sample**	**E**	**Environmental Sample**	**pp**	**Pocket Penetrometer Test (kPa)**
B	**Bulk Sample**	**U**	**Undisturbed Tube (50mm diameter)**	**Is(50)**	**Point Load Test Result (MPa)**
V	**Vane Shear Strength (Uncorrected)kPa**	**A**	**Asbestos**		

Excavator: 14t Kobelco
Bucket Size: 1800mm
Groundwater: No free groundwater encountered during excavation
Logged by: AH
Co-Ordinates E: 479925
Co-Ordinates N: 6936546
Remarks: *Ground surface level and coordinates determined in field using a GNSS positioning device

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TEST PIT PHOTOGRAPHS

Client:	Stockland Development Pty Ltd	**Test Pit:** 4
Project:	Providence West Residential Subdivision Development	
Location:	via Ripley Road, Ripley Valley	
Project No.:	BG25-1039A	**Ground Surface Level:** RL67.8m
Date:	30 June 2025	**Depth:** 0.0 – 0.9m



Photograph 1: Spoil



Photograph 2: Side Wall

TEST PIT REPORT

TEST PIT 5

Client: Stockland Development Pty Ltd
Project: Providence West Residential Subdivision Development
Location: via Ripley Road, Ripley Valley
Project No: BG25-1039A

Page No: 1 of 1
Date: 30 June 2025
Ground Surface Level: RL75.6m*

Depth (m)	Description	RL (m)	Lithology	Sample Type	Depth (m)	Test Results
		75.6				
0	***SILTY SAND (SM)*** - very loose to loose, brown, fine to medium grained			D	0.0	
	SANDY CLAY (CH) - hard, grey, fine to medium grained sand			D	0.15	pp>600
	- orange-grey	75.0		D	0.5	pp>600
	SANDSTONE (XW) - low to medium strength, orange mottled pale brown, fine to medium grained			D	0.8 / 0.9	
1	End of Test Pit at 0.9 m (Bucket refusal)	74.0				
2		73.0				
3						

D	**Disturbed Sample**	**E**	**Environmental Sample**	**pp**	**Pocket Penetrometer Test (kPa)**
B	**Bulk Sample**	**U**	**Undisturbed Tube (50mm diameter)**	**Is(50)**	**Point Load Test Result (MPa)**
V	**Vane Shear Strength (Uncorrected)kPa**	**A**	**Asbestos**		

Excavator: 14t Kobelco
Bucket Size: 1800mm
Groundwater: No free groundwater encountered during excavation
Logged by: AH
Co-Ordinates E: 479582
Co-Ordinates N: 6936558
Remarks: *Ground surface level and coordinates determined in field using a GNSS positioning device

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TEST PIT PHOTOGRAPHS

Client:	Stockland Development Pty Ltd	**Test Pit:** 5
Project:	Providence West Residential Subdivision Development	
Location:	via Ripley Road, Ripley Valley	
Project No.:	BG25-1039A	**Ground Surface Level:** RL75.7m
Date:	30 June 2025	**Depth:** 0.0 – 0.9m



Photograph 1: Spoil



Photograph 2: Side Wall

TEST PIT REPORT

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Client: Stockland Development Pty Ltd
Project: Providence West Residential Subdivision Development
Location: via Ripley Road, Ripley Valley
Project No: BG25-1039A

TEST PIT 6

Page No: 1 of 1
Date: 30 June 2025
Ground Surface Level: RL87.5m*

Depth (m)	Description	RL (m)	Lithology	Sample Type	Depth (m)	Test Results
		87.5				
0	***SILTY SAND (SM)***				0.0	
	- medium dense, brown, fine to medium grained sand			D	0.1	
	- grey, with clay			D		
	- dense, pale brown orange				0.4	
		87.0		D		
					0.7	
	SANDSTONE (XW)				0.8	
1	- extremely low strength, orange-pale brown, fine to medium grained			D	1.0	
	End of Test Pit at 1.3 m (Bucket refusal)	86.0				
2		85.0				
3						

D	**Disturbed Sample**	**E**	**Environmental Sample**	**pp**	**Pocket Penetrometer Test (kPa)**
B	**Bulk Sample**	**U**	**Undisturbed Tube (50mm diameter)**	**Is(50)**	**Point Load Test Result (MPa)**
V	**Vane Shear Strength (Uncorrected)kPa**	**A**	**Asbestos**		

Excavator: 14t Kobelco
Bucket Size: 1800mm
Groundwater: No free groundwater encountered during excavation
Logged by: AH
Co-Ordinates E: 479512
Co-Ordinates N: 6936769
Remarks: *Ground surface level and coordinates determined in field using a GNSS positioning device

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TEST PIT PHOTOGRAPHS

Client:	Stockland Development Pty Ltd	**Test Pit:** 6
Project:	Providence West Residential Subdivision Development	
Location:	via Ripley Road, Ripley Valley	
Project No.:	BG25-1039A	**Ground Surface Level:** RL87.4m
Date:	30 June 2025	**Depth:** 0.0 – 1.3m



Photograph 1: Spoil



Photograph 2: Side Wall

TEST PIT REPORT

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TEST PIT 13

Client: Stockland Development Pty Ltd
Project: Providence West Residential Subdivision Development
Location: via Ripley Road, Ripley Valley
Project No: BG25-1039A

Page No: 1 of 1
Date: 1 July 2025
Ground Surface Level: RL63.0m*

Depth (m)	Description	RL (m)	Lithology	Sample Type	Depth (m)	Test Results
0		63.0				
	SILTY SAND (SM) - very loose to loose, brown, fine to medium grained			D	0.0	
	- medium dense to dense, pale brown			D	0.2	
					0.6	
	SANDY CLAY (CI) - hard, red-brown mottled orange, fine to medium grained sand,interbedded with clayey sand bands				0.9	
1		62.0		D		pp>600
					1.3	pp>600
						pp>600
2		61.0				
	SANDSTONE (XW) - medium strength, orange-pale brown, fine to medium grained			D	2.4	
	End of Test Pit at 2.5 m (Bucket refusal)				2.5	
3		60.0				

D	**Disturbed Sample**	**E**	**Environmental Sample**	**pp**	**Pocket Penetrometer Test (kPa)**
B	**Bulk Sample**	**U**	**Undisturbed Tube (50mm diameter)**	**Is(50)**	**Point Load Test Result (MPa)**
V	**Vane Shear Strength (Uncorrected)kPa**	**A**	**Asbestos**		

Excavator: 14t Kobelco
Bucket Size: 1800mm
Groundwater: No free groundwater encountered during excavation
Logged by: AH
Co-Ordinates E: 480285
Co-Ordinates N: 6936663
Remarks: *Ground surface level and coordinates determined in field using a GNSS positioning device

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TEST PIT PHOTOGRAPHS

Client:	Stockland Development Pty Ltd	**Test Pit:** 13
Project:	Providence West Residential Subdivision Development	
Location:	via Ripley Road, Ripley Valley	
Project No.:	BG25-1039A	**Ground Surface Level:** RL64.0m
Date:	1 July 2025	**Depth:** 0.0 – 2.5m



Photograph 1: Spoil



Photograph 2: Spoil



Photograph 3: Side Wall

TEST PIT REPORT

TEST PIT 14

Client: Stockland Development Pty Ltd
Project: Providence West Residential Subdivision Development
Location: via Ripley Road, Ripley Valley
Project No: BG25-1039A

Page No: 1 of 1
Date: 1 July 2025
Ground Surface Level: RL55.5m*

Depth (m)	Description	RL (m)	Lithology	Sample Type	Depth (m)	Test Results
		55.5				
0	***SILTY SAND (SM)*** - very loose to loose, brown, fine to medium grained			D	0.0	
	SANDY CLAY (CH) - hard, brown mottled orange, fine to medium grained sand			D	0.2	pp>600
	- brown-red	55.0		D	0.5	
1					0.9	
	SANDSTONE (XW) - very low strength, orange mottled brown, fine to medium grained			D	1.05	
	End of Test Pit at 1.2 m (Bucket refusal)				1.2	
		54.0				
2						
		53.0				
3						

D	**Disturbed Sample**	**E**	**Environmental Sample**	**pp**	**Pocket Penetrometer Test (kPa)**
B	**Bulk Sample**	**U**	**Undisturbed Tube (50mm diameter)**	**Is(50)**	**Point Load Test Result (MPa)**
V	**Vane Shear Strength (Uncorrected)kPa**	**A**	**Asbestos**		

Excavator: 14t Kobelco
Bucket Size: 1800mm
Groundwater: No free groundwater encountered during excavation
Logged by: AH
Co-Ordinates E: 480456
Co-Ordinates N: 6936675
Remarks: *Ground surface level and coordinates determined in field using a GNSS positioning device

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TEST PIT PHOTOGRAPHS

Client:	Stockland Development Pty Ltd	**Test Pit:** 14
Project:	Providence West Residential Subdivision Development	
Location:	via Ripley Road, Ripley Valley	
Project No.:	BG25-1039A	**Ground Surface Level:** RL55.7m
Date:	1 July 2025	**Depth:** 0.0 – 1.2m



Photograph 1: Spoil



Photograph 2: Spoil



Photograph 3: Spoil



Photograph 4: Side Wall

TEST PIT REPORT

TEST PIT 20

Client: Stockland Development Pty Ltd
Project: Providence West Residential Subdivision Development
Location: via Ripley Road, Ripley Valley
Project No: BG25-1039A

Page No: 1 of 1
Date: 1 July 2025
Ground Surface Level: RL58.6m*

Depth (m)	Description	RL (m)	Lithology	Sample Type	Depth (m)	Test Results
0		58.6				
	SILTY SAND (SM) - very loose, brown, fine to medium grained			D	0.0	
	SAND (SP) - loose, brown, fine grained			D	0.2	
	CLAYEY SAND (SC) - loose to medium dense, grey mottled orange-pale brown	58.0		D	0.5	
1	- grey-brown mottled orange			D	0.9	
	- brown-grey			D	1.3	
		57.0			1.7	
2						
	SANDSTONE (XW) - very low strength, orange-brown, fine to medium grained			D	2.4	
	End of Test Pit at 2.5 m (Bucket refusal)	56.0			2.5	
3						

D	**Disturbed Sample**	**E**	**Environmental Sample**	**pp**	**Pocket Penetrometer Test (kPa)**
B	**Bulk Sample**	**U**	**Undisturbed Tube (50mm diameter)**	**Is(50)**	**Point Load Test Result (MPa)**
V	**Vane Shear Strength (Uncorrected)kPa**	**A**	**Asbestos**		

Excavator: 14t Kobelco
Bucket Size: 1800mm
Groundwater: No free groundwater encountered during excavation
Logged by: AH
Co-Ordinates E: 479711
Co-Ordinates N: 6936406
Remarks: *Ground surface level and coordinates determined in field using a GNSS positioning device

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TEST PIT PHOTOGRAPHS

Client:	Stockland Development Pty Ltd	**Test Pit:** 20
Project:	Providence West Residential Subdivision Development	
Location:	via Ripley Road, Ripley Valley	
Project No.:	BG25-1039A	**Ground Surface Level:** RL57.8m
Date:	1 July 2025	**Depth:** 0.0 – 2.5m



Photograph 1: Spoil



Photograph 2: Spoil



Photograph 3: Side Wall

TEST PIT REPORT

TEST PIT 24

Client: Stockland Development Pty Ltd
Project: Providence West Residential Subdivision Development
Location: via Ripley Road, Ripley Valley
Project No: BG25-1039A

Page No: 1 of 1
Date: 2 July 2025
Ground Surface Level: RL92.8m*

Depth (m)	Description	RL (m)	Lithology	Sample Type	Depth (m)	Test Results
		92.8				
0	***SILTY SAND (SM)*** - loose to medium dense, brown, fine to medium grained			D	0.0	
	- dense to very dense, pale brown			D	0.2	
	- very dense, pale brown orange			D	0.6	
		92.0		D		
1					1.0	
	SANDSTONE (XW) - very low to low strength, orange-pale brown, fine to medium grained			D	1.6	
		91.0			1.8	
	End of Test Pit at 1.8 m (Bucket refusal)					
2						
		90.0				
3						

D	**Disturbed Sample**	**E**	**Environmental Sample**	**pp**	**Pocket Penetrometer Test (kPa)**
B	**Bulk Sample**	**U**	**Undisturbed Tube (50mm diameter)**	**Is(50)**	**Point Load Test Result (MPa)**
V	**Vane Shear Strength (Uncorrected)kPa**	**A**	**Asbestos**		

Excavator: 14t Kobelco
Bucket Size: 1800mm
Groundwater: No free groundwater encountered during excavation
Logged by: AH
Co-Ordinates E: 479278
Co-Ordinates N: 6936696
Remarks: *Ground surface level and coordinates determined in field using a GNSS positioning device

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TEST PIT PHOTOGRAPHS

Client:	Stockland Development Pty Ltd	**Test Pit:** 24
Project:	Providence West Residential Subdivision Development	
Location:	via Ripley Road, Ripley Valley	
Project No.:	BG25-1039A	**Ground Surface Level:** RL91.3m
Date:	2 July 2025	**Depth:** 0.0 – 1.8m



Photograph 1: Spoil



Photograph 2: Spoil



Photograph 3: Spoil



Photograph 4: Side Wall

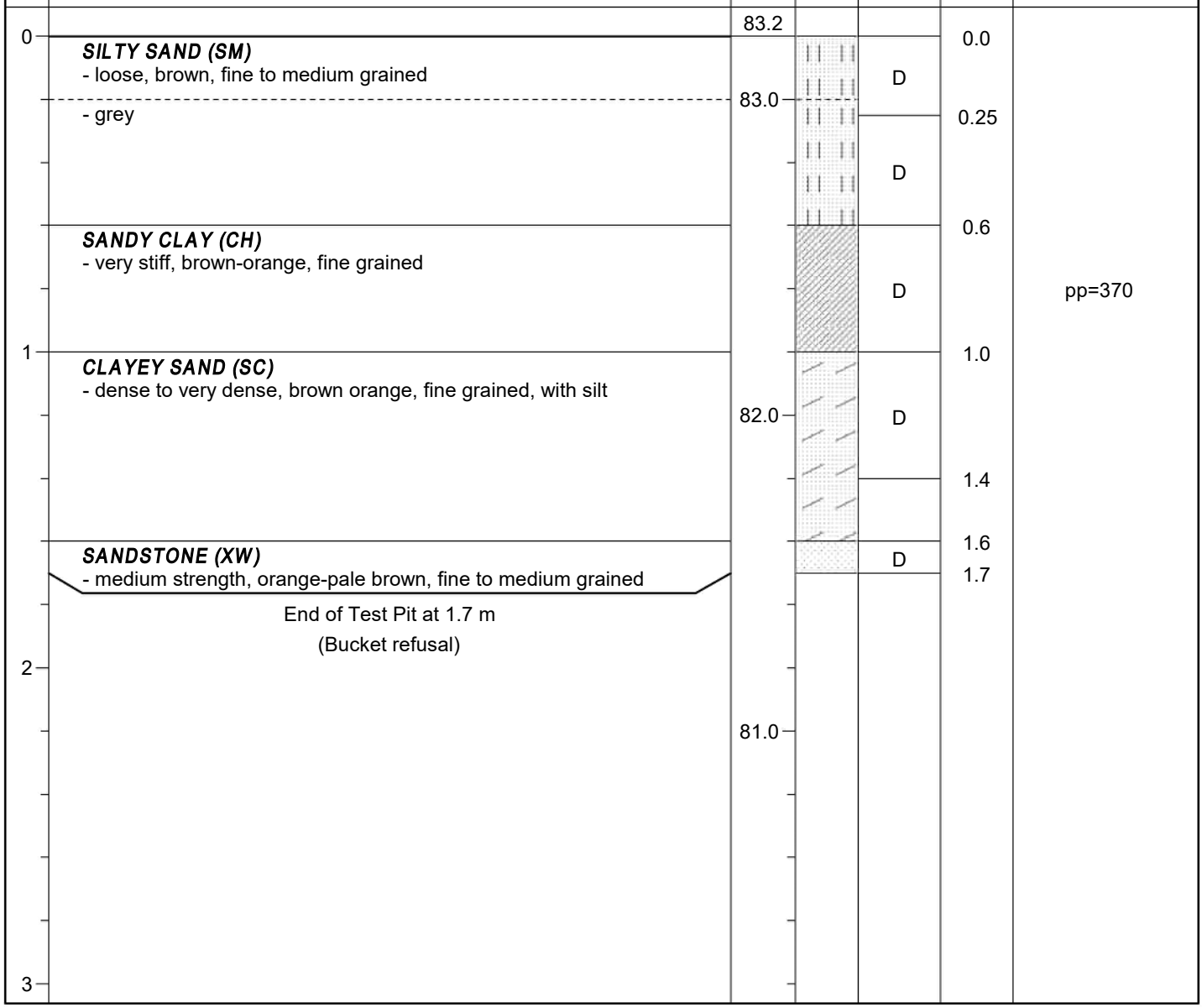
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TEST PIT 25

Client: Stockland Development Pty Ltd
Project: Providence West Residential Subdivision Development
Location: via Ripley Road, Ripley Valley
Project No: BG25-1039A

Page No: 1 of 1
Date: 2 July 2025
Ground Surface Level: RL83.2m*



D	**Disturbed Sample**	**E**	**Environmental Sample**	**pp**	**Pocket Penetrometer Test (kPa)**
B	**Bulk Sample**	**U**	**Undisturbed Tube (50mm diameter)**	**Is(50)**	**Point Load Test Result (MPa)**
V	**Vane Shear Strength (Uncorrected)kPa**	**A**	**Asbestos**		

Excavator: 14t Kobelco
Bucket Size: 1800mm
Groundwater: No free groundwater encountered during excavation
Logged by: AH
Co-Ordinates E: 479043
Co-Ordinates N: 6936743
Remarks: *Ground surface level and coordinates determined in field using a GNSS positioning device

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TEST PIT PHOTOGRAPHS

Client:	Stockland Development Pty Ltd	**Test Pit:** 25
Project:	Providence West Residential Subdivision Development	
Location:	via Ripley Road, Ripley Valley	
Project No.:	BG25-1039A	**Ground Surface Level:** RL82.8m
Date:	2 July 2025	**Depth:** 0.0 – 1.7m



Photograph 1: Spoil



Photograph 2: Spoil



Photograph 3: Spoil



Photograph 4: Side Wall

TEST PIT REPORT

TEST PIT 26

Client: Stockland Development Pty Ltd
Project: Providence West Residential Subdivision Development
Location: via Ripley Road, Ripley Valley
Project No: BG25-1039A

Page No: 1 of 1
Date: 2 July 2025
Ground Surface Level: RL80.2m*

Depth (m)	Description	RL (m)	Lithology	Sample Type	Depth (m)	Test Results
0		80.2				
	SILTY SAND (SM) - medium dense, brown, fine to medium grained			D	0.0	
	SANDY CLAY (CH) - stiff to very stiff, mottled red pale grey, fine grained sand	80.0		D	0.2	pp=340
	CLAYEY SAND (SC) - medium dense to dense, mottled orange pale brown, fine to medium grained			D	0.5	
1	- dense				0.9	
		79.0				
	SANDSTONE (XW) - extremely low to very low strength, orange-pale brown, fine to medium grained			D	1.4	
	End of Test Pit at 1.5 m (Bucket refusal)				1.5	
2		78.0				
3						

D	Disturbed Sample	E	Environmental Sample	pp	Pocket Penetrometer Test (kPa)
B	Bulk Sample	U	Undisturbed Tube (50mm diameter)	Is(50)	Point Load Test Result (MPa)
V	Vane Shear Strength (Uncorrected)kPa	A	Asbestos		

Excavator: 14t Kobelco
Bucket Size: 1800mm
Groundwater: No free groundwater encountered during excavation
Logged by: AH
Co-Ordinates E: 479171
Co-Ordinates N: 6936771
Remarks: *Ground surface level and coordinates determined in field using a GNSS positioning device

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TEST PIT PHOTOGRAPHS

client:	Stockland Development Pty Ltd	**Test Pit:** 26
Project:	Providence West Residential Subdivision Development	
Location:	via Ripley Road, Ripley Valley	
Project No.:	BG25-1039A	**Ground Surface Level:** RL79.9m
Date:	2 July 2025	**Depth:** 0.0 – 1.5m



Photograph 1: Spoil



Photograph 2: Spoil



Photograph 3: Side Wall

Notes on Description and Classification of Soil

The methods of description and classification of soils used in this report are generally based on Australian Standard AS1726-1993 Geotechnical Site Investigations.

Soil description is based on an assessment of disturbed samples, as recovered from bores and excavations, or from undisturbed materials as seen in excavations and exposures or in undisturbed samples. Descriptions given on report sheets are an interpretation of the conditions encountered at the time of investigation.

In the case of cone or piezocone penetrometer tests, actual soil samples are not recovered and soil description is inferred based on published correlations, past experience and comparison with bore and/or test pit data (if available).

Soil classification is based on the particle size distribution of the soil and the plasticity of the portion of the material finer than 0.425mm. The description of particle size distribution and plasticity is based on the results of visual field estimation, laboratory testing or both. When assessed in the field, the properties of the soil are estimated; precise description will always require laboratory testing to define soil properties.

Where soil can be clearly identified as FILL this will be noted as the main soil type followed by a description of the composition of the fill (e.g. FILL – yellow-brown, fine to coarse grained gravelly clay fill with concrete rubble). If the soil is assessed as possibly being fill this will be noted as an additional observation.

Soils are generally described using the following sequence of terms. In certain instances, not all of the terms will be included in the soil description.

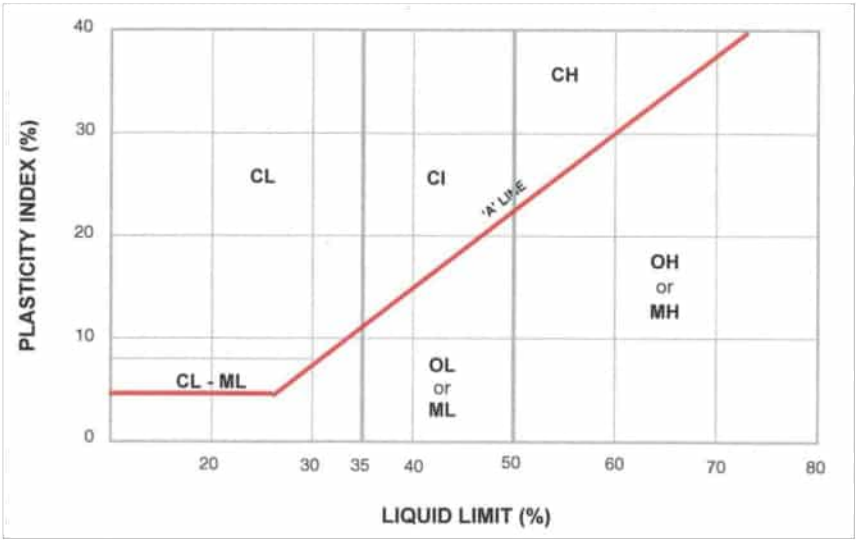
MAIN SOIL TYPE (CLASSIFICATION GROUP SYMBOL)
- strength/density, colour, structure/grain size, secondary and minor components, additional observations

Information on the definition of descriptive and classification terms follows.

SOIL TYPE and CLASSIFICATION GROUP SYMBOLS

	Major Divisions	Particle Size	Classification Group Symbol	Typical Names
COARSE GRAINED SOILS (more than half of material is larger than 0.075mm)	BOULDERS	>200mm		
	COBBLES	63 – 200mm		
	GRAVELS (more than half of coarse fraction is larger than 2.36mm)	Coarse: 20 – 63mm Medium: 6 – 20mm Fine: 2.36 – 6mm	GW	Well graded gravels, gravel-sand mixtures, little or no fines.
			GP	Poorly graded gravels and gravel-sand mixtures, little or no fines, uniform gravels.
			GM	Silty gravels, gravel-sand-silt mixtures.
			GC	Clayey gravels, gravel-sand-clay mixtures.
	SANDS (more than half of coarse fraction is smaller than 2.36mm)	Coarse: 0.6 – 2.36mm Medium: 0.2 – 0.6mm Fine: 0.075 – 0.2mm	SW	Well graded sands, gravelly sands, little or no fines.
			SP	Poorly graded sands and gravelly sands; little or no fines, uniform sands.
			SM	Silty sands, sand-silt mixtures.
			SC	Clayey sands, sand-clay mixtures.
FINE GRAINED SOILS (more than half of material is smaller than 0.075mm)	SILTS & CLAYS (liquid limit <50%)		ML	Inorganic silts and very fine sands, silty/clayey fine sands or clayey silts with low plasticity.
			CL and CI	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays.
			OL	Organic silts and organic silty clays of low plasticity.
	SILTS & CLAYS (liquid limit >50%)		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils.
			CH	Inorganic clays of high plasticity.
			OH	Organic clays of medium to high plasticity, organic silts.
	HIGHLY ORGANIC SOILS		Pt	Peat and other highly organic soils.

PLASTICITY CHART FOR CLASSIFICATION OF FINE GRAINED SOILS



(Reference: Australian Standard AS1726-1993 Geotechnical site investigations)

DESCRIPTIVE TERMS FOR MATERIAL PROPORTIONS

Coarse Grained Soils		Fine Grained Soils	
% Fines	Modifier	% Coarse	Modifier
<5	Omit, or use 'trace'	<15	Omit, or use trace.
5 – 12	Describe as 'with clay/silt' as applicable.	15 – 30	Describe as 'with sand/gravel' as applicable.
>12	Prefix soil as 'silty/clayey' as applicable	>30	Prefix soil as 'sandy/gravelly' as applicable.

STRENGTH TERMS – COHESIVE SOILS

Strength Term	Undrained Shear Strength	Field Guide to Strength
Very soft	<12kPa	Exudes between the fingers when squeezed in hand.
Soft	12 – 25kPa	Can be moulded by light finger pressure.
Firm	25 – 50kPa	Can be moulded by strong finger pressure.
Stiff	50 – 100kPa	Cannot be moulded by fingers, can be indented by thumb.
Very stiff	100 – 200kPa	Can be indented by thumb nail.
Hard	>200kPa	Can be indented with difficulty by thumb nail.

DENSITY TERMS – NON COHESIVE SOILS

Density Term	Density Index	SPT "N"	CPT Cone Resistance
Very loose	<15%	0 – 5	0 – 2MPa
Loose	15 – 35%	5 – 10	2 – 5MPa
Medium dense	35 – 65%	10 – 30	5 – 15MPa
Dense	65 – 85%	30 – 50	15 – 25MPa
Very dense	>85%	>50	>25MPa

COLOUR

The colour of a soil will generally be described in a 'moist' condition using simple colour terms (e.g. black, grey, red, brown etc.) modified as necessary by "pale", "dark", "light" or "mottled". Borderline colours will be described as a combination of colours (e.g. grey-brown).

EXAMPLE

e.g. CLAYEY SAND (SC) – medium dense, grey-brown, fine to medium grained with silt.

Indicates a medium dense, grey-brown, fine to medium grained clayey sand with silt.

Notes on Description and Classification of Rock

The methods of description and classification of rock used in this report are generally based on Australian Standard AS1726-1993 *Geotechnical site investigations*.

Rock description is based on an assessment of disturbed samples, as recovered from bores and excavations, or from undisturbed materials as seen in excavations and exposures, or in core samples. Descriptions given on report sheets are an interpretation of the conditions encountered at the time of investigation.

Notes outlining the method and terminology adopted for the description of rock defects are given below, however, detailed information on defects can generally only be determined where rock core is taken, or excavations or exposures allow detailed observation and measurement.

Rocks are generally described using the following sequence of terms. In certain instances not all of the terms will be included in the rock description.

ROCK TYPE (WEATHERING SYMBOL), strength, colour, grain size, defect frequency

Information on the definition of descriptive and classification terms follows.

ROCK TYPE

In general, simple rock names are used rather than precise geological classifications.

ROCK MATERIALS WEATHERING CLASSIFICATION

Term	Weathering Symbol	Definition
Residual soil	RS	Soil developed from extremely weathered rock; the mass structure and substance fabrics are no longer evident; there is a large change in volume but the soil has not been significantly transported.
Extremely weathered	XW	Rock is weathered to such an extent that it has 'soil' properties, i.e. it either disintegrates or can be remoulded in water.
Distinctly weathered *	DW	Rock strength usually changed by weathering. The rock may be highly discoloured, usually by ironstaining. Porosity may be increased by leaching, or may be decreased due to deposition of weathering products in pores.
- Highly weathered	HW	Rock substance affected by weathering to the extent that limonite staining or bleaching affects the whole of the rock substance and other signs of chemical or physical decomposition are evident. Porosity and strength may be increased or decreased compared to the fresh rock, usually as a result of iron leaching or deposition. The colour and strength of the original fresh rock substance is no longer recognisable.
- Moderately weathered	MW	Rock substance affected by weathering to the extent that staining extends throughout the whole of the rock substance and the original colour of the fresh rock may be no longer recognisable.
Slightly weathered	SW	Rock is slightly discoloured but shows little or no change of strength from fresh rock.
Fresh	FR	Rock shows no sign of decomposition or staining.

** Subdivision of this weathering grade into highly and moderately may be used where applicable.*

STRENGTH OF ROCK MATERIAL

Term	Symbol	Point Load Index I_s (50)	Field Guide To Strength
Extremely low	EL	<0.03MPa	Easily remoulded by hand to a material with soil properties.
Very low	VL	0.03 – 0.1MPa	Material crumbles under firm blows with sharp end of pick; can be peeled with knife; too hard to cut a triaxial sample by hand. Pieces up to 30mm thick can be broken by finger pressure.
Low	L	0.1 – 0.3MPa	Easily scored with a knife; indentations 1mm to 3mm show in the specimen with firm blows of the pick point; has dull sound under hammer. A piece of core 150mm long 50mm diameter may be broken by hand. Sharp edges of core may be friable and break during handling.
Medium	M	0.3 – 1.0MPa	Readily scored with a knife; a piece of core 150mm long by 50mm diameter can be broken by hand with difficulty.
High	H	1.0 – 3.0MPa	A piece of core 150mm long by 50mm diameter cannot be broken by hand but can be broken by a pick with a single firm blow; rock rings under hammer.
Very high	VH	3.0 – 10.0MPa	Hand specimen breaks with pick after more than one blow; rock rings under hammer.
Extremely high	EH	>10MPa	Specimen requires many blows with geological pick to break through intact material; rock rings under hammer.

Notes:
1. *These terms refer to the strength of the rock material and not to the strength of the rock mass which may be considerably weaker due to the effect of rock defects.*
2. *The field guide visual assessment for rock strength may be used for preliminary assessment or when point load testing is not available.*
3. *Anisotropy of rock may affect the field assessment of strength.*

COLOUR

The colour of a rock will generally be described in a 'moist' condition using simple colour terms (e.g. black, grey, red, brown, etc) modified as necessary by 'pale', 'dark', 'light' or 'mottled'. Borderline colours will be described as a combination of colours (e.g. grey-brown).

GRAIN SIZE

Descriptive Term	Particle Size Range
Coarse grained	0.6 – 2.0mm
Medium grained	0.2 – 0.6mm
Fine grained	0.06 – 0.2mm

DEFECT FREQUENCY

Where appropriate, a defect frequency may be recorded as part of the rock description and will be expressed as the number of natural (or interpreted natural) defects present in an equivalent one metre length of core; by use of the following defect frequency descriptive terms; or both. The descriptive terms refer to the spacing of all types of natural defects along which the rock is discontinuous and include, bedding plane partings, joints and other rock defects, but excludes known artificial fractures such as drilling breaks.

Defect Frequency	Description
Fragmented	Rock core is comprised primarily of fragments of length less than 20mm, and mostly of width less than the core diameter.
Highly Fractured	Core lengths are generally less than 20mm to 40mm with occasional fragments.
Fractured	Core lengths are mainly 30mm to 100mm with occasional shorter and longer sections.
Fractured to Slightly Fractured	Core lengths are mainly 100mm to 300mm with occasional shorter to longer sections.
Slightly Fractured	Core lengths are generally 300mm to 1,000mm with occasional longer sections and occasional sections of 100mm to 300mm.
Unbroken	The core does not contain any fractures.

EXAMPLE

e.g. SANDSTONE (XW) – low strength, pale brown, fine to coarse grained, slightly fractured.

ROCK DEFECT LOGGING

Defects are discontinuities in the rock mass and include joints, sheared zones, cleavages and bedding partings. The ability to observe and log defects will depend on the investigation methodology. Defects logged in core are described using the abbreviations noted in the following tables.

The *depth* noted in the description is measured in metres from the ground surface, the *defect angle* is measured in degrees from horizontal, and the defect *thickness* is measured normal to the plane of the defect and is in millimetres (unless otherwise noted).

Defects are generally described using the following sequence of terms:

Depth, Defect Type, Defect Angle (dip), Surface Roughness, Infill, Thickness

DEFECT TYPE

B	– Bedding
J	– Joint
S	– Shear Zone
C	– Crushed Zone

SURFACE ROUGHNESS

i	- rough or irregular, stepped
ii	- smooth, stepped
iii	- slickensided, stepped
iv	- rough or irregular, undulating
v	- smooth, undulating
vi	- slickensided, undulating
vii	- rough or irregular, planar
viii	- smooth planar
ix	- slickensided, planar

INFILL

Infill refers to secondary minerals or other materials formed on the surface of the defect and some common descriptions are given in the following table together with their abbreviations.

Ls	- limonite staining
Fe	- iron staining
Cl	- clay
Mn	- manganese staining
Qtz	- quartz
Ca	- calcite
Clean	- no visible infill

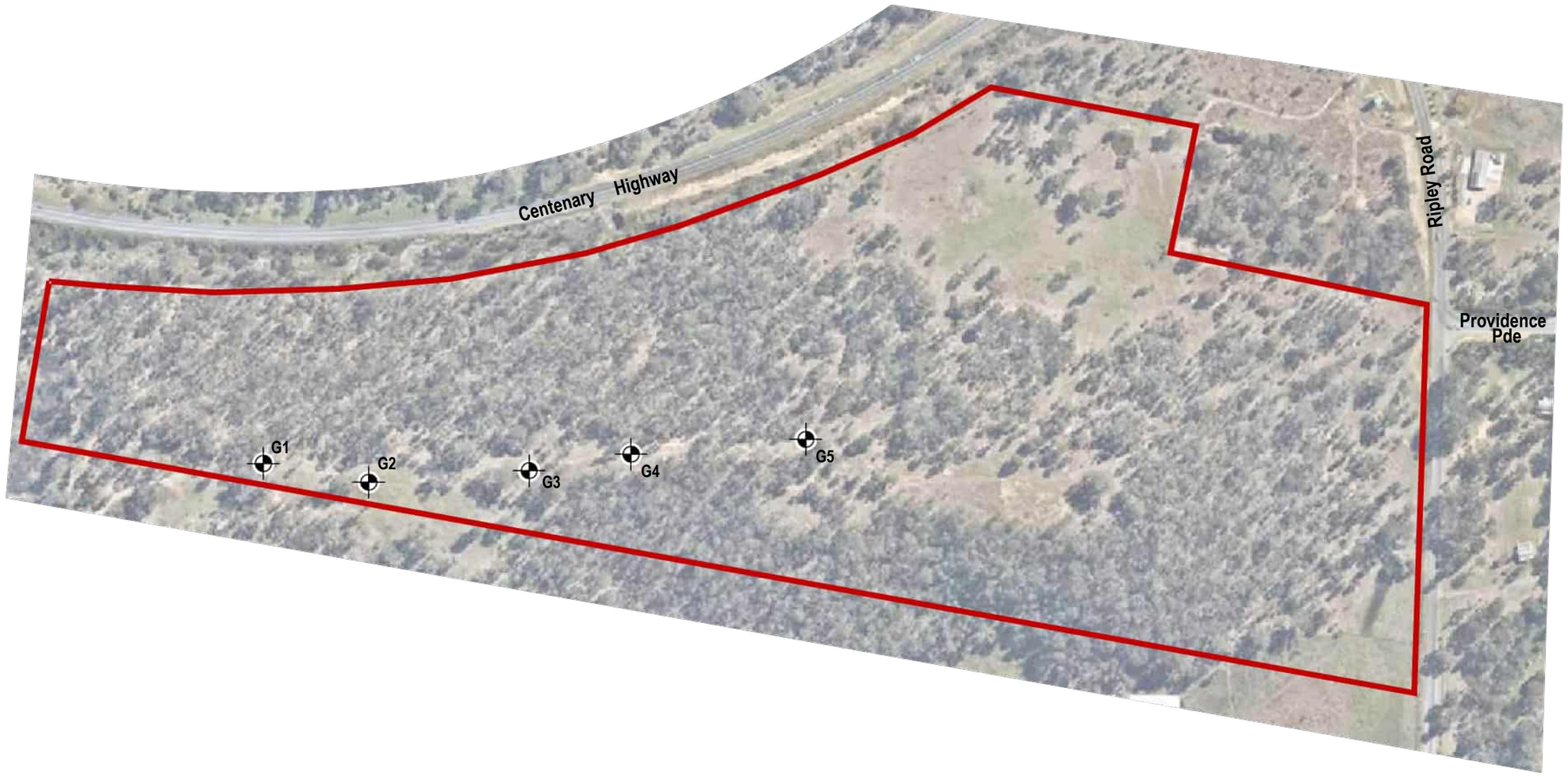
EXAMPLE

3.59m, J, 90, vii, Ls, 1mm

indicates a joint at 3.59m depth that is at 90° to horizontal (i.e. vertical), is rough or irregular and planar, limonite stained and 1mm thick.

APPENDIX B

BORE REPORT SHEETS (PREVIOUS INVESTIGATION)



LEGEND

G1 Bore

Site Boundary

Imagery Reference: Nearmap, dated 30/08/2021.

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Site



UBD Reference: Map 254 Grid B10 to F10 (ACS,v8) nts

Providence Residential Subdivision Development

787 Ripley Road, Ripley Valley

Locality Plan and Bore Locations

CLIENT: Stockland Development Pty Ltd

SCALE AT A3:

0 50 100 150m

1:4000

DATE:	DECEMBER 2021
DRAWN:	LA
APPROVED:	
PROJECT No:	020-190F
DRAWING No: 1	REV: A

File Location: Z:\Projects\2020Series\020-190D Ripley, via Ripley Road Lot 250 Providence\Drawings\Geotechnical\020-190D GEO Dwg1 RevA 201021.dwg

BORE REPORT

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BORE G1

Client: Stockland Development Pty Ltd

Project: Providence Residential Subdivision Development

Location: 787 Ripley Road, Ripley Valley

Project No: 020-190F

Page No: 1 of 1

Date: 6 December 2021

Ground Surface Level: RL85.0m*

Depth (m)	Description	RL (m)	Structures	Average Number of Defects/m	Sample Type	Sample Depth (m)	Is(50) (MPa)	Core Recovery (%)	RQD (%)	Sample ID	Test Results
0	*CLAYEY SAND (SC)* - brown, fine to coarse grained, with roots (topsoil)	85.0									
	- medium dense to dense, orange-brown				S	0.5					5,25,30/70mm
1	*SANDSTONE (XW)* - extremely low strength, pale orange-brown, fine to medium grained	84.0			S	0.87					
					B						
					S	1.5					30/85mm
2		83.0				1.59					
	- very low strength				S	2.5					30/60mm
3		82.0				2.56					
4	- extremely low strength	81.0			S	4.0					30/120mm
						4.12					
5		80.0									
	- low strength				(S)	5.5					30/15mm
6		79.0				5.52					
						7.0					30/20mm
7		78.0	7.05m to 7.11m,3J,0,vii,clean,1mm		(S)	7.02					
	- medium strength, brown, fine to coarse grained, fractured		7.22m,J,5,vii,clean,1mm 7.28m to 7.49m,J,70,vii,clean,1mm	6	C	7.15	1.0(d) 0.9(a)	100	87		
			7.73m,J,45,vii,clay,2mm			7.86					
8	- fine grained, with some low strength bands	77.0									
			8.68m,J,10,vii,clean,1mm 8.82m,J,10,vii,clay,20mm			8.73	0.05(d) 0.2(a)				
9		76.0		2-3	C			100	96		
			9.44m,J,20,vii,clean,1mm 9.73m,J,20,vii,clean,1mm 9.90m,J,70,vii,clean,1mm			9.49	0.4(d) 0.3(a)				
10	End of Bore at 10 m	75.0				10.0					
11		74.0									

U Undisturbed Tube Sample (50mm dia)
D Disturbed Sample
B Bulk Sample
pp Pocket Penetrometer Test (kPa)

S Standard Penetration Test (SPT)
HB SPT Hammer Bouncing
( ) No Sample Recovery
V Vane Shear Strength, Uncorrected (kPa)

E Environmental Sample
Up Pushtube Sample
C NMLC Coring

Is(50) Point Load Test Result (MPa)
(d) Diametral Test
(a) Axial Test
(i) Lump Test

Rig: Hydrapower Scout

Logged by: RZ

Drilling Method: Auger to 2.5m, washbore to 7.0m, then NMLC

Coordinates: E: 479668 N: 6936821

Groundwater: No free groundwater encountered during auger drilling

Remarks: *Very approximate ground surface level estimated from Queensland Globe; to be confirmed

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CORE PHOTOGRAPHS

Client:	**Stockland Development Pty Ltd**	**Bore: G1**
Project:	**Providence Residential Subdivision Development**	
Location:	**787 Ripley Road, Ripley Valley**	
Project No.:	**020-190F**	**Ground Surface Level: RL85.0m**



0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0m

BORE REPORT

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Client: Stockland Development Pty Ltd

Project: Providence Residential Subdivision Development

Location: 787 Ripley Road, Ripley Valley

Project No: 020-190F

BORE G2

Page No: 1 of 1

Date: 6 December 2021

Ground Surface Level: RL87.0m*

Depth (m)	Description	RL (m)	Structures	Average Number of Defects/m	Sample Type	Sample Depth (m)	Is(50) (MPa)	Core Recovery (%)	RQD (%)	Sample ID	Test Results
0		87.0									
	CLAYEY SAND (SC) - brown, fine to coarse grained, with roots (topsoil)					0.5					
					S/B	0.63					30/130mm
1	*SANDSTONE (XW)* - extremely low strength, orange-brown mottled pale grey, fine to coarse grained	86.0			B						
	- fine to medium grained					1.5					
					S	1.61					30/110mm
2		85.0									
3		84.0				3.0					
					S	3.05					30/50mm
4		83.0									
						4.5					
					S	4.53	0.07(d)				30/30mm
	SANDSTONE (DW) - very low to low strength, orange-brown, fine to medium grained, slightly fractured					4.56	0.07(a)				
5		82.0	5.48m,J,0,vii,clean,1mm								
						5.6	0.1(d)				
			5.82m,J,10,vii,clean,1mm	1-2	C		0.2(a)	100	100		
6		81.0	6.16m,J,0,vii,clean,1mm								
						6.46	0.02(d)				
	- with medium to coarse gravel inclusions						0.02(a)				
7		80.0	7.11m,J,0,vii,clean,1mm			7.0					
	MUDSTONE (XW) - extremely low to very low strength, grey mottled orange and pale grey, slightly fractured		7.16m,J,0,vii,clay,1mm 7.47m,J,10,vii,clean,1mm								
						7.58	0.04(d)				
8		79.0		1-2	C		0.07(a)	100	100		
	- interbedded with sandstone bands		8.41m,J,70,vii,clay,2mm								
						8.77	0.01(d)				
9		78.0				9.0	0.03(a)				
	End of Bore at 9 m										
10		77.0									
11		76.0									

U	Undisturbed Tube Sample (50mm dia)	S	Standard Penetration Test (SPT)	E	Environmental Sample	Is(50)	Point Load Test Result (MPa)
D	Disturbed Sample	HB	SPT Hammer Bouncing	Up	Pushtube Sample	(d)	Diametral Test
B	Bulk Sample	( )	No Sample Recovery	C	NMLC Coring	(a)	Axial Test
pp	Pocket Penetrometer Test (kPa)	V	Vane Shear Strength, Uncorrected (kPa)			(i)	Lump Test

Rig: Hydrapower Scout

Logged by: RZ

Drilling Method: Auger to 2.5m, washbore to 4.5m, then NMLC

Coordinates: E: 479756 N: 6936810

Groundwater: No free groundwater encountered during auger drilling

Remarks: *Very approximate ground surface level estimated from Queensland Globe; to be confirmed

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CORE PHOTOGRAPHS

Client:	**Stockland Development Pty Ltd**	**Bore: G2**
Project:	**Providence Residential Subdivision Development**	
Location:	**787 Ripley Road, Ripley Valley**	
Project No.:	**020-190F**	**Ground Surface Level: RL87.0m**



0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0m

BORE REPORT

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BORE G3

Client: Stockland Development Pty Ltd

Project: Providence Residential Subdivision Development

Location: 787 Ripley Road, Ripley Valley

Project No: 020-190F

Page No: 1 of 1

Date: 7 December 2021

Ground Surface Level: RL90.0m*

Depth (m)	Description	RL (m)	Structures	Average Number of Defects/m	Sample Type	Sample Depth (m)	Is(50) (MPa)	Core Recovery (%)	RQD (%)	Sample ID	Test Results
0	*CLAYEY SAND (SC)* - brown, fine to medium grained, with roots (topsoil)	90.0									
	- orange-brown				S/B	0.5					30/80mm
1	*SANDSTONE (XW)* - extremely low strength, orange-brown, fine to medium grained	89.0			B	0.58					
					S	1.5					30/60mm
2		88.0				1.56					
	- interbedded with mudstone bands										
3		87.0			S	3.0					30/55mm
						3.06					
4		86.0									
			4.54m,J,0,vii,clean,1mm								
	SANDSTONE (DW)		4.63m,J,5,vii,clean,1mm			4.5	0.03(d)				
5	- very low to low strength, orange-brown mottled pale grey, fine to medium grained, slightly fractured	85.0				4.58	0.09(a)				
	- with bands of fine to coarse grained and fine gravel inclusions			1-2	C			100	94		
			5.66m,J,10,vii,clean,1mm			5.7	0.3(d)				
6	- low to medium strength	84.0					0.4(a)				
			6.18m to 6.56m,5J,0,vii,clean,1mm			6.1					
	- medium strength					6.56	0.2(d)				
7		83.0					0.4(a)				
			7.38m,J,20,vii,clean,1mm								
			7.62m,J,5,vii,clean,1mm	2-3	C	7.62	0.7(d)	100	90		
	- high strength						1.2(a)				
8		82.0	7.96m,J,30,vii,clean,1mm								
			8.18m,J,5,vii,Fe,2mm								
	- high strength, fine to medium grained		8.34m,J,10,vii,clean,1mm								
			8.62m,J,10,vii,clean,1mm			8.6	1.8(d)				
9		81.0					2.0(a)				
						9.2					
	End of Bore at 9.2 m										
10		80.0									
11		79.0									

U	Undisturbed Tube Sample (50mm dia)	S	Standard Penetration Test (SPT)	E	Environmental Sample	Is(50)	Point Load Test Result (MPa)
D	Disturbed Sample	HB	SPT Hammer Bouncing	Up	Pushtube Sample	(d)	Diametral Test
B	Bulk Sample	( )	No Sample Recovery	C	NMLC Coring	(a)	Axial Test
pp	Pocket Penetrometer Test (kPa)	V	Vane Shear Strength, Uncorrected (kPa)			(i)	Lump Test

Rig: Hydrapower Scout

Logged by: RZ

Drilling Method: Auger to 2.5m, washbore to 4.5m, then NMLC

Coordinates: E: 479869 N: 6936806

Groundwater: No free groundwater encountered during auger drilling

Remarks: *Very approximate ground surface level estimated from Queensland Globe; to be confirmed

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CORE PHOTOGRAPHS

Client:	**Stockland Development Pty Ltd**	**Bore: G3**
Project:	**Providence Residential Subdivision Development**	
Location:	**787 Ripley Road, Ripley Valley**	
Project No.:	**020-190F**	**Ground Surface Level: RL90.0m**



0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0m

BORE REPORT

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BORE G4

Client: Stockland Development Pty Ltd

Project: Providence Residential Subdivision Development

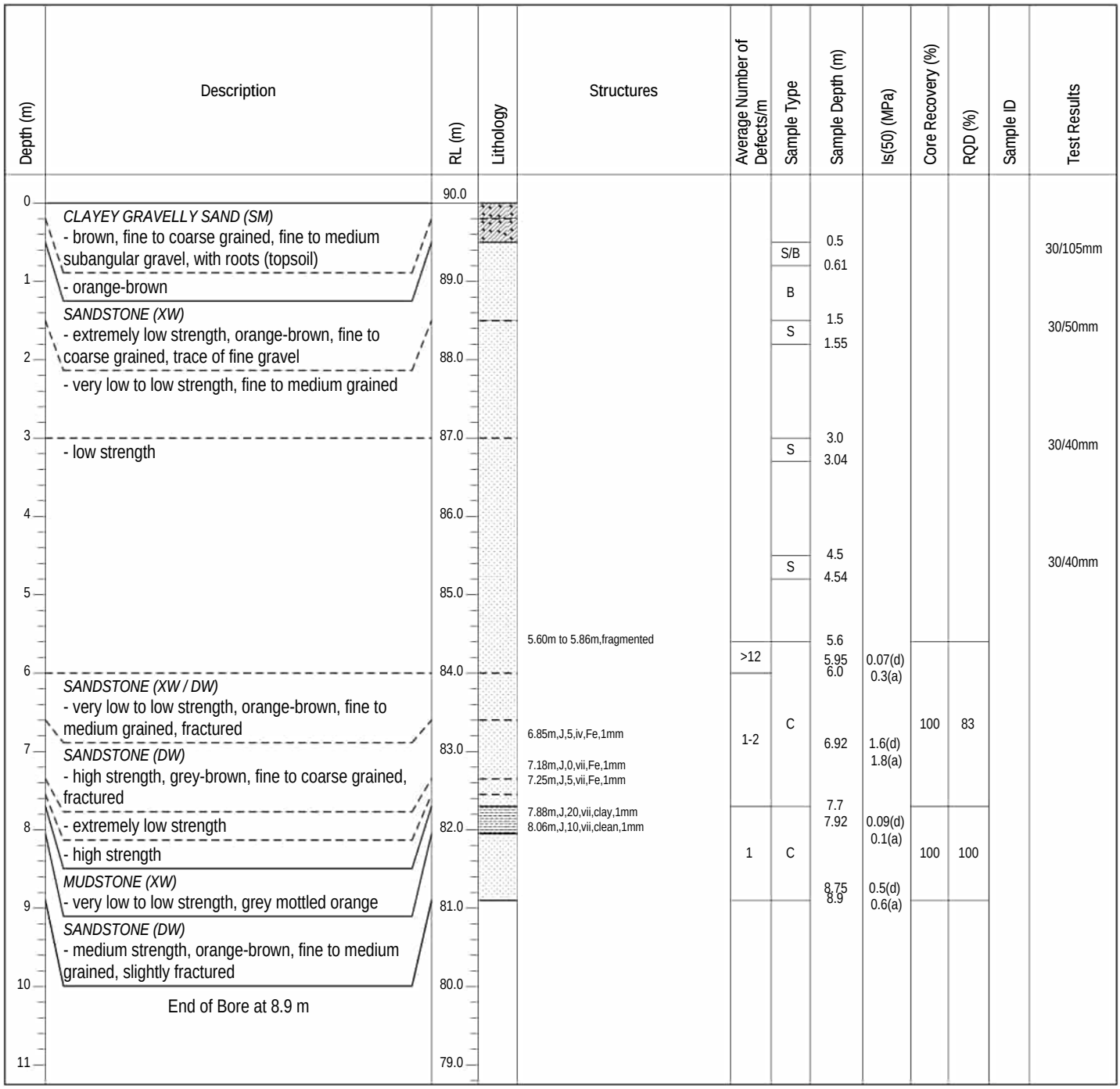
Location: 787 Ripley Road, Ripley Valley

Project No: 020-190F

Page No: 1 of 1

Date: 7 December 2021

Ground Surface Level: RL90.0m*



U	Undisturbed Tube Sample (50mm dia)	S	Standard Penetration Test (SPT)	E	Environmental Sample	Is(50)	Point Load Test Result (MPa)
D	Disturbed Sample	HB	SPT Hammer Bouncing	Up	Pushtube Sample	(d)	Diametral Test
B	Bulk Sample	( )	No Sample Recovery	C	NMLC Coring	(a)	Axial Test
pp	Pocket Penetrometer Test (kPa)	V	Vane Shear Strength, Uncorrected (kPa)			(i)	Lump Test

Rig: Hydrapower Scout

Logged by: RZ

Drilling Method: Auger to 2.5m, washbore to 5.6m, then NMLC

Coordinates: E: 479957 N: 6936805

Groundwater: No free groundwater encountered during auger drilling

Remarks: *Very approximate ground surface level estimated from Queensland Globe; to be confirmed

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CORE PHOTOGRAPHS

Client:	**Stockland Development Pty Ltd**	**Bore: G4**
Project:	**Providence Residential Subdivision Development**	
Location:	**787 Ripley Road, Ripley Valley**	
Project No.:	**020-190F**	**Ground Surface Level: RL90.0m**



0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0m

BORE REPORT

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BORE G5

Client: Stockland Development Pty Ltd

Project: Providence Residential Subdivision Development

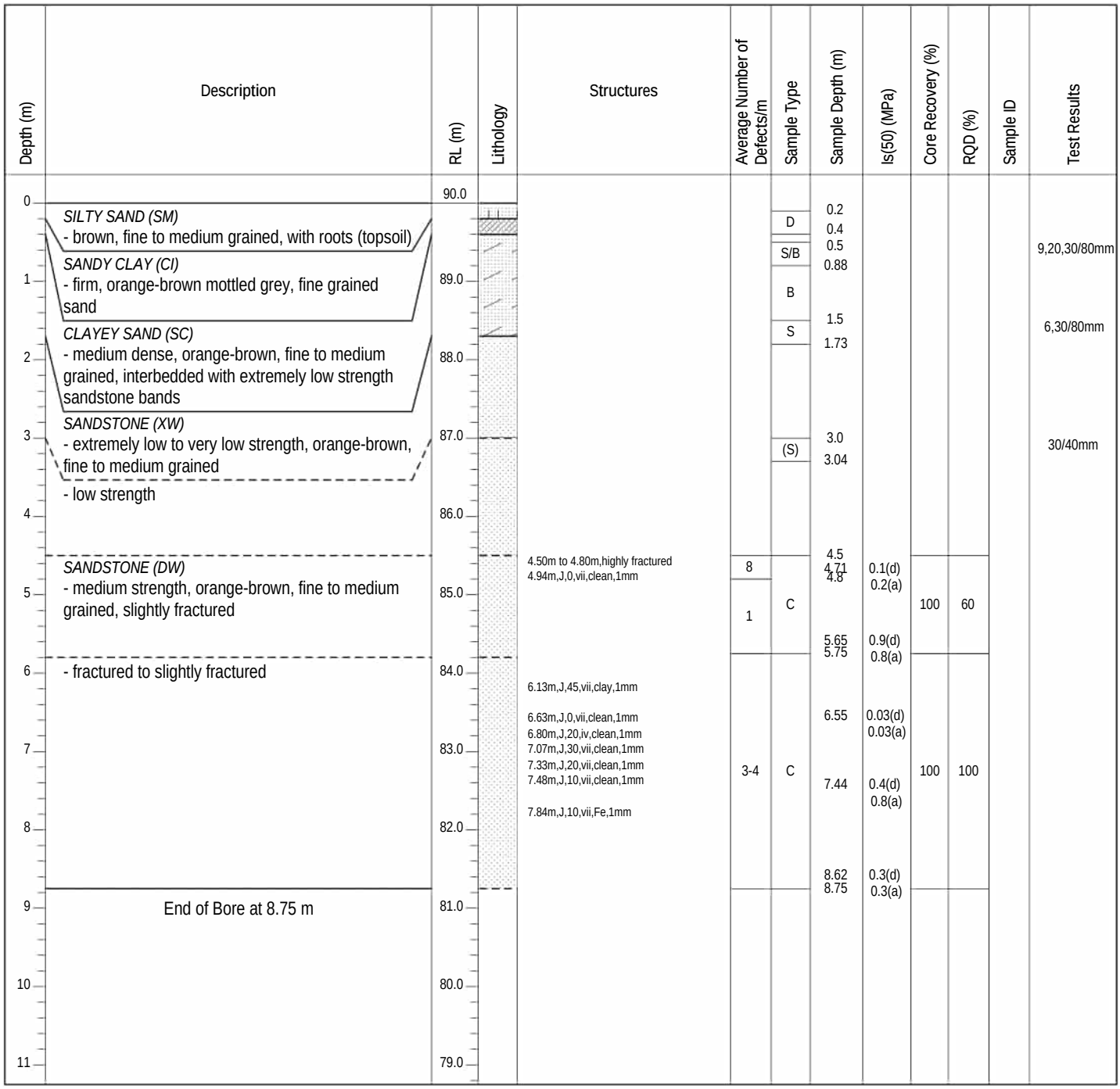
Location: 787 Ripley Road, Ripley Valley

Project No: 020-190F

Page No: 1 of 1

Date: 7 December 2021

Ground Surface Level: RL90.0m*



U	Undisturbed Tube Sample (50mm dia)	S	Standard Penetration Test (SPT)	E	Environmental Sample	Is(50)	Point Load Test Result (MPa)
D	Disturbed Sample	HB	SPT Hammer Bouncing	Up	Pushtube Sample	(d)	Diametral Test
B	Bulk Sample	( )	No Sample Recovery	C	NMLC Coring	(a)	Axial Test
pp	Pocket Penetrometer Test (kPa)	V	Vane Shear Strength, Uncorrected (kPa)			(i)	Lump Test

Rig: Hydrapower Scout

Logged by: RZ

Drilling Method: Auger to 2.5m, washbore to 4.5m, then NMLC

Coordinates: E: 480092 N: 6936825

Groundwater: No free groundwater encountered during auger drilling

Remarks: *Very approximate ground surface level estimated from Queensland Globe; to be confirmed

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CORE PHOTOGRAPHS

Client:	**Stockland Development Pty Ltd**	**Bore: G5**
Project:	**Providence Residential Subdivision Development**	
Location:	**787 Ripley Road, Ripley Valley**	
Project No.:	**020-190F**	**Ground Surface Level: RL90.0m**



0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0m

APPENDIX C

LABORATORY TEST REPORT SHEETS

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Brisbane Laboratory
22 Corunna Street
Albion Queensland 4010
Telephone: 61 (07) 3256 2900

POINT LOAD STRENGTH INDEX TEST REPORT

Test Method: AS4133.4.1 AS1726

Client:	Stockland Development Pty Ltd	**Report No.:**	BG25-1039A_PLT_BH01
Project:	Providence West Residential Subdivision Development	**Tested by:**	DH
Location:	via Ripley Road, Ripley Valley	**Date:**	14/4/2025
		Checked by:	MN
Project No:	BG25-1039A	**Date:**	29/9/2025

THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Bore:	Depth (m)	Test Type	Sample Description	Point Load Strength [$I_s(50)$] (MPa)	Rock Strength Category*
1	0.36	Diametral	Sandstone	0.21	Low
	0.36	Axial	Sandstone	0.4	Medium
	1.62	Diametral	Sandstone	0.25	Low
	1.62	Axial	Sandstone	0.35	Medium
	2.36	Diametral	Sandstone	0.24	Low
	2.36	Axial	Sandstone	0.30	Medium
	3.94	Diametral	Sandstone	0.4	Medium
	3.94	Axial	Sandstone	0.4	Medium
	4.81	Diametral	Sandstone	0.32	Medium
	4.81	Axial	Sandstone	0.5	Medium
	5.74	Diametral	Sandstone	0.34	Medium
	5.74	Axial	Sandstone	0.4	Medium
	6.07	Diametral	Sandstone	0.29	Low
	6.07	Axial	Sandstone	0.6	Medium
	7.76	Diametral	Sandstone	0.6	Medium
	7.76	Axial	Sandstone	0.7	Medium
	8.11	Diametral	Sandstone	0.5	Medium
	8.11	Axial	Sandstone	0.8	Medium

*Australian Standard AS1726-1993 *Geotechnical site investigation*

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Brisbane Laboratory
22 Corunna Street
Albion Queensland 4010
Telephone: 61 (07) 3256 2900

POINT LOAD STRENGTH INDEX TEST REPORT

Test Method: AS4133.4.1 AS1726

Client:	Stockland Development Pty Ltd	**Report No.:**	BG25-1039A_PLT_BH02
Project:	Providence West Residential Subdivision Development	**Tested by:**	DH
Location:	via Ripley Road, Ripley Valley	**Date:**	15/4/2025
		Checked by:	MN
Project No:	BG25-1039A	**Date:**	29/9/2025

THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Bore:	Depth (m)	Test Type	Sample Description	Point Load Strength [$I_s(50)$] (MPa)	Rock Strength Category*
2	0.55	Diametral	Conglomerate	0.08	Very low
	0.55	Axial	Sandstone	0.01	Extremely low
	1.04	Diametral	Sandstone	0.06	Very low
	1.04	Axial	Sandstone	0.30	Medium
	2.93	Diametral	Sandstone	0.23	Low
	2.93	Axial	Sandstone	0.4	Medium
	3.46	Diametral	Sandstone	0.30	Low
	3.46	Axial	Sandstone	0.4	Medium
	4.07	Diametral	Sandstone	0.7	Medium
	4.07	Axial	Sandstone	0.9	Medium
	5.32	Diametral	Sandstone	0.14	Low
	5.32	Axial	Sandstone	0.14	Low
	6.92	Diametral	Sandstone	0.6	Medium
	6.92	Axial	Sandstone	1.1	High
	7.21	Diametral	Sandstone	0.9	Medium
	7.21	Axial	Sandstone	1.3	High
	8.93	Diametral	Sandstone	0.05	Very low
	8.93	Axial	Sandstone	0.10	Very low
	9.74	Diametral	Sandstone	0.17	Low
	9.74	Axial	Sandstone	0.28	Low
	10.13	Diametral	Sandstone	0.4	Medium
	10.13	Axial	Sandstone	0.4	Medium

*Australian Standard AS1726-1993 *Geotechnical site investigation*

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Gold Coast Laboratory
2/23 Traders Way
Currumbin QLD 4223
Telephone 61 (07) 5535 2539

POINT LOAD STRENGTH INDEX TEST REPORT

Test Method: AS4133.4.1 AS1726

Client:	Stockland Development Pty Ltd	**Report No.:**	BG25-1039A_PLT_BH03
Project:	Providence West Residential Subdivision Development	**Tested by:**	WH
Location:	via Ripley Road, Ripley Valley	**Date:**	6/08/2025
		Checked by:	RZP
Project No:	BG25-1039A	**Date:**	8/11/2025

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Bore:	Depth (m)	Test Type	Sample Description	Point Load Strength [$I_s(50)$] (MPa)	Rock Strength Category*
3	2.03	Axial	Sandstone	0.09	Very low
	2.89	Diametral	Sandstone	0.5	Medium
	2.89	Axial	Sandstone	0.32	Medium
	3.05	Diametral	Sandstone	1.0	Medium
	3.05	Axial	Sandstone	0.6	Medium
	4.87	Diametral	Sandstone	0.28	Low
	5.88	Diametral	Sandstone	2.2	High
	5.88	Axial	Sandstone	1.5	High
	6.40	Diametral	Sandstone	1.0	Medium
	6.40	Axial	Sandstone	0.9	Medium
	7.96	Diametral	Sandstone	1.6	High
	7.96	Axial	Sandstone	1.2	High
	8.96	Diametral	Sandstone	1.1	High
	8.96	Axial	Sandstone	1.5	High
	9.98	Diametral	Sandstone	1.6	High
	9.98	Axial	Sandstone	2.7	High
	10.98	Diametral	Sandstone	0.4	Medium
	10.98	Axial	Sandstone	0.4	Medium
	11.98	Diametral	Sandstone	0.5	Medium
	11.98	Axial	Sandstone	0.6	Medium

*Australian Standard AS1726-1993 *Geotechnical site investigation*

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Gold Coast Laboratory
2/23 Traders Way
Currumbin QLD 4223
Telephone 61 (07) 5535 2539

POINT LOAD STRENGTH INDEX TEST REPORT

Test Method: AS4133.4.1 AS1726

Client:	Stockland Development Pty Ltd	**Report No.:**	BG25-1039A_PLT_BH04
Project:	Providence West Residential Subdivision Development	**Tested by:**	WH
Location:	via Ripley Road, Ripley Valley	**Date:**	6/8/2025
		Checked by:	RZP
Project No:	BG25-1039A	**Date:**	11/8/2025

THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Bore:	Depth (m)	Test Type	Sample Description	Point Load Strength [$I_s(50)$] (MPa)	Rock Strength Category*
4	1.03	Diametral	Sandstone	0.26	Low
	1.03	Axial	Sandstone	0.5	Medium
	2.10	Diametral	Sandstone	0.12	Low
	2.05	Axial	Sandstone	0.35	Medium
	3.96	Diametral	Sandstone	0.13	Low
	3.96	Axial	Sandstone	0.13	Low
	4.23	Diametral	Sandstone	0.5	Medium
	4.23	Axial	Sandstone	0.31	Medium
	5.13	Diametral	Sandstone	0.4	Medium
	5.13	Axial	Sandstone	0.23	Low
	6.05	Diametral	Sandstone	0.5	Medium
	6.05	Axial	Sandstone	0.4	Medium
	7.04	Diametral	Sandstone	0.5	Medium
	7.04	Axial	Sandstone	0.5	Medium
	8.04	Diametral	Sandstone	1.4	High
	8.04	Axial	Sandstone	0.8	Medium
	9.04	Diametral	Sandstone	0.8	Medium
	9.04	Axial	Sandstone	0.24	Low
	10.82	Diametral	Sandstone	1.0	Medium
	11.70	Diametral	Sandstone	0.4	Medium
	11.70	Axial	Sandstone	0.6	Medium

*Australian Standard AS1726-1993 *Geotechnical site investigation*

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Gold Coast Laboratory
2/23 Traders Way
Currumbin QLD 4223
Telephone 61 (07) 5535 2539

POINT LOAD STRENGTH INDEX TEST REPORT

Test Method: AS4133.4.1 AS1726

Client:	Stockland Development Pty Ltd	**Report No.:**	BG25-1039A_PLT_BH05
Project:	Providence West Residential Subdivision Development	**Tested by:**	WH
Location:	via Ripley Road, Ripley Valley	**Date:**	5/8/2025
		Checked by:	RZP
Project No:	BG25-1039A	**Date:**	11/8/2025

THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Bore:	Depth (m)	Test Type	Sample Description	Point Load Strength [$I_s(50)$] (MPa)	Rock Strength Category*
5	1.58	Diametral	Sandstone	0.08	Very low
	1.58	Axial	Sandstone	0.06	Very low
	2.03	Diametral	Sandstone	0.06	Very low
	2.03	Axial	Sandstone	0.05	Very low
	3.90	Diametral	Sandstone	0.17	Low
	3.90	Axial	Sandstone	0.20	Low
	4.58	Diametral	Sandstone	0.08	Very low
	4.58	Axial	Sandstone	0.13	Low
	5.32	Diametral	Conglomerate	0.11	Low
	5.32	Axial	Conglomerate	0.23	Low
	6.06	Diametral	Conglomerate	0.4	Medium
	6.06	Axial	Conglomerate	0.25	Low
	7.95	Diametral	Sandstone	0.23	Low
	7.95	Axial	Sandstone	0.21	Low
	8.40	Diametral	Sandstone	0.4	Medium
	8.42	Axial	Sandstone	0.4	Medium
	9.96	Diametral	Sandstone	0.8	Medium
	9.96	Axial	Sandstone	0.7	Medium
	10.50	Diametral	Sandstone	0.4	Medium
	10.50	Axial	Sandstone	0.7	Medium
	11.40	Diametral	Sandstone	0.8	Medium
	11.40	Axial	Sandstone	0.8	Medium

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POINT LOAD STRENGTH INDEX TEST REPORT

Test Method: AS4133.4.1 AS1726

Client:	Stockland Development Pty Ltd	**Report No.:**	BG25-1039A_PLT_BH06
Project:	Providence West Residential Subdivision Development	**Tested by:**	WH
Location:	via Ripley Road, Ripley Valley	**Date:**	5/8/2025
		Checked by:	RZP
Project No:	BG25-1039A	**Date:**	11/8/2025

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Bore:	Depth (m)	Test Type	Sample Description	Point Load Strength [$I_s(50)$] (MPa)	Rock Strength Category*
6	1.40	Diametral	Sandstone	0.4	Medium
	1.40	Axial	Sandstone	0.06	Very low
	2.67	Diametral	Sandstone	0.35	Medium
	2.67	Axial	Sandstone	0.7	Medium
	3.06	Diametral	Sandstone	0.4	Medium
	3.06	Axial	Sandstone	0.27	Low
	4.66	Diametral	Sandstone	0.31	Medium
	4.66	Axial	Sandstone	0.31	Medium
	5.04	Diametral	Sandstone	0.4	Medium
	5.04	Axial	Sandstone	0.25	Low
	6.65	Diametral	Sandstone	0.18	Low
	6.65	Axial	Sandstone	0.33	Medium
	7.71	Diametral	Sandstone	0.28	Low
	7.71	Axial	Sandstone	0.21	Low
	8.46	Diametral	Sandstone	0.08	Very low
	8.46	Axial	Sandstone	0.24	Low
	10.95	Diametral	Sandstone	0.5	Medium
	10.95	Axial	Sandstone	1.0	Medium
	11.47	Diametral	Sandstone	0.34	Medium
	11.47	Axial	Sandstone	0.25	Low

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POINT LOAD STRENGTH INDEX TEST REPORT

Test Method: AS4133.4.1 AS1726

Client:	Stockland Development Pty Ltd	**Report No.:**	BG25-1039A_PLT_BH07
Project:	Providence West Residential Subdivision Development	**Tested by:**	WH
Location:	via Ripley Road, Ripley Valley	**Date:**	26/6/2025
		Checked by:	RZP
Project No:	BG25-1039A	**Date:**	11/8/2025

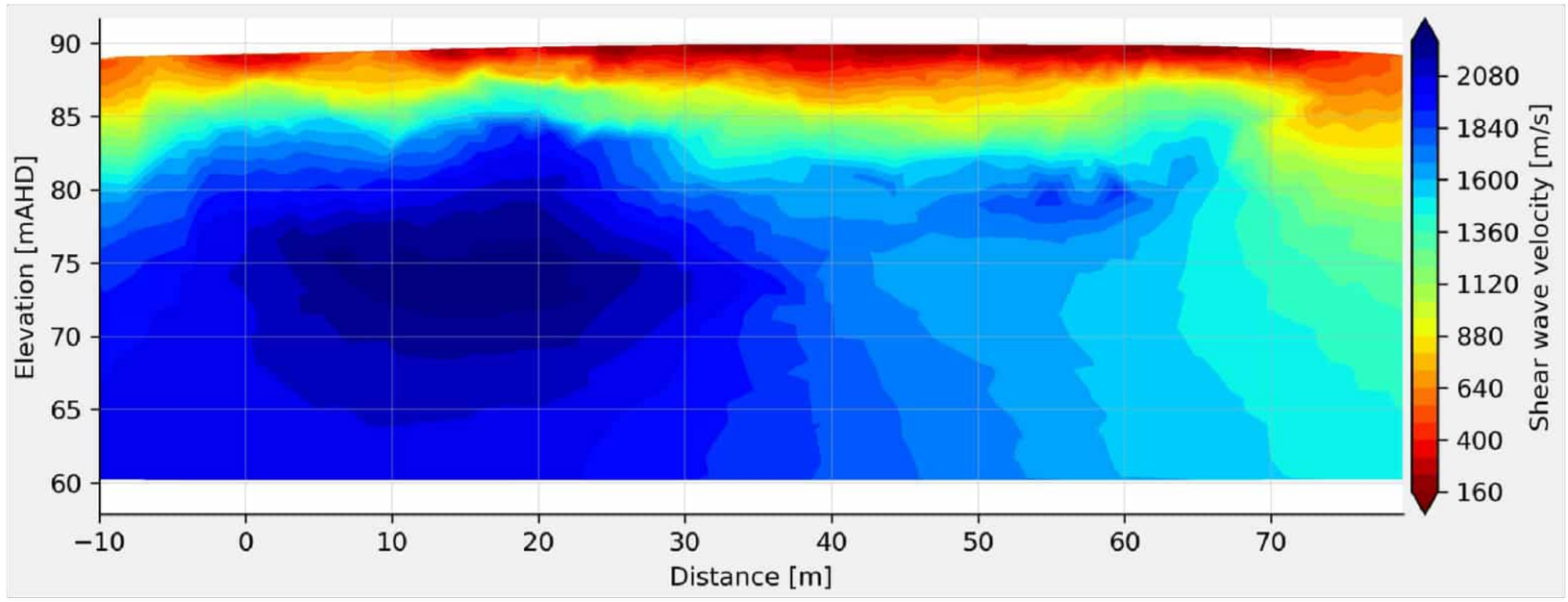
THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Bore:	Depth (m)	Test Type	Sample Description	Point Load Strength [$I_s(50)$] (MPa)	Rock Strength Category*
7	10.78	Diametral	Sandstone	0.13	Low
	10.78	Axial	Sandstone	0.13	Low
	11.41	Diametral	Sandstone	1.0	High
	11.41	Axial	Sandstone	1.6	High

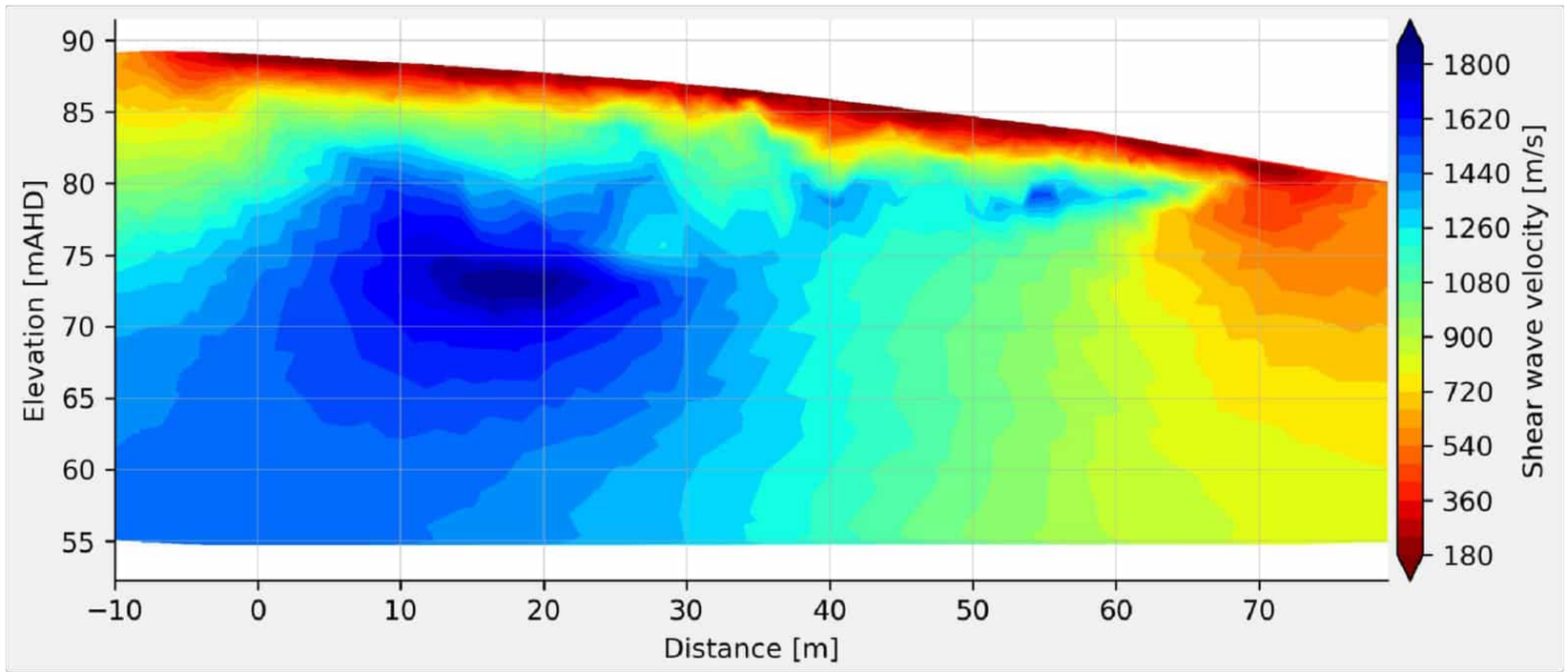
*Australian Standard AS1726-1993 *Geotechnical site investigation*

APPENDIX D

SEISMIC REFRACTION TOMOGRAPHY



Seismic Refraction 4A



Seismic Refraction 4B

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PROJECT
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PROJECT ADDRESS
via Ripley Road, Ripley Valley

CLIENT
Stockland Development Pty Ltd

SCALE
AS SHOWN

REV.	DATE	ISSUE	APP.
A	1/10/2025	INITIAL RELEASE	RZP

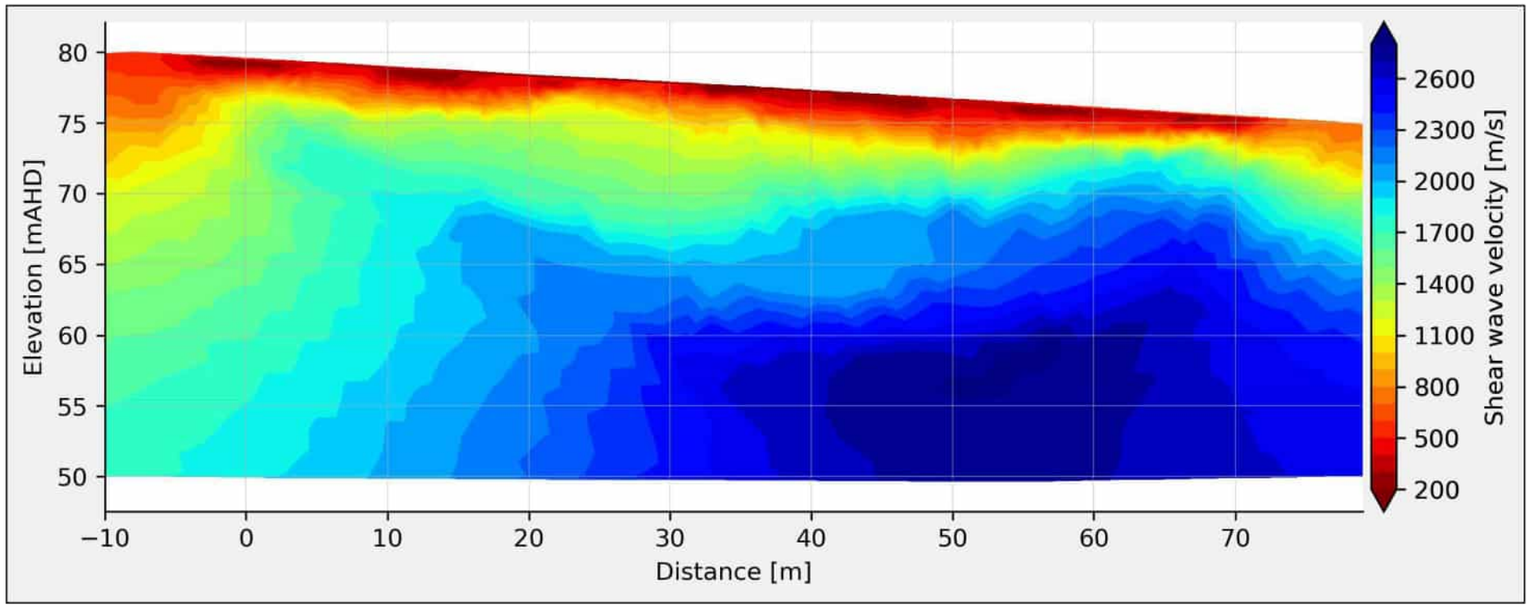
DRAWING
Seismic Refraction 4

REPORT
GI

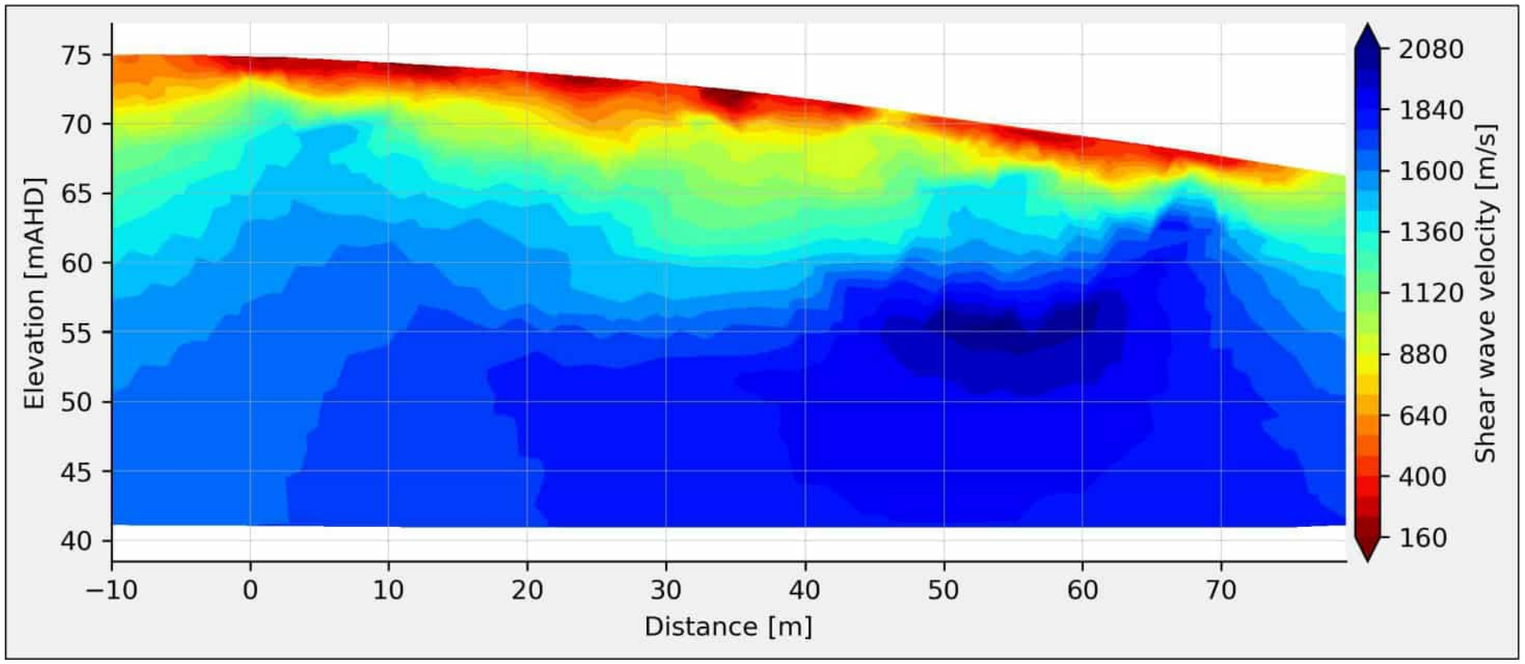
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BG25-1039A

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Seismic Refraction 5A



Seismic Refraction 5B

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PROJECT
Providence West
Residential Subdivision

PROJECT ADDRESS
via Ripley Road, Ripley Valley

CLIENT
Stockland Development Pty Ltd

SCALE
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REV.	DATE	ISSUE	APP.
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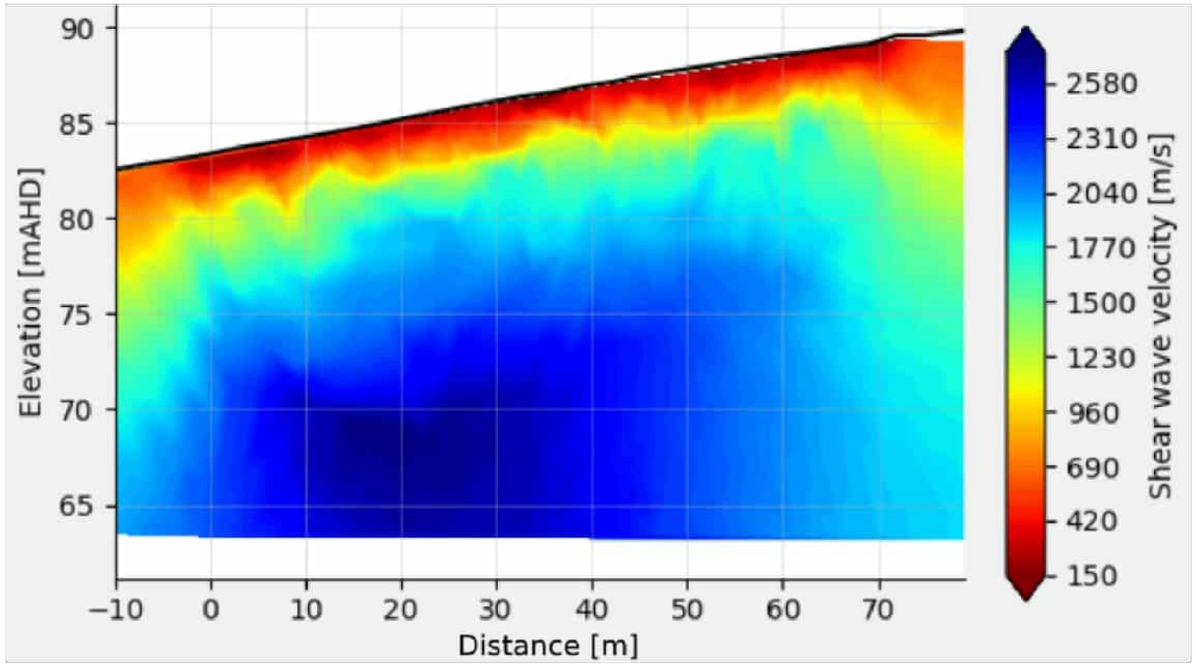
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Seismic Refraction 5

REPORT
GI

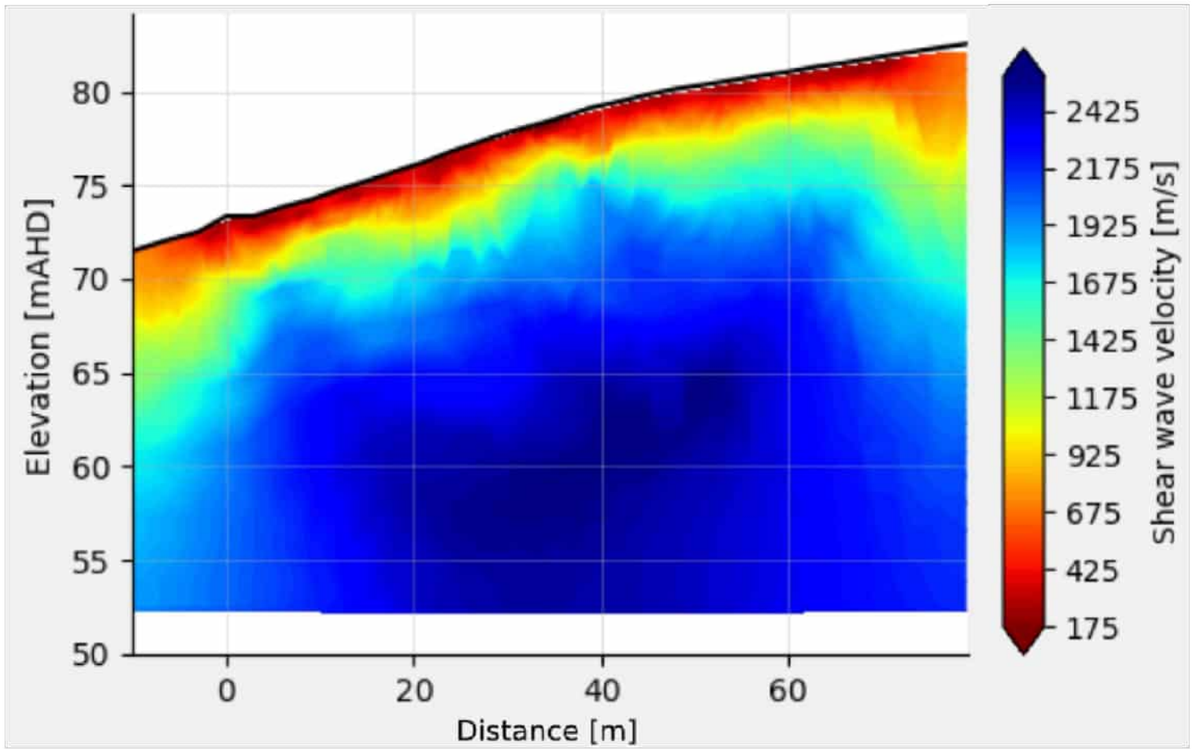
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Seismic Refraction 6A



Seismic Refraction 6B

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DRAWING
Seismic Refraction 6

REPORT
GI

PROJECT No.
BG25-1039A

DRAWING No.
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