REPORT TO

NSW DEPARTMENT OF EDUCATION

ON

GEOTECHNICAL INVESTIGATION

FOR

NEW HIGH SCHOOL FOR LEPPINGTON AND DENHAM COURT

AT

128-134 RICKARD ROAD, LEPPINGTON, NSW

Date: 17 January 2025
Ref: 35910LTrptrev1

JKGeotechnics
www.jkgeotechnics.com.au

T: +61 2 9888 5000
JK Geotechnics Pty Ltd
ABN 17 003 550 801

Report prepared by:

Arthur Billinhgam
Associate | Geotechnical Engineer

Report reviewed by:

Woodie Theunissen
Principal | Geotechnical Engineer

For and on behalf of
JK GEOTECHNICS
PO BOX 976
NORTH RYDE BC NSW 1670

DOCUMENT REVISION RECORD

Report Reference	Report Status	Report Date
35910LTrpt	Final Report	3 September 2024
35910LTrptrev1	Revision 1 following additional investigation	17 January 2025

Table of Contents

ATTACHMENTS

STS Table A: Moisture Content, Atterberg Limits & Linear Shrinkage Test Report
STS Table B: Four Day Soaked California Bearing Ratio Test Report
STS Table C: Shrink-Swell Index Test Report
Table D: Point Load Strength Index Test Results

Envirolab Services Certificate of Analysis No. 339674

Borehole Logs 1 to 30 Inclusive
Borehole Logs 101 to 139 Inclusive (With Core Photographs)

Figure 1: Site Location Plan
Figure 2: Borehole Location Plan
Figure 3: Inferred Top of Class V Bedrock
Figure 4: Inferred Top of Class III Or Better Bedrock
Figure 5: Section A-A Graphical Borehole Summary
Figure 6: Section B-B Graphical Borehole Summary

Vibration Emission Design Goals
Report Explanation Notes

1 CLIENT SUPPLIED INTRODUCTION

This geotechnical report has been prepared to support a Review of Environmental Factors (REF) for the Department of Education (DoE) for the new high school for Leppington and Denham Court (the activity).

We understand that the purpose of the REF is to assess the potential environmental impact of the activity that is prescribed by *State Environmental Planning Policy (Transport and Infrastructure) 2021* (T&I SEPP) as "development permitted without consent" where carried out on land by or on behalf of a public authority under Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). The activity is to be undertaken pursuant to Chapter 3, Part 3.4, Section 3.37A of the T&I SEPP.

The proposed activity is for the construction of a new high school located at 128-134 Rickard Road, Leppington, NSW, 2179 (the site). The site is legally described as Lots A and B in Deposited Plan 411211. The site is located on the eastern side of Rickard Road, is approximately 4.1ha in area, is located immediately south of the existing Leppington Public School at 144 Rickard Road and is approximately 700m south of Leppington Train Station.

Figure A below provides an aerial image of the site.

Figure A: Aerial image of site (Source: NearMap)

The northern portion of the site is currently used for residential purposes while the southern portion is used for agricultural purposes, with multiple greenhouses and an existing pond on the property.

The purpose of the investigations was to obtain geotechnical information on the subsurface conditions. Based on this we have provided comments and recommendations on excavation, groundwater, retention, earthworks, footings, floor slabs and pavements.

1.1 Proposed Activity Description

The proposed activity is for a new high school that will service Leppington and Denham Court. The new high school will accommodate up to 1,000 students across 3 new buildings and will comprise 48 permanent teaching spaces (PTS), 3 support teaching spaces (STS), 9 specialist labs/workshops/kitchens and a hall. Buildings A, B and C will wrap the western and southern boundaries of the site, with the hall being located in the south-east corner. The activity also includes the construction of a sports field in the centre of the site and 3 multipurpose courts along the northern boundary. The proposed scope of works is illustrated in Figure B below.

Figure B: New High School for Leppington and Denham Court (source: djrd architects)

2 INTRODUCTION

This report presents the results of a geotechnical investigation for the new high school for Leppington and Denham Court at 128-134 Rickard Road, Leppington, NSW. The location of the site is shown in Figure 1. The geotechnical investigation was commissioned by School Infrastructure NSW (SINSW) on behalf of the NSW Department of Education.

We have been supplied with the following documentation relating to the proposed development:

- REF architectural drawings prepared by DJRD Architects (Project No. 24 408, Drawing Nos. LEPPHS-DJRD-00-00-REF-A-0102^{03}, DJRD-00-00-REF-A-0103^{07}, DJRD-00-00-REF-A-0250^{07}, DJRD-B00A-ZZ-REF-A-4011^{02}, DJRD-B00A-ZZ-REF-A-4021^{02}, DJRD-B00A-ZZ-REF-A-4031^{02}, DJRD-B00A-ZZ-REF-A-4041^{02} and DJRD-B00A-ZZ-REF-A-4042^{02}, dated 15 January 2025);
- Earthworks Cut and Fill Volumes Plan prepared by TTW (Ref: LHS-TTW-01-00-DR-C-0310-3, dated 14 January 2025);

- Detailed Site Investigation (DSI) report prepared by SMEC (Ref: 30018043, dated 18 March 2024).

From the architectural drawings and earthworks plan, we understand that the proposed activity will comprise the following:

- Construction of three (3) three-storey buildings (Buildings A to C) (main buildings) within the western and southern portions of the site. The proposed ground floor level of these buildings is RL96.9m. To achieve this level will require cut and fill earthworks which will generally require less than 1m of excavation and filling for Buildings A and C. Locally fill to heights of up to 1.5m will be required at the south-western corner of Building C with filling up to approximately 2.5m required below Building B.
- Construction of a hall (minor structure) within the eastern portion of the site that will have a ground floor level of RL98.8m. To achieve the proposed floor level will require cut and fill earthworks with excavation up to approximately 1.8m deep in the north-western corner of the building transitioning to filling within the southern portion of the footprint up to a maximum height of approximately 2.5m.
- Construction of three multi-sports courts within the northern portion of the site. The surface level of the courts will step down from the east to west over the existing hillside with cut and fill earthworks required to achieve the platforms. The extent of cut and fill is not expected to be greater than about 1m from existing surface levels.
- Within the central portion of the site a large sports field is proposed. To form the sports field will require excavation ranging from approximately 2.5m in the north-eastern portion of the field grading to close to no excavation at the south-western corner.
- Along the south-western boundary of the property an internal driveway is proposed. This will provide access from Rickard Road and will run to a carpark and turning circle located within the south-eastern corner of the site. Cut and fill is proposed along the length of the road and within the carpark to achieve the design levels. Filling of the existing dam within the southern corner of the site will be required to construct the pavements.
- Construction of OSD tanks adjacent to Buildings B and C with plan areas of 191m^2 and 413m^2 respectively. The depth of the tanks is currently unknown, although such structures are generally in the order of 1.5m to 3m deep.
- Construction of pedestrian pavements around the buildings and installation of above ground rainwater tanks.

The purpose of the investigations was to obtain geotechnical information on the subsurface conditions as a basis for providing comments and recommendations on excavation, groundwater, retention, earthworks, footings, floor slabs and pavements. The geotechnical investigation has been carried out in two parts, with the initial due diligence investigation to assess subsurface conditions carried out in December 2023. The current investigation has been carried out to refine the subsurface model below the building footprints to allow additional assessment of geotechnical parameters to be made, particularly for foundation design for Buildings A to C, which have higher loads. It is understood that the hall is relatively lightly loaded and will be supported on a stiffened raft and not the underlying bedrock.

3 INVESTIGATION PROCEDURE

3.2 Due Diligence Investigation

The fieldwork comprised the auger drilling of thirty boreholes (BH1 to BH30) using our truck mounted JK400 and track mounted JK308 drilling rigs to refusal depths ranging from 1.3m to 5.2m below the existing ground surface. The boreholes were drilled using spiral augers fitted with a Tungsten Carbide (TC) bit.

The borehole locations, as shown on Figure 2, and the surface levels, as shown on the borehole logs, were measured using a differential GPS unit. The borehole coordinates were measured relative to Map Grid of Australia (MGA) 2020. The height datum is the Australian Height Datum (AHD). The borehole locations were set out as much as possible on a regular grid to suit the requirements of the environmental preliminary site investigation (PSI) by JK Environments (JKE). However, due to the existing development, particularly with the south-western portion of the site, some areas of the site could not be investigated.

The strength of the natural soil was assessed from the Standard Penetration Test (SPT) 'N' values and by the results of hand penetrometer tests completed on cohesive soils recovered in the SPT split tube sampler. The strength of the underlying weathered bedrock was assessed from the observation of the resistance to drilling of a TC bit attached to the augers, together with tactile inspection of rock chips recovered from the augers and subsequent correlation with laboratory moisture content test results. Rock strengths assessed in this way are approximate only, and variations of one strength order should not be unexpected.

Groundwater observations were made during and on completion of auger drilling. No longer term monitoring of groundwater levels was carried out.

Our geotechnical engineer was present full-time during the fieldwork to set out the borehole locations, nominate the testing and sampling and prepare the borehole logs. The borehole logs are attached, together with a set of Report Explanation Notes which define the logging terms and symbols used and describe the investigation techniques and their limitations.

Selected soil samples were returned to Soil Test Services Pty Ltd (STS) and Envirolab Services Pty Ltd, both NATA accredited laboratories. STS completed moisture content, Atterberg Limits, linear shrinkage and CBR testing. These results are summarised in the attached STS Table A and B. Envirolab completed a suite of soil aggression testing comprising pH, sulphate contents, chloride contents and soil resistivity. The results of the soil aggression tests are presented in the attached Envirolab Certificate of Analysis No. 339674. Samples were also collected from the boreholes for testing as part of the environmental PSI by JKE.

3.3 Additional Investigations

The additional investigations were completed between 29 July and 12 August 2024 and 17 and 20 December 2024 and comprised the drilling of thirty-nine boreholes (BH101 to BH139) with our track mounted JK308, JK309 and JK330 drilling rigs and our truck-mounted JK400 drilling rig. BH101 to BH119 were drilled during

the initial establishment with the remaining boreholes completed in December, following discussion of the structural foundation requirements and procurement of No. 128 Rickard Road by the DoE.

All boreholes were initially advanced through the soils and upper weathered bedrock using spiral auger drilling techniques with an attached Tungsten Carbide (TC) bit. Each of the boreholes, except BH131 to BH139, were extended to their final depths (which ranged from 11.57m to 15.0m) by rotary diamond coring techniques using an NMLC triple tube core barrel and water flush.

The borehole locations, as shown on Figure 2, and the surface levels, as shown on the borehole logs, were measured using a differential GPS unit. The coordinates and reduced levels were measured relative to MGA2020 and AHD respectively.

The strength of the natural soil was assessed from the Standard Penetration Test (SPT) 'N' values and by the results of hand penetrometer tests completed on cohesive soils recovered in the SPT split tube sampler. The strength of the bedrock in the augered portion was assessed from observation of the drilling resistance using the TC drill bit attached to the augers and tactile examination of rock cuttings. It should be noted that strengths assessed in this way are approximate and variances of at least one strength order should not be unexpected.

For the cored portion of the borehole, the recovered core was returned to our laboratory for photographing and Point Load Strength Index (Is_{50}) testing. These Point Load Strength test results are summarised in the attached Table D and on the borehole logs.

Groundwater observations were recorded in all boreholes during and on completion of auger drilling. No longer term groundwater monitoring was carried out as this was completed as part of the environmental DSI by SMEC.

Our geotechnical engineers were present on a full-time basis during the fieldwork, to nominate testing and sampling and prepare the borehole logs. The borehole logs are attached, together with a set of Report Explanation Notes which define the logging terms and symbols used and describe the investigation techniques and their limitations.

Following the December 2025 investigation, selected soil samples were also returned to STS for shrink-swell index testing. The results of these tests are provided in the attached STS Table C.

4 RESULTS OF ASSESSMENT

4.1 Site History

A review of the historical aerial imagery obtained by JKE indicates that the site appeared to be farmland in 1949 with cultivation predominantly within the northern portion of the site and a small building towards the northern boundary, adjacent to Leppington Public School. The site appeared similar the 1955, 1961, 1965

and 1970 images, with a house appearing in the north-western corner in the 1978 image and cultivation within the northern portion of the site appearing to cease at some time between 1970 and 1978. In the 1994 image, greenhouses or similar appeared in the southern portion of the site (No. 128), which were removed in 2007 and reinstated in 2011. From the 2011 image onwards a farm dam is visible within the southern corner.

4.2 Site Description

The site comprises two properties, being No. 128 Rickard Road within the south-western portion of the site, and No. 134 Rickard Road within the north-eastern portion. The boundary between the two properties is roughly defined by the north-eastern edge of the greenhouses within No. 128, as shown on Figures 1 and 2.

The site is located within gently undulating topography, that is defined by low-relief hills that slope at generally less than 10° towards broad, shallow gullies containing perennial creeks. The site is located on a local hill along a roughly north-south orientated ridgeline. The apex of the hill is present within the north-eastern portion of the site with surface levels around the apex locally flatter. Surface levels slope down from the crest of the hill at approximately 3°, with levels sloping down towards the west and south within the western and southern portions of the site respectively.

In the north-west corner of the site is a single storey brick house, with the remainder of the northern portion of the site (No. 134) comprising grassed paddocks. Adjacent to the south-western site boundary is a gravel driveway, which provides access to a row of greenhouses and several metal clad sheds. These greenhouses and sheds occupy the majority of No. 128. In the southern corner of the site is an embankment dam. The embankments are generally up to 1.5m to 2m in height and are battered at approximately 1 Vertical in 2 Horizontal on the southern and eastern sides. On the northern side of the dam the filled mound forming the dam embankment is densely vegetated with small to medium sized trees. Excavation on the northern side of the dam embankment has resulted in sub-vertical cuts that are approximately 1.5m high and have been formed through clay fill along the edge of the driveway. A second small pond is located towards the western corner of the site at the end of the row of greenhouses. Medium to large trees are generally concentrated along the south-western boundary with trees otherwise widely spread within the remainder of the site.

To the north of the site is Leppington Public School, which contains several single storey brick and weatherboard buildings, some of which are understood to be heritage listed. The remainder of the site is surrounded by semi-rural allotments containing one and two storey houses and sheds.

The site is bound to the north-west by Rickard Road, which is in fair condition. Many of the surrounding roads are in poor condition with significant cracking and rutting present.

4.3 Subsurface Conditions

The NSW Seamless Geology Version 2.4 indicates that the site is underlain by Bringelly Shale bedrock, although this profile does not take into account any residual soils derived from in-situ weathering of the

bedrock or placement of fill. Bringelly Shale comprises *"shale, carbonaceous claystone, claystone, laminite, fine to medium-grained lithic sandstone, rare coal and tuff"*. The boreholes encountered a profile comprising generally shallow fill and topsoil overlying residual clay grading into weathered bedrock at depths ranging from 1.3m to 5.2m. We note the logging of the weathered claystone profile on the borehole logs for the due diligence investigation (BH1 to BH30) have been revised in light of the more recent, detailed investigation.

A summary of the subsurface conditions encountered within the boreholes is provided below, however for a detailed description at each location reference should be made to the attached borehole logs.

Fill and Topsoil

Fill was encountered in all boreholes drilled in No. 128 Rickard Road, i.e. BH1 to BH9, and in BH12, located at the rear of the residence at No. 134 Rickard Road. The fill extended to depths ranging from 0.2m to 0.5m. The fill comprised silty sand, silty clay, silty sandy clay and sandy silty clay. The clay fill was assessed as being of low plasticity and contained inclusions of igneous gravel, brick, plastic, asphalt, concrete and ceramic fragments and ash.

In all boreholes in No. 134, except BH12, topsoil was encountered to depths ranging from 0.1m to 0.4m, although depths were typically in the order of 0.1m to 0.2m. The topsoil was assessed to comprise silty clay ranging from low to high plasticity, with a higher root content than the underlying residual soil. The presence of topsoil correlates with the former cultivation that occurred within this portion of the site prior to 1970.

Residual Silty Clay

Residual silty clay, underlying the fill or topsoil, was encountered in all boreholes, except BH29. The residual silty clay was generally assessed to be of high plasticity, with some medium or medium to high plasticity layers. The residual clay was generally of hard strength with some stiff to very stiff strength clay encountered within BH1, BH4, BH5 and BH6, which were located within the southern portion of the site. The upper profile of the residual clay was generally root affected.

Weathered Bedrock

Weathered claystone or siltstone was encountered at depths and reduced levels ranging from 0.4m to 3.9m and RL101.3m to RL91.2m respectively. The claystone or siltstone was generally extremely weathered and of 'hard soil' strength upon initial contact. The thickness of the extremely weathered profile appears to generally be less than 1m towards the south-western and north-western site boundaries. However, towards the crest of the hill within the north-eastern portion of the site the extremely weathered profile was generally greater than 2.5m thick with a maximum measured thickness of 3.35m in BH116. We note that extremely weathered claystone or siltstone can be easily remoulded to a material with soil like properties and is therefore more representative of a hard soil than a rock.

Weathered claystone or siltstone bedrock was encountered within the cored boreholes below the extremely weathered material at depths ranging from 1.2m to 5.2m, with corresponding surface levels ranging from RL99.1m (BH138) to RL91.6m (BH122). The bedrock surface generally appears to follow the surface gradients within the site (i.e. sloping down from the crest within the north-eastern portion). The upper bedrock profile was assessed as being distinctly weathered. The variation in strength of the bedrock in the upper profile

appears to generally correlate with the thickness of extremely weathered material (i.e. the bedrock was generally of low or greater strength in the areas where the extremely weathered profile was thinner and was of very low or very low to low strength where a greater thickness of extremely weathered material is present).

The bedrock generally increased in strength and became fresh with depth in each of the cored boreholes. Where the bedrock comprised claystone the fresh bedrock was generally of medium strength. Units of laminite, sandstone and interbedded sandstone and claystone/siltstone were typically encountered in the cored boreholes at depths ranging between 2m and 13.35m. These were generally of high strength when fresh. Sandstone or interbedded sandstone and claystone was encountered within most boreholes except five cored boreholes located near the crest of the hillside within the north-eastern portion of the site. The sandstone strata encountered indicate there are possibly two distinct beds, with an upper stratum generally encountered from RL89m to RL92m and a lower stratum from approximately RL86m. The thickness of the sandstone strata varied within the site with the thickness of the upper stratum generally in the order of 3m to 4.5m although locally thinner bands were encountered within the eastern portion of the site. The lower stratum which generally comprised interbedded sandstone and claystone was encountered in BH103, BH104, BH105, BH118 and BH119. With the exception of BH119, these boreholes were terminated within the lower stratum, which appears to range from approximately 1.5m to 3.5m thick.

Defects encountered within the bedrock comprised extremely weathered and clay seams, sub-horizontal bedding partings and joints. Extremely weathered and clay seams, as well as 'no core' zones, which are anticipated to correlate with loss of extremely weathered material during the coring process, were particularly prevalent within the claystone units. Bedding partings generally appear to be moderately to widely spaced. Joints were generally measured to dip steeper than 45°.

The following table provides our rock classification assessment for BH101 to BH130 inclusive. The classification was completed in general accordance with Pells et al (2019). Plots of the inferred surface contours for Class V and Class III or better bedrock are also shown schematically on the attached Figures 3 and 4. The contours for Class V are based on the assessment of the cored boreholes as well as the bedrock levels within the previous augered boreholes. The rock classes are approximate only and will be dependent on footing/pile sizes. The delineation between the various classes of rock shown on the graphical sections (Figures 5 and 6) are also approximate and have been determined by linear interpolation and some judgement between the known locations. Some variability should be expected.

Borehole Number	Depths (Reduced Levels) Class V Rock	Depths (reduced Levels) Class IV Rock	Depths (Reduced Levels) Class III Rock	Depths (Reduced Levels) Class II or Better Rock
101	2.0m to 3.3m (RL93.6 to RL92.3)	Not encountered	3.3m to 7.1m (RL92.3 to RL88.5)	7.1m to 12.0m (RL88.5to RL83.6)
102	2.3m to 4.4m (RL93.9 to RL91.8)	Not encountered	Not encountered	4.4m to 12.2m (RL91.8 to RL84.0)
103	2.2m to 4.1m (RL93.9 to RL92.0)	7.4m to 9.8m (RL88.7 to RL86.3)	Not encountered	4.1m to 7.4m (RL92.0 to RL88.7) 9.8m to 12.0m

Borehole Number	Depths (Reduced Levels) Class V Rock	Depths (reduced Levels) Class IV Rock	Depths (Reduced Levels) Class III Rock	Depths (Reduced Levels) Class II or Better Rock
				(RL86.3 to RL84.1)
104	2.8m to 4.2m (RL93.3 to RL91.9)	4.2m to 5.0m (RL91.9 to RL91.1)	7.0m to 10.3m (RL89.1 to RL85.8)	5.0m to 7.0m (RL91.1 to RL89.1) 10.3m to 13.4m (RL85.8 to RL82.7)
105	4.4m to 5.5m (RL92.4 to RL91.3)	Not encountered	5.5m to 10.6m (RL91.3 to RL86.2)	10.6m to 14.5m (RL86.2 to RL82.3)
106	2.5m to 6.0m (RL93.8 to RL90.3)	Not encountered	Not encountered	6.0m to 14.2m (RL90.3 to RL82.1)
107	2.6m to 6.8m (RL94.9 to RL90.7)	Not encountered	6.8m to 7.6m (RL90.7 to RL89.9)	7.6m to 14.4m (RL89.9 to RL83.1)
108	1.4m to 6.5m (RL95.2 to RL90.1)	Not encountered	Not encountered	6.5m to 14.6m (RL90.1 to RL82.0)
109	2.3m to 6.5m (RL94.9 to RL90.7)	Not encountered	Not encountered	6.5m to 14.3m (RL90.7 to RL82.9)
110	2.3m to 9.1m (RL98.2 to RL91.4)	9.1m to 11.2m (RL91.4 to RL89.3)	11.2m to 14.2m (RL89.3 to RL86.3)	Not encountered
111	2.7m to 5.7m (RL97.8 to RL94.8)	5.7m to 11.2m (RL94.8 to RL89.3)	11.2m to 14.9m (RL89.3 to RL85.6)	Not encountered
112	2.8m to 6.7m (RL98.8 to RL94.9)	6.7m to 9.0m (RL94.9 to RL92.6)	9.0m to 12.5m (RL92.6 to 89.1)	Not encountered
113	3.5m to 5.6m (RL97.8 to RL95.7) 11.5m to 13.0m (RL89.8 to RL88.3)	5.6m to 7.4m (RL95.7 to RL93.9)	7.4m to 11.5m (RL93.9 to RL89.8) 13.0m to 14.3m (RL88.3 to RL87.0)	Not encountered
114	2.5m to 7.1m (RL98.3 to RL93.7) 11.5m to 12.8m (RL89.3 to RL88.0)	Not encountered	12.8m to 14.5m (RL88.0 to RL86.3)	7.1m to 11.5m (RL93.7 to RL89.3)
115	3.0m to 6.5m (RL97.5 to RL94.0)	6.5m to 8.8m (RL94.0 to RL91.7)	8.8m to 12.4m[1] (RL91.7 to RL88.1)	12.4m to 14.5m (RL88.1 to RL86.0)
116	4.0m to 6.5m (RL97.7 to RL95.2)	Not encountered	12.0m to 15.0m (RL89.7 to RL86.7)	6.5m to 12.0m (RL95.2 to RL89.7)
117	4.5m to 6.0m (RL95.9 to RL94.4)	6.0m to 8.7m (RL94.4 to RL91.7)	Not encountered	8.7m to 11.7m (RL91.7 to RL88.7)
118	4.3m to 7.7m (RL95.6 to RL92.2)	7.7m to 11.7m (RL92.2 to RL88.2)	Not encountered	11.7m to 14.1m (RL88.2 to RL85.8)
119	4.0m to 5.9m (RL97.2 to RL95.3)	5.9m to 8.5m (RL95.3 to RL92.7)	8.5m to 13.3m (RL92.7 to RL87.9)	13.3m to 14.6m (RL87.9 to RL86.6)
120	1.7m to 6.7m (RL94.6 to RL89.6)	Not encountered	Not encountered	6.7m to 12.2m (RL89.6 to RL84.1)
121	2.6m to 5.2m (RL94.1 to RL91.5)	Not encountered	Not encountered	5.2m to 13.6m (RL92.5 to RL83.1)
122	Not encountered	Not encountered	Not encountered	3.6m to 13.0m (RL91.6 to RL82.2)
123	2.2m to 4.0m (RL92.3 to RL90.5)	Not encountered	Not encountered	4.0m to 12.4m (RL90.5 to RL82.1)
124	1.2m to 2.2m (RL92.4 to RL91.4)	4.2m to 5.1m (RL89.4 to RL88.5)	Not encountered	2.2m to 4.2m (RL91.4 to RL89.4)

Borehole Number	Depths (Reduced Levels) Class V Rock	Depths (reduced Levels) Class IV Rock	Depths (Reduced Levels) Class III Rock	Depths (Reduced Levels) Class II or Better Rock
				5.1m to 11.6m (RL88.5 to RL82.1)
125	2.2m to 2.7m (RL92.4 to RL91.9)	6.8m to 8.2m (RL87.8 to RL86.4)	Not encountered	2.7m to 6.8m (RL91.9 to RL87.8) 8.2m to 11.8m (RL86.4 to RL83.4)
126	2.0m to 3.0m (RL93.1 to RL92.1)	Not encountered	Not encountered	3.0m to 12.0m (RL92.1 to RL83.1)
127	2.0m to 4.4m (RL93.9 to RL91.5)	Not encountered	Not encountered	4.4m to 12.0m (RL91.5 to RL83.9)
128	4.2m to 5.0m (RL92.6 to RL91.8)	Not encountered	Not encountered	5.0m to 13.2m (RL91.8 to RL83.6)
129	2.1m to 4.0m (RL94.0 to RL92.1)	Not encountered	Not encountered	4.0m to 12.7m (RL92.1 to RL83.4)
130	Not encountered	Not encountered	Not encountered	5.0m to 13.0m (RL91.7 to RL83.7)

1. Class III bedrock contains a 0.7m thick band of Class V material between 11.7m to 12.4m (RL88.8 to RL88.1)

Groundwater

No groundwater was encountered during or on completion of drilling in any of the boreholes. No longer-term monitoring was carried out as part of the geotechnical investigations as we were advised groundwater monitoring was carried out by SMEC as part of their DSI. Three monitoring wells (SMW01 to SMW03) were installed by SMEC with groundwater measured at depths of 5.75m and 0.3m in SMW01 and SMW03 respectively. These depths correlate with groundwater levels at approximately RL88.5m and RL94.75m. SMW02 was 'dry' to RL90.1m on the date of their site visit.

The locally high groundwater level in SMW03 was attributed by SMEC to the proximity of this well to the existing dam.

4.4 Laboratory Test Results

The moisture content and Atterberg Limits tests on the residual clay and weathered bedrock correlated reasonably well with our field assessments. Based on the Atterberg limits and linear shrinkage test results, the residual silty clay is of medium, medium to high and high plasticity and is assessed to have a high potential for shrink-swell movements with changes in moisture content.

The shrink-swell tests on the high plasticity residual silty clay from BH133, BH138 and BH139 returned values of 4.03%/pF, 2.12%/pF and 3.69%%/pF confirming the clays will have a medium or high potential for shrink-swell movements with changes in moisture content.

The four day soaked CBR tests on the samples of residual clay from BH8, BH10 and BH25 compacted to 98% of their Standard Maximum Dry Density (SMDD) returned values of 1% and 1.5%. The in-situ moisture

contents of these residual clays were 0.8% to 3.8% 'dry' of their Standard Optimum Moisture Contents. During soaking swell values ranging from 2.5% to 3.5% were measured indicating a high reactivity to variation in moisture content.

The soil aggression test results are summarised in the table below:

Borehole No.	Sample Depth (m)	Soil Type	pH	Chloride Content (mg/kg)	Sulphate Content (mg/kg)	Resistivity (ohm.cm)
BH3	1.5-1.95	RESIDUAL Silty Clay	4.8	1,000	710	970
BH9	1.1-1.5	XW Claystone	5.4	530	670	1,300
BH12	1-1.5	Claystone	7.5	<10	<10	16,000
BH15	0.5-0.95	RESIDUAL Silty Clay	5.5	66	110	6,100
BH25	0.5-0.95	RESIDUAL Silty Clay	5.1	240	210	2,900
BH29	1.5-2	XW Claystone	4.6	590	510	1,100

5 COMMENTS AND RECOMMENDATIONS

5.1 Geotechnical Considerations

From a geotechnical perspective, we consider the site will be suitable for the proposed activity. Based on the results of our geotechnical investigations, we consider that the main geotechnical considerations relating to the design and construction of the proposed activity will be as follows:

- Earthworks will be carried out for the development and these must be completed with adequate care and control if structures and pavements are to be supported on the fill.
- A dam and small pond are present within the southern and western portions of the site in No. 128 Rickard Road. The current plans indicate that a road is proposed above the dam and the small pond may be below the footprint of Building 2. Prior to placement of any new fill in these areas, all water-softened material will need to be removed prior to backfilling and the backfill placed in accordance with the earthworks specification.
- The residual silty clays are generally of high plasticity and care will be required during any earthworks where clay fill is used. Clay fill will need to be compacted at close to its optimum moisture content and must not be over compacted, as this will increase the risk of swelling of the clays. Adequate drainage will be required during earthworks so the exposed clays do not become moisture affected.
- Extremely weathered claystone may also be used for filling, but will tend to break down to a residual clay during compaction. The extremely weathered claystone will be reactive to variations in moisture content and should be treated in a similar manner to residual clay.
- Low CBR values were measured for the residual silty clay. This will require the adoption of relatively thick pavements, some form of subgrade treatment to improve the subgrade quality or bound subbases for concrete pavements. High swells were also measured during testing indicating the subgrade is highly sensitive to moisture variations and therefore it will be important to install subsoil drainage to reduce infiltration of moisture.

- Bedrock encountered within the cored boreholes generally improves in quality and strength with depth. However, within BH113 to BH115, within the eastern portion of the site, bands of Class V material were encountered within Class III or better bedrock at depth. Design of foundations must consider the potential for bands of weaker material to be present at depth.
- Class II or better bedrock is present below the footprints of the three main buildings (Buildings a to C). Based on the detailed geotechnical investigations completed, we consider that there is sufficient information to adopt this stratum for the design of foundations for these three buildings. Adopting these parameters will require inspection during drilling of all piles. In-situ testing of piles designed to found in Class II or better bedrock could also be completed during construction to allow the adoption of a higher geotechnical reduction factor where ultimate limit state values are adopted.

Further comments on these issues are provided within the following sections of this report.

5.2 Site Classification

Due to the depth of the fill, proposed earthworks and the abnormal moisture conditions likely to be present across the site as a result of buildings (including greenhouses), trees and dams, we consider that the proposed building areas will classify as Class 'P' in accordance with AS2870-2011 'Residential Slabs and Footings'. Therefore, all footings will need to be designed by engineering principles. Some areas may be able to be classified as other than Class P, but buildings are generally not proposed in those areas of the site. In addition, cut and fill earthworks are proposed throughout the site and the classification appropriate for the design will depend on the earthworks carried out and will need to be assessed on completion of the earthworks.

As a guide, based on the laboratory testing of the residual silty clay soils where no earthworks are carried out, the clays are likely to have characteristic surface movements equivalent to the range of a Class 'H1' site under 'normal' conditions. However, if the residual silty clay soils are reused as an engineered fill, or if excavations into the residual silty clays are carried out to remove the existing cracked zone, then it is likely that characteristic surface movements will be greater and more likely within the range for a Class 'H2' site. Similarly, if non-reactive fill is used the surface movements are likely to be less.

Varying classifications may also be appropriate for different buildings depending on the amount of cut and fill carried out and the fill used. For Buildings A, B and C and the Hall we have completed an assessment on the limits of excavation into the residual clay and filling with site-won residual clay (without use of a non-reactive capping layer) to maintain shrink-swell movements within the Class 'H1' range i.e. 41mm to 60mm. To achieve this criterion the depth of excavation into the residual clays would need to be limited to no greater than 0.4m and the height of filling to no greater than 0.3m. A summary of the proposed maximum values for cut and fill for each building are presented in the table below.

Building	Proposed Bulk Excavation Level (mAHD)	Proposed Maximum Depth of Cut (m)	Proposed Maximum Height of Fill (m)
A	96.5	0.7	1.0
B	96.5	0.1	2.3
C	96.5	0.9	1.4
Hall	98.4	1.4	2.3

Consequently, where excavation cannot be reduced to less than 0.4m or the height of fill to 0.3m less, to maintain shrink-swell movements within the Class 'H1' range, a minimum 300mm thick layer of imported inert select engineered fill will need to be placed and compacted below the surface of each building pad. This will require over-excavation in areas of cut to place the inert fill. Where extremely weathered claystone or claystone bedrock is exposed at bulk excavation level then the non-reactive fill would not be required.

Where footings are designed on the basis of AS2870-2011, consideration will also need to be given to the adverse effect on shrink-swell movements from trees located close to the proposed development area or where existing trees have been removed. We note that the use of AS2870-2011 will only be relevant to lightly-loaded structures within the scope defined by the code.

Reference should also be made to Appendix B of AS2870-2011, for guidance on appropriate site maintenance, including site drainage and planting of trees and shrubs.

5.3 Removal of Existing Trees

Numerous trees are to be removed within the vicinity of the proposed Buildings A, B and C. We note that it can take a number of years for the soils in the area of removed trees to return to their equilibrium moisture content. We therefore strongly recommend that any nominated trees be removed and any other vegetation that will also be removed be removed as early as possible ahead of construction so as to reduce the magnitude of moisture content increase of the soil and potential impact on the proposed building as a result of the subsequent swelling of the soil.

Following the cutting down of trees, we recommend that all primary roots be excavated and/or ripped out using an excavator or bulldozer. The sides of the root excavations should then be benched at an overall grade of 1 Vertical (V) on 1 Horizontal (H) to facilitate the compaction of the backfill placed to raise levels. Site won clayey soils can be used to backfill the excavations. The clayey soil must be free of roots and other organic matter, and the maximum particle size should not exceed 50mm. The clayey soil must then be moistened (not saturated) and rigorously compacted in maximum 150mm loose layers with a trench roller. Where these root excavations extend below the building footprints the clay should be placed at 0 to 2% 'wet' of Standard Optimum Moisture Content (SOMC) and compacted to a density between 98% and 102% of Standard Maximum Dry Density (SMDD).

5.4 Excavation Conditions

The following recommendations should be read in conjunction with the latest version of *'Excavation Work – Code of Practice'* prepared by SafeWork NSW.

Based on the current bulk earthworks plan, excavation is generally proposed to be less than 2m with some localised deeper excavation up to 3m. Based on the investigation results, excavation to these depths will encounter fill, topsoil, residual soils and extremely and distinctly weathered claystone. Excavation of the

soils and extremely weathered claystone should be readily achieved using the buckets of large hydraulic excavators. Excavation of claystone bedrock of very low to low strength should generally be achievable using the buckets of large excavators fitted with tiger teeth, although ripping hooks may be required to break up iron indurated bands within this weaker bedrock. Claystone of medium or higher strength, or bands of sandstone of low or higher strength will require 'hard rock' excavation techniques. Hard rock excavation techniques include both percussive and non-percussive techniques. Percussive techniques comprise rock hammers while non-percussive techniques include, rock saws, rotary grinders, ripping etc.

Due to the setback from existing structures, we anticipate that the use of percussive rock hammers will generally be suitable within the site. Where rock hammers are used in close proximity to the existing buildings within Leppington Public School, we recommend that quantitative vibration monitoring be completed at the commencement of excavation to confirm that transmitted vibrations fall below acceptable limits at the site boundary. Should the measured vibrations exceed acceptable limits, smaller hammers or non-percussive equipment will be required. Reference should be made to the attached Vibration Emission Design Goals sheet for acceptable limits of transmitted vibrations.

We recommend that only excavation contractors with appropriate insurances and experience on similar projects be used. Excavation contractors should be provided with a copy of this geotechnical report, including the borehole logs and point load strength test results, so that they can make their own assessment of suitable excavation equipment.

Material to be disposed of offsite will need to be suitably classified for waste disposal. Reference should be made to the waste classification report for the site.

5.5 Groundwater

No groundwater was encountered in the boreholes during the investigation. Given the location of the site on the upper reaches of a local hill, we do not anticipate that excavation for the proposed development will encounter the groundwater table. During construction, seepage flows may occur through the soils, but due to the expected low permeability of the residual clays and clayey fill we anticipate that flows will likely be controllable by gravity drainage and conventional sump and pump techniques. Higher flows may occur along the fill/residual soil and soil/rock interfaces, particularly following periods of wet weather. Seepage may need to be treated prior to disposal into stormwater systems and any requirements should be checked with the environmental and hydraulic consultants.

In the long term, drainage should be provided behind any retaining walls to collect and direct any seepage into the drainage system. Any excavation areas should be inspected by the hydraulic consultant to assess if the designed drainage system is adequate for any seepage that does occur.

5.6 Filling

Earthworks recommendations in this report should be read in conjunction with AS3798-2007 '*Guidelines on Earthworks for Commercial and Residential Developments*'.

Filling to varying heights is proposed to achieve the design surface levels for each of the proposed structures. In the area of the dam and pond in the southern and western portions of the site, additional excavation will likely be required to remove wet or softened material prior to backfilling. Any sediment, organic material or over-wet material will not be suitable for reuse and will need to be removed from site.

Fill was encountered in the boreholes drilled within No. 128 Rickard Road and from the results of the DSI it appears that areas of fill are present within No. 134 Rickard Road where existing and former structures have been present. We are unaware of any records of placement or compaction control for the existing fill and as such it must be considered 'uncontrolled' and is not suitable for the support of footings or floor slabs. Where the footprints of proposed buildings are underlain by existing fill all existing uncontrolled fill must be fully stripped and replaced with controlled, engineered fill. Where uncontrolled fill is present within pavement or landscaped areas it may remain in place, subject to environmental approval, provided it performs adequately during proof rolling as recommended below. However, where the upper fill contains roots it will not be suitable for reuse as engineered fill, but may, subject to approval from the environmental consultant, be reused within landscaped areas.

The following procedures should be followed for subgrade preparation and placement of engineered fill for the proposed development.

- Initially strip vegetation, topsoil, root-affected material, any deleterious fill and over-wet material within the dam and pond. Where the existing uncontrolled fill is located within proposed building areas this should also be stripped to expose the residual silty clay. Excavated topsoil and root affected soils are considered unsuitable for reuse as engineered fill and should be appropriately disposed offsite. Alternatively, these soils could be reused for landscaping purposes subject to confirmation by a contamination consultant. Any root/organic rich material and 'soft' soils excavated from the existing dam will likely be unsuitable for reuse as engineered fill and should be stockpiled separately for inspection by the geotechnical engineer and contamination consultant.
- Proof roll the exposed subgrade with at least 8 passes of a minimum 12 tonne smooth drum roller. The final pass of the proof rolling should be carried out in the presence of a geotechnical engineer or experienced earthworks technician to detect any soft or heaving areas.
- Any areas of heaving subgrade should be locally excavated to a competent base and replaced with engineered fill. Alternative subgrade improvement measures may be required. This is best determined in consultation with the geotechnical engineer at the time of proof rolling.
- Place engineered fill as required in horizontal layers as recommended in Section 4.6 below.
- Where battered fill embankments are to be constructed, we recommend that the outer edge of each fill layer extend a horizontal distance of at least 1m beyond the design geometry, in order to achieve adequate edge compaction. The roller must extend out over the edge of each placed layer in order to

seal the batter surface. On completion of filling, the excess under-compacted edge fill should be trimmed back to the design geometry.

During earthworks the subgrade should be well graded to promote runoff and reduce the risk of water ponding on the surface. If the subgrade becomes wet it may become untrafficable and a working platform of granular material may be required to maintain trafficability.

5.7 Engineered Fill and Compaction Control

Engineered fill should preferably comprise a good quality granular material, such as crushed sandstone that is free from deleterious materials and has a maximum particle size not exceeding 75mm. Such fill should be compacted in horizontal layers of typically no greater than 200mm loose thickness to a density of at least 98% of Standard Maximum Dry Density (SMDD). For backfilling confined excavations such as service trenches, the same compaction specification must be adhered to. However, where light compaction equipment is used the layer thickness will need to be reduced and should be limited to approximately 100mm loose thickness. Loose layer thicknesses may be varied provided the compaction specification is achieved over the full layer thickness.

The existing clayey fill, residual clay and weathered claystone and siltstone may also be used as engineered fill, provided they are free from deleterious materials and particles in excess of 75mm. Such material should be compacted strictly between 98% and 102% of Standard Maximum Dry Density (SMDD) and within ±2% of Standard Optimum Moisture Content (SOMC). If the residual clay soils are to be adopted for use as an engineered fill the following needs to be carefully considered:

- Where clays have moisture contents greater than the plastic limit they will require drying out prior to their use as engineered fill or where clays are dry, moisture will need to be added. This may result in additional time being required for the earthworks.
- Where reactive clay or extremely weathered claystone is used as engineered fill they will undergo greater shrink-swell movements with changes in moisture content than the in situ reactive clays. Therefore, consideration needs to be given to the effect that greater shrink-swell movements will have on the performance of structures supported on the engineered fill.

Density testing should be regularly carried out on any engineered fill to confirm that the project specification has been met. Supervision and regular density testing in accordance with Level 1 requirements of AS3798-2007 'Guidelines on Earthworks for Commercial and Residential Developments' is recommended if engineered fill is required to support structural loads from buildings. In pavement areas, or where fill is placed as form fill below buildings, Level 2 testing may be carried out.

5.8 Excavation Batters and Retention

Around the edge of the relatively level terraces required for construction of the proposed buildings, sports courts and sports field a combination of permanent batters and retaining walls are expected to facilitate the

transition in surface levels. The height of permanent batters and retaining walls is anticipated to be less than 3m. The comments and recommendations given below are for batters and retaining walls to such heights. If higher batters or walls are proposed, additional specific geotechnical advice must be obtained.

5.8.1 Excavation Batters

Temporary batters should be feasible for most of the proposed excavations. Where there is insufficient space for temporary batters, or temporary batters are not preferred, in-situ retention systems will need to be constructed prior to excavation commencing. There are also cost implications with excavating and disposing of additional soil to form temporary batters and importing durable granular backfill. Therefore, it may be preferable to install shoring systems rather than form temporary batters.

Temporary batters no higher than 3m formed through residual clay and any upper weathered rock up to and including very low strength should be formed at no steeper than 1 Vertical (V) in 1 Horizontal (H), subject to inspection by a geotechnical engineer. Where low or low to medium strength bedrock is encountered it may be temporarily battered at not steeper than 1V in 0.5H. Where adverse defects are encountered within temporary batter slopes, they would need to be stabilised with rock bolts, shotcrete or other measures approved by the geotechnical engineers.

Surcharge loads such as construction traffic, site sheds etc., should be located no closer than twice the vertical height of the batter from the crest of any temporary batter. Surface drainage should not be allowed to flow over the crest of temporary batters and should be collected and discharged in a manner which avoids concentrated flows and erosion.

Where permanent batter slopes are proposed, their formation will be dependent on the height and materials present. However, where permanent batters are no higher than 3m they may be formed at no steeper than 1V:2H. If higher batters are proposed and they may need to be formed at flatter angles and specific advice should be obtained.

Any permanent batters will need to be fully protected from erosion by a suitable and approved erosion protection measure. Suitable measures would include revegetation or shotcrete. Where revegetation is being proposed, consideration should be given to flattening the permanent batters even further than recommended above, say to 1V:3H or 4H, to assist with initial vegetation and topsoil establishment, to reduce the risk of topsoil washing from the face during heavy rainfall and to provide for ease of access for maintenance.

5.8.2 Retaining Walls

Where temporary batter slopes are adopted and permanent retaining walls constructed at the toe of the batters, we recommend that the following characteristic parameters be adopted for wall design. The following parameters are provided on the basis of either a properly placed and compacted engineered backfill or backfill comprising a uniform sized durable granular material.

- For cantilever walls where some movement can be tolerated, we recommend a triangular lateral earth pressure distribution using an 'active' earth pressure coefficient (K_a) of 0.35.
- For cantilever walls which will be propped by floor slabs or where movements are to be reduced, we recommend a triangular lateral earth pressure distribution using an 'at rest' earth pressure coefficient (K_0) of 0.6.
- A bulk unit weight of 20kN/m^3 may be used for the backfill.
- All surcharge loads affecting the walls (e.g. nearby footings, construction loads and traffic, inclined backfill, etc.) are additional to the earth pressure recommendations above and should be included in the design.

Where retaining walls are to be constructed in front of temporary batters, care will be required during backfilling between the temporary batter slope and the new retaining wall. Uncontrolled backfilling will lead to large settlements which may adversely affect pavements, structures or landscaping areas behind the wall. It is often difficult to achieve adequate compaction of backfill due to limited access and the need to use small compaction equipment so that excessive surcharge loads are not placed on the wall. We therefore recommend the use of a single-sized durable gravel, such as "blue metal" gravel or crushed concrete (free of fines and with less than 10% brick), which does not require significant compactive effort. Such material should be nominally compacted using a hand operated vibrating plate (sled) compactor in 100mm thick loose layers. A non-woven geotextile filter fabric such as Bidim A34 should be placed as a separation layer immediately above the cut batter slope to control subsoil erosion. Provided the gravel backfill is placed as recommended above, density testing of the gravel backfill would not be required. The geotextile should then be wrapped over the surface of the gravel backfill and capped with at least a 0.5m thick compacted layer of clayey engineered fill. If other materials are proposed for use as backfill, additional geotechnical advice should be obtained on the appropriate compaction specification. This will depend on whether the area behind the wall is to support structures or will comprise soft landscaping.

Where in-situ retention systems are to be installed prior to excavation, solider pile walls with shotcrete infill panels would be appropriate, provided some movement of the wall is tolerable. Where movements are to be reduced, more rigid contiguous pile walls may be required. Such walls may be designed as cantilevered walls based on the parameters give above. However, where the walls support more than about 3m additional lateral support would be required. Further geotechnical advice should be obtained if shoring walls are proposed.

5.9 Footings

5.9.1 Main Buildings (Buildings A, B and C)

For the larger buildings proposed as part of the development, footings uniformly founded within bedrock will likely be required to support the anticipated structural loads. In this regard, piles will be required to reach the better-quality bedrock.

Where piles are required, bored piers should be feasible, provided significant groundwater seepage does not occur into the pier holes. In those circumstances the side walls of bored piles may collapse and temporary liners would be required. If the piles are poured shortly after drilling this will reduce the risk of seepage entering the pier holes.

The bedrock ranges from very low to high strength. Therefore, considering the bedrock profile and the likely large diameter piles required to carry the column loads, this will necessitate the use of moderate to large piling rigs with rock drilling equipment. We recommend that any potential piling contractors be provided with a copy of this geotechnical report and they be requested to confirm that their equipment is suitable to penetrate the rock and achieve the required depths.

The table in Section 4.2 provides our assessment of the depth and reduced levels for the various rock classes encountered within the boreholes. Based on the rock classification, the following table presents our recommendations on maximum allowable end bearing pressures, ultimate end bearing pressures, maximum allowable skin friction values and ultimate skin friction values for the various classes of rock.

Piles socketed at least 0.5m into the underlying bedrock may be designed for the allowable end bearing pressures and ultimate end bearing pressures presented in Table 5 below.

Allowable and Ultimate End Bearing Pressures

Siltstone Rock Classification	Allowable End Bearing Pressure in Compression (kPa)	Ultimate End Bearing Pressure in Compression (MPa)	Elastic Modulus, E (MPa)
Class V	700	2	100
Class IV	1,000	3	250
Class III	2,500	15	500
Class II	4,000	40	1,000

For the design of rock sockets, the following allowable and ultimate shaft adhesion values may be adopted:

Allowable and Ultimate Shaft Adhesion Values

Siltstone Rock Classification	Allowable Shaft Adhesion Value in Compression (kPa)	Allowable Shaft Adhesion Value in Tension (kPa)	Ultimate Shaft Adhesion Value in Compression (kPa)
Class V	70	35	100
Class IV	100	50	150
Class III	250	125	450
Class II	400	200	600

Class II or better bedrock was encountered at moderate depths in and around the proposed footprints of Buildings A to C. Considering the anticipated relatively higher footing loads consideration could be given to uniformly supporting these buildings within Class II or better bedrock.

We recommend that all piles have a minimum embedment of 0.5m into the appropriate quality of bedrock. In addition to the maximum allowable and ultimate end bearing pressures, piles can also be designed for skin friction. The boreholes indicate bands of poorer quality rock within some of the better-quality rock. For founding purposes, the toe of a single pile must be terminated a minimum depth of at least 1.5B (where B is

the pile diameter) above any of these poorer bands in order to adopt such a rock class for the founding material. Where pile groups are necessary, a similar 1.5 factor would apply, however this would apply to the minimum width of the pile group. Pile groups would need to be further assessed on a case-by-case basis.

Where allowable bearing pressures and skin friction values are adopted, settlement of piles will typically be less than 1% of the pile diameter at the toe of the pile. However, where ultimate end bearing and skin friction values are adopted, settlements will be greater and therefore once column loads are known, some detailed settlement analysis of piles is recommended to check that predicted settlements fall within acceptable limits.

Where ultimate end bearing and skin friction values are adopted, the ultimate values recommended in the table above must be reduced by an appropriate geotechnical reduction factor. The geotechnical reduction factor should be based on the risk assessment procedure set out in Table 4.3.2 (A) of AS2159-2009, but should not be greater than 0.4, unless the risk factors producing a higher geotechnical reduction factor can be fully justified e.g. by in-situ testing of a percentage of piles. Consideration should also be given to the pile testing requirements when determining a suitable geotechnical strength reduction factor. The use of ultimate values will result in higher settlements and therefore specific analysis of the footing settlements must be carried out to confirm that it is consistent with the required structural performance.

In order to achieve the recommended skin friction values nominated in the table above, it is essential that the rock sockets be free from any clay smear and suitably roughened using a side wall grooving tool, and that they be at least as rough as Roughness Class R2. We note that an R2 roughness is equivalent to grooves 1mm to 4mm deep and grooves 2mm wide, which are spaced at 50mm to 200mm down the socket length. It will be the responsibility of the piling contractor to ensure that they have the appropriate equipment and methodology to satisfy this roughness criteria.

Where piling rigs are set up at bulk excavation level we anticipate that the subgrade will generally have suitable strength to support the rig. Notwithstanding this, a working platform with a minimum thickness of 0.3m should be provided to protect the subgrade from deterioration during inclement weather. The specific requirements for any working platforms should be determined once the piling rig and the loading conditions are known and a thickness of more than 0.3m may be required. An inspection of the subgrade should be completed by the geotechnical engineer to confirm the suitability of the material and identify any soft spots requiring remediation. As a guide, the wearing surface material could comprise a DGB20 or similar granular material, such as recycled crushed concrete. The DGB20 material must be compacted using a medium sized static roller to at least 98% SMDD. The compacted wearing surface should extend at least 2m outside the working area of the pilling rig.

5.9.2 Minor Structures (Hall)

Lightly loaded structures, such as the Hall, may be designed to be supported on footings found on the residual soils or engineered fill. However, if excavation is carried out and rock is exposed in one area of the building footprint then the whole building must be uniformly supported on the underlying bedrock to reduce the risk of differential settlements. From the boreholes it appears that bedrock may be encountered at the northern

end of the proposed Hall. Where footings are founded within bedrock the allowable bearing pressures provided in Section 4.8.1 may be used.

Shallow pad/strip footings or stiffened raft slabs would be feasible. Provided the structures fall within the scope of AS2870-2011 'Residential Slabs and Footings', the footing systems may be designed in accordance with that code. Other structures outside the scope of AS2870-2011, will need to be designed on the basis of engineering principles, taking into account the reactivity of the soils and the site conditions.

Shallow footings founded within controlled, engineered fill may be designed based on an allowable bearing pressure of 100kPa while where they are supported on the residual clay they may be designed for an allowable bearing pressure of 150kPa for residual silty clays of at least very stiff strength or 300kPa for extremely weathered claystone.

Where high level footings found within the soil are adopted, the design shrink-swell movements will depend on the reactivity of the fill material placed, the depth of cut completed and the depth to the underlying bedrock. All of these factors will need to be taken into account to determine the appropriate shrink-swell movements for each structure as it may vary in different areas of the site. Reference should be made to Section 4.2 above on likely shrink-swell movements. Particular consideration will also need to be given to the effect cuts have on shrink-swell movements and the reactivity of material placed as engineered fill as greater surface movements may result. Reference should also be made to Appendix B of AS2870-2011, which provides further guidance on foundation performance and maintenance for structures on reactive silty clay soils.

5.9.3 Footing Inspections

We recommend that the geotechnical engineers inspect piles during drilling to confirm the above recommended bearing pressures and skin frictions are being achieved. Where the lower quality rock (equivalent to Class V or IV) is adopted as the founding material, we consider that only a selection of piles will need to be inspected by the geotechnical engineers. However, if the higher quality rock (equivalent to Class III or better) is adopted as the founding material then all piles should be inspected by the geotechnical engineers. Inspection of piles will require the geotechnical engineer to be on site during the drilling process so that they can inspect both the material being drilled and check the pile's consistency with nearby borehole logs.

Where footings are founded within engineered fill, certification will need to be provided by the Geotechnical Inspection and Testing Authority (GITA) that the fill has been compacted and tested in accordance with the earthworks specification under Level 1 inspection and testing in accordance with AS3798-2007. The geotechnical engineer should also inspect all high-level footings supported on soil, whether natural silty clay or fill.

It is important to note that the geotechnical engineers can only 'sign off' on those footings (piles or high-level footings) they have inspected.

Prior to pouring concrete, footings will need to be dewatered, cleaned of all loose debris from the base, inspected and approved by the geotechnical engineers. We recommend the base of piles are cleaned with a cleaning bucket. Footings will need to be poured as soon as possible after drilling/excavation. If piles are left open overnight, they must be redrilled prior to pouring concrete to remove any softened or other debris from the base of the pile.

5.10 Ground Floor Slabs

Following bulk excavation and earthworks, the subgrade is likely to comprise either residual silty clay or engineered fill. Options for support of ground floor slabs include:

- Constructing the slabs on grade, or
- Designing the slabs as fully suspended.

Where the residual silty clays are encountered at subgrade level, and slabs on grade are proposed, we recommend that the subgrade be prepared in accordance with the recommendations outlined in Section 4.5 above. Similarly, if slabs on-grade are proposed and site levels are to be raised, the fill below the slabs must comprise engineered fill. Where the existing 'uncontrolled' fill is not removed the floor slabs would need to be constructed as suspended slabs.

Wherever slabs on-grade are supported on soils, the slabs should be separated from the columns or other structural elements supported on the underlying bedrock to allow relative movement between the slabs and rest of the structure (i.e. designed as floating slabs). These movements will likely largely be due to shrink-swell movements where the slabs are underlain by residual clay or clay fill. The extent of shrink-swell movements, as noted in Section 4.2, will depend on the earthworks completed at each building location and should be assessed following confirmation of the cut and fill depths and material to be used as engineered fill. To reduce the differential movements between the floor slabs and the building structure consideration could be given to replacing the residual clay subgrade with a non-reactive fill material and using such material where engineered fill is required to raise site levels.

For suspended slabs, the slabs will need to be founded on piers supported on the underlying bedrock as recommended above. Suspended slabs will need to be underlain by degradable void formers of at least 75mm thickness to reduce the risk of swelling soils 'jacking' the slabs off the piles. Where fill is used to raise site levels and the slabs are designed as suspended slabs the fill will be form fill and need not be placed as engineered fill.

5.11 Pavements

Following subgrade preparation in accordance with the recommendations in Section 4.5, pavements will need to be designed on the basis of the material present at subgrade level. Where the subgrade comprises the residual silty clay or excavated clay from site used as fill, pavements should be designed based on a CBR of 1%, or an estimated modulus of subgrade reaction of 10kPa/mm (750mm plate). Where pavements

overlie areas of engineered fill imported to site, CBR testing of the engineered fill subgrade will be required to confirm the appropriate design parameters.

Given the low CBR value, consideration could be given to the use of a select subgrade material or stabilisation of the subgrade as part of the overall pavement design in order to reduce the pavement design thickness . A select layer comprising a minimum 300mm of good quality granular material, such as ripped and crushed sandstone with a CBR value of at least 10%, may be used below the pavement layers. Alternatively, the clay subgrade may be stabilised by the addition of lime to reduce the reactivity and increase subgrade strength. The effect and quality of lime required would need to be determined by laboratory testing, but as a guide the addition of say 2% to 4% of lime by dry weight may result in a soaked CBR of the treated material in the order of 6% to 8%. This higher CBR layer may then be considered as part of the pavement design.

Concrete pavements should be underlain by a 150mm thick layer of lean-mix concrete subbase and the pavements be designed based on an effective subgrade strength of CBR 5%, correlating with a long-term Young's Modulus of 20MPa and short-term Young's Modulus of 33MPa. Slab joints should be designed to resist shear forces but not bending moments by providing dowelled or keyed joints.

Surface and subsoil drainage should be provided on the high side of the pavements to reduce moisture ingress into the subgrade and below the pavement. The subsoil drains should extend to a depth of at least 0.3m below the adjacent subgrade level and the drains should have adequate falls to reduce ponding in the drains. In addition, the surface of the adjacent pavement subgrade should be provided with a uniform cross fall towards the subsoil drain to assist with drainage.

5.12 Exposure Classification

The soil aggression test results have indicated the residual silty clay and extremely weathered claystone conditions ranging from slightly to strongly acidic and low sulphate and chloride contents. In accordance with Table 4.8.1 of AS3600:2018 'Concrete Structures', the exposure classification to the concrete elements is 'A2'. In accordance with Table 6.4.2(C) of AS2159-2009 'Piling – design and installation' the exposure classification for concrete piles is 'Mild'. For steel piles an exposure classification of 'Moderate' would be appropriate in accordance with Table 6.5.2(C) of AS2159-2009.

5.13 Earthquake Design Parameters

The following parameters can be adopted for earthquake design in accordance with AS1170.4:2024 'Structural Design Actions, Part 4: Earthquake Actions in Australia':

- Hazard factor (Z) = 0.08
- Site Subsoil Class = Class Ce

5.14 Further Geotechnical Input

The following is a summary of the further geotechnical input which is required and has been detailed in the preceding sections of this report:

- Confirmation of likely shrink-swell movements ground floor slabs will be subjected to where they are designed as slab on-grade.
- CBR testing of engineered fill material to confirm design CBR values.
- Where percussive excavation techniques are adopted quantitative vibration monitoring must be completed along the boundary with Leppington Public School.
- Inspection of proof rolling by an experienced geotechnical engineer or geotechnician.
- In-situ density testing of all materials placed as engineered fill to confirm that it complies with the earthworks specification.
- Inspection of all temporary and permanent batters to conform that they have been formed at a suitable angle.
- Inspection of the subgrade prior to mobilising piling rigs and design of working platforms for the specific rigs proposed.
- Inspection of pile drilling or footing excavations to confirm that material adequate for the design bearing pressures has been encountered.

6 SALINITY

The site is located in an area where soil and groundwater salinity may occur. Salinity can affect the longevity and appearance of structures as well as causing adverse horticultural and hydrogeological effects. The local council has guidelines relating to salinity issues which should be checked for relevance to this project.

7 GENERAL COMMENTS

The recommendations presented in this report include specific issues to be addressed during the design and construction phase of the project. As an example, special treatment of soft spots may be required as a result of their discovery during proof-rolling, etc. In the event that any of the advice presented in this report is not implemented, the general recommendations may become inapplicable and JK Geotechnics accept no responsibility whatsoever for the performance of the structure where recommendations are not implemented in full and properly tested, inspected and documented.

The long-term successful performance of floor slabs and pavements is dependent on the satisfactory completion of the earthworks. In order to achieve this, the quality assurance program should not be limited to routine compaction density testing only. Other critical factors associated with the earthworks may include subgrade preparation, selection of fill materials, control of moisture content and drainage, etc. The satisfactory control and assessment of these items may require judgment from an experienced engineer. Such judgment often cannot be made by a technician who may not have formal engineering qualifications and experience. In order to identify potential problems, we recommend that a pre-construction meeting be

held so that all parties involved understand the earthworks requirements and potential difficulties. This meeting should clearly define the lines of communication and responsibility.

The subsurface conditions between the completed boreholes may be found to be different (or may be interpreted to be different) from those expected. Variation can also occur with groundwater conditions, especially after climatic changes. If such differences appear to exist, we recommend that you immediately contact this office.

This report provides advice on geotechnical aspects for the proposed civil and structural design. As part of the documentation stage of this project, Contract Documents and Specifications may be prepared based on our report. However, there may be design features we are not aware of or have not commented on for a variety of reasons. The designers should satisfy themselves that all the necessary advice has been obtained. If required, we could be commissioned to review the geotechnical aspects of contract documents to confirm the intent of our recommendations has been correctly implemented.

A waste classification is required for any soil and/or bedrock excavated from the site prior to offsite disposal. Subject to the appropriate testing, material can be classified as Virgin Excavated Natural Material (VENM), Excavated Natural Material (ENM), General Solid, Restricted Solid or Hazardous Waste. Analysis can take up to seven to ten working days to complete, therefore, an adequate allowance should be included in the construction program unless testing is completed prior to construction. If contamination is encountered, then substantial further testing (and associated delays) could be expected. We strongly recommend that this requirement is addressed prior to the commencement of excavation on site.

115 Wicks Road
Macquarie Park, NSW 2113
PO Box 976
North Ryde, Bc 1670
Telephone: 02 9888 5000
Facsimile: 02 9888 5001

SOIL TEST SERVICES

ABN 43 002 145 173

TABLE A
MOISTURE CONTENT, ATTERBERG LIMITS AND LINEAR SHRINKAGE TEST REPORT

Client: JK Geotechnics
Project: Proposed High School
Location: 128-134 Rickard Road, Leppington, NSW

Report No.: 35910BT - A
Report Date: 19/12/2023
Page 1 of 1

AS 1289	TEST METHOD	2.1.1	3.1.2	3.2.1	3.3.1	3.4.1
BOREHOLE NUMBER	DEPTH m	MOISTURE CONTENT %	LIQUID LIMIT %	PLASTIC LIMIT %	PLASTICITY INDEX %	LINEAR SHRINKAGE %
1	3.00 - 3.45	10.1	-	-	-	-
4	0.50 - 0.95	24.6	59	18	41	13.5
8	0.90 - 1.30	9.6	-	-	-	-
11	1.20 - 1.60	7.5	-	-	-	-
14	0.50 - 0.95	19.6	61	18	43	14.0*
16	2.10 - 2.50	10.6	-	-	-	-
19	0.50 - 0.95	16.3	50	18	32	13.5
20	2.00 - 2.20	12.0	-	-	-	-
23	0.50 - 0.95	22.4	44	20	24	13.0
28	1.90 - 2.60	9.7	-	-	-	-

Notes:

- The test sample for liquid and plastic limit was air-dried & dry-sieved
- The linear shrinkage mould was 125mm
- Refer to appropriate notes for soil descriptions
- Date of receipt of sample: 06/12/2023.
- Sampled and supplied by client. Samples tested as received.
- * Denotes Linear Shrinkage curled.

NATA

NATA Accredited Laboratory Number:1327

19/12/2023
Authorised Signature / Date
(D. Treweek)

115 Wicks Road
Macquarie Park, NSW 2113
PO Box 976
North Ryde, Bc 1670
Telephone: 02 9888 5000
Facsimile: 02 9888 5001

SOIL TEST SERVICES

ABN 43 002 145 173

TABLE B
FOUR DAY SOAKED CALIFORNIA BEARING RATIO TEST REPORT

Client:	JK Geotechnics	**Report No.:**	35910BT - B
Project:	Proposed High School	**Report Date:**	19/12/2023
Location:	128-134 Rickard Road, Leppington, NSW	**Page 1 of 1**	

BOREHOLE NUMBER		BH 8	BH 10	BH 25
DEPTH (m)		0.50 - 0.90	0.20 - 0.70	0.50 - 1.50
Surcharge (kg)		9.0	9.0	9.0
Maximum Dry Density (t/m^3)		1.66 STD	1.64 STD	1.59 STD
Optimum Moisture Content (%)		17.3	18.2	21.7
Moulded Dry Density (t/m^3)		1.63	1.60	1.56
Sample Density Ratio (%)		98	98	98
Sample Moisture Ratio (%)		101	102	101
Moisture Contents				
Insitu (%)		16.2	14.4	20.9
Moulded (%)		17.5	18.5	21.9
After soaking and				
After Test, Top 30mm(%)		32.4	32.7	39.7
Remaining Depth (%)		21.9	23.8	27.3
Material Retained on 19mm Sieve (%)		2*	0	0
Swell (%)		2.5	3.0	3.5
C.B.R. value:	@2.5mm penetration	1.5	1.0	1.0

NOTES: Sampled and supplied by client. Samples tested as received.

- Refer to appropriate Borehole logs for soil descriptions
- Test Methods : AS 1289 6.1.1, 5.1.1 & 2.1.1.
- Date of receipt of sample: 05/12/2023.
- * Denotes not used in test sample.

NATA

NATA Accredited Laboratory Number:1327

19/12/2023

Authorised Signature / Date
(D. Treweek)

115 Wicks Road
Macquarie Park, NSW 2113
PO Box 976
North Ryde, Bc 1670
Telephone: 02 9888 5000
Facsimile: 02 9888 5001

SOIL TEST SERVICES

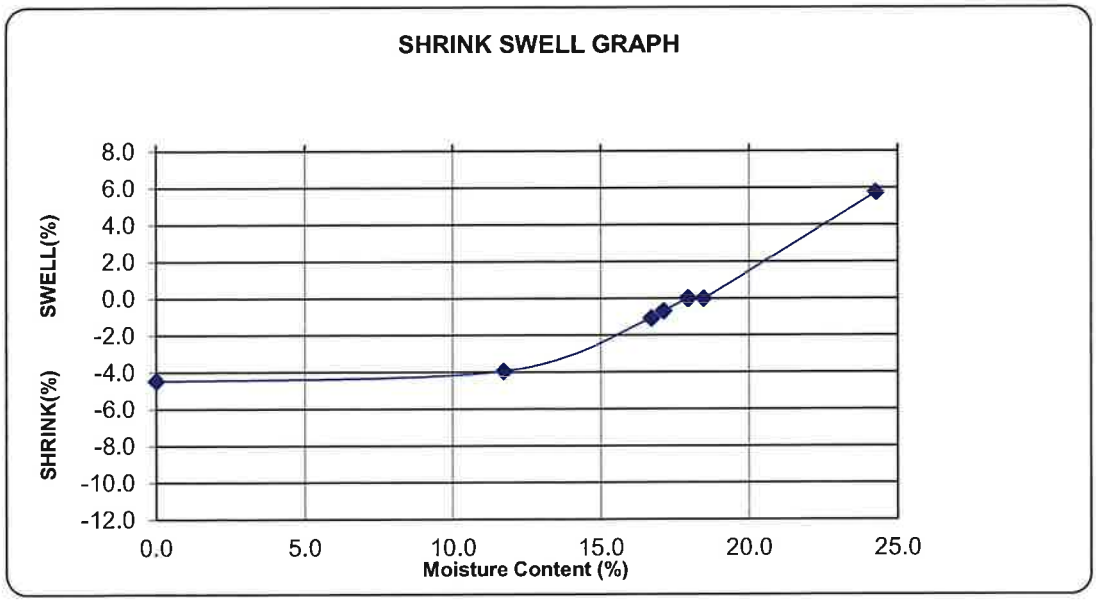
ABN 43 002 145 173

TABLE C
SHRINK - SWELL TEST REPORT
TEST METHOD: AS1289 7.1.1

Client: JK Geotechnics
Project: Proposed High School
Location: 128-134 Rickard Road, Leppington, NSW

Report No.: 35910LT - C
Report Date: 15/01/2025
Page 1 of 3

Borehole No.: 133		Depth: 0.30 - 0.75m			
MOISTURE CONTENT (SWELL)		ESTIMATED UNCONFINED COMPRESSIVE STRENGTH			
BEFORE TEST	AFTER TEST	BEFORE TEST		AFTER TEST	
18.5%	24.2%	>600	kPa	>210	kPa
LOAD	SETTLEMENT UNDER LOAD BEFORE SATURATION			SWELL ON SATURATION	SHRINKAGE
25	-0.9%			5.8%	4.4%



SHRINK SWELL INDEX
4.03 %/pF

Notes: Sampled and supplied by client. Sample tested as received.

- Suction Value used in calculation = 1.8pF
- Volume Change Coefficient (α) was assumed = 2
- Visually estimated inclusions by volume = 0-5%
- Shrinkage Cracking = Moderate
- Soil Crumbling = none
- Date of receipt of sample: 07/01/2025.

NATA Accredited Laboratory Number:1327

Authorised Signature / Date
(D. Treweek) 16/1/25

115 Wicks Road
Macquarie Park, NSW 2113
PO Box 976
North Ryde, Bc 1670
Telephone: 02 9888 5000
Facsimile: 02 9888 5001

SOIL TEST SERVICES

ABN 43 002 145 173

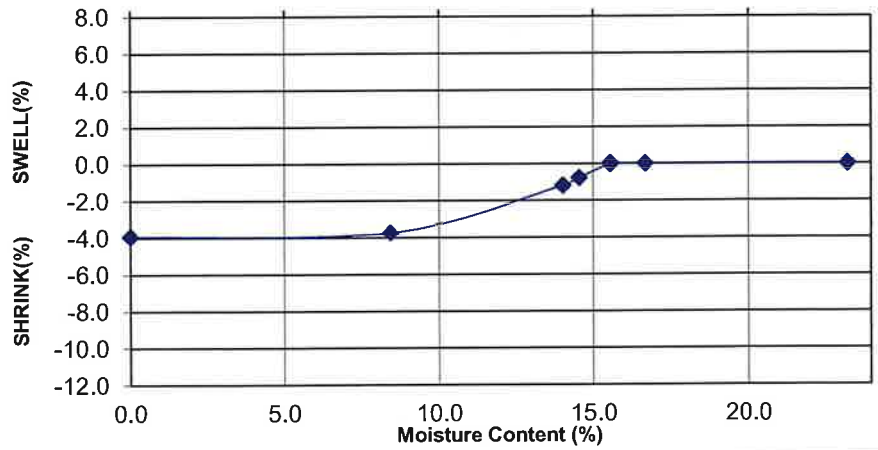
TABLE C
SHRINK - SWELL TEST REPORT
TEST METHOD: AS1289 7.1.1

Client: JK Geotechnics
Project: Proposed High School
Location: 128-134 Rickard Road, Leppington, NSW

Report No.: 35910LT - C
Report Date: 15/01/2025

Borehole No.: 138		Depth: 0.30 - 0.75m	
MOISTURE CONTENT (SWELL)		ESTIMATED UNCONFINED COMPRESSIVE STRENGTH	
BEFORE TEST	AFTER TEST	BEFORE TEST	AFTER TEST
16.7%	23.2%	>600 kPa	>290 kPa
LOAD	SETTLEMENT UNDER LOAD BEFORE SATURATION	SWELL ON SATURATION	SHRINKAGE
25	-0.3%	0.0%	3.8%

SHRINK SWELL GRAPH



SHRINK SWELL INDEX
2.12 %/pF

Notes: Sampled and supplied by client. Sample tested as received.

- Suction Value used in calculation = 1.8pF
- Volume Change Coefficient (α) was assumed = 2
- Visually estimated inclusions by volume = 0-5%
- Shrinkage Cracking = Moderate
- Soil Crumbling = none
- Date of receipt of sample:07/01/2025.

NATA Accredited Laboratory Number:1327

Accredited for compliance with ISO/IEC 17025 - Testing.
This document shall not be reproduced except in full without approval of the laboratory. Results relate only to the items tested or sampled.

Authorised Signature / Date (D. Treweek) 16/1/25

115 Wicks Road
Macquarie Park, NSW 2113
PO Box 976
North Ryde, Bc 1670
Telephone: 02 9888 5000
Facsimile: 02 9888 5001

SOIL TEST SERVICES

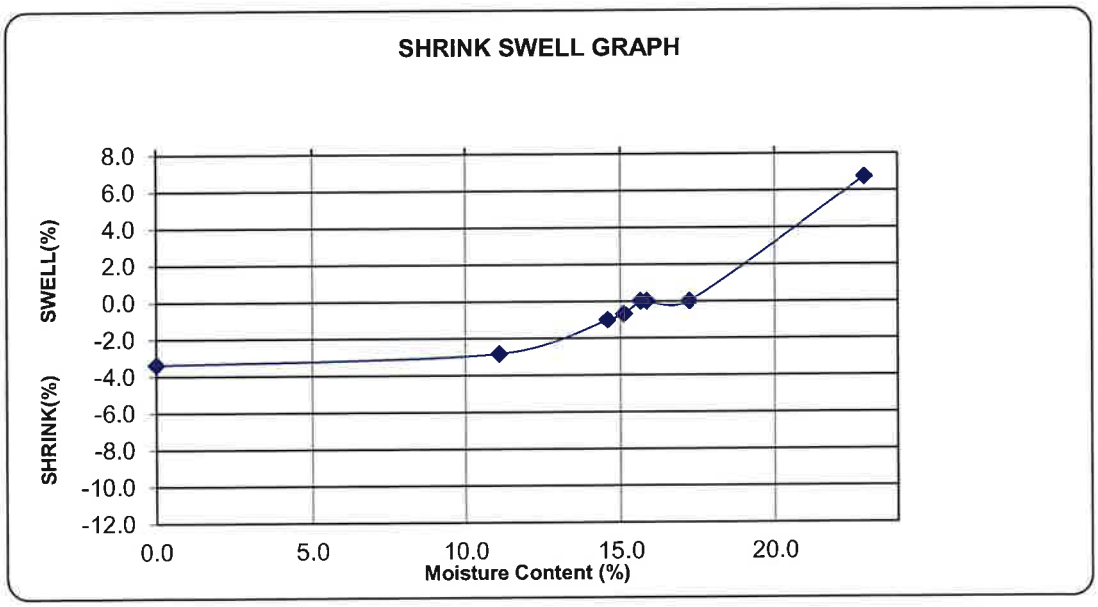
ABN 43 002 145 173

TABLE C
SHRINK - SWELL TEST REPORT
TEST METHOD: AS1289 7.1.1

Client: JK Geotechnics
Project: Proposed High School
Location: 128-134 Rickard Road, Leppington, NSW

Report No.: 35910LT - C
Report Date: 15/01/2025
Page 3 of 3

Borehole No.: 139		Depth: 0.30 - 0.75m	
MOISTURE CONTENT (SWELL)		ESTIMATED UNCONFINED COMPRESSIVE STRENGTH	
BEFORE TEST	AFTER TEST	BEFORE TEST	AFTER TEST
17.2%	22.9%	>450 kPa	410 kPa
LOAD	SETTLEMENT UNDER LOAD BEFORE SATURATION	SWELL ON SATURATION	SHRINKAGE
25	-0.8%	6.7%	3.3%



SHRINK SWELL INDEX
3.69 %/pF

Notes: Sampled and supplied by client. Sample tested as received.

- Suction Value used in calculation = 1.8pF
- Volume Change Coefficient (α) was assumed = 2
- Visually estimated inclusions by volume = 0-5%
- Shrinkage Cracking = Moderate
- Soil Crumbling = none
- Date of receipt of sample: 07/01/2025.

NATA Accredited Laboratory Number:1327

Accredited for compliance with ISO/IEC 17025 - Testing.
This document shall not be reproduced except in full without approval of the laboratory. Results relate only to the items tested or sampled.

Authorised Signature / Date (D. Treweek) 16/1/25

TABLE D
POINT LOAD STRENGTH INDEX TEST REPORT

Client: School Infrastructure NSW **Ref No:** 35910LT

Project: Proposed High School **Report:** D

Location: 128-134 Rickard Road, LEPPINGTON, NSW **Report Date:** 23/08/24

BOREHOLE NUMBER	DEPTH (m)	$I_{S\,(50)}$ (MPa)	ESTIMATED UNCONFINED COMPRESSIVE STRENGTH (MPa)	TEST DIRECTION
101	3.31 - 3.34	0.6	12	A
	3.82 - 3.86	1.1	22	A
	4.23 - 4.27	1.3	26	A
	4.64 - 4.68	1.6	32	A
	5.32 - 5.36	0.6	12	A
	5.74 - 5.77	1.1	22	A
	6.24 - 6.27	0.5	10	A
	6.68 - 6.72	5.5	110	A
	7.06 - 7.09	1.1	22	A
	7.64 - 7.67	0.5	10	A
	8.25 - 8.28	0.6	12	A
	8.79 - 8.82	0.3	6	A
	9.13 - 9.16	0.5	10	A
	9.63 - 9.67	1.5	30	A
	10.21 - 10.24	1.1	22	A
	10.83 - 10.87	1.5	30	A
	11.37 - 11.39	1.1	22	A
	11.89 - 11.92	1.6	32	A
102	4.12 - 4.15	1.4	28	A
	4.66 - 4.69	1.7	34	A
	5.49 - 5.51	0.7	14	A
	5.84 - 5.87	1.4	28	A
	6.06 - 6.09	1.6	32	A
	6.91 - 6.95	1.1	22	A
	7.07 - 7.10	1.2	24	A

NOTE: SEE PAGE 14

TABLE D
POINT LOAD STRENGTH INDEX TEST REPORT

Client: School Infrastructure NSW **Ref No:** 35910LT

Project: Proposed High School **Report:** D

Location: 128-134 Rickard Road, LEPPINGTON, NSW **Report Date:** 23/08/24

BOREHOLE NUMBER	DEPTH (m)	$I_{S\,(50)}$ (MPa)	ESTIMATED UNCONFINED COMPRESSIVE STRENGTH (MPa)	TEST DIRECTION
102	7.76 - 7.79	1.5	30	A
	8.17 - 8.19	0.5	10	A
	8.67 - 8.69	0.4	8	A
	9.11 - 9.14	0.8	16	A
	9.48 - 9.52	1.4	28	A
	10.20 - 10.24	1.1	22	A
	10.72 - 10.76	1	20	A
	11.25 - 11.28	1.5	30	A
	11.68 - 11.72	1	20	A
	12.11 - 12.13	0.8	16	A
103	4.17 - 4.20	1.3	26	A
	4.69 - 4.72	1	20	A
	5.10 - 5.12	1.7	34	A
	5.52 - 5.56	5.5	110	A
	6.21 - 6.24	1	20	A
	6.73 - 6.76	1.6	32	A
	7.13 - 7.16	0.6	12	A
	7.85 - 7.87	0.5	10	A
	8.54 - 8.57	0.5	10	A
	9.38 - 9.41	0.5	10	A
	9.91 - 9.94	1.2	24	A
	10.09 - 10.13	1.7	34	A
	10.64 - 10.66	1.5	30	A
	11.36 - 11.39	1.7	34	A
	11.84 - 11.86	1.8	36	A

NOTE: SEE PAGE 14

TABLE D
POINT LOAD STRENGTH INDEX TEST REPORT

Client: School Infrastructure NSW **Ref No:** 35910LT

Project: Proposed High School **Report:** D

Location: 128-134 Rickard Road, LEPPINGTON, NSW **Report Date:** 23/08/24

BOREHOLE NUMBER	DEPTH (m)	$I_{S(50)}$ (MPa)	ESTIMATED UNCONFINED COMPRESSIVE STRENGTH (MPa)	TEST DIRECTION
104	4.37 - 4.40	0.7	14	A
	4.72 - 4.75	0.7	14	A
	5.19 - 5.23	1.7	34	A
	5.77 - 5.80	1.7	34	A
	6.20 - 6.23	1.5	30	A
	6.64 - 6.67	0.6	12	A
	7.24 - 7.26	0.8	16	A
	7.65 - 7.68	0.6	12	A
	8.21 - 8.24	0.8	16	A
	8.81 - 8.84	0.2	4	A
	9.08 - 9.10	0.5	10	A
	9.82 - 9.85	0.9	18	A
	10.18 - 10.20	1.4	28	A
	10.56 - 10.59	1.8	36	A
	11.31 - 11.34	1.2	24	A
	11.82 - 11.85	0.8	16	A
	12.16 - 12.19	2.6	52	A
	12.88 - 12.90	2.2	44	A
	13.07 - 13.10	2.4	48	A
105	5.79 - 5.83	0.4	8	A
	5.83 - 5.87	0.3	6	A
	6.27 - 6.30	0.3	6	A
	6.65 - 6.69	1.1	22	A
	7.21 - 7.25	0.7	14	A
	7.67 - 7.70	0.5	10	A

NOTE: SEE PAGE 14

TABLE D
POINT LOAD STRENGTH INDEX TEST REPORT

Client:	School Infrastructure NSW	**Ref No:**	35910LT
Project:	Proposed High School	**Report:**	D
Location:	128-134 Rickard Road, LEPPINGTON, NSW	**Report Date:**	23/08/24
		Page 4 of 14	

BOREHOLE NUMBER	DEPTH (m)	$I_{S\,(50)}$ (MPa)	ESTIMATED UNCONFINED COMPRESSIVE STRENGTH (MPa)	TEST DIRECTION
105	8.25 - 8.29	0.5	10	A
	8.79 - 8.81	0.5	10	A
	9.23 - 9.26	0.5	10	A
	9.74 - 9.78	0.3	6	A
	10.36 - 10.40	0.5	10	A
	10.88 - 10.92	0.8	16	A
	11.15 - 11.18	1	20	A
	11.78 - 11.82	3	60	A
	12.10 - 12.14	1.2	24	A
	12.80 - 12.84	0.8	16	A
	13.16 - 13.19	2.8	56	A
	13.78 - 13.81	1.5	30	A
	14.16 - 14.19	2.1	42	A
106	5.30 - 5.34	0.5	10	A
	5.84 - 5.87	0.8	16	A
	6.21 - 6.25	1.6	32	A
	6.83 - 6.87	4.3	86	A
	7.21 - 7.25	1	20	A
	7.75 - 7.77	1.8	36	A
	8.12 - 8.16	1.3	26	A
	8.65 - 8.69	4.2	84	A
	9.09 - 9.12	1.2	24	A
	9.70 - 9.74	1.1	22	A
	10.26 - 10.29	1.1	22	A
	10.80 - 10.84	0.7	14	A

NOTE: SEE PAGE 14

TABLE D
POINT LOAD STRENGTH INDEX TEST REPORT

Client:	School Infrastructure NSW	**Ref No:**	35910LT
Project:	Proposed High School	**Report:**	D
Location:	128-134 Rickard Road, LEPPINGTON, NSW	**Report Date:**	23/08/24
		Page 5 of 14	

BOREHOLE NUMBER	DEPTH (m)	$I_{S\,(50)}$ (MPa)	ESTIMATED UNCONFINED COMPRESSIVE STRENGTH (MPa)	TEST DIRECTION
106	11.19 - 11.21	0.6	12	A
	11.70 - 11.73	1	20	A
	12.23 - 12.27	0.9	18	A
	12.70 - 12.74	2.7	54	A
	13.18 - 13.22	1.1	22	A
	13.68 - 13.72	0.7	14	A
	14.00 - 14.04	0.5	10	A
107	7.46 - 7.49	0.3	6	A
	7.82 - 7.85	1.4	28	A
	8.09 - 8.12	1	20	A
	8.76 - 8.79	1.6	32	A
	9.15 - 9.18	1.1	22	A
	9.66 - 9.69	0.4	8	A
	10.11 - 10.15	8.4	168	A
	10.76 - 10.80	1.2	24	A
	11.09 - 11.13	1.3	26	A
	11.76 - 11.79	0.8	16	A
	12.21 - 12.23	0.6	12	A
	12.77 - 12.79	0.9	18	A
	13.21 - 13.24	0.7	14	A
	13.73 - 13.76	0.9	18	A
	14.18 - 14.21	0.8	16	A
108	6.68 - 6.72	1.1	22	A
	7.08 - 7.11	2.1	42	A
	7.69 - 7.71	2	40	A

NOTE: SEE PAGE 14

TABLE D
POINT LOAD STRENGTH INDEX TEST REPORT

Client:	School Infrastructure NSW	**Ref No:**	35910LT
Project:	Proposed High School	**Report:**	D
Location:	128-134 Rickard Road, LEPPINGTON, NSW	**Report Date:**	23/08/24
		Page 6 of 14	

BOREHOLE NUMBER	DEPTH (m)	$I_{S\,(50)}$ (MPa)	ESTIMATED UNCONFINED COMPRESSIVE STRENGTH (MPa)	TEST DIRECTION
108	8.23 - 8.26	1.7	34	A
	8.79 - 8.81	1.4	28	A
	9.22 - 9.26	1.5	30	A
	9.90 - 9.94	2.2	44	A
	10.17 - 10.20	2.4	48	A
	10.72 - 10.76	0.8	16	A
	11.19 - 11.23	1	20	A
	11.46 - 11.50	0.6	12	A
	12.31 - 12.34	1.1	22	A
	12.70 - 12.73	0.9	18	A
	13.34 - 13.38	0.6	12	A
	13.72 - 13.75	1.3	26	A
109	5.83 - 5.86	0.4	8	A
	6.11 - 6.14	0.6	12	A
	6.68 - 6.71	1.1	22	A
	7.23 - 7.27	2.4	48	A
	7.83 - 7.86	2.1	42	A
	8.21 - 8.25	2.1	42	A
	8.73 - 8.76	1.5	30	A
	9.12 - 9.16	1.9	38	A
	9.80 - 9.83	2	40	A
	10.24 - 10.27	2	40	A
	10.77 - 10.80	1.2	24	A
	11.11 - 11.16	1.2	24	A
	11.79 - 11.83	0.9	18	A

NOTE: SEE PAGE 14

TABLE D
POINT LOAD STRENGTH INDEX TEST REPORT

Client:	School Infrastructure NSW	**Ref No:**	35910LT
Project:	Proposed High School	**Report:**	D
Location:	128-134 Rickard Road, LEPPINGTON, NSW	**Report Date:**	23/08/24

BOREHOLE NUMBER	DEPTH (m)	$I_{S\,(50)}$ (MPa)	ESTIMATED UNCONFINED COMPRESSIVE STRENGTH (MPa)	TEST DIRECTION
109	12.20 - 12.24	0.9	18	A
	12.80 - 12.84	1	20	A
	13.10 - 13.14	1.6	32	A
	13.66 - 13.71	0.6	12	A
	14.10 - 14.14	1.9	38	A
110	4.67 - 4.70	0.4	8	A
	5.38 - 5.41	0.6	12	A
	5.93 - 5.94	0.2	4	A
	6.05 - 6.08	0.1	2	A
	6.35 - 6.38	0.3	6	A
	6.56 - 6.60	0.5	10	A
	9.27 - 9.30	0.2	4	A
	9.68 - 9.70	0.3	6	A
	10.12 - 10.14	0.08	2	A
	10.30 - 10.33	0.2	4	A
	10.69 - 10.71	0.2	4	A
	11.25 - 11.27	0.2	4	A
	11.86 - 11.89	0.4	8	A
	12.11 - 12.15	1.3	26	A
	12.58 - 12.61	1.5	30	A
	13.02 - 13.06	2.9	58	A
	13.71 - 13.74	1.7	34	A
	13.93 - 13.97	0.5	10	A
	14.05 - 14.09	0.3	6	A
111	5.89 - 5.92	0.5	10	A

NOTE: SEE PAGE 14

TABLE D
POINT LOAD STRENGTH INDEX TEST REPORT

Client:	School Infrastructure NSW	**Ref No:**	35910LT
Project:	Proposed High School	**Report:**	D
Location:	128-134 Rickard Road, LEPPINGTON, NSW	**Report Date:**	23/08/24
		Page 8 of 14	

BOREHOLE NUMBER	DEPTH (m)	$I_{S\,(50)}$ (MPa)	ESTIMATED UNCONFINED COMPRESSIVE STRENGTH (MPa)	TEST DIRECTION
111	6.24 - 6.28	0.3	6	A
	6.84 - 6.87	0.6	12	A
	7.19 - 7.22	0.2	4	A
	7.68 - 7.71	1.1	22	A
	8.43 - 8.46	0.3	6	A
	8.66 - 8.69	0.4	8	A
	9.69 - 9.72	0.2	4	A
	10.30 - 10.32	0.08	2	A
	10.86 - 10.88	0.2	4	A
	11.27 - 11.31	0.4	8	A
	11.81 - 11.85	0.6	12	A
	12.26 - 12.28	0.7	14	A
	12.90 - 12.93	1.3	26	A
	13.18 - 13.21	1	20	A
	13.54 - 13.57	0.7	14	A
	14.20 - 14.23	0.5	10	A
	14.71 - 14.73	1	20	A
112	4.60 - 4.63	0.3	6	A
	5.43 - 5.46	0.2	4	A
	5.79 - 5.81	0.1	2	A
	6.81 - 6.84	0.6	12	A
	7.08 - 7.10	0.2	4	A
	7.62 - 7.66	0.2	4	A
	8.27 - 8.30	0.4	8	A
	8.71 - 8.73	0.4	8	A

NOTE: SEE PAGE 14

TABLE D
POINT LOAD STRENGTH INDEX TEST REPORT

Client:	School Infrastructure NSW	**Ref No:**	35910LT
Project:	Proposed High School	**Report:**	D
Location:	128-134 Rickard Road, LEPPINGTON, NSW	**Report Date:**	23/08/24
		Page 9 of 14	

BOREHOLE NUMBER	DEPTH (m)	$I_{S\,(50)}$ (MPa)	ESTIMATED UNCONFINED COMPRESSIVE STRENGTH (MPa)	TEST DIRECTION
112	9.16 - 9.19	1.9	38	A
	9.45 - 9.48	1.3	26	A
	9.83 - 9.87	0.4	8	A
	10.12 - 10.14	0.3	6	A
	10.63 - 10.66	0.7	14	A
	11.08 - 11.12	0.4	8	A
	11.64 - 11.68	0.4	8	A
	12.24 - 12.28	0.3	6	A
113	6.02 - 6.06	0.3	6	A
	6.55 - 6.57	0.08	2	A
	6.73 - 6.75	0.1	2	A
	7.08 - 7.12	0.2	4	A
	7.63 - 7.66	0.2	4	A
	8.16 - 8.19	0.1	2	A
	8.85 - 8.88	0.3	6	A
	9.12 - 9.16	0.7	14	A
	9.58 - 9.60	0.3	6	A
	10.18 - 10.20	0.3	6	A
	10.74 - 10.76	0.5	10	A
	11.10 - 11.13	0.8	16	A
	11.81 - 11.84	0.3	6	A
	12.33 - 12.36	0.2	4	A
	12.70 - 12.72	0.2	4	A
	13.18 - 13.21	1.2	24	A
	13.38 - 13.40	0.3	6	A

NOTE: SEE PAGE 14

TABLE D
POINT LOAD STRENGTH INDEX TEST REPORT

Client:	School Infrastructure NSW	**Ref No:**	35910LT
Project:	Proposed High School	**Report:**	D
Location:	128-134 Rickard Road, LEPPINGTON, NSW	**Report Date:**	23/08/24

BOREHOLE NUMBER	DEPTH (m)	$I_{S\,(50)}$ (MPa)	ESTIMATED UNCONFINED COMPRESSIVE STRENGTH (MPa)	TEST DIRECTION
113	13.80 - 13.83	0.2	4	A
	14.03 - 14.05	0.8	16	A
	14.29 - 14.32	0.3	6	A
	14.60 - 14.63	0.4	8	A
114	5.74 - 5.77	0.6	12	A
	6.15 - 6.18	0.3	6	A
	6.65 - 6.67	0.1	2	A
	7.19 - 7.23	0.4	8	A
	7.74 - 7.78	0.5	10	A
	8.11 - 8.14	0.6	12	A
	8.42 - 8.46	0.4	8	A
	8.90 - 8.93	0.6	12	A
	9.16 - 9.18	0.4	8	A
	9.60 - 9.63	0.6	12	A
	10.34 - 10.37	0.4	8	A
	10.93 - 10.96	0.5	10	A
	11.20 - 11.24	0.8	16	A
	11.88 - 11.90	0.3	6	A
	12.11 - 12.15	0.2	4	A
	12.60 - 12.64	0.4	8	A
	13.25 - 13.29	0.6	12	A
	13.78 - 13.81	0.5	10	A
	14.05 - 14.08	0.8	16	A
	14.39 - 14.42	0.5	10	A
	14.45 - 14.48	0.3	6	A

NOTE: SEE PAGE 14

TABLE D
POINT LOAD STRENGTH INDEX TEST REPORT

Client:	School Infrastructure NSW	**Ref No:**	35910LT
Project:	Proposed High School	**Report:**	D
Location:	128-134 Rickard Road, LEPPINGTON, NSW	**Report Date:**	23/08/24

BOREHOLE NUMBER	DEPTH (m)	$I_{S\,(50)}$ (MPa)	ESTIMATED UNCONFINED COMPRESSIVE STRENGTH (MPa)	TEST DIRECTION
115	6.20 - 6.22	0.5	10	A
	6.56 - 6.59	0.4	8	A
	7.29 - 7.32	0.4	8	A
	7.80 - 7.83	0.3	6	A
	8.20 - 8.24	0.3	6	A
	8.59 - 8.62	0.1	2	A
	8.88 - 8.92	0.6	12	A
	9.04 - 9.08	0.3	6	A
	9.56 - 9.59	0.6	12	A
	10.18 - 10.21	0.5	10	A
	10.69 - 10.72	0.5	10	A
	11.35 - 11.37	0.6	12	A
	11.84 - 11.86	0.4	8	A
	12.12 - 12.15	0.4	8	A
	12.49 - 12.53	0.4	8	A
	13.25 - 13.28	1.1	22	A
	13.75 - 13.78	0.6	12	A
	14.00 - 14.03	0.5	10	A
	14.41 - 14.44	0.8	16	A
116	6.10 - 6.14	0.4	8	A
	6.71 - 6.74	0.4	8	A
	7.21 - 7.24	0.4	8	A
	7.67 - 7.69	0.6	12	A
	8.19 - 8.22	0.3	6	A
	8.77 - 8.79	0.4	8	A

NOTE: SEE PAGE 14

TABLE D
POINT LOAD STRENGTH INDEX TEST REPORT

Client:	School Infrastructure NSW	**Ref No:**	35910LT
Project:	Proposed High School	**Report:**	D
Location:	128-134 Rickard Road, LEPPINGTON, NSW	**Report Date:**	23/08/24

BOREHOLE NUMBER	DEPTH (m)	$I_{S\,(50)}$ (MPa)	ESTIMATED UNCONFINED COMPRESSIVE STRENGTH (MPa)	TEST DIRECTION
116	9.27 - 9.30	0.7	14	A
	9.83 - 9.86	0.6	12	A
	10.07 - 10.10	2.3	46	A
	10.70 - 10.74	0.4	8	A
	11.22 - 11.26	0.7	14	A
	11.86 - 11.89	0.4	8	A
	12.28 - 12.32	0.2	4	A
	12.69 - 12.72	0.5	10	A
	13.24 - 13.27	0.4	8	A
	13.76 - 13.79	0.4	8	A
	14.17 - 14.20	0.2	4	A
	14.54 - 14.57	0.7	14	A
117	6.06 - 6.08	0.3	6	A
	6.67 - 6.71	0.7	14	A
	7.18 - 7.21	0.8	16	A
	7.73 - 7.75	0.6	12	A
	8.02 - 8.05	0.3	6	A
	8.73 - 8.76	0.6	12	A
	9.26 - 9.29	0.8	16	A
	9.67 - 9.70	1.5	30	A
	10.19 - 10.22	0.5	10	A
	10.28 - 10.32	0.6	12	A
	10.64 - 10.66	0.8	16	A
	11.17 - 11.20	0.5	10	A
	11.60 - 11.63	0.3	6	A

NOTE: SEE PAGE 14

TABLE D
POINT LOAD STRENGTH INDEX TEST REPORT

Client:	School Infrastructure NSW	**Ref No:**	35910LT
Project:	Proposed High School	**Report:**	D
Location:	128-134 Rickard Road, LEPPINGTON, NSW	**Report Date:**	23/08/24

BOREHOLE NUMBER	DEPTH (m)	$I_{S\,(50)}$ (MPa)	ESTIMATED UNCONFINED COMPRESSIVE STRENGTH (MPa)	TEST DIRECTION
118	5.75 - 5.78	0.2	4	A
	6.16 - 6.19	0.4	8	A
	6.64 - 6.67	0.6	12	A
	7.02 - 7.05	0.3	6	A
	7.05 - 7.08	0.2	4	A
	7.63 - 7.66	0.2	4	A
	8.19 - 8.22	0.7	14	A
	8.65 - 8.67	0.3	6	A
	8.91 - 8.94	0.3	6	A
	9.21 - 9.24	0.7	14	A
	9.72 - 9.75	0.4	8	A
	10.09 - 10.12	0.4	8	A
	10.86 - 10.89	0.3	6	A
	11.31 - 11.35	0.3	6	A
	11.88 - 11.91	0.5	10	A
	12.25 - 12.29	0.5	10	A
	13.15 - 13.18	1	20	A
	13.70 - 13.74	1.8	36	A
	14.05 - 14.08	2.9	58	A
119	6.26 - 6.28	0.5	10	A
	6.80 - 6.83	0.2	4	A
	7.22 - 7.24	0.3	6	A
	7.54 - 7.56	0.4	8	A
	8.77 - 8.80	0.4	8	A
	9.09 - 9.12	0.3	6	A

NOTE: SEE PAGE 14

TABLE D
POINT LOAD STRENGTH INDEX TEST REPORT

Client:	School Infrastructure NSW	**Ref No:**	35910LT
Project:	Proposed High School	**Report:**	D
Location:	128-134 Rickard Road, LEPPINGTON, NSW	**Report Date:**	23/08/24

BOREHOLE NUMBER	DEPTH (m)	$I_{S\,(50)}$ (MPa)	ESTIMATED UNCONFINED COMPRESSIVE STRENGTH (MPa)	TEST DIRECTION
119	9.73 - 9.75	0.4	8	A
	10.13 - 10.16	0.4	8	A
	10.76 - 10.80	0.4	8	A
	11.18 - 11.22	0.4	8	A
	11.65 - 11.69	0.4	8	A
	12.07 - 12.09	0.3	6	A
	12.92 - 12.94	0.9	18	A
	13.18 - 13.21	0.8	16	A
	13.72 - 13.75	0.8	16	A
	14.05 - 14.08	1.7	34	A
	14.42 - 14.45	2.8	56	A

NOTES

1. In the above table, testing was completed in test direction A for the axial direction, D for the diametral direction, B for the block test and L for the lump test.
2. The above strength tests were completed at the 'as received' moisture content.
3. Test Method: RMS T223.
4. For reporting purposes, the $I_{S(50)}$ has been rounded to the nearest 0.1MPa, or to one significant figure if less than 0.1MPa.
5. The estimated Unconfined Compressive Strength was calculated from the Point Load Strength Index based on the correlation provided in AS1726:2017 'Geotechnical Site Investigations' and rounded off to the nearest whole number: U.C.S. = 20 $I_{S(50)}$.

TABLE D
POINT LOAD STRENGTH INDEX TEST REPORT

Client: School Infrastructure NSW **Ref No:** 35910LT

Project: Proposed School **Report:** D

Location: 128 Rickard Road, LEPPINGTON, NSW **Report Date:** 23/12/24

BOREHOLE NUMBER	DEPTH (m)	$I_{S\,(50)}$ (MPa)	ESTIMATED UNCONFINED COMPRESSIVE STRENGTH (MPa)	TEST DIRECTION
120	3.66 - 3.68	0.3	6	A
	3.84 - 3.87	0.4	8	A
	5.94 - 5.96	0.3	6	A
	6.23 - 6.25	0.4	8	A
	6.76 - 6.79	1.4	28	A
	7.06 - 7.09	2.2	44	A
	7.73 - 7.76	2.6	52	A
	8.18 - 8.21	2.6	52	A
	8.88 - 8.91	2.5	50	A
	9.20 - 9.23	2.3	46	A
	9.82 - 9.86	2.7	54	A
	10.10 - 10.13	1.2	24	A
	10.75 - 10.78	2	40	A
	11.07 - 11.10	0.6	12	A
	11.75 - 11.77	0.6	12	A
	12.00 - 12.03	0.2	4	A
121	4.95 - 4.98	0.3	6	A
	5.25 - 5.28	0.7	14	A
	5.75 - 5.78	2.6	52	A
	6.07 - 6.10	2.4	48	A
	6.75 - 6.79	5.1	102	A
	7.19 - 7.22	1.5	30	A
	7.88 - 7.92	1.5	30	A
	8.16 - 8.19	1.7	34	A
	8.78 - 8.82	1.7	34	A

NOTE: SEE PAGE 9

TABLE D
POINT LOAD STRENGTH INDEX TEST REPORT

Client: School Infrastructure NSW **Ref No:** 35910LT

Project: Proposed School **Report:** D

Location: 128 Rickard Road, LEPPINGTON, NSW **Report Date:** 23/12/24

BOREHOLE NUMBER	DEPTH (m)	$I_{S\,(50)}$ (MPa)	ESTIMATED UNCONFINED COMPRESSIVE STRENGTH (MPa)	TEST DIRECTION
121	9.15 - 9.18	2.2	44	A
	9.72 - 9.74	0.7	14	A
	10.09 - 10.12	0.6	12	A
	10.81 - 10.84	0.4	8	A
	11.19 - 11.22	1.1	22	A
	11.86 - 11.89	1.6	32	A
	12.10 - 12.14	2	40	A
	12.80 - 12.84	2.7	54	A
	13.25 - 13.28	3.6	72	A
	13.51 - 13.54	3.2	64	A
122	4.24 - 0.00	1.4	28	A
	4.78 - 0.00	2.1	42	A
	5.20 - 5.24	2	40	A
	5.84 - 5.86	1.2	24	A
	6.29 - 6.32	2	40	A
	6.78 - 6.81	1.3	26	A
	7.18 - 7.20	0.8	16	A
	7.81 - 7.85	0.7	14	A
	8.23 - 8.26	0.4	8	A
	8.75 - 8.78	0.5	10	A
	9.04 - 9.07	0.4	8	A
	9.52 - 9.55	1.3	26	A
	9.84 - 9.87	4.3	86	A
	10.09 - 10.12	1.6	32	A
	10.67 - 10.70	0.8	16	A

NOTE: SEE PAGE 9

TABLE D
POINT LOAD STRENGTH INDEX TEST REPORT

Client: School Infrastructure NSW **Ref No:** 35910LT

Project: Proposed School **Report:** D

Location: 128 Rickard Road, LEPPINGTON, NSW **Report Date:** 23/12/24

BOREHOLE NUMBER	DEPTH (m)	$I_{S\,(50)}$ (MPa)	ESTIMATED UNCONFINED COMPRESSIVE STRENGTH (MPa)	TEST DIRECTION
122	11.09 - 11.12	0.8	16	A
	11.70 - 11.73	1.2	24	A
	12.27 - 12.31	1.5	30	A
	12.80 - 12.83	1.6	32	A
123	3.83 - 0.00	0.9	18	A
	4.12 - 0.00	1.8	36	A
	4.86 - 0.00	1.7	34	A
	5.05 - 0.00	1.3	26	A
	5.77 - 0.00	0.6	12	A
	6.34 - 0.00	1.1	22	A
	6.72 - 0.00	0.5	10	A
	7.22 - 0.00	1	20	A
	7.80 - 0.00	0.2	4	A
	8.20 - 0.00	0.5	10	A
	8.76 - 0.00	1.4	28	A
	9.23 - 0.00	1.6	32	A
	9.81 - 0.00	2.5	50	A
	10.15 - 0.00	1.5	30	A
	10.67 - 0.00	2.8	56	A
	11.21 - 0.00	2.6	52	A
	11.75 - 0.00	1.2	24	A
	12.26 - 0.00	1.1	22	A
124	2.64 - 2.67	1.1	22	A
	3.16 - 3.19	1.3	26	A
	3.62 - 3.65	1.4	28	A

NOTE: SEE PAGE 9

TABLE D
POINT LOAD STRENGTH INDEX TEST REPORT

Client:	School Infrastructure NSW	**Ref No:**	35910LT
Project:	Proposed School	**Report:**	D
Location:	128 Rickard Road, LEPPINGTON, NSW	**Report Date:**	23/12/24
		Page 4 of 9	

BOREHOLE NUMBER	DEPTH (m)	$I_{S\,(50)}$ (MPa)	ESTIMATED UNCONFINED COMPRESSIVE STRENGTH (MPa)	TEST DIRECTION
124	4.22 - 4.25	0.03	1	A
	4.72 - 4.76	0.06	1	A
	5.34 - 5.37	0.6	12	A
	5.90 - 5.94	0.5	10	A
	6.50 - 6.54	0.6	12	A
	6.85 - 6.89	0.5	10	A
	7.15 - 7.17	0.4	8	A
	7.52 - 7.56	0.5	10	A
	7.84 - 7.87	1.2	24	A
	8.14 - 8.17	1.6	32	A
	8.75 - 8.79	1.6	32	A
	9.24 - 9.27	1.4	28	A
	9.75 - 9.78	1.6	32	A
	10.14 - 10.17	2.8	56	A
	10.83 - 10.86	5.3	106	A
	11.07 - 11.09	4.6	92	A
	11.46 - 11.49	1.6	32	A
125	2.84 - 2.88	1.6	32	A
	3.34 - 3.38	3.2	64	A
	3.90 - 3.94	1.2	24	A
	4.13 - 4.16	1.7	34	A
	4.50 - 4.54	2.2	44	A
	4.81 - 4.86	1.8	36	A
	5.23 - 5.28	2.2	44	A
	5.68 - 5.72	1.1	22	A

NOTE: SEE PAGE 9

TABLE D
POINT LOAD STRENGTH INDEX TEST REPORT

Client:	School Infrastructure NSW	**Ref No:**	35910LT
Project:	Proposed School	**Report:**	D
Location:	128 Rickard Road, LEPPINGTON, NSW	**Report Date:**	23/12/24
		Page 5 of 9	

BOREHOLE NUMBER	DEPTH (m)	$I_{S\,(50)}$ (MPa)	ESTIMATED UNCONFINED COMPRESSIVE STRENGTH (MPa)	TEST DIRECTION
125	6.17 - 6.21	1.6	32	A
	6.70 - 6.74	1	20	A
	7.34 - 7.38	1.1	22	A
	7.78 - 7.82	0.08	2	A
	7.83 - 7.87	0.2	4	A
	8.37 - 8.42	0.8	16	A
	8.71 - 8.76	0.8	16	A
	9.23 - 9.27	1.1	22	A
	9.67 - 9.71	1.6	32	A
	10.26 - 10.30	1.8	36	A
	10.75 - 10.78	1.4	28	A
	11.14 - 11.18	1.9	38	A
	11.54 - 11.58	3.5	70	A
126	3.30 - 3.34	1	20	A
	3.77 - 3.80	4.4	88	A
	4.21 - 4.24	2.5	50	A
	4.67 - 4.70	1.3	26	A
	5.11 - 5.15	2	40	A
	5.71 - 5.75	0.8	16	A
	6.27 - 6.31	1.1	22	A
	6.78 - 6.82	1	20	A
	7.12 - 7.15	0.9	18	A
	7.74 - 7.77	1	20	A
	8.26 - 8.30	0.4	8	A
	8.64 - 8.67	0.9	18	A

NOTE: SEE PAGE 9

TABLE D
POINT LOAD STRENGTH INDEX TEST REPORT

Client:	School Infrastructure NSW	**Ref No:**	35910LT
Project:	Proposed School	**Report:**	D
Location:	128 Rickard Road, LEPPINGTON, NSW	**Report Date:**	23/12/24
		Page 6 of 9	

BOREHOLE NUMBER	DEPTH (m)	$I_{S\,(50)}$ (MPa)	ESTIMATED UNCONFINED COMPRESSIVE STRENGTH (MPa)	TEST DIRECTION
126	9.12 - 9.15	0.5	10	A
	9.77 - 9.80	0.6	12	A
	10.20 - 10.24	2	40	A
	10.80 - 10.83	1.7	34	A
	11.22 - 11.25	2.5	50	A
	11.96 - 11.98	1.1	22	A
127	3.60 - 3.63	0.6	12	A
	3.96 - 3.98	0.5	10	A
	4.18 - 4.22	0.5	10	A
	4.83 - 4.86	1.1	22	A
	5.17 - 5.21	1	20	A
	5.88 - 5.91	1.3	26	A
	6.23 - 6.26	2.1	42	A
	6.76 - 6.78	1	20	A
	7.23 - 7.27	2	40	A
	7.67 - 7.72	0.7	14	A
	8.54 - 8.57	0.3	6	A
	8.83 - 8.85	0.4	8	A
	9.28 - 9.31	0.4	8	A
	9.83 - 9.86	0.8	16	A
	10.20 - 10.23	0.7	14	A
	10.84 - 10.87	0.5	10	A
	11.30 - 11.34	0.4	8	A
	11.73 - 11.77	0.7	14	A
128	4.26 - 4.29	0.1	2	A

NOTE: SEE PAGE 9

TABLE D
POINT LOAD STRENGTH INDEX TEST REPORT

Client:	School Infrastructure NSW	**Ref No:**	35910LT
Project:	Proposed School	**Report:**	D
Location:	128 Rickard Road, LEPPINGTON, NSW	**Report Date:**	23/12/24
		Page 7 of 9	

BOREHOLE NUMBER	DEPTH (m)	$I_{S\,(50)}$ (MPa)	ESTIMATED UNCONFINED COMPRESSIVE STRENGTH (MPa)	TEST DIRECTION
128	4.84 - 4.88	0.7	14	A
	5.23 - 5.26	2	40	A
	5.77 - 5.80	2	40	A
	6.08 - 6.12	2.8	56	A
	6.72 - 6.75	8.5	170	A
	7.22 - 7.26	1.8	36	A
	7.69 - 7.72	1.2	24	A
	8.17 - 8.22	0.9	18	A
	8.50 - 8.54	1.4	28	A
	9.35 - 9.38	0.4	8	A
	9.83 - 9.86	0.4	8	A
	10.12 - 10.15	0.4	8	A
	10.68 - 10.71	1.5	30	A
	11.12 - 11.16	1	20	A
	11.78 - 11.81	1.7	34	A
	12.17 - 12.20	2.2	44	A
	12.75 - 12.79	2.5	50	A
	13.08 - 13.11	0.8	16	A
129	3.35 - 3.37	0.1	2	A
	4.12 - 4.16	1.4	28	A
	4.77 - 4.80	1.5	30	A
	5.17 - 5.20	1.4	28	A
	5.87 - 5.89	1.8	36	A
	6.22 - 6.24	1.4	28	A
	6.78 - 6.80	0.6	12	A

NOTE: SEE PAGE 9

TABLE D
POINT LOAD STRENGTH INDEX TEST REPORT

Client:	School Infrastructure NSW	**Ref No:**	35910LT
Project:	Proposed School	**Report:**	D
Location:	128 Rickard Road, LEPPINGTON, NSW	**Report Date:**	23/12/24
		Page 8 of 9	

BOREHOLE NUMBER	DEPTH (m)	$I_{S\,(50)}$ (MPa)	ESTIMATED UNCONFINED COMPRESSIVE STRENGTH (MPa)	TEST DIRECTION
129	7.37 - 7.39	0.7	14	A
	7.91 - 0.00	0.2	4	A
	8.50 - 0.00	0.4	8	A
	8.90 - 0.00	0.5	10	A
	9.07 - 0.00	0.5	10	A
	9.71 - 0.00	0.5	10	A
	10.11 - 0.00	0.6	12	A
	10.71 - 0.00	1.1	22	A
	11.12 - 0.00	1	20	A
	11.81 - 0.00	1.7	34	A
	12.12 - 0.00	2.1	42	A
	12.63 - 0.00	2.5	50	A
130	4.24 - 4.27	0.4	8	A
	5.18 - 5.22	2.1	42	A
	5.71 - 5.75	0.7	14	A
	6.29 - 6.34	1.1	22	A
	6.85 - 6.89	1.7	34	A
	7.14 - 7.18	1.5	30	A
	7.69 - 7.72	0.6	12	A
	8.23 - 8.28	1.1	22	A
	8.69 - 8.73	0.8	16	A
	9.17 - 9.21	0.6	12	A
	9.68 - 9.72	0.6	12	A
	10.19 - 10.23	0.4	8	A
	10.75 - 10.79	1	20	A

NOTE: SEE PAGE 9

TABLE D
POINT LOAD STRENGTH INDEX TEST REPORT

Client:	School Infrastructure NSW	**Ref No:**	35910LT
Project:	Proposed School	**Report:**	D
Location:	128 Rickard Road, LEPPINGTON, NSW	**Report Date:**	23/12/24
		Page 9 of 9	

BOREHOLE NUMBER	DEPTH (m)	$I_{S\,(50)}$ (MPa)	ESTIMATED UNCONFINED COMPRESSIVE STRENGTH (MPa)	TEST DIRECTION
130	11.25 - 11.29	2.1	42	A
	11.85 - 11.89	3.1	62	A
	12.17 - 12.20	1.4	28	A
	12.71 - 12.74	2.7	54	A
	13.00 - 13.05	5.1	102	A

NOTES

1. In the above table, testing was completed in test direction A for the axial direction, D for the diametral direction, B for the block test and L for the lump test.
2. The above strength tests were completed at the 'as received' moisture content.
3. Test Method: RMS T223.
4. For reporting purposes, the $I_{S(50)}$ has been rounded to the nearest 0.1MPa, or to one significant figure if less than 0.1MPa.
5. The estimated Unconfined Compressive Strength was calculated from the Point Load Strength Index based on the correlation provided in AS1726:2017 'Geotechnical Site Investigations' and rounded off to the nearest whole number: U.C.S. = 20 $I_{S(50)}$.

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

CERTIFICATE OF ANALYSIS 339674

Client Details

Client	JK Geotechnics
Attention	Arthur Billingham
Address	PO Box 976, North Ryde BC, NSW, 1670

Sample Details

Your Reference	**35910BT, Proposed High School - Leppington**
Number of Samples	6 Soil
Date samples received	07/12/2023
Date completed instructions received	07/12/2023

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Please refer to the last page of this report for any comments relating to the results.

Report Details

Date results requested by	14/12/2023
Date of Issue	15/12/2023
Reissue Details	This report replaces R00 created on 14/12/2023 due to: Sample ID Amended

Results Approved By
Diego Bigolin, Inorganics Supervisor

Authorised By
Nancy Zhang, Laboratory Manager

Misc Inorg - Soil						
Our Reference		339674-1	339674-2	339674-3	339674-4	339674-5
Your Reference	UNITS	BH3	BH9	BH12	BH15	BH25
Depth		1.5-1.95	1.1-1.5	1-1.5	0.5-0.95	0.5-0.95
Date Sampled		27/11/2023	01/12/2023	28/11/2023	28/11/2023	01/12/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	13/12/2023	13/12/2023	13/12/2023	13/12/2023	13/12/2023
Date analysed	-	13/12/2023	13/12/2023	13/12/2023	13/12/2023	13/12/2023
pH 1:5 soil:water	pH Units	4.8	5.4	7.5	5.5	5.1
Chloride, Cl 1:5 soil:water	mg/kg	1,000	530	<10	66	240
Sulphate, SO4 1:5 soil:water	mg/kg	710	670	<10	110	210
Resistivity in soil*	ohm m	9.7	13	160	61	29

Misc Inorg - Soil		
Our Reference		339674-6
Your Reference	UNITS	BH29
Depth		1.5-2.0
Date Sampled		01/12/2023
Type of sample		Soil
Date prepared	-	13/12/2023
Date analysed	-	13/12/2023
pH 1:5 soil:water	pH Units	4.6
Chloride, Cl 1:5 soil:water	mg/kg	590
Sulphate, SO4 1:5 soil:water	mg/kg	510
Resistivity in soil*	ohm m	11

Method ID	Methodology Summary
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA latest edition, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Inorg-002	Conductivity and Salinity - measured using a conductivity cell at 25oC in accordance with APHA 22nd ED 2510 and Rayment & Lyons. Resistivity is calculated from Conductivity (non NATA). Resistivity (calculated) may not correlate with results otherwise obtained using Resistivity-Current method, depending on the nature of the soil being analysed.
Inorg-081	Anions - a range of Anions are determined by Ion Chromatography, in accordance with APHA latest edition, 4110-B. Waters samples are filtered on receipt prior to analysis. Alternatively determined by colourimetry/turbidity using Discrete Analyser.

QUALITY CONTROL: Misc Inorg - Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			13/12/2023	1	13/12/2023	13/12/2023		13/12/2023	[NT]
Date analysed	-			13/12/2023	1	13/12/2023	13/12/2023		13/12/2023	[NT]
pH 1:5 soil:water	pH Units		Inorg-001	[NT]	1	4.8	4.8	0	101	[NT]
Chloride, Cl 1:5 soil:water	mg/kg	10	Inorg-081	<10	1	1000	970	3	105	[NT]
Sulphate, SO4 1:5 soil:water	mg/kg	10	Inorg-081	<10	1	710	680	4	100	[NT]
Resistivity in soil*	ohm m	1	Inorg-002	<1	1	9.7	10	3	[NT]	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

The recommended maximums for analytes in urine are taken from “2018 TLVs and BEIs”, as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.

Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Where matrix spike recoveries fall below the lower limit of the acceptance criteria (e.g. for non-labile or standard Organics <60%), positive result(s) in the parent sample will subsequently have a higher than typical estimated uncertainty (MU estimates supplied on request) and in these circumstances the sample result is likely biased significantly low.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Report Comments

Samples received in good order: Holding time exceedance

JKGeotechnics

BOREHOLE LOG

Borehole No. **1** 1/1

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910BT **Method:** SPIRAL AUGER **R.L. Surface:** 95.63m

Date: 27/11/23 **Datum:** AHD

Plant Type: JK400 **Logged/Checked by:** S.K./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLET-ION	■			■		0			FILL: Silty clay, low to medium plasticity, brown and dark grey, trace of fine to medium grained igneous gravel, concrete and plastic fragments ash and root fibres.	w<PL			
	■			■	N = 6 2,3,3			CH	Silty CLAY: high plasticity, red brown mottled grey, trace of root fibres.	w>PL	VSt	220 220 200	RESIDUAL
	■			■		1							
				■	N = 24 3,8,16			CI-CH	Silty CLAY: medium to high plasticity, grey mottled red brown, trace of fine to medium grained ironstone gravel, and root fibres.		Hd	480 500 500	
				■		2		-	Extremely Weathered claystone: silty CLAY, low to medium plasticity, grey.	XW	Hd		BRINGELLY SHALE VERY LOW 'TC' BIT RESISTANCE
				■		3							MODERATE RESISTANCE BANDS
				■		4			CLAYSTONE: dark grey.	DW	M		
				■		5							
									END OF BOREHOLE AT 5.2m				'TC' BIT REFUSAL
						6							
						7							

JKGeotechnics

BOREHOLE LOG

Borehole No. 2
1/1

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910BT **Method:** SPIRAL AUGER **R.L. Surface:** 96.12m

Date: 27/11/23 **Datum:** AHD

Plant Type: JK400 **Logged/Checked by:** S.K./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLET-ION	■			■		0			FILL: Silty sand, fine to medium grained, dark grey, trace of concrete, bricks, terracotta, asphalt fragments, and roots.	D			
				■	N = 16 4,8,8			CH	Silty CLAY: high plasticity, red brown mottled grey, trace of roots and root fibres.	w<PL	Hd	>600 >600 >600	RESIDUAL
	■					1		-	Extremely Weathered claystone: silty CLAY, low to medium plasticity, grey, with iron indurated bands.	XW	Hd		BRINGELLY SHALE VERY LOW 'TC' BIT RESISTANCE
				■	N > 7 4,7/100mm REFUSAL	3						>600 >600 >600	
									CLAYSTONE: grey.	DW	L-M		LOW TO MODERATE RESISTANCE
				■		4					M-H		HIGH RESISTANCE
									END OF BOREHOLE AT 4.6m				'TC' BIT REFUSAL
						5							
						6							
						7							

JKGeotechnics

BOREHOLE LOG

Borehole No. 3 1/1

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910BT **Method:** SPIRAL AUGER **R.L. Surface:** 96.06m

Date: 27/11/23 **Datum:** AHD

Plant Type: JK400 **Logged/Checked by:** S.K./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLET-ION	■			■		0			FILL: Silty sand, fine to medium grained, dark grey, trace of fine to medium grained igneous gravel, brick, concrete, terracotta, plastic and granite fragments.	D			
	■		■		N = 7 2,4,3			CH	Silty CLAY: high plasticity, red brown mottled grey, trace of root fibres.	w>PL	VSt	220 220 220	RESIDUAL
			■			1							
			■	■	N = 10 2,3,7				Silty CLAY: high plasticity, grey mottled red brown, trace of root fibres.			270 270 300	
						2							
				■				-	CLAYSTONE: grey.	DW	L-M		BRINGELLY SHALE MODERATE 'TC' BIT RESISTANCE BANDS
				■		3					M		HIGH RESISTANCE
									END OF BOREHOLE AT 3.9m				'TC' BIT REFUSAL
						4							
						5							
						6							
						7							

JKGeotechnics

BOREHOLE LOG

Borehole No. 4 1/1

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910BT **Method:** SPIRAL AUGER **R.L. Surface:** 96.90m

Date: 27/11/23 **Datum:** AHD

Plant Type: JK400 **Logged/Checked by:** S.K./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLET-ION	■			■		0			FILL: Silty sand, fine to medium grained, dark grey, trace of fine to medium grained igneous gravel, concrete and brick fragments.	D			
	■			■	N = 5 2,2,3			CH	Silty CLAY: high plasticity, red brown mottled grey, trace of root fibres.	w>PL	St	180 180 200	RESIDUAL
				■		1							
					N = 18 3,7,11						(Hd)		NO SPT SAMPLE RECOVERED
						2			as above, but with extremely weathered fabric.	w<PL			LOW 'TC' BIT RESISTANCE
				■		3							
								-	Extremely Weathered claystone: silty CLAY, low to medium plasticity, grey.	XW	Hd		BRINGELLY SHALE MODERATE RESISTANCE BANDS
				■		4			CLAYSTONE: grey brown, with iron indurated bands.	DW	L-M		HIGH RESISTANCE
									END OF BOREHOLE AT 4.7m				'TC' BIT REFUSAL
						5							
						6							
						7							

JKGeotechnics

BOREHOLE LOG

Borehole No. 5 1/1

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910BT **Method:** SPIRAL AUGER **R.L. Surface:** 95.97m

Date: 27/11/23 **Datum:** AHD

Plant Type: JK400 **Logged/Checked by:** S.K./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLET-ION	■			■		0			FILL: Silty sandy clay, low plasticity, dark grey, fine to medium grained sand, trace of fine to medium grained igneous gravel, and concrete fragments.	w<PL			
				■				CI-CH	Silty CLAY: medium to high plasticity, red brown mottled grey.	w>PL	VSt	280 320 400	RESIDUAL HP TEST ON REMOULDED SAMPLE
	■				N = 6 3,2,4	1							NO SPT SAMPLE RECOVERY
				■	N = 16 3,5,11			-	Extremely Weathered claystone: silty CLAY, medium plasticity, grey mottled red brown, trace of fine to medium grained ironstone gravel.	XW	Hd	>600 >600	BRINGELLY SHALE
						2				DW	VL	>600	LOW 'TC' BIT RESISTANCE
				■					CLAYSTONE: grey brown, with extremely weathered bands.				
						3			CLAYSTONE: brown, with iron indurated bands.		M		MODERATE TO HIGH RESISTANCE
									END OF BOREHOLE AT 3.1m				'TC' BIT REFUSAL
						4							
						5							
						6							
						7							

JKGeotechnics

BOREHOLE LOG

Borehole No. 6 1/1

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910BT **Method:** SPIRAL AUGER **R.L. Surface:** 96.00m

Date: 27/11/23 **Datum:** AHD

Plant Type: JK400 **Logged/Checked by:** S.K./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLET-ION	■			■		0			FILL: Silty sand, fine to medium grained, dark grey, trace of fine to medium grained igneous gravel, concrete, bricks and asphalt fragments, and roots.	D			
	■			■	N = 5 2,3,2			CI	Silty CLAY: medium plasticity, red brown mottled grey, trace of root fibres.	w>PL	St-VSt	180 210 200	RESIDUAL
						1							
				■	N = 12 4,6,6			CI-CH	Silty CLAY: medium to high plasticity, grey mottled red brown, trace of fine to medium grained ironstone gravel, and root fibres.		Hd	>600 >600 >600	
						2							
				■				-	CLAYSTONE: grey, with iron indurated bands.	DW	L		BRINGELLY SHALE MODERATE 'TC' BIT RESISTANCE
						3							
				■					SANDSTONE: fine to medium grained, grey.		M-H		HIGH RESISTANCE
									END OF BOREHOLE AT 3.7m				'TC' BIT REFUSAL
						4							
						5							
						6							
						7							

JKGeotechnics

BOREHOLE LOG

Borehole No. 7 1/1

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910BT **Method:** SPIRAL AUGER **R.L. Surface:** 95.18m

Date: 27/11/23 **Datum:** AHD

Plant Type: JK400 **Logged/Checked by:** S.K./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLET-ION	■			■		0			FILL: Silty sand, fine to medium grained, dark grey, trace of fine to medium grained igneous gravel, brick, asphalt and concrete fragments.	D			
				■	N = 16 3,7,9			CH	Silty CLAY: high plasticity, red brown mottled grey.	w<PL	Hd	>600 >600 >600	RESIDUAL
	■			■		1		-	Extremely Weathered claystone: silty CLAY, low plasticity, grey, with iron indurated bands.	XW	Hd		BRINGELLY SHALE MODERATE TO HIGH 'TC' BIT RESISTANCE BANDS
				■		2			CLAYSTONE: grey brown, with fine to medium grained sandstone bands.	DW	M-H		MODERATE TO HIGH RESISTANCE
									END OF BOREHOLE AT 2.2m				'TC' BIT REFUSAL
						3							
						4							
						5							
						6							
						7							

JKGeotechnics

BOREHOLE LOG

Borehole No. 8

1/1

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910BT **Method:** SPIRAL AUGER **R.L. Surface:** 92.18m

Date: 27/11/23 **Datum:** AHD

Plant Type: JK400 **Logged/Checked by:** S.K./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLET-ION	■			■		0			FILL: Sandy silty clay, low plasticity, brown, fine to medium grained sand, trace of fine to coarse grained igneous gravel, concrete fragments and roots.	w<PL			
	■		■		N = 13 4,6,7			CH	Silty CLAY: high plasticity, red brown, trace of root fibres.	w≈PL	Hd	>600 >600 >600	RESIDUAL
				■		1		-	CLAYSTONE: grey, with iron indurated bands.	DW	VL		BRINGELLY SHALE
									END OF BOREHOLE AT 1.3m				MODERATE 'TC' BIT RESISTANCE 'TC' BIT REFUSAL
						2							
						3							
						4							
						5							
						6							
						7							

JKGeotechnics

BOREHOLE LOG

Borehole No. 9 1/1

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910BT **Method:** SPIRAL AUGER **R.L. Surface:** 94.03m

Date: 1/12/23 **Datum:** AHD

Plant Type: JK308 **Logged/Checked by:** S.K./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLET-ION	■			■		0			FILL: Silty sand, fine to medium grained, brown, trace of fine to medium grained igneous gravel, asphalt fragments and ash.	D			
	■			■	N = 17 4,9,8			CI-CH	Silty CLAY: medium to high plasticity, grey mottled light brown, trace of ash and root fibres.	w<PL	Hd	>600 >600	RESIDUAL
				■		1		-	Extremely Weathered claystone: silty CLAY, medium plasticity, grey, with iron indurated bands.	XW	Hd		BRINGELLY SHALE VERY LOW 'TC' BIT RESISTANCE WITH MODERATE BANDS
									END OF BOREHOLE AT 1.7m				'TC' BIT REFUSAL
						2							
						3							
						4							
						5							
						6							
						7							

JKGeotechnics

BOREHOLE LOG

Borehole No. **10** 1/1

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910BT **Method:** SPIRAL AUGER **R.L. Surface:** 96.24m

Date: 28/11/23 **Datum:** AHD

Plant Type: JK308 **Logged/Checked by:** S.K./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLET-ION	■			■		0			TOPSOIL: Silty clay, low plasticity, brown, trace of roots and root fibres.	w<PL			GRASS COVER
								CH	Silty CLAY: high plasticity, red brown.	w<PL	Hd		RESIDUAL
	■			■	N = 16 6,9,7							>600 >600 >600	
				■		1		-	CLAYSTONE: grey and light brown, with iron indurated bands.	DW	VL-L		BRINGELLY SHALE
									END OF BOREHOLE AT 1.4m				MODERATE TO HIGH 'TC' BIT RESISTANCE 'TC' BIT REFUSAL
						2							
						3							
						4							
						5							
						6							
						7							

JKGeotechnics

BOREHOLE LOG

Borehole No. **11** 1/1

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910BT **Method:** SPIRAL AUGER **R.L. Surface:** 97.77m

Date: 28/11/23 **Datum:** AHD

Plant Type: JK308 **Logged/Checked by:** S.K./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLET-ION	■			■		0			TOPSOIL: Silty clay, low plasticity, brown, trace of roots.	w<PL			GRASS COVER
								CH	Silty CLAY: high plasticity, brown mottled grey, trace of root fibres.	w≈PL	Hd		RESIDUAL
	■			■	N = 17 5,7,10							>600 >600 >600	
						1							
				■				-	CLAYSTONE: grey and grey brown.	DW	VL-L		BRINGELLY SHALE MODERATE TO HIGH RESISTANCE
									END OF BOREHOLE AT 1.6m				'TC' BIT REFUSAL
						2							
						3							
						4							
						5							
						6							
						7							

JKGeotechnics

BOREHOLE LOG

Borehole No. 12
1/1

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910BT **Method:** SPIRAL AUGER **R.L. Surface:** 96.16m

Date: 28/11/23 **Datum:** AHD

Plant Type: JK308 **Logged/Checked by:** S.K./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLET-ION	■			■		0			FILL: Silty sandy clay, low plasticity, brown, fine to medium grained sand, trace of brick fragments, roots and root fibres.	w<PL			
				■	N = 22 5,10,12			CH	Silty CLAY: high plasticity, grey mottled orange brown, trace of roots and root fibres.	w<PL	Hd	>600	RESIDUAL
	■			■				-		XW	Hd	>600 >600	BRINGELLY SHALE
				■		1			Extremely Weathered claystone: silty CLAY: medium plasticity, grey and orange brown, with very low strength bands.				MODERATE RESISTANCE
						2			END OF BOREHOLE AT 2.0m				'TC' BIT REFUSAL
						3							
						4							
						5							
						6							
						7							

JKGeotechnics

BOREHOLE LOG

Borehole No. 13

1/1

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910BT **Method:** SPIRAL AUGER **R.L. Surface:** 97.09m

Date: 28/11/23 **Datum:** AHD

Plant Type: JK308 **Logged/Checked by:** S.K./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLET-ION	■			■		0			TOPSOIL: Silty clay, low plasticity, brown, trace of ash and roots.	w<PL			GRASS COVER
								CH	Silty CLAY: high plasticity, grey mottled red brown, trace of roots and root fibres.	w≈PL	Hd		RESIDUAL
	■			■	N = 19 4,7,12							>600 >600 >600	
						1		-	Extremely Weathered claystone: silty CLAY, low plasticity, grey, with iron indurated bands.	XW	Hd		BRINGELLY SHALE
									END OF BOREHOLE AT 1.6m				LOW TO MODERATE 'TC' BIT RESISTANCE
						2							'TC' BIT REFUSAL
						3							
						4							
						5							
						6							
						7							

JKGeotechnics

BOREHOLE LOG

Borehole No. **14** 1/1

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910BT **Method:** SPIRAL AUGER **R.L. Surface:** 98.53m

Date: 28/11/23 **Datum:** AHD

Plant Type: JK308 **Logged/Checked by:** S.K./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLET-ION	■			■		0			TOPSOIL: Silty clay, low to medium plasticity, brown, trace of roots and root fibres.	w≈PL			GRASS COVER
								CH		w>PL	Hd		RESIDUAL
	■			■	N = 8 2,4,4				Silty CLAY: high plasticity, red brown mottled grey, trace of root fibres.			>600 >600 >600	
						1							
				■				-	Extremely Weathered claystone: silty CLAY, low to medium plasticity, grey and grey brown, with iron indurated bands.	XW	Hd		BRINGELLY SHALE LOW TO MODERATE 'TC' BIT RESISTANCE
						2							
									END OF BOREHOLE AT 2.9m				'TC' BIT REFUSAL
						3							
						4							
						5							
						6							
						7							

JKGeotechnics

BOREHOLE LOG

Borehole No. **15** 1/1

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910BT **Method:** SPIRAL AUGER **R.L. Surface:** 99.03m

Date: 28/11/23 **Datum:** AHD

Plant Type: JK308 **Logged/Checked by:** S.K./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLET-ION	■			■		0			TOPSOIL: Silty clay, low plasticity, brown, trace of roots.	w<PL			GRASS COVER
								CH	Silty CLAY: high plasticity, red brown, trace of root fibres.	w≈PL	Hd		RESIDUAL
	■			■	N = 16 4,6,10							>600 >600 >600	
						1							
								-	Extremely Weathered claystone: silty CLAY, low to medium plasticity, grey, with iron induarated bands.	XW	Hd		BRINGELLY SHALE LOW TO MODERATE 'TC' BIT RESISTANCE
						2			END OF BOREHOLE AT 2.1m				'TC' BIT REFUSAL
						3							
						4							
						5							
						6							
						7							

JKGeotechnics

BOREHOLE LOG

Borehole No. **16** 1/1

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910BT **Method:** SPIRAL AUGER **R.L. Surface:** 100.62m

Date: 30/11/23 **Datum:** AHD

Plant Type: JK308 **Logged/Checked by:** S.K./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLET-ION	■			■		0			TOPSOIL: Silty clay, medium plasticity, brown, trace of ash and roots.	w>PL			GRASS COVER
								CI-CH		w≈PL	Hd		RESIDUAL
	■			■	N = 12 5,5,7				Silty CLAY: medium to high plasticity, grey mottled red brown, trace of root fibres.			>600 >600 >600	
				■		1		-	Extremely Weathered claystone: silty CLAY, medium plasticity, grey, with iron indurated bands.	XW	Hd		BRINGELLY SHALE LOW 'TC' BIT RESISTANCE
				■		2							MODERATE RESISTANCE
									END OF BOREHOLE AT 2.4m				'TC' BIT REFUSAL
						3							
						4							
						5							
						6							
						7							

JKGeotechnics

BOREHOLE LOG

Borehole No. 17

1/1

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910BT **Method:** SPIRAL AUGER **R.L. Surface:** 100.01m

Date: 30/11/23 **Datum:** AHD

Plant Type: JK308 **Logged/Checked by:** S.K./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLET-ION						0			TOPSOIL: Silty clay, high plasticity, brown, trace of roots.	w>PL			GRASS COVER
								CH	Silty CLAY: high plasticity, red brown mottled grey, trace of root fibres.	w<PL	Hd		RESIDUAL
					N = 21 10,11,10							>600 >600 >600	
						1		-	Extremely Weathered claystone: silty CLAY, low plasticity, grey.	XW	Hd		BRINGELLY SHALE
													LOW TO MODERATE 'TC' BIT RESISTANCE
						2			END OF BOREHOLE AT 1.9m				'TC' BIT REFUSAL
						3							
						4							
						5							
						6							
						7							

JKGeotechnics

BOREHOLE LOG

Borehole No. **18** 1/1

SDUP4: 0-0.1

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910BT **Method:** SPIRAL AUGER **R.L. Surface:** 100.52m

Date: 30/11/23 **Datum:** AHD

Plant Type: JK308 **Logged/Checked by:** S.K./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLET-ION	■			■		0			TOPSOIL: Silty clay, medium plasticity, brown, trace of roots.	w≈PL			GRASS COVER
								CH	Silty CLAY: high plasticity, red brown mottled grey, trace of root fibres.	w>PL	Hd		RESIDUAL
	■			■	N = 17 5,5,12							>600	
				■		1		-	Extremely Weathered claystone: silty CLAY, medium plasticity, grey, with very low strength bands.	XW	Hd	>600	BRINGELLY SHALE VERY LOW 'TC' BIT RESISTANCE
				■									MODERATE TO HIGH RESISTANCE
									END OF BOREHOLE AT 1.8m				'TC' BIT REFUSAL
						2							
						3							
						4							
						5							
						6							
						7							

JKGeotechnics

BOREHOLE LOG

Borehole No. **19** 1/1

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910BT **Method:** SPIRAL AUGER **R.L. Surface:** 99.43m

Date: 30/11/23 **Datum:** AHD

Plant Type: JK308 **Logged/Checked by:** S.K./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLET-ION	■			■		0			TOPSOIL: Silty clay, medium to high plasticity, brown, with roots.	w≈PL			GRASS COVER
								CI-CH	Silty CLAY: medium to high plasticity, grey mottled red brown, trace of root fibres.	w<PL	Hd		RESIDUAL
	■			■	N = 15 4,6,9							>600 >600 >600	
				■		1		-	Extremely Weathered claystone: silty CLAY, low to medium plasticity, grey brown, with iron indurated bands.	XW	Hd		BRINGELLY SHALE LOW TO MODERATE 'TC' BIT RESISTANCE
						2			CLAYSTONE: grey brown, with iron indurated bands.	DW	VL-L		MODERATE RESISTANCE
									END OF BOREHOLE AT 2.7m				'TC' BIT REFUSAL
						3							
						4							
						5							
						6							
						7							

JKGeotechnics

BOREHOLE LOG

Borehole No. **20** 1/1

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910BT **Method:** SPIRAL AUGER **R.L. Surface:** 99.53m

Date: 30/11/23 **Datum:** AHD

Plant Type: JK308 **Logged/Checked by:** S.K./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLET-ION	■			■		0			TOPSOIL: Silty clay, medium plasticity, brown, with roots.	w>PL			GRASS COVER
								CH	Silty CLAY: high plasticity, red brown mottled grey, with fine to medium grained ironstone gravel.	w<PL	Hd		RESIDUAL
	■			■	N = 31 7,15,16							>600 >600 >600	
				■		1		-	Extremely Weathered claystone: silty CLAY, low to medium plasticity, grey, with iron indurated bands.	XW	Hd		BRINGELLY SHALE MODERATE TO HIGH 'TC' BIT RESISTANCE
				■		2							LOW TO MODERATE RESISTANCE
				■		3			CLAYSTONE: grey.	DW	L-M		
									END OF BOREHOLE AT 3.2m				'TC' BIT REFUSAL
						4							
						5							
						6							
						7							

JKGeotechnics

BOREHOLE LOG

Borehole No. 21
1/1

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910BT **Method:** SPIRAL AUGER **R.L. Surface:** 99.90m

Date: 30/11/23 **Datum:** AHD

Plant Type: JK308 **Logged/Checked by:** S.K./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLET-ION	■			■		0			TOPSOIL: Silty clay, medium plasticity, brown, trace of roots.	w≈PL			GRASS COVER
								CH	Silty CLAY: high plasticity, grey mottled red brown, trace of root fibres.	w≈PL	Hd		RESIDUAL
	■			■	N = 18 5,8,10							>600 >600 >600	
						1		-	Extremely Weathered claystone: silty CLAY, medium plasticity, grey, with iron indurated bands.	XW	Hd		BRINGELLY SHALE VERY LOW TO LOW 'TC' BIT RESISTANCE
				■					CLAYSTONE: grey brown.	DW	VL-L		MODERATE TO HIGH RESISTANCE
						2			END OF BOREHOLE AT 2.4m				'TC' BIT REFUSAL
						3							
						4							
						5							
						6							
						7							

JKGeotechnics

BOREHOLE LOG

Borehole No. 22

1/1

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910BT **Method:** SPIRAL AUGER **R.L. Surface:** 99.82m

Date: 30/11/23 **Datum:** AHD

Plant Type: JK308 **Logged/Checked by:** S.K./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLET-ION	■			■		0			TOPSOIL: Silty clay, medium plasticity, brown, trace of roots and root fibres.	w>PL			GRASS COVER
								CH		w>PL	Hd		RESIDUAL
				■	N = 10 4,4,6				Silty CLAY: high plasticity, grey mottled red brown, trace of root fibres.			450 500 500	
	■					1		-	Extremely Weathered claystone: silty CLAY, medium plasticity, grey, with iron indurated bands.	XW	Hd		BRINGELLY SHALE VERY LOW TO LOW 'TC' BIT RESISTANCE
				■		2							
						3							
				■		4			CLAYSTONE: grey brown.	DW	VL-L		MODERATE TO HIGH RESISTANCE
									END OF BOREHOLE AT 4.1m				'TC' BIT REFUSAL
						5							
						6							
						7							

JKGeotechnics

BOREHOLE LOG

Borehole No. 23
1/1

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910BT **Method:** SPIRAL AUGER **R.L. Surface:** 101.05m

Date: 30/11/23 **Datum:** AHD

Plant Type: JK308 **Logged/Checked by:** S.K./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLET-ION	■			■		0			TOPSOIL: Silty clay, high plasticity, brown, trace of fine to medium grained sand, and roots.	w>PL			GRASS COVER
								CI		w>PL	Hd		RESIDUAL
	■			■	N = 13 2,4,9				Silty CLAY: medium plasticity, red brown mottled grey.			550 600 600	
						1							
				■				-	Extremely Weathered claystone: silty CLAY, low plasticity, grey, with iron indurated bands.	XW	Hd		BRINGELLY SHALE VERY LOW TO LOW 'TC' BIT RESISTANCE
				■		2							MODERATE TO HIGH RESISTANCE
									END OF BOREHOLE AT 2.2m				'TC' BIT REFUSAL
						3							
						4							
						5							
						6							
						7							

JKGeotechnics

BOREHOLE LOG

Borehole No. 24 1/1

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910BT **Method:** SPIRAL AUGER **R.L. Surface:** 101.7m

Date: 30/11/23 **Datum:** AHD

Plant Type: JK308 **Logged/Checked by:** S.K./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLET-ION	■		■	■		0			TOPSOIL: Silty clay, high plasticity, brown, trace of roots.	w>PL			GRASS COVER
								CH	Silty CLAY: high plasticity, red brown.	w>PL	Hd		RESIDUAL
	■			■	N = 22 5,8,14	1		-	Extremely Weathered claystone: silty CLAY, medium plasticity, with iron indurated and very low strength bands.	XW	Hd	>600 >600 >600	BRINGELLY SHALE
				■									VERY LOW TO LOW 'TC' BIT RESISTANCE
				■		2			CLAYSTONE: grey.	DW	VL-L		HIGH RESISTANCE
									END OF BOREHOLE AT 2.7m				'TC' BIT REFUSAL
						3							
						4							
						5							
						6							
						7							

JKGeotechnics

BOREHOLE LOG

Borehole No. **25** 1/1

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910BT **Method:** SPIRAL AUGER **R.L. Surface:** 100.23m

Date: 1/12/23 **Datum:** AHD

Plant Type: JK308 **Logged/Checked by:** S.K./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLET-ION	■			■		0			TOPSOIL: Silty clay, high plasticity, brown, trace of roots.	w>PL			GRASS COVER
								CH	Silty CLAY: high plasticity, red brown mottled grey, trace of root fibres.	w≈PL	Hd		RESIDUAL
	■		■		N = 10 3,4,6							450 500 550	
						1							
				■	N > 13 5,13/ 150mm REFUSAL			-	Extremely Weathered claystone: silty CLAY, medium plasticity, grey, with iron indurated and very low strength bands.	XW	Hd	>600 >600 >600	BRINGELLY SHALE
						2			CLAYSTONE: grey and grey brown.	DW	VL-L		LOW TO MODERATE 'TC' BIT RESISTANCE
				■									MODERATE TO HIGH RESISTANCE
									END OF BOREHOLE AT 2.7m				'TC' BIT REFUSAL
						3							
						4							
						5							
						6							
						7							

JKGeotechnics

BOREHOLE LOG

Borehole No. 26
1/1

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910BT **Method:** SPIRAL AUGER **R.L. Surface:** 101.88m

Date: 1/12/23 **Datum:** AHD

Plant Type: JK308 **Logged/Checked by:** S.K./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLET-ION	■			■		0			TOPSOIL: Silty clay, low to medium plasticity, brown, trace of roots.	w>PL			GRASS COVER
								CH	Silty CLAY: high plasticity, grey mottled brown, trace of root fibres.	w<PL	Hd		RESIDUAL
	■			■	N = 13 2,5,8							>600 >600 >600	
				■		1		-	Extremely Weathered claystone: silty CLAY, low to medium plasticity, grey, with iron indurated bands.	XW	Hd		BRINGELLY SHALE MODERATE 'TC' BIT RESISTANCE
				■		2							HIGH RESISTANCE
									END OF BOREHOLE AT 2.8m				'TC' BIT REFUSAL
						3							
						4							
						5							
						6							
						7							

JKGeotechnics

BOREHOLE LOG

Borehole No. 27
1/1

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910BT **Method:** SPIRAL AUGER **R.L. Surface:** 102.29m

Date: 1/12/23 **Datum:** AHD

Plant Type: JK308 **Logged/Checked by:** S.K./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLET-ION	■			■		0			TOPSOIL: Silty clay, medium plasticity, brown, trace of roots.	w>PL			GRASS COVER
								CH	Silty CLAY: high plasticity, grey mottled red brown.	w≈PL	Hd		RESIDUAL
				■	N = 16 3,7,9							>600 >600 >600	
	■					1							
				■				-	Extremely Weathered claystone: silty CLAY, low to medium plasticity, grey, with iron indurated and very low strength bands.	XW	Hd		BRINGELLY SHALE LOW 'TC' BIT RESISTANCE
						2							MODERATE RESISTANCE
									END OF BOREHOLE AT 2.8m				'TC' BIT REFUSAL
						3							
						4							
						5							
						6							
						7							

JKGeotechnics

BOREHOLE LOG

Borehole No. **28** 1/1

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910BT **Method:** SPIRAL AUGER **R.L. Surface:** 101.03m

Date: 1/12/23 **Datum:** AHD

Plant Type: JK308 **Logged/Checked by:** S.K./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLET-ION	■			■		0			TOPSOIL: Silty clay, medium plasticity, brown, trace of roots.	w>PL			GRASS COVER
								CH	Silty CLAY: high plasticity, red brown mottled grey, trace of root fibres.	w≈PL	Hd		RESIDUAL
	■			■	N = 16 5,6,10							>600 >600 >600	
				■		1		-	Extremely Weathered claystone: silty CLAY, medium plasticity, grey, with iron indurated bands.	XW	Hd		BRINGELLY SHALE LOW 'TC' BIT RESISTANCE
				■		2							MODERATE RESISTNACE
													HIGH RESISTANCE
									END OF BOREHOLE AT 2.8m				'TC' BIT REFUSAL
						3							
						4							
						5							
						6							
						7							

JKGeotechnics

BOREHOLE LOG

Borehole No. 29

1/1

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910BT **Method:** SPIRAL AUGER **R.L. Surface:** 98.97m

Date: 1/12/23 **Datum:** AHD

Plant Type: JK308 **Logged/Checked by:** S.K./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLET-ION	■			■		0			TOPSOIL: Silty clay, low plasticity, brown, trace of roots and root fibres.	w<PL	Hd		GRASS COVER
	■			■		1		-	Extremely Weathered claystone: silty CLAY, high plasticity, with iron indurated bands.	XW	Hd		BRINGELLY SHALE VERY LOW 'TC' BIT RESISTANCE WITH MODERATE TO HIGH RESISTANCE BANDS
				■		2							
				■		3							
				■		4			CLAYSTONE: grey and grey brown, with iron indurated bands.	DW	L-M		MODERATE TO HIGH RESISTANCE
				■		5							
						6			END OF BOREHOLE AT 5.2m				'TC' BIT REFUSAL
						7							

JKGeotechnics

BOREHOLE LOG

Borehole No. 30
1/1

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910BT **Method:** SPIRAL AUGER **R.L. Surface:** 101.97m

Date: 1/12/23 **Datum:** AHD

Plant Type: JK308 **Logged/Checked by:** S.K./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLET-ION	■			■		0			TOPSOIL: Silty clay, medium plasticity, trace of roots.	w<PL			GRASS COVER
								CH	Silty CLAY: high plasticity, grey, trace of root fibres.	w≈PL	Hd		RESIDUAL
	■			■	N = 9 3,4,5							>600 >600 >600	
				■		1		-	Extremely Weathered claystone: silty CLAY, high plasticity, grey, with iron indurated bands.	XW	Hd		BRINGELLY SHALE VERY LOW 'TC' BIT RESISTANCE
				■		2							
				■		3							MODERATE TO HIGH RESISTANCE
				■		4							
									END OF BOREHOLE AT 4.3m				'TC' BIT REFUSAL
						5							
						6							
						7							

JKGeotechnics

BOREHOLE LOG

Borehole No. 101

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT **Method:** SPIRAL AUGER **R.L. Surface:** 95.64 m

Date: 29/7/24 **Datum:** AHD

Plant Type: JK308 **Logged/Checked By:** A.M./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION OF AUGERING						95.64	0			FILL: Silty sand, fine to medium grained, brown, with fine to medium grained sandstone and igneous gravel, trace of clay nodules, concrete fragments and root fibres.	M			
					N = 7 3,3,4				CH	Silty CLAY: high plasticity, brown, trace of fine grained ironstone gravel.	w<PL	VSt - Hd	440 410 400	RESIDUAL
						95	1			as above, but orange brown and grey.			250 300 340	
					N = 15 4,6,9	94	2		-	Extremely Weathered claystone: silty CLAY, medium plasticity, grey.	XW	Hd	>600 >600 >600	BRINGELLY SHALE
						93	3			CLAYSTONE: brown and grey.	DW	L		LOW 'TC' BIT RESISTANCE
														LOW TO MODERATE RESISTANCE
												M		HIGH RESISTANCE
						92	4			REFER TO CORED BOREHOLE LOG				
						91	5							
						90	6							
						89								

JKGeotechnics

CORED BOREHOLE LOG

Borehole No. 101

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT | **Core Size:** NMLC | **R.L. Surface:** 95.64 m

Date: 29/7/24 | **Inclination:** VERTICAL | **Datum:** AHD

Plant Type: JK308 | **Bearing:** N/A | **Logged/Checked By:** A.M./A.B.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$	DEFECT DETAILS SPACING (mm) DESCRIPTION Type, orientation, defect shape and roughness, defect coatings and seams, openness and thickness Specific / General	Formation
					START CORING AT 3.17m					
		92			NO CORE 0.05m LAMINITE: Siltstone, brown and dark grey, interlaminated with Sandstone, fine to medium grained, light grey, bedded at 0-10°.	MW	M	0.60	(3.43m) Be, 0°, P, R, Fe Sn (3.66m) J, 70°, P, R, Cn (3.74m) Cr, 0°, 20 mm.t (3.79m) Be, 0°, P, S, Fe Sn, 5 mm.t	
			4		SANDSTONE: fine to medium grained, light grey, with occasional dark grey siltstone bands, bedded at 0-10°.	SW	M - H	1.1 1.3		
		91						1.6 0.60	(5.47m) Be, 0°, P, S, Clay Vn (5.59m) Be, 10°, P, R, Fe Sn (5.62m) Jh, 80°, P	
			5					1.1		
		90						0.50	(6.07m) J, 70°, C, R, Cn	
			6					5.5	(6.50m) J, 80°, P, R, Fe Sn (6.80m) Be, 10°, P, R, Fe Sn	
		89						1.1		Bringelly Shale
			7		LAMINITE: Sandstone, fine to medium grained, grey, interlaminated with Siltstone, dark grey, bedded at 0-5°.	FR		0.50	(7.72m) CS, 0°, 180 mm.t	
		88							(8.02m) Be, 5°, P, R, Fe Sn (8.11m) CS, 0°, 10 mm.t	
			8		CLAYSTONE: dark grey, bedded at 0-5°.			0.60		
		87						0.30		
			9		CLAYSTONE: dark grey, with sandstone, fine grained grey bands, bedded at 0-10°.			0.50	(9.06m) Be, 0°, P, S, Cn	
		86					H	1.5		

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS

JKGeotechnics

CORED BOREHOLE LOG

Borehole No. 101

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT | **Core Size:** NMLC | **R.L. Surface:** 95.64 m

Date: 29/7/24 | **Inclination:** VERTICAL | **Datum:** AHD

Plant Type: JK308 | **Bearing:** N/A | **Logged/Checked By:** A.M./A.B.

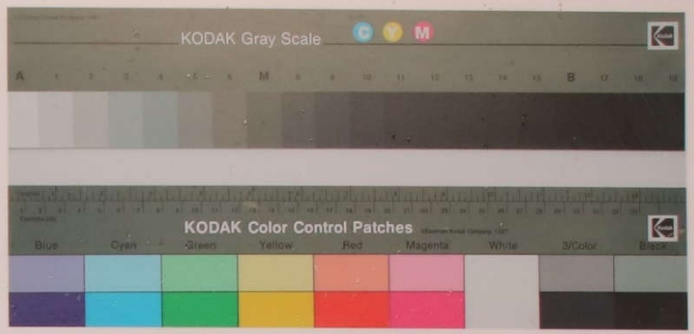
Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION: Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$ (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	DEFECT DETAILS: SPACING (mm) (600, 200, 60, 20)	DEFECT DETAILS: DESCRIPTION (Specific / General)	Formation
		85	11		CLAYSTONE: dark grey, with sandstone, fine grained grey bands, bedded at 0-10°. *(continued)*	FR	H	1.1; 1.5; 1.1; 1.6			Bringelly Shale
		84	12		END OF BOREHOLE AT 12.00 m						
		83	13								
		82	14								
		81	15								
		80	16								
		79									

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS


JKGeotechnics
Job No: 35910BT
Borehole No: BH101
Depth: 3.17m to 7.00m
KODAK Gray Scale
KODAK Color Control Patches
35910BT BH101 START CORING AT 3.17m.
3
(EOBH 17.0m)
NO CORE 0.05m
4
5
6

JKGeotechnics

Job No: 35910BT
Borehole No: BH101
Depth: 7.00m to 12.00m



JKGeotechnics

BOREHOLE LOG

Borehole No. 102 1 / 3

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT **Method:** SPIRAL AUGER **R.L. Surface:** 96.20 m

Date: 29/7/24 TO 30/7/24 **Datum:** AHD

Plant Type: JK308 **Logged/Checked By:** A.M./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION OF AUGERING						96				FILL: Silty gravelly sand, fine to medium grained, dark grey, fine to medium grained sandstone and igneous gravel.	M			
									CH	Silty CLAY: high plasticity, brown, trace of fine grained ironstone gravel.	w~PL	VSt	250 250 250	RESIDUAL NO SAMPLE IN SPT
					N = 7 2,3,4		1							
						95				as above, but grey.			240 250	
					N = 15 2,6,9				CI	Silty CLAY: medium plasticity, light grey and red brown, with extremely weathered fabric and ironstone bands.	w<PL	VSt - Hd	260 250 350 400	
						94	2							
									-	CLAYSTONE: brown and dark grey.	DW	L		BRINGELLY SHALE LOW 'TC' BIT RESISTANCE
						93	3							
									-	SANDSTONE: fine to medium grained, grey and light brown.		H		MODERATE RESISTANCE
							4			REFER TO CORED BOREHOLE LOG				
						92								
							5							
						91								
							6							
						90								

JKGeotechnics

CORED BOREHOLE LOG

Borehole No. 102

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT | **Core Size:** NMLC | **R.L. Surface:** 96.20 m

Date: 29/7/24 TO 30/7/24 | **Inclination:** VERTICAL | **Datum:** AHD

Plant Type: JK308 | **Bearing:** N/A | **Logged/Checked By:** A.M./A.B.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION: Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$ (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	DEFECT DETAILS: SPACING (mm) (600, 200, 60, 20)	DEFECT DETAILS: DESCRIPTION (Specific / General)	Formation
		93			START CORING AT 3.75m						
		92	4		SANDSTONE: fine to medium grained, grey and light brown, with dark grey laminae and occasional claystone bands, bedded at 0-10°.	SW	H	1.4; 1.7		(3.79m) Be, 0°, P, R, Clay Ct (3.83m) CS, 0°, 5 mm.t (3.95m) J, 80°, P, R, Cn (4.06m) J, 80°, P, R, Cn (4.24m) CS, 0°, 10 mm.t (4.42m) CS, 0°, 10 mm.t	Bringelly Shale
		91	5					0.70		(5.18m) Be, 0°, P, R, Fe Sn (5.20m) J, 90°, C, R, Fe Sn	
		90	6		as above, but light grey and light brown.			1.4; 1.6		(5.78m) Be, 10°, P, S, Fe Sn (6.25m) Be, 0°, P, R, Clay FILLED (6.50m) J, 80°, P, R, Fe Sn (6.51m) Be, 0°, P, R, Fe Sn	
		89	7					1.1; 1.2			
		88	8		CLAYSTONE: dark grey and grey, with sandstone, fine grained, grey laminae, bedded at 0-10°.		M	1.5; 0.50		(7.88m) Jh, 30°, P (7.93m) J, 40°, P, R, Cn (8.26m) Be, 0°, P, R, Clay Ct	
		87	9			FR	M - H	0.40; 0.80; 1.4		(8.55m) Be, 0°, R, Clay Ct (8.57m) Cr, 0°, 20 mm.t (9.19m) Be, 0°, P, R, Clay Vn (9.22m) Be, 0°, P, R, Clay FILLED	

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS

JKGeotechnics

CORED BOREHOLE LOG

Borehole No. 102

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT | **Core Size:** NMLC | **R.L. Surface:** 96.20 m

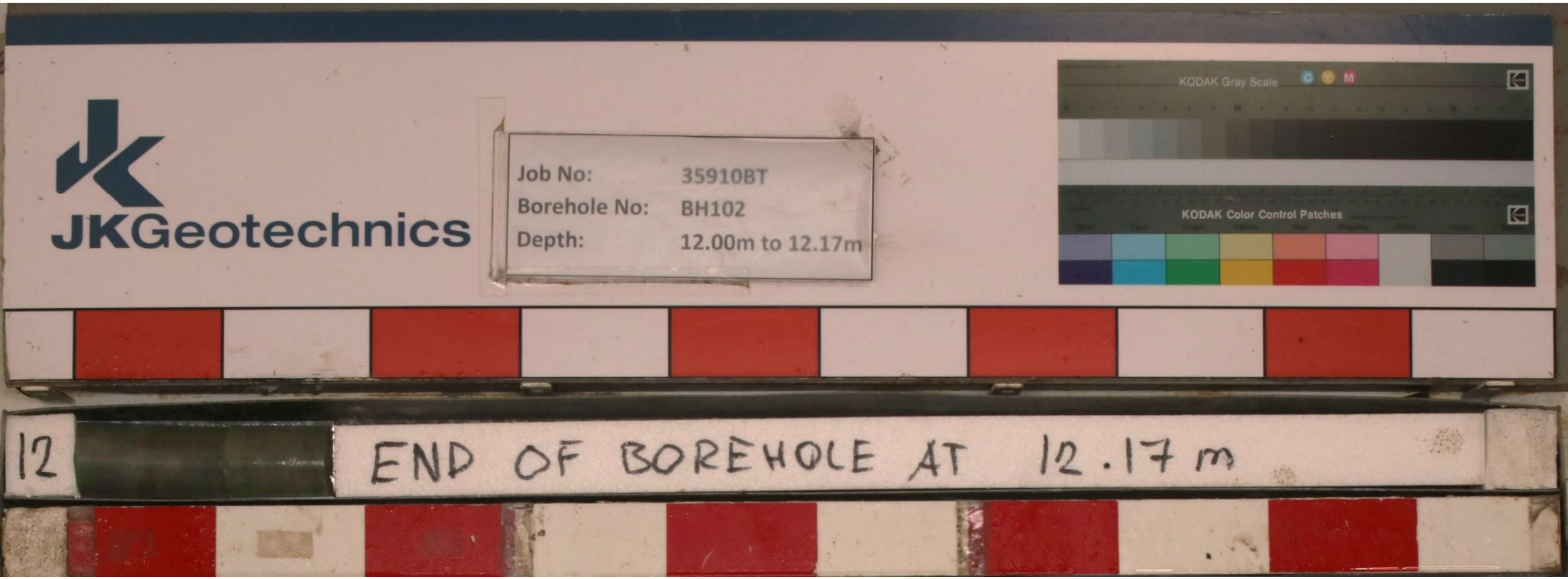
Date: 29/7/24 TO 30/7/24 | **Inclination:** VERTICAL | **Datum:** AHD

Plant Type: JK308 | **Bearing:** N/A | **Logged/Checked By:** A.M./A.B.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION: Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$ (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	DEFECT DETAILS: SPACING (mm) (600, 200, 60, 20)	DEFECT DETAILS: DESCRIPTION (Specific / General)	Formation
		86	11		CLAYSTONE: dark grey and grey, with sandstone, fine grained, grey laminae, bedded at 0-10°. *(continued)*	FR	M - H	1.1, 1.0, 1.5, 1.0, 0.80			Bringelly Shale
		85									
		84	12		END OF BOREHOLE AT 12.17 m						
		83	13								
		82	14								
		81	15								
		80	16								

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS


JKGeotechnics
Job No: 35910BT
Borehole No: BH102
Depth: 3.75m to 12.00m
KODAK Gray Scale
KODAK Color Control Patches
35910BT BH 102 START CORING AT 3.75m
3
4
5
6
7
8
9
10
11


JKGeotechnics
Job No: 35910BT
Borehole No: BH102
Depth: 12.00m to 12.17m
KODAK Gray Scale
KODAK Color Control Patches
12
END OF BOREHOLE AT 12.17 m

JKGeotechnics

BOREHOLE LOG

Borehole No. 103

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT **Method:** SPIRAL AUGER **R.L. Surface:** 96.08 m

Date: 30/7/24 **Datum:** AHD

Plant Type: JK308 **Logged/Checked By:** A.M./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
						96				FILL: Silty gravelly sand, fine to medium grained, brown, fine to coarse grained sandstone and igneous gravel.	M			
									CH	Silty CLAY: high plasticity, red brown, trace of fine grained ironstone gravel.	w>PL	VSt	300 250 270	RESIDUAL NO SAMPLE IN SPT
					N = 6 3,3,3		1							
						95				as above, but red brown and grey.	w~PL			
					N = 14 2,4,10								280 280 280	
							2		-	Extremely Weathered claystone: silty CLAY, medium plasticity, grey and red brown.	XW	VSt - Hd	450 400 350	BRINGELLY SHALE
						94				CLAYSTONE: brown and dark grey.	DW	L - M		LOW 'TC' BIT RESISTANCE
							3							MODERATE 'TC' BIT RESISTANCE
						93				REFER TO CORED BOREHOLE LOG				
						92	4							
						91	5							
						90	6							

JKGeotechnics

CORED BOREHOLE LOG

Borehole No. 103 **2 / 3**

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT **Core Size:** NMLC **R.L. Surface:** 96.08 m

Date: 30/7/24 **Inclination:** VERTICAL **Datum:** AHD

Plant Type: JK308 **Bearing:** N/A **Logged/Checked By:** A.M./A.B.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION: Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$	DEFECT DETAILS: SPACING (mm)	DEFECT DETAILS: DESCRIPTION (Specific / General)	Formation
		93			START CORING AT 3.20m						
					CLAYSTONE: grey brown.	MW	L			(3.30m) J, 85°, P, R, Cn	
					Extremely Weathered claystone: silty CLAY, medium plasticity, grey, with bands of claystone.	XW	Hd				
		92	4		Interbedded Sandstone, fine to medium grained, grey, and Claystone, grey and dark grey.	SW	H	1.3		(3.96m) Be, 0°, P, R, Cn (4.02m) CS, 0°, 40 mm.t	
					SANDSTONE: fine to medium grained, grey, with dark grey laminae and occasional claystone, dark grey bands, bedded at 0-10°.			1.0		(4.84m) Be, 10°, P, R, Fe Sn	
		91	5					1.7			
								5.5		(5.46m) Be, 0°, P, S, Fe Sn	
		90	6					1.0		(6.06m) XWS, 0°, 50 mm.t	Bringelly Shale
								1.6		(6.83m) J, 80°, P, R, Cn	
		89	7		Interbedded Sandstone, fine grained, grey, and Claystone, dark grey, bedded at 0-5°.		M	0.60		(7.18m) Be, 0°, P, R, Clay Vn	
					NO CORE 0.09m						
					CLAYSTONE: dark grey and grey, with sandstone, fine grained grey bands and laminae, bedded at 0-10°.	SW	M	0.50		(7.77m) CS, 0°, 50 mm.t	
		88	8							(7.99m) CS, 0°, 10 mm.t (8.10m) XWS, 0°, 40 mm.t (8.21m) CS, 0°, 10 mm.t (8.31m) Cr, 0°, 50 mm.t	
								0.50		(8.49m) Be, 0°, P, R, Clay Ct	
		87	9							(9.00m) CS, 0°, 20 mm.t	
										(9.22m) CS, 0°, 30 mm.t (9.33m) Be, 0°, P, R, Clay Ct	
								0.50		(9.51m) Be, 5°, P, R, Fe Sn (9.54m) CS, 0°, 10 mm.t (9.61m) XWS, 0°, 40 mm.t	
						FR	H	1.2			

JK 9.02.4 LIB:GLB Log JK CORED BOREHOLE - MASTER 35910LT LEPPINGTON.GPJ <<DrawingFile>> 30/08/2024 14:28 10.01.00.01 Datgel Lab and In Situ Tool - DGD | Lib: JK 9.02.4 2019-05-31 Prj: JK 9.01.0 2018-03-20

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS

JKGeotechnics

CORED BOREHOLE LOG

Borehole No. 103

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT | **Core Size:** NMLC | **R.L. Surface:** 96.08 m

Date: 30/7/24 | **Inclination:** VERTICAL | **Datum:** AHD

Plant Type: JK308 | **Bearing:** N/A | **Logged/Checked By:** A.M./A.B.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION: Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$ (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	DEFECT DETAILS: SPACING (mm) (600, 200, 60, 20)	DEFECT DETAILS: DESCRIPTION (Specific / General)	Formation
		86			CLAYSTONE: as above	FR	H	1.7			Bringelly Shale
					LAMINITE: Sandstone, fine grained, and siltstone grey and dark grey.			1.5			
		85	11					1.7		(11.14m) Jh, 80°, C	
			12					1.8			
		84			END OF BOREHOLE AT 12.05 m						
		83	13								
		82	14								
		81	15								
		80	16								

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS


JKGeotechnics
Job No: 35910BT
Borehole No: BH103
Depth: 3.20 to 12.00m
KODAK Gray Scale
KODAK Color Control Patches
35910BT BH103 START CORING AT 3.20m
3
4
5
6
7
NO CORE
0.09m
8
9
10
11


JKGeotechnics
Job No: 35910BT
Borehole No: BH103
Depth: 12.00m to 12.05m
KODAK Gray Scale
KODAK Color Control Patches
12
END OF BOREHOLE AT 12.05M

JKGeotechnics

BOREHOLE LOG

Borehole No. 104

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT **Method:** SPIRAL AUGER **R.L. Surface:** 96.09 m

Date: 29/7/24 TO 30/7/24 **Datum:** AHD

Plant Type: JK330 **Logged/Checked By:** T.F./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION OF AUGERING						96				FILL: Silty sandy clay, low plasticity, grey, fine to coarse grained sand, with fine to coarse grained sandstone gravel and cobbles, concrete and brick fragments.				
				■	N = 7 3,3,4				CH		w>PL	VSt		RESIDUAL
										Silty CLAY: high plasticity, red brown mottled orange brown.			280 280 270 260	
						95	1							
				■	N = 10 3,3,7								360 350 380	
						94	2							
									-	Extremely Weathered claystone: silty CLAY, medium plasticity, grey and brown.	XW	Hd		BRINGELLY SHALE
										CLAYSTONE: orange brown.	DW	L - M		LOW TO MODERATE 'TC' BIT RESISTANCE
				■		93	3							
										CLAYSTONE: grey and dark grey.		M		MODERATE RESISTANCE
				■		92	4							
										REFER TO CORED BOREHOLE LOG				
						91	5							
						90	6							

JKGeotechnics

CORED BOREHOLE LOG

Borehole No. 104

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT | **Core Size:** NMLC | **R.L. Surface:** 96.09 m

Date: 29/7/24 TO 30/7/24 | **Inclination:** VERTICAL | **Datum:** AHD

Plant Type: JK330 | **Bearing:** N/A | **Logged/Checked By:** T.F./A.B.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION: Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$	DEFECT DETAILS: SPACING (mm)	DEFECT DETAILS: DESCRIPTION (Specific / General)	Formation
		92			START CORING AT 4.20m						
95% RETURN		92			Interbedded Claystone, brown and grey, and Sandstone, fine grained, light grey, bedded at 0-5°.	MW	M	0.70, 0.70		(4.21m) XWS, 0°, 50 mm.t; (4.28m) CS, 0°, 10 mm.t; (4.32m) CS, 0°, 25 mm.t; (4.49m) CS, 0°, 45 mm.t; (4.57m) XWS, 0°, 5 mm.t	
		91	5		SANDSTONE: fine to medium grained, light grey, with grey laminae, bedded at 0-10°.	SW	H	1.7, 1.7, 1.5		(5.02m) J, 85°, Ir, R, Fe Sn; (5.05m) CS, 0°, 15 mm.t; (5.10m) CS, 0°, 8 mm.t; (5.28m) Be, 2°, P, R, Fe Sn; (5.63m) Be, 0°, P, R, Fe Sn	
		90	6		LAMINITE: Sandstone, fine to medium grained, grey and light grey, interlaminated with Siltstone, grey, bedded at 0-10°.		M	0.60		(6.10m) Be, 0°, P, R, Fe Sn; (6.72m) XWS, 0°, 7 mm.t	
		89	7		CLAYSTONE: dark grey and grey, with Sandstone, fine grained, grey laminae, bedded at 0-10°.	FR		0.80, 0.60	200, 60, 20	(7.37m) Be, 0°, P, R, Fe Sn; (7.77m) Be, 0°, P, R, Clay Vn; (7.93m) CS, 0°, 160 mm.t	Bringelly Shale
100% RETURN		88	8					0.80		(8.58m) J, 75°, Ir, R, Cn	
		87	9					0.20, 0.50		(9.20m) Be, 0°, Ir, R, Fe Sn; (9.46m) XWS, 0°, 100 mm.t	
		86	10				M - H	0.90, 1.4, 1.8	600, 200, 60, 20	(10.76m) XWS, 0°, 5 mm.t	
					LAMINITE: Siltstone, dark grey, interlaminated with Sandstone, fine grained, grey, bedded at 0-10°.						

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS

JKGeotechnics

CORED BOREHOLE LOG

Borehole No. 104 **3 / 3**

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT **Core Size:** NMLC **R.L. Surface:** 96.09 m

Date: 29/7/24 TO 30/7/24 **Inclination:** VERTICAL **Datum:** AHD

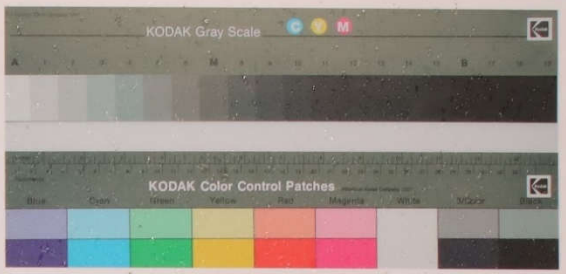
Plant Type: JK330 **Bearing:** N/A **Logged/Checked By:** T.F./A.B.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION: Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$ (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	DEFECT DETAILS: SPACING (mm) (600, 200, 60, 20)	DEFECT DETAILS: DESCRIPTION (Specific / General)	Formation
100% RETURN		85	12		LAMINITE: Siltstone, dark grey, interlaminated with Sandstone, fine grained, grey, bedded at 0-10°. *(continued)*	FR	M - H	1.2		(11.56m) XWS, 10°, 15 mm.t (11.70m) Be, 2°, P, R, Clay Vn	Bringelly Shale
		84					H	0.80 2.6			
		83	13					2.2 2.4		(12.66m) J, 65°, Ir, R, Cn (12.75m) XWS, 0°, 2 mm.t	
		82	14		END OF BOREHOLE AT 13.44 m						
		81	15								
		80	16								
		79	17								

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS

JKGeotechnics

Job No:	35910LT
Borehole No:	BH104
Depth:	4.20m to 13.00m



35910LT BH104 START CORING AT 4.20m


JKGeotechnics
Job No: 35910LT
Borehole No: BH104
Depth: 13.00m to 13.44m
KODAK Gray Scale
KODAK Color Control Patches
13
END OF BOREHOLE
AT 13.44m

JKGeotechnics

BOREHOLE LOG

Borehole No. 105

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT **Method:** SPIRAL AUGER **R.L. Surface:** 96.80 m

Date: 29/7/24 **Datum:** AHD

Plant Type: JK330 **Logged/Checked By:** T.F./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION OF AUGERING										FILL: Silty clayey sand, fine to coarse grained, with fine to coarse grained sandstone gravel and cobbles, tile and concrete fragments.				
									CH		w>PL			RESIDUAL
					N = 11 3,5,6	96	1			Silty CLAY: high plasticity, red brown mottled orange brown, with fine to coarse grained ironstone gravel.		VSt	350 360 270 250	
											w<PL			
					N = 18 9,9,9	95	2					VSt - Hd	360 410 420 330	
										Silty CLAY: high plasticity, light grey and red brown, trace of fine to coarse grained ironstone gravel and fine to coarse grained ironstone gravel, extremely weathered fabric.				
					N > 17 11,15,2/ 0mm REFUSAL	94	3			as above, but light grey.		Hd	550 510 520	
						93	4		-	Extremely Weathered claystone: silty CLAY, medium plasticity, grey and light grey, with iron indurated bands.	XW	Hd		BRINGELLY SHALE
										CLAYSTONE: grey and dark grey.	DW	L - M		LOW 'TC' BIT RESISTANCE MODERATE RESISTANCE
						92	5							
						91	6			REFER TO CORED BOREHOLE LOG				
						90								

JKGeotechnics

CORED BOREHOLE LOG

Borehole No. 105 **2 / 3**

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT **Core Size:** NMLC **R.L. Surface:** 96.80 m

Date: 29/7/24 **Inclination:** VERTICAL **Datum:** AHD

Plant Type: JK330 **Bearing:** N/A **Logged/Checked By:** T.F./A.B.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION: Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$	DEFECT DETAILS: SPACING (mm)	DEFECT DETAILS: DESCRIPTION (Specific / General)	Formation
					START CORING AT 5.50m						
95% RETURN		91	6		CLAYSTONE: dark grey and grey, with occasional sandstone, fine grained grey laminae and bands, bedded at 0-5°.	SW	M	0.40 0.30		(5.52m) CS, 0°, 10 mm.t (5.58m) Ji, 25°, Ir (5.64m) J, 50°, Ir, R, Fe Sn	Bringelly Shale
								0.30		(5.95m) Be, 0°, P, R, Fe Sn (6.09m) XWS, 0°, 20 mm.t	
		90	7					1.1		(6.21m) XWS, 0°, 5 mm.t (6.51m) XWS, 0°, 2 mm.t	
								0.70		(6.77m) XWS, 0°, 15 mm.t (7.03m) Be, 2°, Ir, R, Fe Sn	
		89	8					0.50		(7.49m) Cr, 0°, 30 mm.t	
								0.50		(8.20m) XWS, 0°, 30 mm.t	
60% RETURN		88	9			FR		0.50		(8.47m) XWS, 0°, 2 mm.t (8.63m) CS, 0°, 10 mm.t	
								0.50		(9.13m) XWS, 0°, 2 mm.t	
		87	10					0.30		(9.83m) CS, 0°, 5 mm.t (9.93m) CS, 0°, 100 mm.t	
								0.50		(10.25m) J, 80°, Ir, R, Fe Sn (10.32m) XWS, 0°, 1 mm.t	
		86	11					0.80		(10.55m) XWS, 0°, 10 mm.t	
					Interbedded Sandstone, fine grained, grey and light grey, and Claystone, dark grey, bedded at 0-10°.		H	1.0			
		85						3.0		(11.57m) Be, 0°, P, S, Cn	

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS

JKGeotechnics

CORED BOREHOLE LOG

Borehole No. 105

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT | **Core Size:** NMLC | **R.L. Surface:** 96.80 m

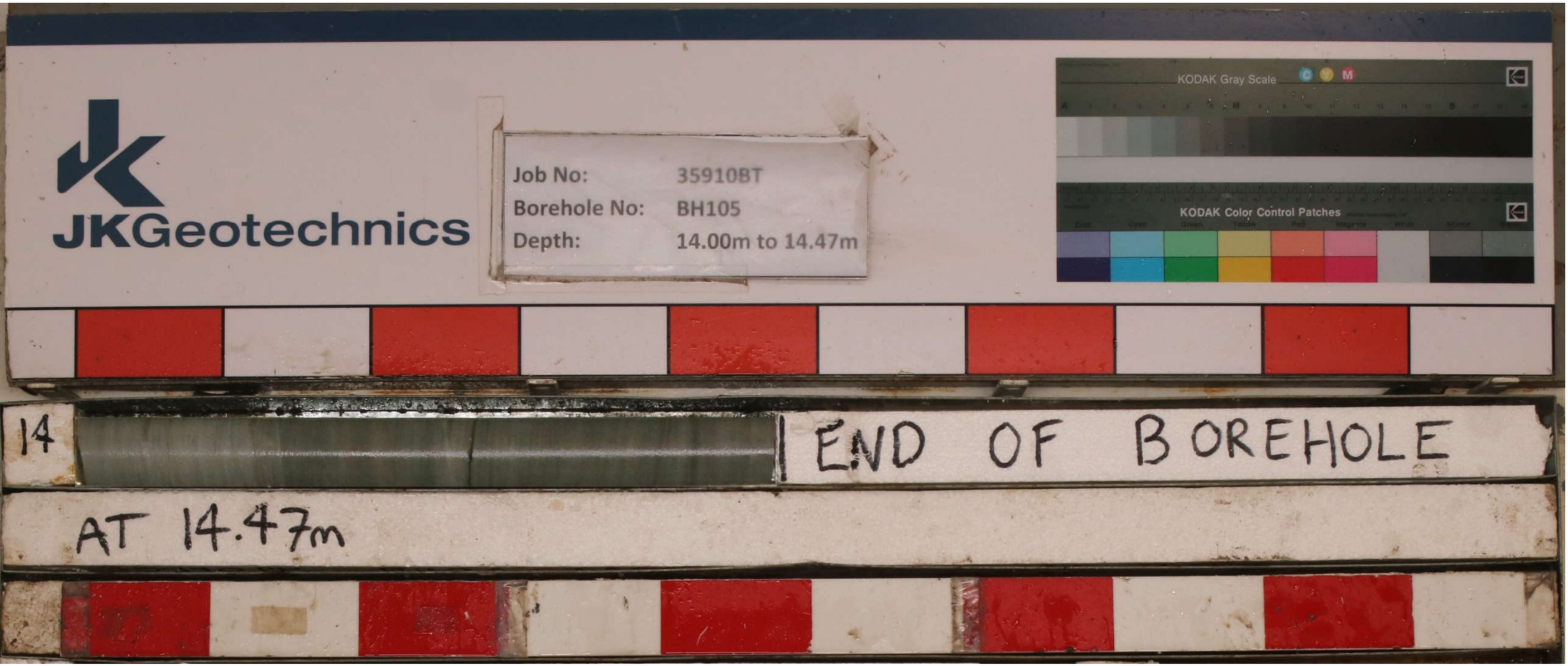
Date: 29/7/24 | **Inclination:** VERTICAL | **Datum:** AHD

Plant Type: JK330 | **Bearing:** N/A | **Logged/Checked By:** T.F./A.B.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION: Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$ (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	DEFECT DETAILS: SPACING (mm) (600, 200, 60, 20)	DEFECT DETAILS: DESCRIPTION (Specific / General)	Formation
60% RETURN		84	13		Interbedded Sandstone, fine grained, grey and light grey, and Claystone, dark grey, bedded at 0-10°. *(continued)*	FR	H	1.2; 0.80; 2.8; 1.5; 2.1			Bringelly Shale
		83	14								
		82	15		END OF BOREHOLE AT 14.47 m						
		81	16								
		80	17								
		79	18								
		78									

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS


JKGeotechnics
Job No: 35910BT
Borehole No: BH105
Depth: 5.55m to 14.00m
KODAK Gray Scale
KODAK Color Control Patches
35910LT BH105 START CORING AT 5.50m
5
6
7
8
9
10
11
12
13


JKGeotechnics
Job No: 35910BT
Borehole No: BH105
Depth: 14.00m to 14.47m
KODAK Gray Scale
KODAK Color Control Patches
14
END OF BOREHOLE
AT 14.47m

JKGeotechnics

BOREHOLE LOG

Borehole No. 106

1 / 3

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT **Method:** SPIRAL AUGER **R.L. Surface:** 96.31 m

Date: 5/8/24 **Datum:** AHD

Plant Type: JK309 **Logged/Checked By:** T.F./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION OF AUGERING										TOPSOIL: Silty clay, medium plasticity, brown, trace of root fibres.				GRASS COVER
						96			CH	Silty CLAY: high plasticity, orange brown, trace of fine to coarse grained ironstone gravel.	w>PL	VSt		RESIDUAL
					N = 8 3,4,4		1						360 310 380	
					N > 16 8,16/ 150mm REFUSAL	95								
							2		-	Extremely Weathered claystone: silty CLAY, medium to high plasticity, grey and brown, with low strength claystone bands.	XW	Hd		BRINGELLY SHALE VERY LOW 'TC' BIT RESISTANCE
						94				CLAYSTONE: grey and brown, with extremely weathered and clay bands.	DW	VL - L		VERY LOW TO LOW RESISTANCE
						93	3							
										CLAYSTONE: dark grey, interbedded with Sandstone fine grained, grey.		L		LOW RESISTANCE
						92	4					M		LOW TO MODERATE RESISTANCE
							5							
						91				REFER TO CORED BOREHOLE LOG				
							6							
						90								

JKGeotechnics

CORED BOREHOLE LOG

Borehole No. 106 **2 / 3**

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT **Core Size:** NMLC **R.L. Surface:** 96.31 m

Date: 5/8/24 **Inclination:** VERTICAL **Datum:** AHD

Plant Type: JK309 **Bearing:** N/A **Logged/Checked By:** T.F./A.B.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$	SPACING (mm)	DEFECT DETAILS DESCRIPTION Type, orientation, defect shape and roughness, defect coatings and seams, openness and thickness	Formation
					START CORING AT 5.10m			VL -0.1 L -0.3 M -1 H -3 VH -10 EH	600 200 60 20	Specific / General	
95% RETURN		91			CLAYSTONE: brown and grey, with fine grained sandstone laminae, bedded at 0-10°.	MW	M	0.50 0.80		(5.14m) Be, 0°, Ir, R, Fe Sn (5.18m) Jh, 85°, Ir, R, Fe Sn (5.26m) XWS, 0°, 18 mm.t (5.39m) XWS, 0°, 25 mm.t (5.47m) XWS, 0°, 115 mm.t (5.68m) XWS, 0°, 10 mm.t (5.72m) CS, 5°, 4 mm.t (5.75m) J, 20°, Ir, R, Fe Sn (5.92m) XWS, 0°, 30 mm.t	
		90	6		SANDSTONE: fine to medium grained, grey, with grey laminae, bedded at 0-10°.	FR	H - VH	1.6 4.3		(6.72m) Be, 0°, Ir, R, Fe Sn	
		89	7					1.0 1.8			
		88	8					1.3 4.2		(8.69m) Be, 0°, R, Fe Sn (8.76m) Be, 0°, XWS, 10mm.t	
100% RETURN		87	9					1.2		(8.98m) Be, 5°, Ir, R, Clay Vn (9.29m) CS, 0°, 5 mm.t (9.37m) J, 75°, Ir, R, Fe Sn	
		86	10		Interbedded CLAYSTONE, dark grey and grey, with SANDSTONE, fine grained, grey bands, bedded at 0-10°.		M - H	1.1 1.1 0.70 0.60		(9.62m) Be, 0°, Ir, R, Fe Sn (9.84m) XWS, 0°, 14 mm.t (9.94m) XWS, 0°, 35 mm.t (10.57m) Ji, 50°, Ir, R, Cn	Bringelly Shale
		85	11					1.0		(11.56m) Be, 2°, Ir, R, Clay Vn (11.77m) XWS, 0°, 10 mm.t	

JK 9.02.4 LIB:GLB Log JK CORED BOREHOLE - MASTER 35910LT LEPPINGTON.GPJ <<DrawingFile>> 30/08/2024 14:28 10.01.00.001 Datgel Lab and In Situ Tool - DGD | Lib: JK 9.02.4 2019-05-31 Prj: JK 9.01.0 2018-03-20

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS

JKGeotechnics

CORED BOREHOLE LOG

Borehole No. 106 3 / 3

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT **Core Size:** NMLC **R.L. Surface:** 96.31 m

Date: 5/8/24 **Inclination:** VERTICAL **Datum:** AHD

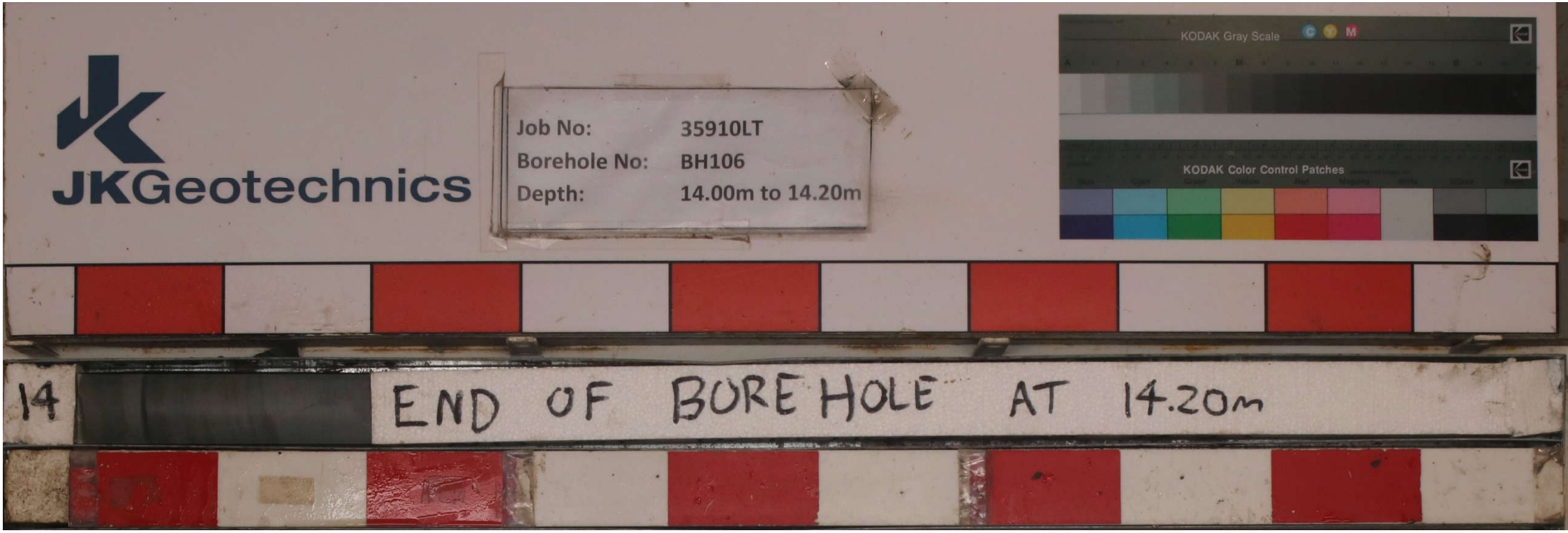
Plant Type: JK309 **Bearing:** N/A **Logged/Checked By:** T.F./A.B.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION: Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$ (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	DEFECT DETAILS: SPACING (mm) (600, 200, 60, 20)	DEFECT DETAILS: DESCRIPTION (Specific / General)	Formation
100% RETURN		84	13		Interbedded CLAYSTONE, dark grey and grey, with SANDSTONE, fine grained, grey bands, bedded at 0-10°. *(continued)*	FR	M - H	0.90; 2.7; 1.1; 0.70; 0.50		(12.16m) XWS, 0°, 10 mm.t; (12.81m) Be, 5°, Clay Vn; (12.92m) CS, 0°, 2 mm.t	Bringelly Shale
		83									
			14							(14.13m) Ji, 80°, Ir, R, Cn	
		82			END OF BOREHOLE AT 14.20 m						
			15								
		81									
			16								
		80									
			17								
		79									
			18								
		78									

JK 9.02.4 LIB:GLB Log JK CORED BOREHOLE - MASTER 35910LT LEPPINGTON.GPJ <<DrawingFile>> 30/08/2024 14:28 10.01.00.01 Datgel Lab and In Situ Tool - DGD | Lib: JK 9.02.4 2019-05-31 Prj: JK 9.01.0 2018-03-20

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS


JKGeotechnics
Job No: 35910LT
Borehole No: BH106
Depth: 05.10m to 14.00m
KODAK Gray Scale
KODAK Color Control Patches
35910LT BH106 START CORING AT 5.10m
5
6
7
8
9
10
11
12
13


JKGeotechnics
Job No: 35910LT
Borehole No: BH106
Depth: 14.00m to 14.20m
KODAK Gray Scale
KODAK Color Control Patches
14
END OF BORE HOLE AT 14.20m

JKGeotechnics

BOREHOLE LOG

Borehole No. 107

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT **Method:** SPIRAL AUGER **R.L. Surface:** 97.52 m

Date: 12/8/24 **Datum:** AHD

Plant Type: JK309 **Logged/Checked By:** A.M./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION OF AUGERING									CH	Silty CLAY: high plasticity, orange brown and red brown, trace of root fibres.	w~PL	Hd	500 >600 570	GRASS COVER RESIDUAL
					N = 18 5,8,10	97	1		CI	Silty CLAY: medium plasticity, orange brown and grey brown, with bands of extremely weathered siltstone and very low strength siltstone gravel, trace of root fibres.	w<PL		>600 >600 >600	HP TESTING ON DISTURBED SAMPLE
					N = 18 4,7,11	96	2		-	Extremely Weathered claystone: silty CLAY, medium plasticity, grey, orange brown and red brown, trace of root fibres.	XW	Hd	>600 >600 >600	BRINGELLY SHALE
ON COMPLETION OF CORING						95	3			CLAYSTONE: grey brown, with extremely weathered bands.	DW	VL - L		LOW 'TC' BIT RESISTANCE WITH BANDS OF VERY LOW RESISTANCE
						94	4					L - M		MODERATE RESISTANCE WITH BANDS OF VERY LOW RESISTANCE
						93	5			as above, but dark grey.				
						92	6			REFER TO CORED BOREHOLE LOG				
						91								

JKGeotechnics

CORED BOREHOLE LOG

Borehole No. 107

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT | **Core Size:** NMLC | **R.L. Surface:** 97.52 m

Date: 12/8/24 | **Inclination:** VERTICAL | **Datum:** AHD

Plant Type: JK309 | **Bearing:** N/A | **Logged/Checked By:** A.M./A.B.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION: Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$	DEFECT DETAILS: SPACING (mm)	DEFECT DETAILS: DESCRIPTION (Specific / General)	Formation
		92			START CORING AT 5.62m						
		91	6		Extremely Weathered claystone: silty CLAY, medium plasticity, brown and dark grey, with bands of low strength siltstone.	XW	Hd				
		90	7		CLAYSTONE: dark grey and brown.	MW	L - M	0.30		(6.80m) Be, 0°, P, S, Clay Ct (6.93m) J, 80°, P, S, Cn (7.06m) XWS, 0°, 160 mm.t (7.30m) J, 80°, P, S, Clay Vn (7.50m) XWS, 0°, 50 mm.t	
		89	8		CLAYSTONE: dark grey, with sandstone, fine grained, grey, bands and laminae, bedded at 0-10°.	FR	H	1.4 1.0		(7.72m) Be, 10°, P, S, Fe Sn	
		88	9		SANDSTONE: fine to medium grained, grey, with dark grey laminae and occasional siltstone bands, bedded at 0-10°.			1.6 1.1 0.40		(8.48m) Be, 0°, P, S, Fe Sn (9.14m) Be, 0°, P, S, Fe Sn	Bringelly Shale
		87	10					8.4		(10.56m) J, 30°, C, S, Cn	
		86	11					1.2 1.3			
					CLAYSTONE: as below.		M	0.80			

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS

JKGeotechnics

CORED BOREHOLE LOG

Borehole No. 107 3 / 3

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT **Core Size:** NMLC **R.L. Surface:** 97.52 m

Date: 12/8/24 **Inclination:** VERTICAL **Datum:** AHD

Plant Type: JK309 **Bearing:** N/A **Logged/Checked By:** A.M./A.B.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION: Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$ (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	DEFECT DETAILS: SPACING (mm) (600, 200, 60, 20)	DEFECT DETAILS: DESCRIPTION (Specific / General)	Formation
		85	13		CLAYSTONE: dark grey, with occasional sandstone, fine grained, grey bands, bedded at 0-5°.	FR	M	0.60, 0.90, 0.70, 0.90, 0.80		(12.15m) J, 70°, P, R, Cn (12.29m) Be, 0°, P, R, Clay Ct (13.02m) J, 80°, P, R, Cn	Bringelly Shale
		84	14								
		83	15		END OF BOREHOLE AT 14.40 m						
		82	16								
		81	17								
		80	18								
		79									

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS


JKGeotechnics
Job No: 35910LT
Borehole No: BH107
Depth: 5.62 to 14.00m
KODAK Gray Scale
KODAK Color-Control Patches
35910LT BH107 START CORING AT 5.62m
5
6
7
8
9
10
11
12
13


JKGeotechnics
Job No: 35910LT
Borehole No: BH107
Depth: 14.00 to 14.40m
KODAK Color Control Patches
14
END OF BOREHOLE AT 14.40m

JKGeotechnics

BOREHOLE LOG

Borehole No. 108

1 / 3

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT **Method:** SPIRAL AUGER **R.L. Surface:** 96.58 m

Date: 2/8/24 **Datum:** AHD

Plant Type: JK330 **Logged/Checked By:** A.M./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION OF AUGERING										TOPSOIL: Silty clay, medium plasticity, brown, with roots and root fibres.				GRASS COVER
									CH	Silty CLAY: high plasticity, orange brown and grey, trace of root fibres.	w>PL	St	170 200 190	RESIDUAL HP TESTING ON REMOULDED SAMPLE
					N = 9 4,4,5	96	1					St - VSt	200 250 190	
					N=SPT 5/ 30mm REFUSAL	95	2		-	Extremely Weathered claystone: silty CLAY, medium plasticity, grey and orange brown.	XW			BRINGELLY SHALE
										CLAYSTONE: grey brown.	DW	VL - L		VERY LOW TO LOW 'TC' BIT RESISTANCE
						94	3			as above, but grey and dark grey.		L - M		TOO FRIABLE FOR HP TESTING MODERATE RESISTANCE WITH LOW BANDS
						93	4							
						92	5			CLAYSTONE: grey.		M		MODERATE TO HIGH RESISTANCE
						91	6			REFER TO CORED BOREHOLE LOG				
						90								

JKGeotechnics

CORED BOREHOLE LOG

Borehole No. 108

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT | **Core Size:** NMLC | **R.L. Surface:** 96.58 m

Date: 2/8/24 | **Inclination:** VERTICAL | **Datum:** AHD

Plant Type: JK330 | **Bearing:** N/A | **Logged/Checked By:** A.M./A.B.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION: Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$ (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	SPACING (mm) (600, 200, 60, 20)	DEFECT DETAILS: DESCRIPTION (Type, orientation, defect shape and roughness, defect coatings and seams, openness and thickness) Specific / General	Formation
					START CORING AT 5.58m						
		91			NO CORE 0.12m						
			6		CLAYSTONE: grey and brown.	SW	L			(5.70m) XWS, 0°, 80 mm.t (5.81m) J, 85°, P, S, Cn (5.94m) J, 30°, P, S, Fe Sn (6.04m) XWS, 0°, 130 mm.t	
		90			LAMINITE: Sandstone, fine to medium grained, grey, interlaminated with Claystone, grey and dark grey.	FR	H	1.1		(6.21m) Be, 0°, P, S, Fe Sn (6.27m) J, 30°, P, S, Cn (6.31m) XWS, 0°, 100 mm.t (6.45m) XWS, 0°, 30 mm.t (6.60m) XWS, 0°, 10 mm.t (6.65m) Ji, 90°, P	
			7					2.1		(6.93m) XWS, 0°, 20 mm.t (7.00m) J, 90°, P, R, Cn	
		89			SANDSTONE: fine to medium grained, grey, with occasional dark grey claystone laminae and occasional bands, bedded at 0-5°.			2.0			Bringelly Shale
			8					1.7			
		88						1.4			
			9					1.5			
		87						2.2			
			10					2.4			
		86					M - H	0.80			
			11		CLAYSTONE: dark grey, with fine grained, grey sandstone bands and laminae, bedded at 0-5°.			1.0			
		85						0.60		(11.60m) J, 50°, P, S, Cn	

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS

JKGeotechnics

CORED BOREHOLE LOG

Borehole No. 108

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT | **Core Size:** NMLC | **R.L. Surface:** 96.58 m

Date: 2/8/24 | **Inclination:** VERTICAL | **Datum:** AHD

Plant Type: JK330 | **Bearing:** N/A | **Logged/Checked By:** A.M./A.B.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION: Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$ (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	DEFECT DETAILS: SPACING (mm) (600, 200, 60, 20)	DEFECT DETAILS: DESCRIPTION (Specific / General)	Formation
		84	13		CLAYSTONE: dark grey, with fine grained, grey sandstone bands and laminae, bedded at 0-5°. *(continued)*	FR	M - H	1.1; 0.90; 0.60; 1.3			Bringelly Shale
		83	14								
		82									
			15		END OF BOREHOLE AT 14.65 m						
		81	16								
		80	17								
		79	18								
		78									

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS


JKGeotechnics
Job No: 35910LT
Borehole No: BH108
Depth: 05.58m to 14.00m
KODAK Gray Scale
KODAK Color Control Patches
35910LT BH108 START CORING AT 5.58m
NO CORE
0.12m
5
6
7
8
9
10
11
12
13


JKGeotechnics
Job No: 35910LT
Borehole No: BH108
Depth: 14.00m to 14.65m
KODAK Gray Scale
KODAK Color Control Patches
14
END OF BOREHOLE AT 14.65m

JKGeotechnics

BOREHOLE LOG

Borehole No. 109

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT **Method:** SPIRAL AUGER **R.L. Surface:** 97.16 m

Date: 5/8/24 **Datum:** AHD

Plant Type: JK308 **Logged/Checked By:** A.M./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION OF AUGERING						97				TOPSOIL: Silty clay, low to medium plasticity, brown, with roots and root fibres.	w>PL			GRASS COVER
									CH	Silty CLAY: high plasticity, red brown abd grey, trace of roots and root fibres.	w>PL	VSt		RESIDUAL
					N = 5 2,2,3		1						200 220 220	
						96			-	Extremely Weathered claystone: silty CLAY, low to medium plasticity, grey brown.	XW	Hd		BRINGELLY SHALE TOO FRIABLE FOR HP TESTING LOW 'TC' BIT RESISTANCE
					N=SPT 8/ 150mm REFUSAL		2							LOW TO MODERATE RESISTANCE
						95				CLAYSTONE: grey brown, with extremely weathered bands.	DW	L		
						94	3							
						93	4							
						92	5			as above, but dark grey and brown.	MW	M		MODERATE RESISTANCE
						91	6			REFER TO CORED BOREHOLE LOG				

JKGeotechnics

CORED BOREHOLE LOG

Borehole No. 109

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT | **Core Size:** NMLC | **R.L. Surface:** 97.16 m

Date: 5/8/24 | **Inclination:** VERTICAL | **Datum:** AHD

Plant Type: JK308 | **Bearing:** N/A | **Logged/Checked By:** A.M./A.B.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION: Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$	DEFECT DETAILS: SPACING (mm)	DEFECT DETAILS: DESCRIPTION (Specific / General)	Formation
		92			START CORING AT 5.61m						
ON COMPLETION OF DRILLING		91	6		CLAYSTONE: brown.	MW	M	0.40, 0.60		(5.61m) CS, 0°, 130 mm.t; (5.74m) XWS, 0°, 40 mm.t; (5.83m) Ji, 60°, P; (5.88m) XWS, 0°, 120 mm.t; (6.04m) XWS, 0°, 5 mm.t	
					LAMINITE: Sandstone, fine grained, grey, and Claystone, grey and dark grey, bedded at 0-15°.	SW	H	1.1		(6.56m) XWS, 0°, 40 mm.t; (6.63m) Be, 10°, P, S, Clay Vn	
		90	7		SANDSTONE: fine to medium grained, grey, with dark grey laminae, bedded at 0-10°.	FR		2.4, 2.1, 2.1, 1.5, 1.9, 2.0, 2.0		(8.92m) Be, 10°, P, R, Clay Vn	Bringelly Shale
		89	8								
		88	9								
		87	10								
					CLAYSTONE: dark grey, with fine grained, grey sandstone bands and laminae, bedded at 0-5°.		M - H	1.2, 1.2, 0.90			
		86	11								

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS

JKGeotechnics

CORED BOREHOLE LOG

Borehole No. 109

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT | **Core Size:** NMLC | **R.L. Surface:** 97.16 m

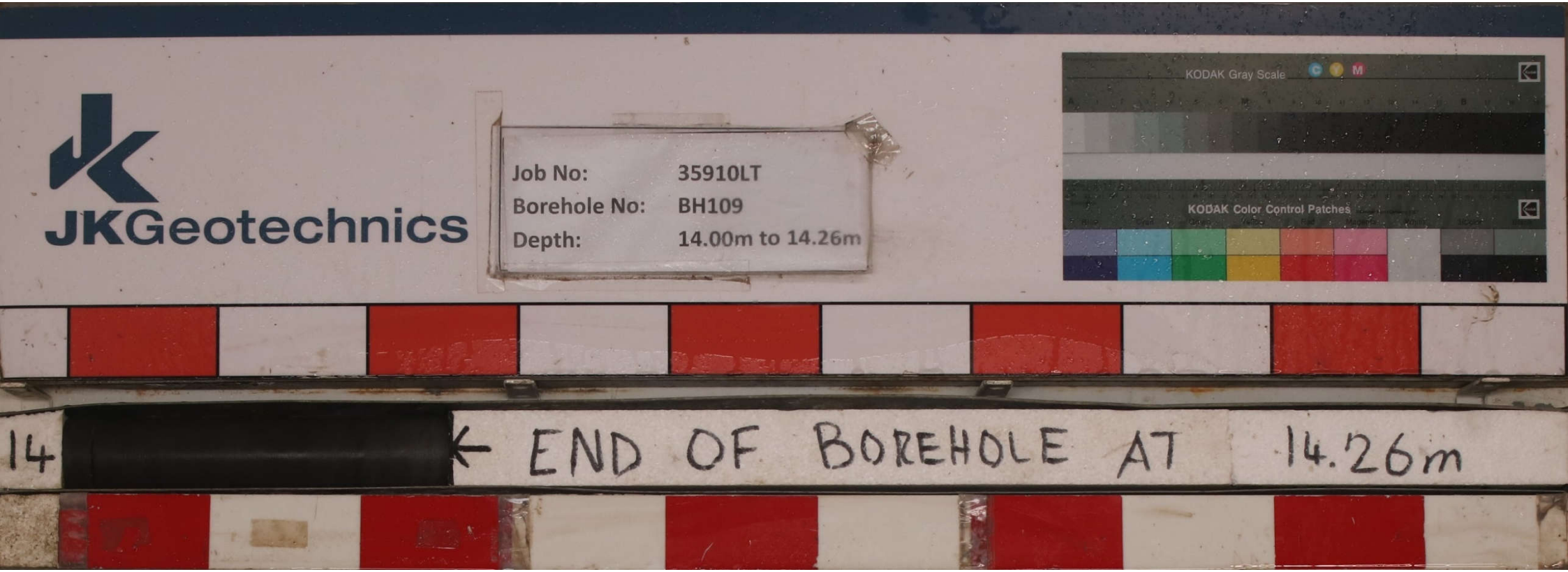
Date: 5/8/24 | **Inclination:** VERTICAL | **Datum:** AHD

Plant Type: JK308 | **Bearing:** N/A | **Logged/Checked By:** A.M./A.B.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$ VL -0.1, L -0.3, M -1, H -3, VH -10, EH	DEFECT DETAILS SPACING (mm) 600, 200, 60, 20 DESCRIPTION Type, orientation, defect shape and roughness, defect coatings and seams, openness and thickness Specific / General	Formation
		85			CLAYSTONE: dark grey, with fine grained, grey sandstone bands and laminae, bedded at 0-5°. *(continued)*	FR	M - H	0.90		Bringelly Shale
			13					1.0		
		84						1.6		
								0.60		
			14							
		83						1.9		
					END OF BOREHOLE AT 14.26 m					
			15							
		82								
			16							
		81								
			17							
		80								
			18							
		79								

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS


JKGeotechnics
Job No: 35910LT
Borehole No: BH109
Depth: 5.61m to 14.00m
KODAK Gray Scale
KODAK Color Control Patches
35910LT BH09 START CORING AT 5.61m
5
6
7
8
9
10
11
12
13


JKGeotechnics
Job No: 35910LT
Borehole No: BH109
Depth: 14.00m to 14.26m
KODAK Gray Scale
KODAK Color Control Patches
14
END OF BOREHOLE AT 14.26m

JKGeotechnics

BOREHOLE LOG

Borehole No. 110

1 / 3

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT **Method:** SPIRAL AUGER **R.L. Surface:** 100.52 m

Date: 5/8/24 TO 6/8/24 **Datum:** AHD

Plant Type: JK309 **Logged/Checked By:** T.F./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION OF AUGERING										TOPSOIL: Silty clay, medium plasticity, grey and brown, trace of root fibres.	w>PL			GRASS COVER
									CH	Silty CLAY: high plasticity, orange brown, trace of fine to coarse grained ironstone gravel, and root fibres.	w>PL	St - VSt	200 200 200	RESIDUAL HP ON DISTURBED SAMPLES
					N = 4 0,2,2	100	1			as above, but orange brown mottled light grey, without root fibres.		VSt	350 350 350	
					N = 19 9,9,10	99	2				w~PL	Hd	480 450 490	
									-	Extremely Weathered claystone: silty CLAY, medium plasticity, grey and brown, with low strength bands.	XW	Hd	>600 >600	BRINGELLY SHALE VERY LOW 'TC' BIT RESISTANCE
						98	3			CLAYSTONE: grey and dark grey, with extremely weathered bands.	DW	VL - L		VERY LOW TO LOW RESISTANCE
						97	4					L		LOW TO MODERATE RESISTANCE
						96	5			REFER TO CORED BOREHOLE LOG				
						95	6							
						94								

JKGeotechnics

CORED BOREHOLE LOG

Borehole No. 110

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT | **Core Size:** NMLC | **R.L. Surface:** 100.52 m

Date: 5/8/24 TO 6/8/24 | **Inclination:** VERTICAL | **Datum:** AHD

Plant Type: JK309 | **Bearing:** N/A | **Logged/Checked By:** T.F./A.B.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION: Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$	DEFECT DETAILS: SPACING (mm)	DEFECT DETAILS: DESCRIPTION (Specific / General)	Formation
					START CORING AT 4.20m						
					Extremely Weathered claystone: silty CLAY, medium to high plasticity.	XW	Hd				
		96			NO CORE 0.17m	MW	L - M				
			5		CLAYSTONE: brown and grey, bedded at 0-5°.			0.40		(4.67m) XWS, 0°, 30 mm.t (4.73m) XWS, 0°, 20 mm.t (4.88m) XWS, 0°, 30 mm.t (5.20m) J, 90°, P, R, Fe Sn	
		95			CLAYSTONE: brown and grey.			0.60		(5.44m) J, 60°, Ir, R, Fe Sn (5.51m) XWS, 0°, 10 mm.t (5.52m) CS, 0°, 20 mm.t (5.58m) J, 70°, Ir, R, Fe Sn (5.66m) J, 60°, Ir, R, Fe Sn (5.72m) CS, 0°, 180 mm.t	Bringelly Shale
			6					0.20 0.10		(6.00m) XWS, 0°, 30 mm.t (6.14m) XWS, 0°, 5 mm.t (6.22m) J, 60°, Ir, R, Fe Sn	
		94					M	0.30 0.50		(6.32m) J, 75°, Ir, R, Fe Sn (6.79m) Be, 5°, Ir, R, Clay Vn	
			7		NO CORE 1.10m						
80% RETURN		93									
			8		Extremely Weathered claystone: silty CLAY, medium plasticity, brown.	XW	Hd				
		92									
			9		CLAYSTONE: dark grey and grey, bedded at 0-5°.	HW	VL - L	0.20		(9.26m) XWS, 0°, 20 mm.t (9.31m) XWS, 0°, 15 mm.t (9.43m) XWS, 0°, 10 mm.t	
		91						0.30			
			10					0.080 0.20		(10.50m) Cr, 0°, 105 mm.t	Bringelly Shale
		90						0.20		(10.78m) XWS, 0°, 35 mm.t	

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS

JKGeotechnics

CORED BOREHOLE LOG

Borehole No. 110

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT | **Core Size:** NMLC | **R.L. Surface:** 100.52 m

Date: 5/8/24 TO 6/8/24 | **Inclination:** VERTICAL | **Datum:** AHD

Plant Type: JK309 | **Bearing:** N/A | **Logged/Checked By:** T.F./A.B.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION: Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$	DEFECT DETAILS: SPACING (mm)	DEFECT DETAILS: DESCRIPTION (Specific / General)	Formation
80% RETURN		89	12		CLAYSTONE: dark grey and grey, bedded at 0-5°.	HW	VL - L	0.20		(11.19m) XWS, 0°, 30 mm.t	
					Interbedded CLAYSTONE, grey and brown, and SANDSTONE, fine grained, grey and light grey, bedded at 0-10°.	SW	M - H			(11.35m) XWS, 0°, 50 mm.t (11.40m) XWS, 0°, 80 mm.t	
								0.40		(11.77m) Be, 0°, Ir, R, Fe Sn	
										(11.92m) XWS, 0°, 30 mm.t	
						FR		1.3		(12.07m) Be, 0°, P, R, Clay Vn	
		88	13							(12.21m) XWS, 0°, 5 mm.t (12.29m) XWS, 0°, 8 mm.t	Bringelly Shale
										(12.47m) XWS, 0°, 3 mm.t	
								1.5			
										(12.76m) CS, 0°, 20 mm.t (12.84m) Be, 0°, P, R, Clay Vn	
		87	14					2.9			
										(13.62m) Be, 3°, Ir, R, Fe Sn	
								1.7			
								0.50			
								0.30			
		86	15		END OF BOREHOLE AT 14.22 m						
		85	16								
		84	17								
		83									

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS


JKGeotechnics
Job No: 35910LT
Borehole No: BH110
Depth: 4.20m to 13.00m
KODAK Gray Scale
KODAK Color Control Patches
35910LT BH110 START CORING AT 4.20m
4
NO CORE 0.17
5
6
7
NO CORE 1.1m
8
9
10
11
12


JKGeotechnics
Job No: 35910LT
Borehole No: BH110
Depth: 13.00m to 14.22m
KODAK Gray Scale
KODAK Color Control Patches
13
14
END OF BOREHOLE AT 14.22m

JKGeotechnics

BOREHOLE LOG

Borehole No. 111

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT **Method:** SPIRAL AUGER **R.L. Surface:** 100.50 m

Date: 1/8/24 **Datum:** AHD

Plant Type: JK330 **Logged/Checked By:** A.M./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION OF AUGERING										TOPSOIL: Silty clay, medium plasticity, brown, trace of roots and root fibres.	w>PL			GRASS COVER
									CH	Silty CLAY: high plasticity, orange brown and grey, trace of root fibres.	w>PL	VSt		RESIDUAL
					N = 27 4,12,15	100							200 240 250	
							1		-	Extremely Weathered claystone: silty CLAY, medium plasticity, grey and orange brown.	XW	Hd	>600 >600 >600	BRINGELLY SHALE
					N = 32 10,14,18	99								
							2							
						98								
										CLAYSTONE: grey.	DW	VL - L		LOW 'TC' BIT RESISTANCE
							3							
						97						L - M		MODERATE RESISTANCE
							4							
						96								
							5							
						95								
										REFER TO CORED BOREHOLE LOG				
							6							
						94								

JKGeotechnics

CORED BOREHOLE LOG

Borehole No. 111

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT | **Core Size:** NMLC | **R.L. Surface:** 100.50 m

Date: 1/8/24 | **Inclination:** VERTICAL | **Datum:** AHD

Plant Type: JK330 | **Bearing:** N/A | **Logged/Checked By:** A.M./A.B.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION: Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$	DEFECT DETAILS: SPACING (mm)	DEFECT DETAILS: DESCRIPTION (Specific / General)	Formation
		95			START CORING AT 5.70m						
		94	6		CLAYSTONE: dark grey, bedded at 0-5°.	SW	L - M	0.50, 0.30		(5.82m) XWS, 0°, 40 mm.t; (6.24m) Be, 0°, P, S, Clay Vn; (6.40m) XWS, 0°, 20 mm.t; (6.47m) XWS, 0°, 310 mm.t	
		93	7					0.60, 0.20		(6.97m) J, 90°, P, S, Fe Sn	
			8		SANDSTONE: fine to medium grained, light brown, bedded at 0-10°.		H	1.1		(7.56m) J, 85°, P, R, Fe Sn	
		92	9		CLAYSTONE: dark grey and grey, bedded at 0-5°.	FR	L - M	0.30, 0.40		(8.11m) CS, 0°, 20 mm.t; (8.26m) Be, 5°, P, S, Fe Sn	Bringelly Shale
ON COMPLETION OF CORING		91	10					0.20		(9.52m) XWS, 0°, 110 mm.t; (9.80m) XWS, 0°, 140 mm.t	
		90	11					0.080, 0.20		(10.19m) XWS, 0°, 50 mm.t; (10.25m) XWS, 0°, 50 mm.t; (10.42m) J, 80°, P, R, Cn; (10.43m) XWS, 0°, 10 mm.t	
		89			Interbedded SANDSTONE: fine grained, grey, and CLAYSTONE: grey and dark grey, bedded at 0-10°.		M - H	0.40, 0.60		(11.21m) Be, 10°, P, S, Fe Sn; (11.38m) Cr, 0°, 10 mm.t; (11.43m) XWS, 30°, 30 mm.t; (11.66m) Be, 0°, P, R, Cn	

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS

JKGeotechnics

CORED BOREHOLE LOG

Borehole No. 111

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT | **Core Size:** NMLC | **R.L. Surface:** 100.50 m

Date: 1/8/24 | **Inclination:** VERTICAL | **Datum:** AHD

Plant Type: JK330 | **Bearing:** N/A | **Logged/Checked By:** A.M./A.B.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION: Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$	DEFECT DETAILS: SPACING (mm)	DEFECT DETAILS: DESCRIPTION (Specific / General)	Formation
		88	13		Interbedded SANDSTONE: fine grained, grey, and CLAYSTONE: grey and dark grey, bedded at 0-10°. *(continued)*	FR	M - H	0.70; 1.3; 1.0; 0.70; 0.50; 1.0		(13.79m) CS, 0°, 10 mm.t; (14.11m) Ji, 60°, P	Bringelly Shale
		87									
			14								
		86									
			15		END OF BOREHOLE AT 14.86 m						
		85									
			16								
		84									
			17								
		83									
			18								
		82									

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS


JKGeotechnics
Job No: 35910LT
Borehole No: BH111
Depth: 05.70m to 14.00m
KODAK Gray Scale
KODAK Color Control Patches
35910LT BH 111 START CORING AT 5.70m
5
6
7
8
9
10
11
12
13


JKGeotechnics
Job No: 35910LT
Borehole No: BH111
Depth: 14.00m to 14.86m
KODAK Gray Scale
KODAK Color Control Patches
14
END OF BOREHOLE AT 14.86m

JKGeotechnics

BOREHOLE LOG

Borehole No. 112

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT **Method:** SPIRAL AUGER **R.L. Surface:** 101.64 m

Date: 30/7/24 TO 31/7/24 **Datum:** AHD

Plant Type: JK330 **Logged/Checked By:** T.F./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION OF AUGERING										TOPSOIL: Silty clay, medium plasticity, brown and grey, trace of fine to medium grained ironstone gravel, and root fibres.	w>PL			GRASS COVER
									CH	Silty CLAY: high plasticity, orange brown mottled light grey, trace of fine to medium grained ironstone gravel.	w>PL	Hd	500 520 480 550	
					N = 24 5,10,14	101	1			as above, but with extremely weathered siltstone bands.				
						100	2		-	Extremely Weathered claystone: silty CLAY, medium plasticity, brown and grey.	XW	Hd		BRINGELLY SHALE VERY LOW 'TC' BIT RESISTANCE
						99	3			CLATSTONE: grey, with high plasticity, light grey silty clay bands.	DW	L - M		LOW RESISTANCE WITH MODERATE BANDS
						98	4							MODERATE RESISTANCE
										REFER TO CORED BOREHOLE LOG				
						97	5							
						96	6							
						95								

JKGeotechnics

CORED BOREHOLE LOG

Borehole No. 112

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT | **Core Size:** NMLC | **R.L. Surface:** 101.64 m

Date: 30/7/24 TO 31/7/24 | **Inclination:** VERTICAL | **Datum:** AHD

Plant Type: JK330 | **Bearing:** N/A | **Logged/Checked By:** T.F./A.B.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION (Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components)	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$	DEFECT DETAILS: SPACING (mm)	DEFECT DETAILS: DESCRIPTION (Type, orientation, defect shape and roughness, defect coatings and seams, openness and thickness) Specific / General	Formation
					START CORING AT 4.15m						
					NO CORE 0.24m						
		97	5		CLAYSTONE: dark grey, with extremely weathered bands up to 280mm.t, bedded at 0-5°.	HW	L - M	0.30		(4.39m) XWS, 0°, 150 mm.t (4.68m) CS, 0°, 10 mm.t (4.73m) CS, 0°, 10 mm.t (4.83m) J, 90°, P, S, Clay Vn (4.88m) Be, 5°, P, S, Fe Sn (4.90m) XWS, 0°, 280 mm.t	
		96	6					0.20 0.10		(5.30m) J, 85°, P, S, Cn (5.43m) Be, 0°, P, S, Clay Vn (5.53m) Be, 0°, P, S, Fe Sn (5.57m) J, 80°, P, S, Cn (5.60m) XWS, 0°, 10 mm.t (5.68m) J, 90°, P, S, Cn	
		95	7				L	0.60 0.20		(6.05m) J, 90°, P, S, Cn (6.16m) Be, 0°, P, S, Clay Vn (6.39m) J, 30°, P, S, Cn (6.48m) XWS, 0°, 140 mm.t (6.62m) Cr, 0°, 80 mm.t	
		94	8		Interbedded SANDSTONE: fine to medium grained, grey, and CLAYSTONE: grey and dark grey, bedded at 0-20°.	SW		0.20	600 200 60 20	(7.42m) CS, 0°, 5 mm.t (7.50m) CS, 0°, 3 mm.t	Bringelly Shale
		93	9				M	0.40 0.40		(7.78m) CS, 0°, 20 mm.t (7.89m) CS, 0°, 110 mm.t (8.00m) XWS, 0°, 90 mm.t (8.10m) XWS, 0°, 20 mm.t (8.17m) XWS, 0°, 10 mm.t (8.24m) CS, 0°, 5 mm.t (8.36m) Be, 0°, P, S, Clay Vn (8.37m) Ji, 80°, P, R, Fe Sn (8.47m) CS, 0°, 20 mm.t	
		92	10		SANDSTONE: fine to medium grained, grey, with dark grey laminae, bedded at 0-10°.		H	1.9 1.3		(9.04m) Be, 0°, P, R, Fe Sn (9.08m) Jh, 70°, P	
		91			Interbedded SANDSTONE: fine to medium grained, grey, and CLAYSTONE, grey and dark grey, bedded at 0-10°.	FR	M	0.40 0.30 0.70	600 200 60 20	(9.72m) Be, 0°, P, S, Clay FILLED (10.18m) CS, 0°, 10 mm.t (10.29m) Be, 0°, P, S, Cn	

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS

JKGeotechnics

CORED BOREHOLE LOG

Borehole No. 112

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT | **Core Size:** NMLC | **R.L. Surface:** 101.64 m

Date: 30/7/24 TO 31/7/24 | **Inclination:** VERTICAL | **Datum:** AHD

Plant Type: JK330 | **Bearing:** N/A | **Logged/Checked By:** T.F./A.B.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION: Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$ (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	DEFECT DETAILS: SPACING (mm) (600, 200, 60, 20)	DEFECT DETAILS: DESCRIPTION (Specific / General)	Formation
		90	12		Interbedded SANDSTONE: fine to medium grained, grey, and CLAYSTONE, grey and dark grey, bedded at 0-10°. *(continued)*	FR	M	0.40		(11.00m) J, 80°, P, S, Cn (11.13m) XWS, 0°, 20 mm.t (11.19m) XWS, 0°, 110 mm.t	Bringelly Shale
					CLAYSTONE: dark grey and grey, bedded at 0-5°.			0.40		(11.86m) XWS, 0°, 50 mm.t	
								0.30		(12.41m) Be, 0°, P, S, Clay Vn (12.50m) XWS, 0°, 50 mm.t	
		89	13		END OF BOREHOLE AT 12.54 m						
		88	14								
		87	15								
		86	16								
		85	17								
		84									

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS


JKGeotechnics
Job No: 35910LT
Borehole No: BH112
Depth: 04.15m to 12.54m
KODAK Gray Scale
KODAK Color Control Patches
35910LT BH112 START CORING AT 4.15m
4
NO CORE
0.24m
5
6
7
8
9
10
11
12
EOBH AT 12.54

JKGeotechnics

BOREHOLE LOG

Borehole No. 113

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT **Method:** SPIRAL AUGER **R.L. Surface:** 101.30 m

Date: 6/8/24 **Datum:** AHD

Plant Type: JK309 **Logged/Checked By:** T.F./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION OF AUGERING										TOPSOIL: Silty clay, medium plasticity, grey brown, trace of root fibres.	w>PL			GRASS COVER
									CH	Silty CLAY: high plasticity, orange brown, trace of root fibres.	w>PL	St	210 260 200	RESIDUAL HP ON DISTURBED SAMPLES
					N = 9 2,3,6	101	1					VSt	360 380 410 350	
						100					w<PL			
					N > 11 7,11/ 100mm REFUSAL							Hd	550 580 560	
									-	Extremely Weathered claystone: silty CLAY, grey and brown.	XW	Hd		BRINGELLY SHALE VERY LOW 'TC' BIT RESISTANCE
						99	2			as above, but with very low to low strength bands.				VERY LOW TO LOW RESISTANCE
						98	3			CLAYSTONE: grey and brown, with extremely weathered bands.	DW	VL - L		LOW RESISTANCE
						97	4					L		LOW TO MODERATE RESISTANCE
							5					L - M		MODERATE RESISTANCE
						96								MODERATE TO HIGH RESISTANCE
										REFER TO CORED BOREHOLE LOG				
						95	6							

JKGeotechnics

CORED BOREHOLE LOG

Borehole No. 113

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT | **Core Size:** NMLC | **R.L. Surface:** 101.30 m

Date: 6/8/24 | **Inclination:** VERTICAL | **Datum:** AHD

Plant Type: JK309 | **Bearing:** N/A | **Logged/Checked By:** T.F./A.B.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION (Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components)	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$	DEFECT DETAILS: SPACING (mm)	DEFECT DETAILS: DESCRIPTION (Type, orientation, defect shape and roughness, defect coatings and seams, openness and thickness)	Formation
		96			START CORING AT 5.60m						
80% RETURN		95	6		CLAYSTONE: grey, bedded at 0-10°.	HW	VL				
					NO CORE 0.17m						
					CLAYSTONE: grey and dark grey, bedded at 0-5°.	MW	VL - L	0.30		(5.84m) XWS, 5°, 30 mm.t (5.94m) Cr, 0°, 30 mm.t (6.10m) XWS, 0°, 4 mm.t (6.24m) Cr, 0°, 25 mm.t (6.30m) XWS, 0°, 40 mm.t (6.37m) Be, Ir, R, Fe Sn (6.46m) J, 60°, Ir, R, Fe Sn	
		94	7					0.080 0.10 0.20		(6.65m) J, 30°, Ir, R, Fe Sn (6.92m) J, 75°, Ir, R, Clay Vn (7.17m) XWS, 0°, 60 mm.t	
						SW	L	0.20		(7.76m) J, 80°, Ir, R, Fe Sn, Rock is fractured	
		93	8					0.10		(8.24m) XWS, 0°, 25 mm.t	
95% RETURN		92	9		CLAYSTONE: grey, with occasional sandstone, grey laminae, bedded at 0-10°.	FR	M	0.30 0.70		(8.48m) XWS, 0°, 40 mm.t (8.61m) CS, 0°, 70 mm.t (8.69m) XWS, 0°, 130 mm.t (8.86m) Be, 0°, P, R, Clay Vn (9.18m) Be, 0°, Ir, R, Clay Vn	Bringelly Shale
								0.30		(9.36m) XWS, 0°, 35 mm.t (9.68m) XWS, 0°, 15 mm.t (9.71m) XWS, 0°, 25 mm.t	
		91	10					0.30		(10.31m) XWS, 0°, 10 mm.t	
								0.50 0.80			
		90	11				L	0.30		(11.48m) XWS, 0°, 100 mm.t (11.59m) CS, 0°, 60 mm.t (11.68m) XWS, 0°, 60 mm.t (11.79m) XWS, 0°, 4 mm.t (11.85m) XWS, 95 mm.t	

JK 9.02.4 LIB:GLB Log JK CORED BOREHOLE - MASTER 35910LT LEPPINGTON.GPJ <<DrawingFile>> 30/08/2024 14:29 10.01.00.001 Datgel Lab and In Situ Tool - DGD | Lib: JK 9.02.4 2019-05-31 Prj: JK 9.01.0 2018-03-20

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS

JKGeotechnics

CORED BOREHOLE LOG

Borehole No. 113 **3 / 3**

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT **Core Size:** NMLC **R.L. Surface:** 101.30 m

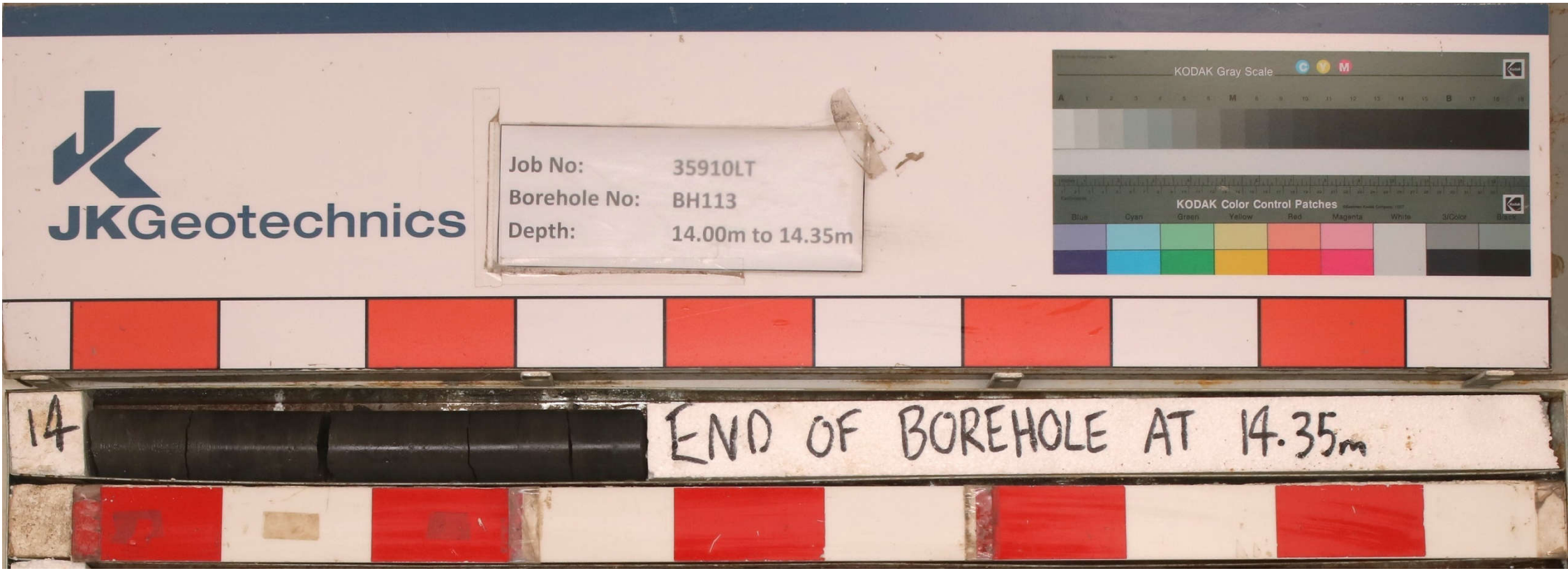
Date: 6/8/24 **Inclination:** VERTICAL **Datum:** AHD

Plant Type: JK309 **Bearing:** N/A **Logged/Checked By:** T.F./A.B.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION: Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$ (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	SPACING (mm) (600, 200, 60, 20)	DEFECT DETAILS: DESCRIPTION (Specific / General)	Formation
95% RETURN		89	13		CLAYSTONE: grey, with occasional sandstone, grey laminae, bedded at 0-10°. *(continued)*	FR	L	0.20		(12.00m) XWS, 0°, 40 mm.t (12.12m) XWS, 0°, 12 mm.t (12.15m) XWS, 0°, 90 mm.t (12.28m) XWS, 0°, 20 mm.t (12.32m) XWS, 0°, 5 mm.t (12.39m) J, 25°, Ir, R, Clay Vn, Rock is fractured (12.45m) XWS, 0°, 100 mm.t	Bringelly Shale
								0.20		(12.64m) XWS, 0°, 40 mm.t (12.76m) J, 70°, Ir, R, Cn (12.85m) XWS, 0°, 180 mm.t	
		88					M	1.2		(13.11m) Be, 0°, P, R, Clay Vn (13.15m) CS, 0°, 4 mm.t	
								0.30		(13.48m) XWS, 0°, 30 mm.t (13.55m) XWS, 2 mm.t	
								0.20		(13.72m) Be, 0°, P, R, Clay Vn	
		87	14					0.80		(13.96m) XWS, 0°, 25 mm.t	
								0.30			
					END OF BOREHOLE AT 14.35 m						
		86	15								
		85	16								
		84	17								
		83	18								

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS


JKGeotechnics
Job No: 35910LT
Borehole No: BH113
Depth: 5.60m to 14.00m
KODAK Gray Scale
KODAK Color Control Patches
35910LT BH113 START CORING AT 5.60m
5
NO CORE 0.17m
6
7
8
9
10
11
12
13


JKGeotechnics
Job No: 35910LT
Borehole No: BH113
Depth: 14.00m to 14.35m
KODAK Gray Scale
KODAK Color Control Patches
14
END OF BOREHOLE AT 14.35m

JKGeotechnics

BOREHOLE LOG

Borehole No. 114

1 / 3

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT **Method:** SPIRAL AUGER **R.L. Surface:** 100.84 m

Date: 6/8/24 TO 7/8/24 **Datum:** AHD

Plant Type: JK309 **Logged/Checked By:** T.F./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
										TOPSOIL: Silty clay, medium plasticity, grey brown, trace of root fibres.				GRASS COVER
									CH	Silty CLAY: high plasticity, orange brown, with fine to coarse grained ironstone gravel, trace of root fibres.	w>PL	St - VSt	180 220 210 210	RESIDUAL HP TESTING ON DISTURBED SAMPLES
					N = 9 7,4,5							Hd	550 580 560	
						100	1			as above, but trace of fine to coarse grained ironstone gravel.	w<PL			
					N > 8 7,8/ 110mm REFUSAL	99	2		-	Extremely Weathered claystone: silty CLAY, high plasticity, grey brown.	XW	Hd		BRINGELLY SHALE VERY LOW 'TC' BIT RESISTANCE
										CLAYSTONE: grey brown, with extremely weathered bands.	DW	VL - L		VERY LOW TO LOW RESISTANCE
						98	3							
						97	4							
						96	5					L - M		MODERATE RESISTANCE
						95	6			REFER TO CORED BOREHOLE LOG				
						94								

JKGeotechnics

CORED BOREHOLE LOG

Borehole No. 114

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT | **Core Size:** NMLC | **R.L. Surface:** 100.84 m

Date: 6/8/24 TO 7/8/24 | **Inclination:** VERTICAL | **Datum:** AHD

Plant Type: JK309 | **Bearing:** N/A | **Logged/Checked By:** T.F./A.B.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION (Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components)	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$	DEFECT DETAILS: SPACING (mm)	DEFECT DETAILS: DESCRIPTION (Type, orientation, defect shape and roughness, defect coatings and seams, openness and thickness)	Formation
					START CORING AT 5.65m						
85% RETURN		95	6		CLAYSTONE: grey, with occasional sandstone, fine grained, grey laminae, bedded at 0-10°.	MW	L - M	0.60		(5.70m) XWS, 0°, 5 mm.t (5.89m) XWS, 0°, 70 mm.t (6.00m) XWS, 0°, 20 mm.t (6.06m) XWS, 0°, 25 mm.t (6.10m) CS, 0°, 15 mm.t (6.12m) XWS, 0°, 30 mm.t (6.21m) XWS, 0°, 5 mm.t (6.24m) XWS, 0°, 25 mm.t	Bringelly Shale
								0.30			
		94	7					0.10		(6.52m) XWS, 0°, 20 mm.t (6.73m) Be, 0°, P, R, Clay Vn (6.86m) XWS, 0°, 20 mm.t (6.95m) XWS, 0°, 25 mm.t (7.04m) XWS, 5 mm.t	
					CLAYSTONE: grey and dark grey, bedded at 0-5°.	FR	M	0.40			
		93	8					0.50		(7.83m) Be, 0°, Ir, R, Clay Vn	
								0.60			
								0.40		(8.55m) XWS, 0°, 50 mm.t (8.75m) XWS, 0°, 3 mm.t	
		92	9					0.60			
								0.40			
								0.60		(9.63m) Be, 0°, Ir, R, Clay Vn	
		91	10					0.40		(10.20m) XWS, 0°, 40 mm.t (10.30m) XWS, 0°, 30 mm.t	
								0.40		(10.65m) Be, 0°, Ir, R, Cn	
		90	11					0.50			
								0.80		(11.20m) XWS, 0°, 8 mm.t	
							L			(11.55m) XWS, 0°, 25 mm.t (11.62m) CS, 0°, 10 mm.t (11.65m) XWS, 0°, 60 mm.t (11.76m) XWS, 0°, 4 mm.t (11.79m) XWS, 0°, 70 mm.t (11.88m) XWS, 20 mm.t	
		89						0.30			

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS

JKGeotechnics

CORED BOREHOLE LOG

Borehole No. 114

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT | **Core Size:** NMLC | **R.L. Surface:** 100.84 m

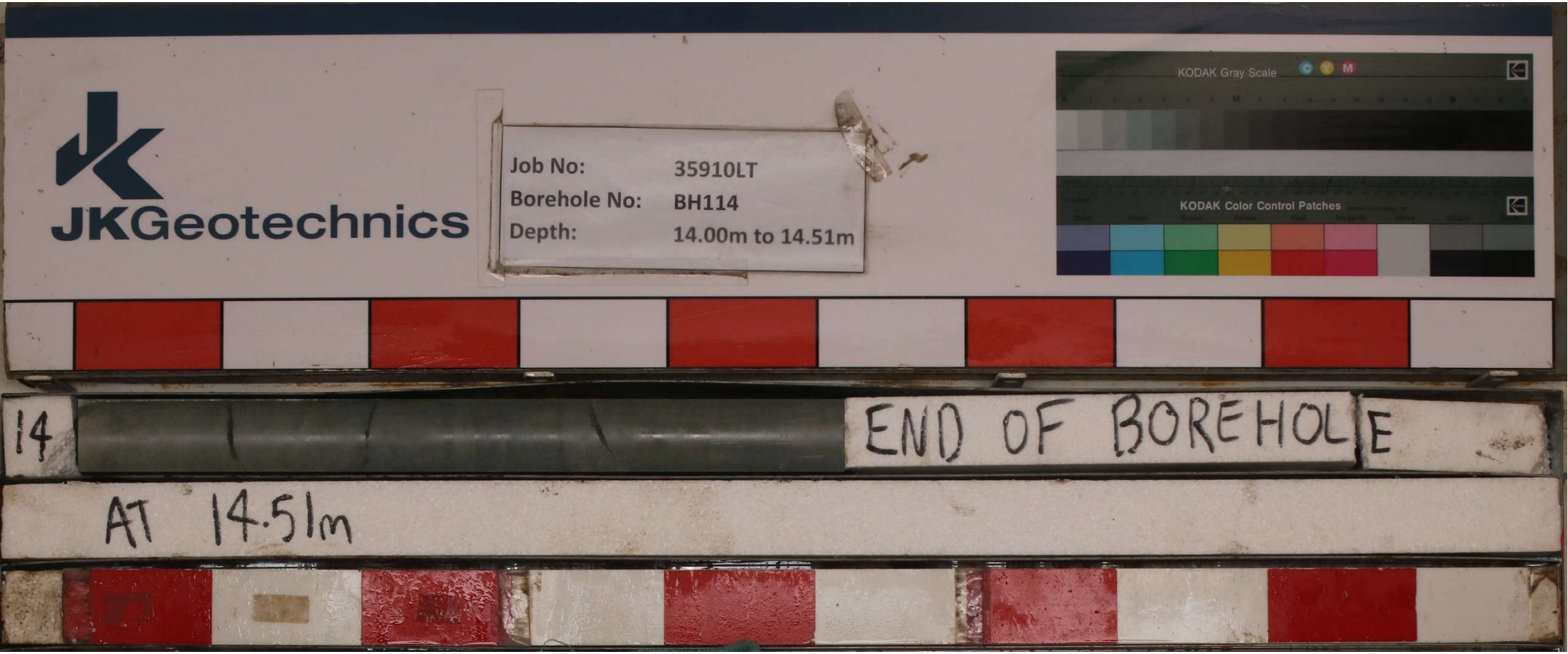
Date: 6/8/24 TO 7/8/24 | **Inclination:** VERTICAL | **Datum:** AHD

Plant Type: JK309 | **Bearing:** N/A | **Logged/Checked By:** T.F./A.B.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION: Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$ (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	SPACING (mm) (600, 200, 60, 20)	DEFECT DETAILS: DESCRIPTION (Type, orientation, defect shape and roughness, defect coatings and seams, openness and thickness) Specific / General	Formation
95% RETURN		88	13		CLAYSTONE: grey and dark grey, bedded at 0-5°. *(continued)*	FR	L	0.20		(11.97m) XWS, 0°, 60 mm.t (12.06m) XWS, 0°, 40 mm.t	Bringelly Shale
								0.40		(12.30m) CS, 0°, 3 mm.t (12.38m) XWS, 0°, 15 mm.t (12.42m) XWS, 0°, 5 mm.t (12.45m) XWS, 5 mm.t (12.47m) XWS, 0°, 70 mm.t (12.55m) XWS, 0°, 10 mm.t (12.59m) Be, 0°, Ir, R, Fe Sn (12.70m) XWS, 0°, 10 mm.t	
							M				
		87	14					0.60		(13.00m) XWS, 0°, 30 mm.t	
								0.50			
								0.80			
								0.50			
								0.30			
					END OF BOREHOLE AT 14.51 m						
		86	15								
		85	16								
		84	17								
		83	18								
		82									

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS


JKGeotechnics
Job No: 35910LT
Borehole No: BH114
Depth: 5.65m to 14.00m
KODAK Gray Scale
KODAK Color Control Patches
35910LT BH114 START CORING AT 5.65m
5
6
7
8
9
10
11
12
13


JKGeotechnics
Job No: 35910LT
Borehole No: BH114
Depth: 14.00m to 14.51m
KODAK Gray Scale
KODAK Color Control Patches
14
END OF BOREHOLE
AT 14.51m

JKGeotechnics

BOREHOLE LOG

Borehole No. 115

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT **Method:** SPIRAL AUGER **R.L. Surface:** 100.51 m

Date: 7/8/24 **Datum:** AHD

Plant Type: JK309 **Logged/Checked By:** T.F./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION OF AUGERING										TOPSOIL: Silty clay, medium plasticity, brown and grey, trace of root fibres.	w>PL			
									CH	Silty CLAY: high plasticity, orange brown, trace of root fibres.	w>PL	VSt - Hd		RESIDUAL
					N = 8 2,3,5	100	1						400 400 350 380	
											w<PL			
					N = 19 6,8,11	99						Hd	>600 >600 >600	
							2		-	Extremely Weathered claystone: silty CLAY, medium plasticity, brown and grey, with very low strength bands.	XW	Hd		BRINGELLY SHALE VERY LOW 'TC' BIT RESISTANCE
						98	3			CLAYSTONE: grey and brown, with extremely weathered bands.	DW	VL		VERY LOW TO LOW RESISTANCE
						97	4							
						96	5					VL - L		MODERATE RESISTANCE
						95								
							6			REFER TO CORED BOREHOLE LOG				
						94								

JKGeotechnics

CORED BOREHOLE LOG

Borehole No. 115

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT | **Core Size:** NMLC | **R.L. Surface:** 100.51 m

Date: 7/8/24 | **Inclination:** VERTICAL | **Datum:** AHD

Plant Type: JK309 | **Bearing:** N/A | **Logged/Checked By:** T.F./A.B.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION: Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$ (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	DEFECT DETAILS: SPACING (mm) (600, 200, 60, 20)	DEFECT DETAILS: DESCRIPTION (Specific / General)	Formation
		95			START CORING AT 5.75m						
			6		CLAYSTONE: grey and brown, with medium strength iron indurated bands.	HW	VL	0.50			
		94			CLAYSTONE: grey and dark grey, with occasional sandstone, fine grained, grey laminae, bedded at 0-10°.	SW	L - M	0.40		(6.66m) XWS, 0°, 100 mm.t	
			7					0.40			
		93						0.30		(7.45m) Be, 2°, Ir, R, Fe Sn (7.51m) XWS, 10 mm.t (7.62m) CS, 0°, 10 mm.t (7.70m) XWS, 0°, 5 mm.t (7.83m) CS, 0°, 30 mm.t (7.92m) XWS, 0°, 20 mm.t	
			8				M	0.30			
		92						0.10		(8.39m) XWS, 0°, 5 mm.t (8.51m) XWS, 40 mm.t (8.69m) XWS, 0°, 70 mm.t	
90% RETURN			9			FR		0.60 0.30			Bringelly Shale
		91						0.60		(9.48m) Be, 0°, Ir, R, Clay Vn	
			10					0.50		(9.73m) XWS, 0°, 10 mm.t (9.76m) XWS, 0°, 110 mm.t (9.82m) CS, 0°, 5 mm.t (9.84m) XWS, 0°, 5 mm.t (9.90m) XWS, 0°, 15 mm.t (10.05m) XWS, 15 mm.t	
		90						0.50		(10.67m) Be, 0°, Ir, R, Fe Sn	
			11					0.60			
		89						0.40		(11.75m) XWS, 0°, 50 mm.t (11.92m) XWS, 0°, 210 mm.t	

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS

JKGeotechnics

CORED BOREHOLE LOG

Borehole No. 115

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT | **Core Size:** NMLC | **R.L. Surface:** 100.51 m

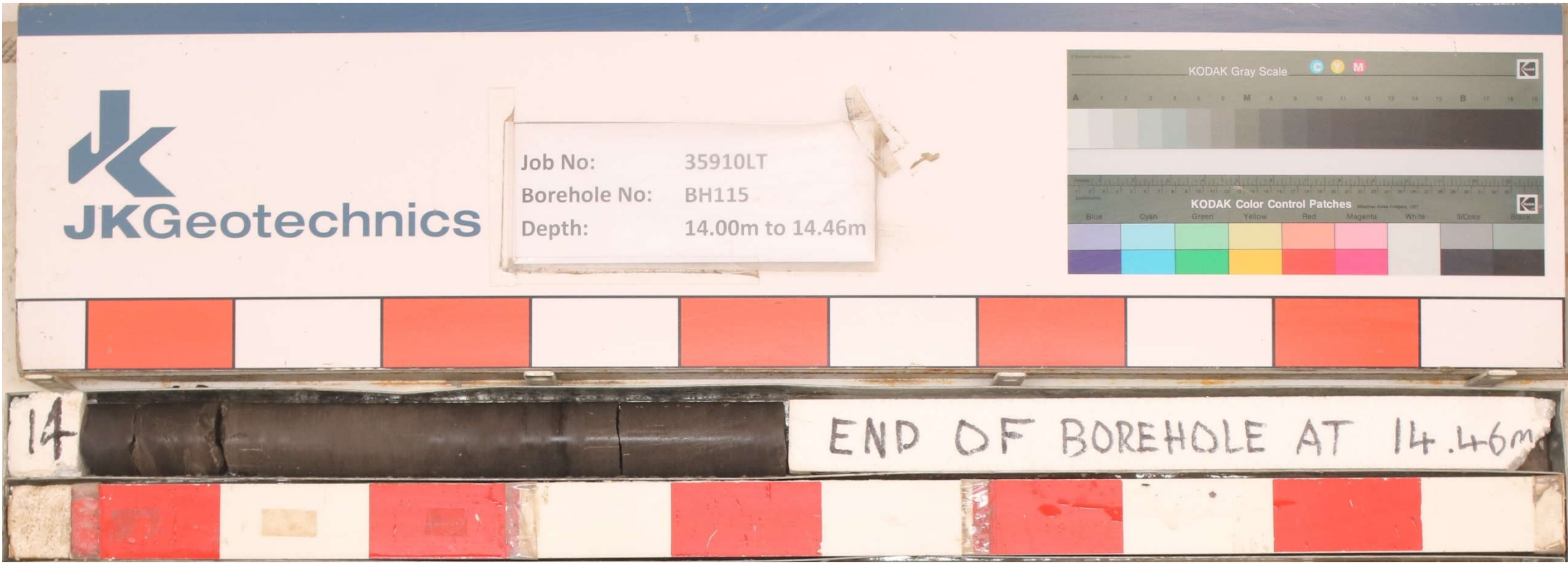
Date: 7/8/24 | **Inclination:** VERTICAL | **Datum:** AHD

Plant Type: JK309 | **Bearing:** N/A | **Logged/Checked By:** T.F./A.B.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION: Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$	DEFECT DETAILS: SPACING (mm)	DEFECT DETAILS: DESCRIPTION (Specific / General)	Formation
90% RETURN		88	13		CLAYSTONE: grey and dark grey, with occasional sandstone, fine grained, grey laminae, bedded at 0-10°. *(continued)*	FR	M	0.40 0.40		(12.11m) XWS, 0°, 35 mm.t (12.18m) XWS, 0°, 5 mm.t (12.20m) XWS, 0°, 3 mm.t (12.23m) XWS, 0°, 150 mm.t (12.44m) Be, 0°, Ir, R, Clay Vn (12.67m) J, 50°, Ir, R, Cn	Bringelly Shale
		87					M - H	1.1		(13.10m) J, 80°, Ir, R, Cn (13.23m) XWS, 0°, 50 mm.t	
			14					0.60 0.50			
		86			END OF BOREHOLE AT 14.46 m			0.80			
			15								
		85									
			16								
		84									
			17								
		83									
			18								
		82									

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS


JKGeotechnics
Job No: 35910LT
Borehole No: BH115
Depth: 5.75m to 14.00m
KODAK Gray Scale
KODAK Color Control Patches
35910LT BH115 START CORING AT 5.75m
5
6
7
8
9
10
11
12
13


JKGeotechnics
Job No: 35910LT
Borehole No: BH115
Depth: 14.00m to 14.46m
KODAK Gray Scale
KODAK Color Control Patches
Blue
Cyan
Green
Yellow
Red
Magenta
White
3/Color
Black
14
END OF BOREHOLE AT 14.46m

JKGeotechnics

BOREHOLE LOG

Borehole No. 116

1 / 3

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT **Method:** SPIRAL AUGER **R.L. Surface:** 101.73 m

Date: 5/8/24 TO 6/8/24 **Datum:** AHD

Plant Type: JK308 **Logged/Checked By:** A.M./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
										TOPSOIL: Silty clay, medium plasticity, brown, with roots and root fibres.	w>PL			GRASS COVER
									CH	Silty CLAY: high plasticity, orange brown and grey, trace of root fibres.	w>PL	VSt		RESIDUAL HP TESTING ON DISTURBED SAMPLES
					N = 21 4,9,12	101	1		-	Extremely Weathered claystone: silty CLAY, medium plasticity, orange brown and grey, with very low strength claystone bands.	XW	Hd	300 280 250 >600 >600 >600	BRINGELLY SHALE
					N = 36 9,19,17	100	2							
						99	3							
					N > 8 4,8/ 100mm REFUSAL	98	4			CLAYSTONE: grey brown, with extremely weathered bands.	DW	L		LOW TO MODERATE 'TC' BIT RESISTANCE
						97	5			as above, but dark grey.		L - M		
						96	6			REFER TO CORED BOREHOLE LOG				
						95								

JKGeotechnics

CORED BOREHOLE LOG

Borehole No. 116

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT | **Core Size:** NMLC | **R.L. Surface:** 101.73 m

Date: 5/8/24 TO 6/8/24 | **Inclination:** VERTICAL | **Datum:** AHD

Plant Type: JK308 | **Bearing:** N/A | **Logged/Checked By:** A.M./A.B.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION (Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components)	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$	DEFECT DETAILS: SPACING (mm)	DEFECT DETAILS: DESCRIPTION (Specific / General)	Formation
		96			START CORING AT 6.00m						
			6		CLAYSTONE: dark grey and grey, with fine to medium grained, grey sandstone bands, bedded at 0-5°.	FR	M	0.40		(6.23m) Be, 5°, P, Un, Clay Vn	
					NO CORE 0.18m						
		95	7		CLAYSTONE: dark grey and grey, with fine to medium grained, grey sandstone bands, bedded at 0-5°.	FR	M	0.40			
								0.40			
		94						0.60		(7.91m) Ji, 40°, P	
			8					0.30			
		93						0.40			
			9		SANDSTONE: fine to medium grained, grey, with dark grey laminae and occasional claystone bands, bedded at 0-15°.		M - H	0.70		(8.97m) Be, 0°, P, R, Clay FILLED	Bringelly Shale
		92						0.60			
			10					2.3		(10.33m) Be, 0°, P, R, Cn	
					Interbedded CLAYSTONE: dark grey, and SANDSTONE: fine to medium grained, grey, bedded at 0-10°.						
		91						0.40			
			11					0.70			
		90						0.40		(11.71m) Be, 0°, P, R, Clay Vn	

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS

JKGeotechnics

CORED BOREHOLE LOG

Borehole No. 116 **3 / 3**

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT **Core Size:** NMLC **R.L. Surface:** 101.73 m

Date: 5/8/24 TO 6/8/24 **Inclination:** VERTICAL **Datum:** AHD

Plant Type: JK308 **Bearing:** N/A **Logged/Checked By:** A.M./A.B.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION: Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$ (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	SPACING (mm) (600, 200, 60, 20)	DEFECT DETAILS: DESCRIPTION (Type, orientation, defect shape and roughness, defect coatings and seams, openness and thickness) Specific / General	Formation
		89	13		Interbedded CLAYSTONE: dark grey, and SANDSTONE: fine to medium grained, grey, bedded at 0-10°. *(continued)*	FR	M - H	0.20, 0.50			Bringelly Shale
		88	14				M	0.40, 0.40, 0.20, 0.70		(13.09m) Be, 0°, P, S, Clay Ct (13.17m) XWS, 0°, 30 mm.t (13.58m) XWS, 0°, 5 mm.t (14.80m) Ji, 90°, P	
		87	15		END OF BOREHOLE AT 15.00 m						
		86	16								
		85	17								
		84	18								
		83									

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS


JKGeotechnics
Job No: 35910LT
Borehole No: BH116
Depth: 06.00m to 15.00m
KODAK Gray Scale
KODAK Color Control Patches
35910LT BH 116 START CORING AT 6.0m
No Core 0.18m
(EOBH at 15.00m)
6
7
8
9
10
11
12
13
14

JKGeotechnics

BOREHOLE LOG

Borehole No. 117

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT **Method:** SPIRAL AUGER **R.L. Surface:** 100.36 m

Date: 6/8/24 **Datum:** AHD

Plant Type: JK308 **Logged/Checked By:** A.M./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION OF AUGERING										TOPSOIL: Silty clay, medium plasticity, brown, with roots and root fibres.	w>PL			
						100			CH	Silty CLAY: high plasticity, red brown, orange brown and grey.	w>PL	VSt		RESIDUAL
					N = 6 2,2,4		1						240 290 220	
						99			-	Extremely Weathered claystone: silty CLAY, medium plasticity, brown, grey and red brown, trace of fine to medium grained ironstone gravel.	XW	Hd		BRINGELLY SHALE
					N=SPT 11,6/ 0mm REFUSAL		2						>600 >600 >600	VERY LOW 'TC' BIT RESISTANCE
						98								
							3							
						97								
							4			as above, but with very low strength claystone bands.				
						96				CLAYSTONE: grey brown and dark grey, with extremely weathered bands.	DW	VL - L		BANDED LOW RESISTANCE
							5					L		
						95								
										REFER TO CORED BOREHOLE LOG				
							6							
						94								

JKGeotechnics

CORED BOREHOLE LOG

Borehole No. 117

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT | **Core Size:** NMLC | **R.L. Surface:** 100.36 m

Date: 6/8/24 | **Inclination:** VERTICAL | **Datum:** AHD

Plant Type: JK308 | **Bearing:** N/A | **Logged/Checked By:** A.M./A.B.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION (Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components)	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$ (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	DEFECT DETAILS: SPACING (mm) (600, 200, 60, 20)	DEFECT DETAILS: DESCRIPTION (Specific / General)	Formation
		95			START CORING AT 5.62m						
					Extremely Weathered claystone: silty CLAY, medium plasticity, brown and grey.	XW	Hd				Bringelly Shale
		94	6		CLAYSTONE: dark grey and brown.	MW	L - M	0.30		(6.12m) CS, 0°, 10 mm.t (6.15m) J, 80°, P, R, Cn (6.31m) Be, 0°, P, S, Clay Ct	
			7		CLAYSTONE: dark grey and brown, with fine grained, grey sandstone bands and laminae, bedded at 0-10°.	SW	M	0.70 0.80 0.60 0.30		(6.78m) J, 90°, P, R, Cn (7.00m) Jh, 80°, P, Fe Sn (7.26m) Be, 5°, P, R, Cn (7.89m) Be, 5°, P, R, Cn (8.05m) Jh, 30°, P	
		93	8		Extremely Weathered claystone: silty CLAY, medium plasticity, brown and grey.	XW	Hd				
		92	9		CLAYSTONE: dark grey, with fine grained sandstone bands and laminae, bedded at 0-5°.	FR	M	0.60 0.80			
		91					M - H	1.5		(9.93m) Be, 0°, P, S, Clay Vn (10.01m) XWS, 0°, 20 mm.t	
		90	10					0.50 0.60 0.80			
		89	11		CLAYSTONE: dark grey and grey, bedded at 0-5°.		L - M	0.50		(10.92m) Be, 0°, P, R, Clay Vn	
						SW		0.30		(11.45m) J, 90°, Ir, R, Clay Vn (11.49m) XWS, 0°, 30 mm.t	
					END OF BOREHOLE AT 11.78 m						

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS


JKGeotechnics
Job No: 35910LT
Borehole No: BH117
Depth: 5.62m to 11.78m
KODAK Gray Scale
KODAK Color Control Patches
35910LT BH117 START CORING AT 5.62m
5
6
7
8
9
10
11
EOBH @ 11.78m

JKGeotechnics

BOREHOLE LOG

Borehole No. 118

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT **Method:** SPIRAL AUGER **R.L. Surface:** 99.88 m

Date: 7/8/24 **Datum:** AHD

Plant Type: JK330 **Logged/Checked By:** A.M./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION OF AUGERING										TOPSOIL: Silty clay, medium plasticity, brown, with roots and root fibres.	w~PL			GRASS COVER
									CH	Silty CLAY: high plasticity, orange brown and grey, trace of root fibres.	w>PL	VSt		RESIDUAL
					N = 14 3,5,9	99	1						320 300 360	
					N = 26 9,14,12	98	2		-	Extremely Weathered claystone: silty CLAY, medium plasticity, grey, orange brown and red brown, trace of fine to medium grained ironstone gravel.	XW	Hd	>600 >600 >600	BRINGELLY SHALE
						97	3							
						96	4			CLAYSTONE: grey and brown, with occasional iron indurated bands.	DW	L - M		LOW 'TC' BIT RESISTANCE
						95	5					M		MODERATE RESISTANCE
						94	6			REFER TO CORED BOREHOLE LOG				
						93								

JKGeotechnics

CORED BOREHOLE LOG

Borehole No. 118 **2 / 3**

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT **Core Size:** NMLC **R.L. Surface:** 99.88 m

Date: 7/8/24 **Inclination:** VERTICAL **Datum:** AHD

Plant Type: JK330 **Bearing:** N/A **Logged/Checked By:** A.M./A.B.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION (Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components)	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$	DEFECT DETAILS: SPACING (mm)	DEFECT DETAILS: DESCRIPTION (Type, orientation, defect shape and roughness, defect coatings and seams, openness and thickness) Specific / General	Formation
					START CORING AT 5.52m					(5.52m) XWS, 0°, 220 mm.t	
ON COMPLETION OF CORING		94	6		CLAYSTONE: dark grey and brown, with fine grained, grey and light brown sandstone bands and laminae, bedded at 0-10°.	MW	L - M	0.20, 0.40, 0.60, 0.30, 0.20		(5.87m) J, 85°, P, S, Cn (6.21m) J, 40°, P, R, Fe Sn (6.24m) Be, 0°, P, R, Clay FILLED (6.34m) J, 80°, Un, R, Clay Vn (6.38m) Be, 5°, P, R, Fe Sn (6.41m) J, 40°, P, R, Cn	
		93	7		Extremely Weathered claystone: silty CLAY, medium plasticity, brown, with very low strength siltstone bands.	XW	Hd			(6.90m) Be, 5°, P, R, Clay Ct (6.92m) J, 80°, P, R, Fe Sn (6.95m) CS, 0°, 5 mm.t (7.11m) Be, 0°, P, R, Clay FILLED (7.12m) J, 80°, P, R, Cn	
		92	8		CLAYSTONE: dark grey, with fine grained grey sandstone bands and laminae, bedded at 0-10°.	MW	L - M	0.20		(7.74m) Be, 0°, P, R, Fe Sn (7.82m) XWS, 0°, 50 mm.t (7.96m) J, 80°, P, R, Cn (8.00m) XWS, 0°, 40 mm.t	
						SW	M	0.70, 0.30, 0.30, 0.70, 0.40, 0.40	600, 200, 60, 20	(8.25m) XWS, 0°, 10 mm.t (8.30m) J, 30°, P, R, Clay Vn (8.41m) CS, 0°, 10 mm.t (8.53m) Be, 0°, P, R, Clay FILLED (8.75m) CS, 0°, 5 mm.t (8.79m) XWS, 0°, 20 mm.t (9.03m) Be, 0°, P, S, Clay Vn (9.63m) XWS, 0°, 20 mm.t (9.67m) Be, 5°, P, S, Clay Vn	
		90	10		CLAYSTONE: dark grey, bedded at 0-5°.					(9.91m) CS, 0°, 10 mm.t (9.96m) XWS, 0°, 10 mm.t (10.03m) Be, 0°, P, S, Clay FILLED (10.18m) CS, 0°, 40 mm.t (10.40m) CS, 0°, 10 mm.t	Bringelly Shale
		89	11		Extremely Weathered claystone: silty CLAY, medium plasticity, grey brown, with very low strength siltstone bands.	XW	Hd				
					CLAYSTONE: grey grey and grey, bedded at 0-5°.	FR	L - M	0.30, 0.30, 0.50		(11.07m) CS, 0°, 210 mm.t (11.36m) Be, 0°, P, S, Clay Ct (11.53m) XWS, 0°, 10 mm.t (11.60m) XWS, 0°, 180 mm.t	
		88									

JK 9.02.4 LIB:GLB Log JK CORED BOREHOLE - MASTER 35910LT LEPPINGTON.GPJ <<DrawingFile>> 30/08/2024 14:29 10.01.00.001 Datgel Lab and In Situ Tool - DGD | Lib: JK 9.02.4 2019-05-31 Prj: JK 9.01.0 2018-03-20

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS

JKGeotechnics

CORED BOREHOLE LOG

Borehole No. 118

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

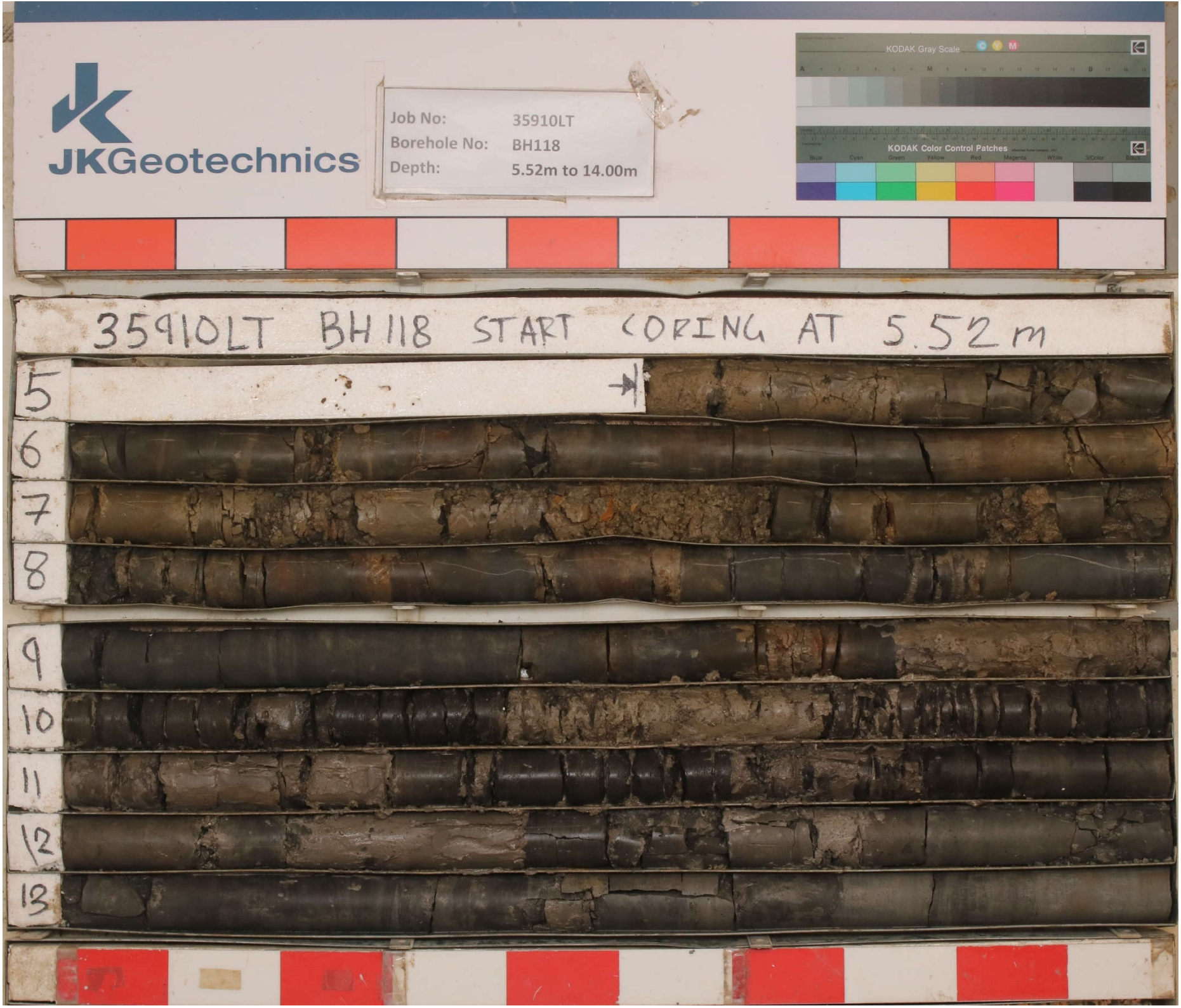
Job No.: 35910LT | **Core Size:** NMLC | **R.L. Surface:** 99.88 m

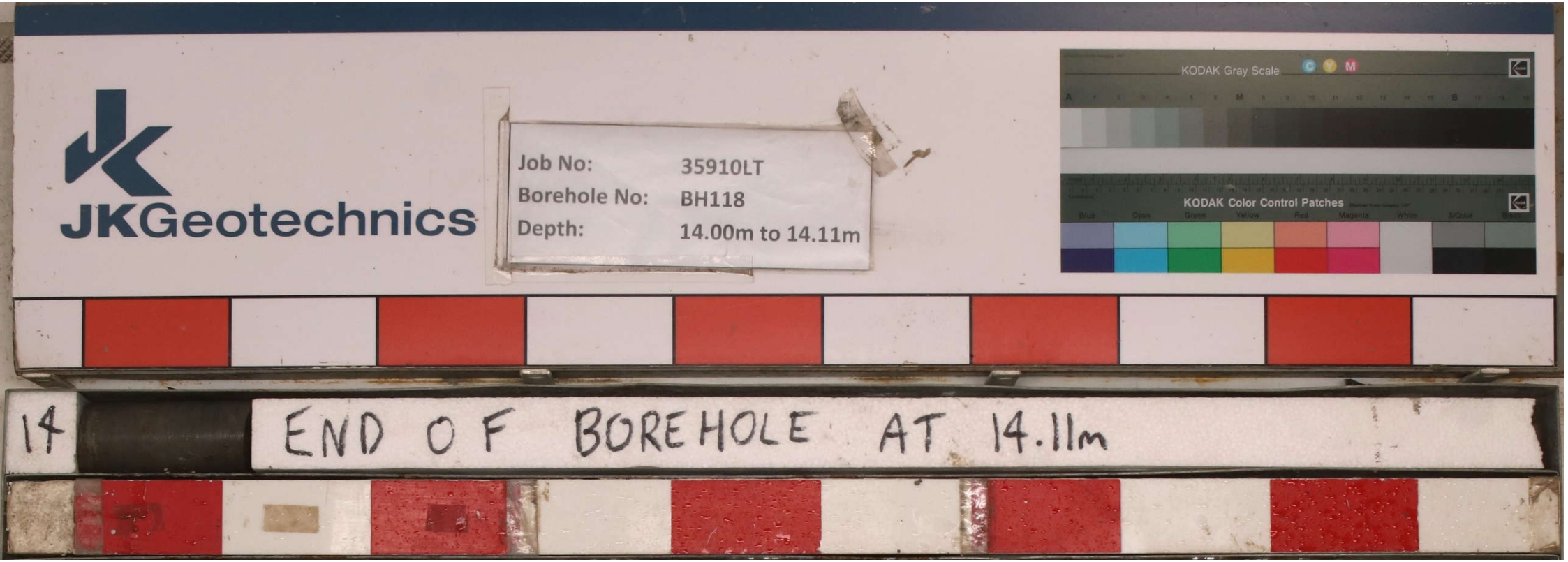
Date: 7/8/24 | **Inclination:** VERTICAL | **Datum:** AHD

Plant Type: JK330 | **Bearing:** N/A | **Logged/Checked By:** A.M./A.B.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION: Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$	DEFECT DETAILS: SPACING (mm)	DEFECT DETAILS: DESCRIPTION (Specific / General)	Formation
		87	13		CLAYSTONE: grey grey and grey, bedded at 0-5°. *(continued)*	FR	M	0.50		(12.32m) CS, 0°, 10 mm.t (12.54m) J, 90°, P, R, Cn (12.68m) XWS, 0°, 40 mm.t (12.90m) J, 90°, P, R, Cn	Bringelly Shale
					Interbedded CLAYSTONE: dark grey, and SANDSTONE, fine grained, grey, bedded at 0-10°.		H	1.0			
		86	14		SANDSTONE: fine to medium grained, grey, with dark grey lamaine, bedded at 0-10°.			1.8 2.9		(13.54m) J, 90°, P, R, Cn	
					END OF BOREHOLE AT 14.11 m						
		85	15								
		84	16								
		83	17								
		82	18								
		81									

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS


JKGeotechnics
Job No: 35910LT
Borehole No: BH118
Depth: 5.52m to 14.00m
KODAK Gray Scale
KODAK Color Control Patches
35910LT BH118 START CORING AT 5.52m
5
6
7
8
9
10
11
12
13


JKGeotechnics
Job No: 35910LT
Borehole No: BH118
Depth: 14.00m to 14.11m
KODAK Gray Scale
KODAK Color Control Patches
14
END OF BOREHOLE AT 14.11m

JKGeotechnics

BOREHOLE LOG

Borehole No. 119

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT **Method:** SPIRAL AUGER **R.L. Surface:** 101.18 m

Date: 9/8/24 **Datum:** AHD

Plant Type: JK309 **Logged/Checked By:** A.M./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION OF AUGERING				■		101				TOPSOIL: Silty clay, medium plasticity, brown, with roots and root fibres.	w>PL			GRASS COVER
									CH	Silty CLAY: high plasticity, orange brown, red brown and grey, trace of fine to medium grained ironstone gravel and root fibres.	w>PL	VSt		RESIDUAL
				■	N = 8 3,4,4		1						240 240 250	
						100			-	Extremely Weathered claystone: silty CLAY, medium plasticity, orange brown, red brown and grey, with occasional very low strength claystone bands and iron indurated bands.	XW	Hd		BRINGELLY SHALE
				■	N = 27 6,15,12		2						>600 >600 >600	BANDS OF VERY LOW RESISTANCE
						99								
							3							
						98								
							4			CLAYSTONE: grey brown.	DW	VL - L		MODERATE 'TC' BIT RESISTANCE
				■		97								
ON COMPLETION OF CORING ▽							5							
						96						L - M		MODERATE TO HIGH RESISTANCE
							6			REFER TO CORED BOREHOLE LOG				
						95								

JKGeotechnics

CORED BOREHOLE LOG

Borehole No. 119

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT | **Core Size:** NMLC | **R.L. Surface:** 101.18 m

Date: 9/8/24 | **Inclination:** VERTICAL | **Datum:** AHD

Plant Type: JK309 | **Bearing:** N/A | **Logged/Checked By:** A.M./A.B.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$	DEFECT DETAILS SPACING (mm)	DESCRIPTION Type, orientation, defect shape and roughness, defect coatings and seams, openness and thickness Specific / General	Formation
		96			START CORING AT 5.87m						
		95	6		CLAYSTONE: dark grey and brown, with fine grained, grey sandstone bands and laminae.	MW	L - M	0.50		(5.89m) XWS, 0°, 10 mm.t (5.95m) Be, 0°, P, S, Clay Vn (6.00m) XWS, 0°, 5 mm.t (6.13m) Ji, 30°, P (6.31m) Be, 0°, P, S, Clay FILLED	Bringelly Shale
		94	7					0.20 0.30 0.40		(6.56m) XWS, 0°, 10 mm.t (6.73m) Be, 0°, P, R, Clay Vn (6.96m) Be, 0°, P, R, Fe Sn (7.04m) Be, 0°, P, S, Clay Vn (7.10m) Be, 0°, P, R, Clay Ct (7.43m) Be, 0°, P, S, Clay Ct	
		93	8		Extremely Weathered claystone: silty CLAY, medium plasticity, grey.	XW	Hd			(7.80m) J, 50°, P, R, Fe Sn (7.90m) J, 60°, P, R, Fe Sn	
					NO CORE 0.18m						
		92	9		CLAYSTONE: dark grey, with fine grained, grey sandstone laminae, bedded at 0-10°.	FR	M	0.40 0.30		(8.54m) J, 90°, P, R, Cn (8.88m) Be, 0°, P, R, Clay Ct (9.38m) Be, 0°, P, S, Clay Vn	Bringelly Shale
		91	10					0.40 0.40		(10.24m) Be, 0°, P, S, Clay Vn	
		90	11		CLAYSTONE: dark grey and grey, bedded at 0-5°.			0.40 0.40 0.40		(10.97m) XWS, 0°, 100 mm.t	
							L - M			(11.74m) Be, 0°, P, R, Clay Vn (11.75m) XWS, 0°, 90 mm.t (11.92m) J, 30°, P, S, Cn	

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS

JKGeotechnics

CORED BOREHOLE LOG

Borehole No. 119

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT | **Core Size:** NMLC | **R.L. Surface:** 101.18 m

Date: 9/8/24 | **Inclination:** VERTICAL | **Datum:** AHD

Plant Type: JK309 | **Bearing:** N/A | **Logged/Checked By:** A.M./A.B.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION (Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components)	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$ (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	DEFECT DETAILS: SPACING (mm) (600, 200, 60, 20)	DEFECT DETAILS: DESCRIPTION (Specific / General)	Formation
		89	13		CLAYSTONE: dark grey and grey, bedded at 0-5°. *(continued)*	FR	L - M	0.30		(12.14m) XWS, 0°, 80 mm.t (12.23m) XWS, 0°, 100 mm.t (12.33m) CS, 0°, 40 mm.t (12.59m) XWS, 0°, 40 mm.t	Bringelly Shale
		88						0.90 0.80			
					Interbedded SANDSTONE, fine grained, grey, and CLAYSTONE, grey, bedded at 0-5°.		M - H	0.80			
		87	14				H	1.7 2.8			
					END OF BOREHOLE AT 14.60 m						
		86	15								
		85	16								
		84	17								
		83	18								

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS


JKGeotechnics
Job No: 35910LT
Borehole No: BH119
Depth: 5.87m to 14.00m
KODAK Gray Scale
KODAK Color Control Patches
35910LT BH 119 START CORING AT 5.87m
5
6
7
8
NO CORE
0.18m
9
10
11
12
13

JKGeotechnics

BOREHOLE LOG

Borehole No. 120

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT **Method:** SPIRAL AUGER **R.L. Surface:** 96.30 m

Date: 18/12/24 **Datum:** AHD

Plant Type: JK400 **Logged/Checked By:** C.A.R./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION OF AUGERING				■		96				FILL: Gravelly sand, fine to medium grained, light brown, fine to coarse grained igneous and sandstone gravel.	M			APPEARS POORLY COMPACTED
				■	N = 4 1,2,2					FILL: Silty clay, medium to high plasticity, brown, trace of fine grained igneous gravel, ash and root fibres.	w>PL			
				■			1		CH	Silty CLAY: high plasticity, light grey and orange brown.	w>PL	St	100 100 130	RESIDUAL
						95			-	Extremely Weathered claystone: silty CLAY, medium plasticity, grey, trace of iron indurated bands.	XW	Hd		BRINGELLY SHALE
				■	N > 16 7,16/ 50mm REFUSAL								>600 >600	
				■						CLAYSTONE: grey brown.	DW	L	>600	LOW 'TC' BIT RESISTANCE
							2			SANDSTONE: fine to medium grained, brown grey, with dark grey laminae.		L - M		LOW TO MODERATE RESISTANCE
						94								
							3					L		LOW RESISTANCE
						93								
										REFER TO CORED BOREHOLE LOG				
							4							
						92								
							5							
						91								
							6							
						90								

JKGeotechnics

CORED BOREHOLE LOG

Borehole No. 120

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT | **Core Size:** NMLC | **R.L. Surface:** 96.30 m

Date: 18/12/24 | **Inclination:** VERTICAL | **Datum:** AHD

Plant Type: JK400 | **Bearing:** N/A | **Logged/Checked By:** C.A.R./A.B.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION (Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components)	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$	DEFECT DETAILS: SPACING (mm)	DEFECT DETAILS: DESCRIPTION (Type, orientation, defect shape and roughness, defect coatings and seams, openness and thickness) Specific / General	Formation
		93			START CORING AT 3.37m						
90% RETURN		93	4		CLAYSTONE: grey brown, with iron indurated bands, bedded at 0-5°.	MW	L - M	0.30, 0.40		(3.52m) J, 90°, Ir, Fe Sn; (3.77m) Cr, 0°, 20 mm.t; (3.84m) Jh, 50°, C; (4.07m) XWS, 0°, 25 mm.t; (4.14m) Be, 0°, Ir, R, Clay Ct	
		92			Extremely Weathered claystone: silty CLAY, medium plasticity, grey and grey brown, with occasional low strength claystone and iron indurated bands.	XW	Hd				Bringelly Shale
		91	5								
			6		CLAYSTONE: grey brown, bedded at 0-5°.	MW	L - M	0.30		(5.90m) J, 60°, P, R, Fe Sn; (6.06m) XWS, 0°, 30 mm.t	
		90			NO CORE 0.06m						
					CLAYSTONE: grey brown, bedded at 0-5°.	MW	L - M	0.40	600, 200, 60, 20	(6.29m) J, 45°, P, S, Fe Sn; (6.39m) XWS, 0°, 180 mm.t; (6.60m) CS, 0°, 30 mm.t; (6.68m) J, 90°, C, S, Cn	
			7		SANDSTONE: fine to medium grained, brown grey and grey, with occasional claystone bands and dark grey laminae, bedded at 0-10°.	SW	H	1.4, 2.2		(6.84m) Be, 0°, P, S, Fe Sn; (7.15m) Be, 0°, P, R, Fe Sn	
		89			SANDSTONE: fine to medium grained, grey, with dark grey laminae and occasional dark grey claystone bands, bedded at 0-10°.	FR		2.6, 2.6, 2.5, 2.3, 2.7	600, 200, 60, 20		Bringelly Shale
		88	8								
			9								
		87									

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS

JKGeotechnics

CORED BOREHOLE LOG

Borehole No. 120

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

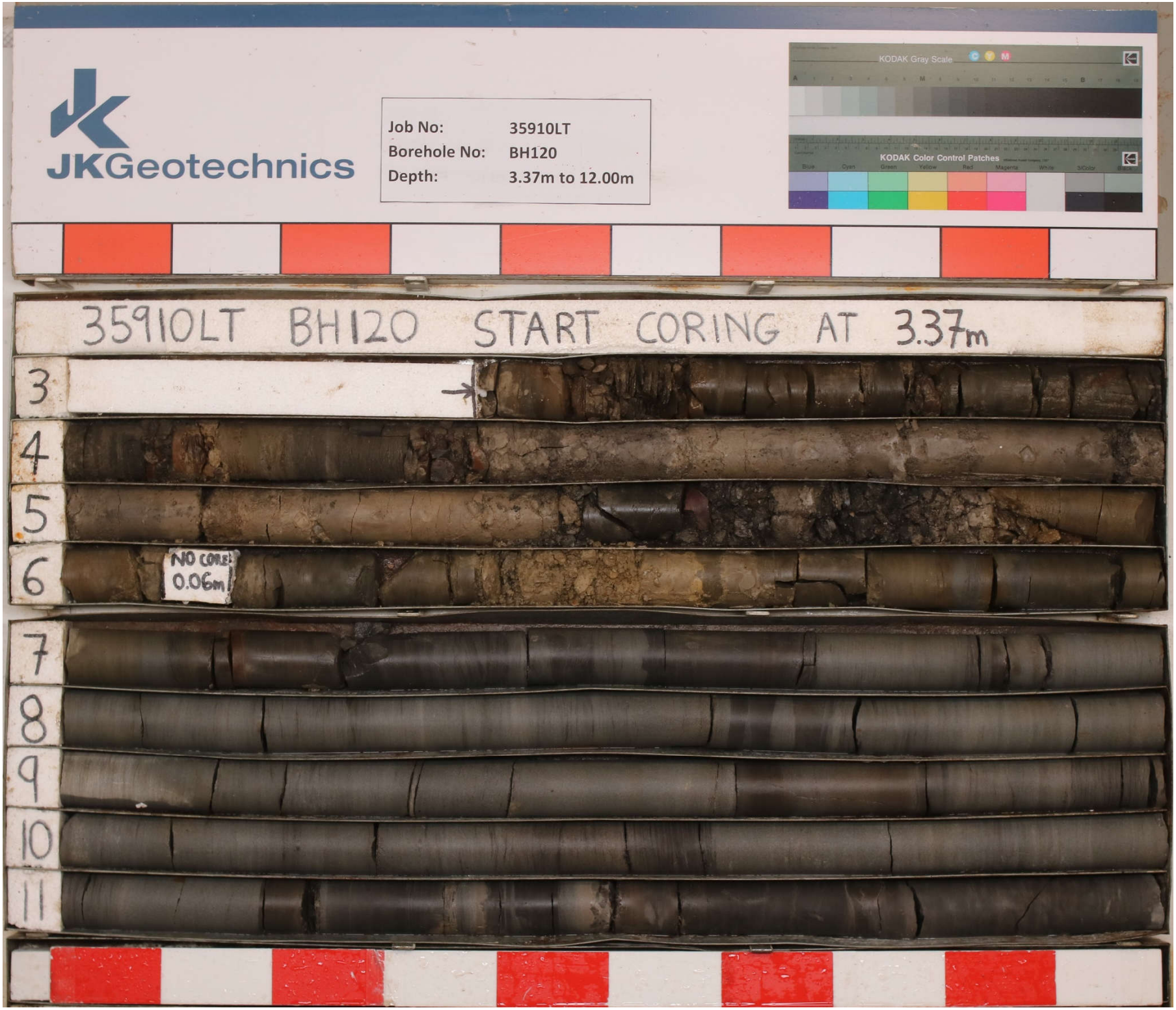
Job No.: 35910LT | **Core Size:** NMLC | **R.L. Surface:** 96.30 m

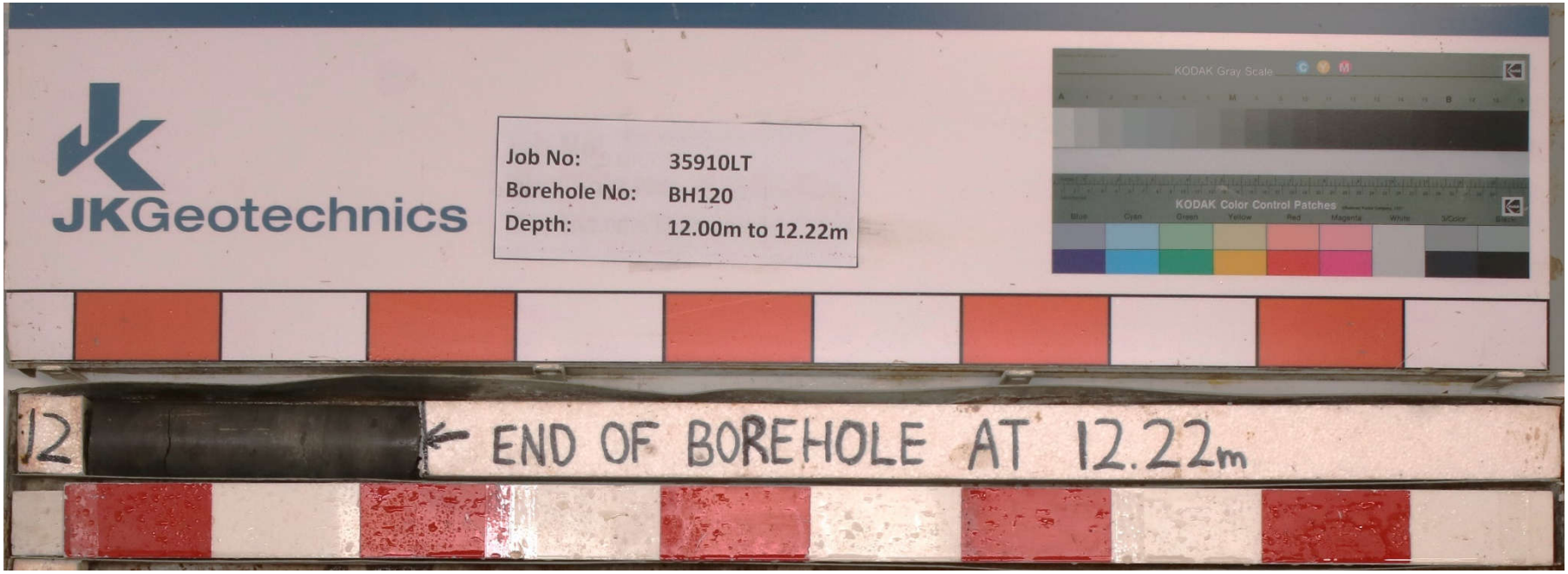
Date: 18/12/24 | **Inclination:** VERTICAL | **Datum:** AHD

Plant Type: JK400 | **Bearing:** N/A | **Logged/Checked By:** C.A.R./A.B.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION (Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components)	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$	DEFECT DETAILS: SPACING (mm)	DEFECT DETAILS: DESCRIPTION (Type, orientation, defect shape and roughness, defect coatings and seams, openness and thickness) Specific / General	Formation
90% RETURN		86	11		SANDSTONE: fine to medium grained, grey, with dark grey laminae and occasional dark grey claystone bands, bedded at 0-10°. *(continued)*	FR	H	1.2, 2.0, 0.60			Bringelly Shale
		85			CLAYSTONE: dark grey and grey, with occasional fine to medium grained sandstone bands, bedded at 0-10°.		M	0.60, 0.20		(11.22m) Be, 0°, P, R, Cb FILLED, 2 mm.t (11.35m) CS, 0°, 1 mm.t	
		84	12		END OF BOREHOLE AT 12.22 m						
		83	13								
		82	14								
		81	15								
		80	16								

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS


JKGeotechnics
Job No: 35910LT
Borehole No: BH120
Depth: 3.37m to 12.00m
KODAK Gray Scale
KODAK Color Control Patches
35910LT BH120 START CORING AT 3.37m
3
4
5
6
NO CORE 0.06m
7
8
9
10
11


JKGeotechnics
Job No: 35910LT
Borehole No: BH120
Depth: 12.00m to 12.22m
KODAK Gray Scale
KODAK Color Control Patches
12
END OF BOREHOLE AT 12.22m

JKGeotechnics

BOREHOLE LOG

Borehole No. 121

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT **Method:** SPIRAL AUGER **R.L. Surface:** 96.66 m

Date: 19/12/24 **Datum:** AHD

Plant Type: JK308 **Logged/Checked By:** J.F./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION OF AUGERING										FILL: Silty clay, medium plasticity, grey brown, trace of fine to medium grained sand, wire, plastic and root fibres.	w<PL			
				■	N = 10 2,4,6	96	1		CH	Silty CLAY: high plasticity, red brown mottled light grey, trace of root fibres.	w>PL	Hd	>600 >600 >600	RESIDUAL
				■	N > 23 5,13,10/ 100mm REFUSAL	95	2		-	Extremely Weathered claystone: silty CLAY, medium plasticity, dark grey, with iron indurated bands.	XW	Hd	>600 >600 >600 >600 >600	BRINGELLY SHALE
				■		94	3			CLAYSTONE: dark grey, with iron indurated and extremely weathered bands.	DW	VL		VERY LOW 'TC' BIT RESISTANCE
				■		93	4							
				■		92				CLAYSTONE: dark grey, with iron indurated bands.		L		LOW RESISTANCE
						91	5			REFER TO CORED BOREHOLE LOG				
						90	6							

JKGeotechnics

CORED BOREHOLE LOG

Borehole No. 121 **2 / 3**

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT **Core Size:** NMLC **R.L. Surface:** 96.66 m

Date: 19/12/24 **Inclination:** VERTICAL **Datum:** AHD

Plant Type: JK308 **Bearing:** N/A **Logged/Checked By:** J.F./A.B.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION: Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$	DEFECT DETAILS: SPACING (mm)	DEFECT DETAILS: DESCRIPTION (Specific / General)	Formation
		92			START CORING AT 4.82m						
			5		CLAYSTONE: dark grey, with grey laminae, bedded at 0-5°.	HW	L - M	0.30		(4.87m) J, 90°, P, S, Fe Ct (5.07m) J, 90°, P, S, Fe Ct (5.19m) XWS, 0°, 10 mm.t	
		91			LAMINITE: Sandstone, fine grained, light grey, and Claystone, dark grey, bedded at 0-5°.	FR	H	0.70 2.6		(5.37m) J, 40°, C, S, Fe Sn (5.40m) Be, 0°, P, S, Fe Sn (5.45m) XWS, 0°, 10 mm.t	
			6		SANDSTONE: fine grained, light grey, with dark grey laminae, bedded at 0-10°.			2.4		(6.14m) Be, 0°, P, S, Clay Vn	
		90						5.1		(6.62m) Be, 10°, P, S, Fe Sn	
			7					1.5		(7.11m) Be, 5°, P, S, Clay Ct	
90% RETURN		89						1.5		(7.82m) CS, 0°, 1 mm.t	Bringelly Shale
			8					1.7			
		88						1.7		(8.79m) CS, 0°, 1 mm.t	
			9		SANDSTONE: fine grained, grey, interbedded with Claystone, dark grey, bedded at 0-10°.			2.2			
		87			CLAYSTONE: dark grey, bedded at 0-5°.		M	0.70		(9.64m) Be, 0°, P, S, Fe Sn (9.82m) CS, 0°, 1 mm.t (9.89m) XWS, 0°, 10 mm.t (9.92m) CS, 0°, 1 mm.t	
			10					0.60		(10.23m) J, 45°, P, S, Fe Sn (10.45m) Be, 0°, P, S, Fe Sn	
		86						0.40		(10.65m) Be, 0°, P, S, Fe Sn (10.79m) CS, 0°, 1 mm.t	

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS

JKGeotechnics

CORED BOREHOLE LOG

Borehole No. 121 **3 / 3**

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT **Core Size:** NMLC **R.L. Surface:** 96.66 m

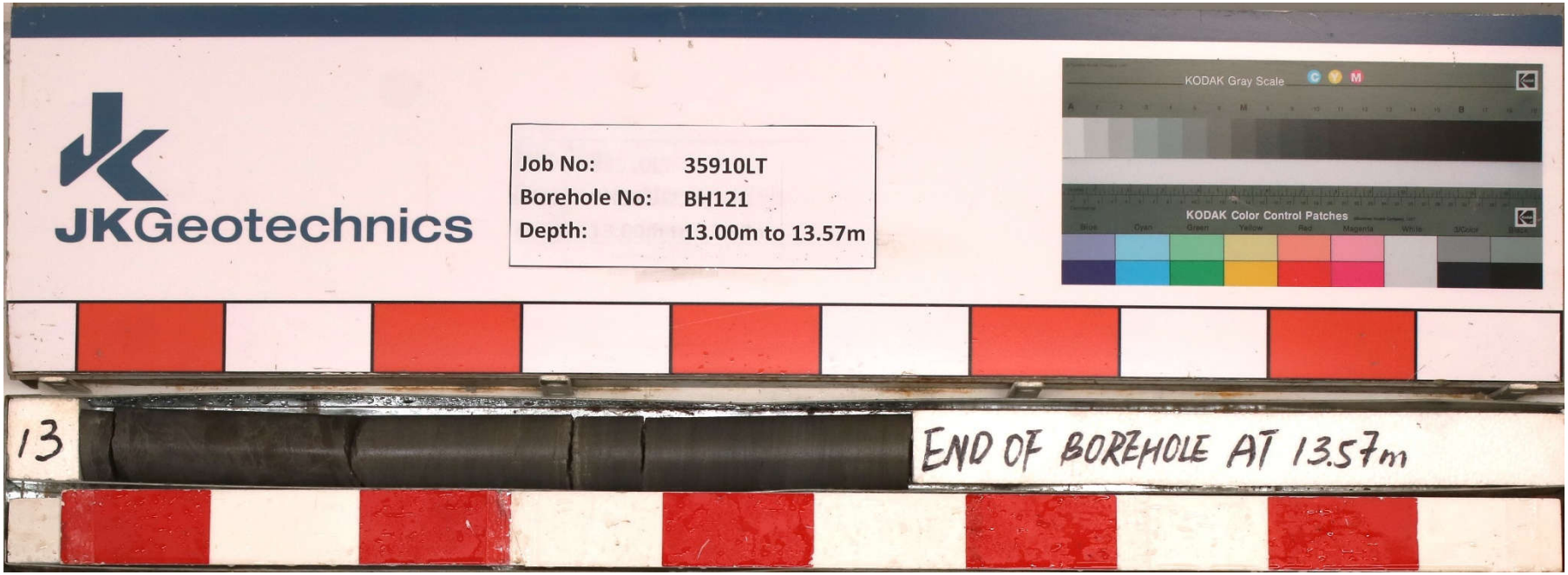
Date: 19/12/24 **Inclination:** VERTICAL **Datum:** AHD

Plant Type: JK308 **Bearing:** N/A **Logged/Checked By:** J.F./A.B.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION: Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$	DEFECT DETAILS: SPACING (mm)	DEFECT DETAILS: DESCRIPTION (Specific / General)	Formation
90% RETURN		85	12		CLAYSTONE: dark grey, bedded at 0-5°. *(continued)*	FR	M	1.1			Bringelly Shale
					CLAYSTONE: dark grey, interbedded with Sandstone, fine grained, light grey, bedded at 0-15°.		H	1.6		(11.55m) Be, 0°, P, S, Clay Ct	
		84	13		SANDSTONE: fine grained, light grey, with occasional claystone bands, bedded at 0-15°.			2.0 2.7 3.6 3.2		(12.90m) Be, 0°, P, S, Clay Vn	
		83	14		END OF BOREHOLE AT 13.57 m						
		82	15								
		81	16								
		80	17								
		79									

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS


JKGeotechnics
Job No: 35910LT
Borehole No: BH121
Depth: 4.82m to 13.00m
KODAK Gray Scale
KODAK Color Control Patches
35910LT BH121 START CORING AT 4.82 m
4
5
6
7
8
9
10
11
12


JKGeotechnics
Job No: 35910LT
Borehole No: BH121
Depth: 13.00m to 13.57m
KODAK Gray Scale
KODAK Color Control Patches
13
END OF BOREHOLE AT 13.57m

JKGeotechnics

BOREHOLE LOG

Borehole No. 122

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT **Method:** SPIRAL AUGER **R.L. Surface:** 95.17 m

Date: 20/12/24 **Datum:** AHD

Plant Type: JK400 **Logged/Checked By:** C.A.R./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION OF AUGERING						95				FILL: Silty clay, medium to high plasticity, dark brown, trace of fine grained igneous gravel, and root fibres.	w~PL			
									CH	Silty CLAY: high plasticity, red brown and grey, trace of fine to medium grained ironstone gravel, and root fibres.	w>PL	St - VSt		RESIDUAL
				■	N = 5 2,3,2								150 190 210	
						94	1					VSt		
				■	N > 19 4,14,5/ 50mm REFUSAL								350 350 380	
				■					-	Extremely Weathered claystone: silty CLAY, medium plasticity, grey and red brown, trace of iron indurated bands.	XW	Hd	>600 >600 >600	BRINGELLY SHALE VERY LOW 'TC' BIT RESISTANCE
						93	2			as above, but with low strength claystone bands.				
				■		92	3							
							4			SANDSTONE: fine to medium grained, brown grey, with claystone, dark grey bands.	SW	M		MODERATE RESISTANCE
						91				REFER TO CORED BOREHOLE LOG				
							5							
						90								
							6							
						89								

JKGeotechnics

CORED BOREHOLE LOG

Borehole No. 122 **2 / 3**

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT **Core Size:** NMLC **R.L. Surface:** 95.17 m

Date: 20/12/24 **Inclination:** VERTICAL **Datum:** AHD

Plant Type: JK400 **Bearing:** N/A **Logged/Checked By:** C.A.R./A.B.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION (Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components)	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$	SPACING (mm)	DEFECT DETAILS: DESCRIPTION (Type, orientation, defect shape and roughness, defect coatings and seams, openness and thickness) Specific / General	Formation
					START CORING AT 4.08m						
90% RETURN		91			SANDSTONE: fine to medium grained, grey and brown grey, with occasional iron indurated bands and dark grey laminae, bedded at 0-10°.	SW	H	1.4, 2.1, 2.0			
		90	5							(5.65m) J, 60°, P, S, Fe Ct	
								1.2, 2.0			
		89	6							(6.06m) Be, 0°, P, R, Fe Sn	
								1.3			
		88	7				M	0.80		(7.09m) Be, 0°, P, S, Fe Sn	
										(7.34m) Be, 0°, P, R, Cb Ct	
								0.70			
		87	8		CLAYSTONE: dark grey and grey brown, with sandstone laminae and occasional iron indurated bands, bedded at 0-10°.					(7.98m) XWS, 0°, 15 mm.t (8.07m) XWS, 0°, 15 mm.t	
								0.40		(8.32m) Be, 0°, P, R, Clay Ct	
								0.50			
		86	9							(8.90m) J, 90°, P, S, Cn	
								0.40		(9.15m) J, 45°, P, S, Fe Sn (9.20m) Be, 0°, P, S, Clay FILLED, 3 mm.t	
							H	1.3, 4.3			
		85	10		SANDSTONE: fine to medium grained, grey and dark grey, with dark grey laminae and claystone clasts, bedded at 0-10°.	FR		1.6			Bringelly Shale
100% RETURN							M	0.80			

JK 9.02.4 LIB:GLB Log JK CORED BOREHOLE - MASTER 35910LT LEPPINGTON.GPJ <<DrawingFile>> 09/01/2025 10:34 10.01.00.01 Datgel Lab and In Situ Tool - DGD | Lib: JK 9.02.4 2019-05-31 Prj: JK 9.01.0 2018-03-20

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS

JKGeotechnics

CORED BOREHOLE LOG

Borehole No. 122

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

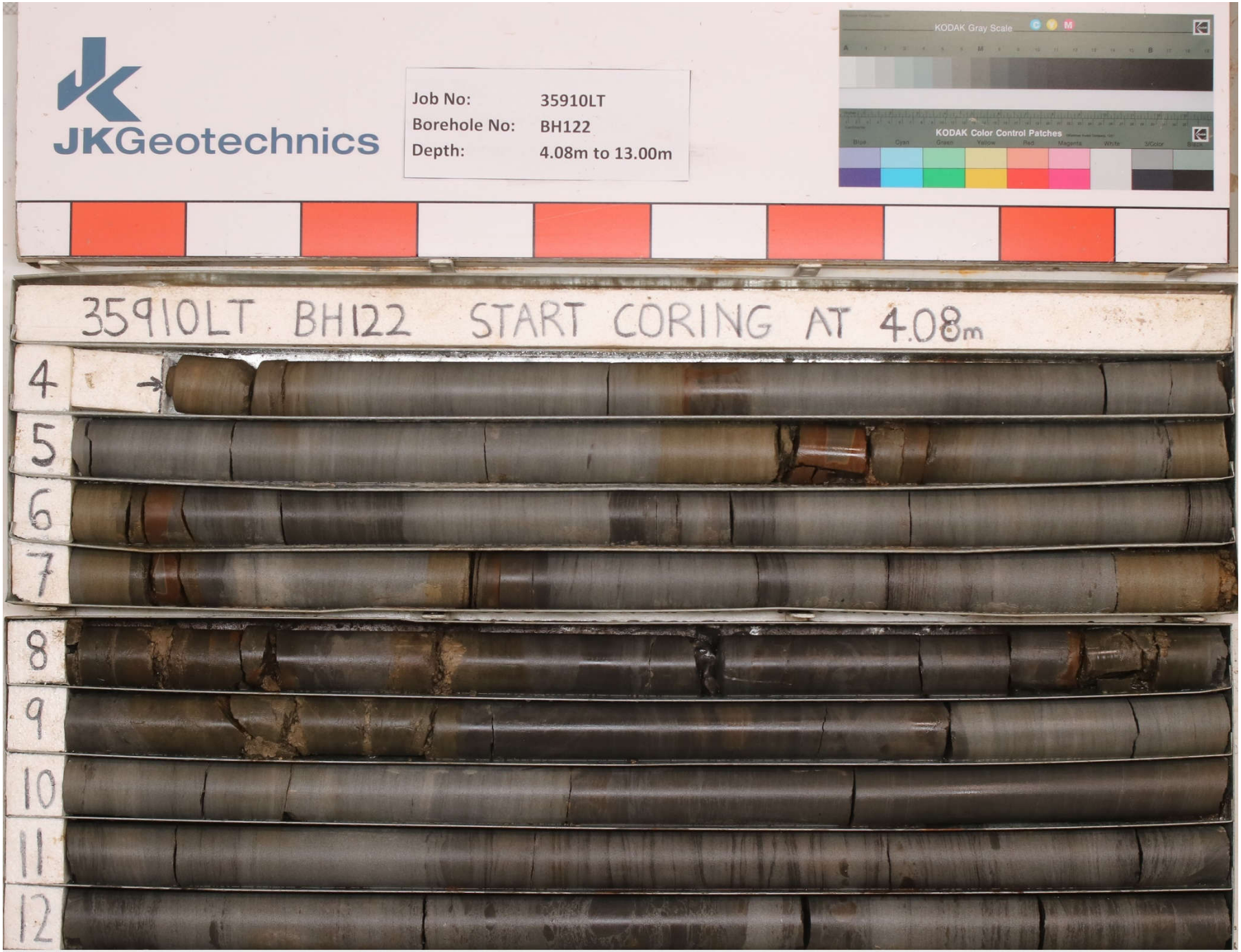
Job No.: 35910LT | **Core Size:** NMLC | **R.L. Surface:** 95.17 m

Date: 20/12/24 | **Inclination:** VERTICAL | **Datum:** AHD

Plant Type: JK400 | **Bearing:** N/A | **Logged/Checked By:** C.A.R./A.B.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION (Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components)	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$ (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	DEFECT DETAILS: SPACING (mm) (600, 200, 60, 20)	DEFECT DETAILS: DESCRIPTION (Specific / General)	Formation
100% RETURN		84	12		SANDSTONE: fine to medium grained, grey and dark grey, with dark grey laminae and claystone clasts, bedded at 0-10°. *(continued)*	FR	M / H	0.80, 1.2, 1.5, 1.6			Bringelly Shale
		83	13		END OF BOREHOLE AT 13.00 m						
		82	14								
		81	15								
		80	16								
		79	17								
		78									

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS



END OF BOREHOLE AT 13.00m

JKGeotechnics

BOREHOLE LOG

Borehole No. 123 1 / 3

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT **Method:** SPIRAL AUGER **R.L. Surface:** 94.49 m

Date: 19/12/24 TO 20/12/24 **Datum:** AHD

Plant Type: JK400 **Logged/Checked By:** C.A.R./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION OF AUGERING				■		94.49	0			FILL: Silty clay, medium to high plasticity, dark brown, trace of fine grained igneous gravel, and root fibres.	w>PL			
									CH	Silty CLAY: high plasticity, light grey and red brown, trace of root fibres.	w>PL	St - VSt		RESIDUAL
				■	N = 5 1,2,3	94	1						160 180 210	
									-	Extremely Weathered claystone: silty CLAY, medium plasticity, grey, red brown and grey brown, trace of iron indurated bands.	XW	Hd		BRINGELLY SHALE
				■	N = 21 8,9,12	93	2						>600 >600 >600	
						92				CLAYSTONE: grey brown, with sandstone and iron indurated bands.	DW	L		LOW 'TC' BIT RESISTANCE
				■		91	3			SANDSTONE: fine to medium grained, brown grey and grey.	MW	M		MODERATE RESISTANCE
										REFER TO CORED BOREHOLE LOG				
						90	4							
						89	5							
						88	6							

JKGeotechnics

CORED BOREHOLE LOG

Borehole No. 123

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT | **Core Size:** NMLC | **R.L. Surface:** 94.49 m

Date: 19/12/24 TO 20/12/24 | **Inclination:** VERTICAL | **Datum:** AHD

Plant Type: JK400 | **Bearing:** N/A | **Logged/Checked By:** C.A.R./A.B.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION (Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components)	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$	DEFECT DETAILS: SPACING (mm)	DEFECT DETAILS: DESCRIPTION (Type, orientation, defect shape and roughness, defect coatings and seams, openness and thickness)	Formation
		91			START CORING AT 3.57m						
90% RETURN		90	4		SANDSTONE: fine to medium grained, brown grey and grey, with occasional dark grey claystone and red brown and orange iron indurated bands, bedded at 0-10°.	MW	M	0.90		(3.61m) CS, 0°, 20 mm.t (3.65m) XWS, 0°, 50 mm.t (3.71m) J, 90°, P, R, Clay Ct (3.72m) XWS, 0°, 40 mm.t (3.92m) Be, 0°, P, R, Fe Sn	Bringelly Shale
							H	1.8			
		89	5				M - H	1.7		(4.30m) Be, 0°, P, S, Fe Sn	
								1.3		(4.79m) Be, 5°, P, R, Clay Ct	
		88	6					0.60		(5.23m) Be, 0°, P, R, Clay Ct (5.39m) Be, 0°, P, R, Clay Ct	
								1.1		(5.91m) XWS, 5°, 20 mm.t	
			7		CLAYSTONE: dark grey and grey brown, with occasional iron indurated bands, bedded at 0-5°.	SW		0.50		(6.18m) J, 90°, Ir, R, Clay FILLED, 6 mm.t	
		87						1.0		(6.81m) Be, 10°, P, R, Cn (6.94m) Ji, 90°, Ir	
			8				L - M	0.20		(7.55m) XWS, 0°, 10 mm.t	
		86			SANDSTONE: fine to medium grained, grey, interbedded with Claystone, dark grey bands, bedded at 0-10°.	FR	H	0.50		(8.13m) Be, 5°, P, R, Fe Ct	
			9					1.4		(8.34m) J, 70°, C, S, Cn (8.47m) Be, 0°, P, R, Fe Sn	
								1.6			
		85			SANDSTONE: fine to medium grained, grey, with occasional dark grey laminae.			2.5			

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS

JKGeotechnics

CORED BOREHOLE LOG

Borehole No. 123 **3 / 3**

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT **Core Size:** NMLC **R.L. Surface:** 94.49 m

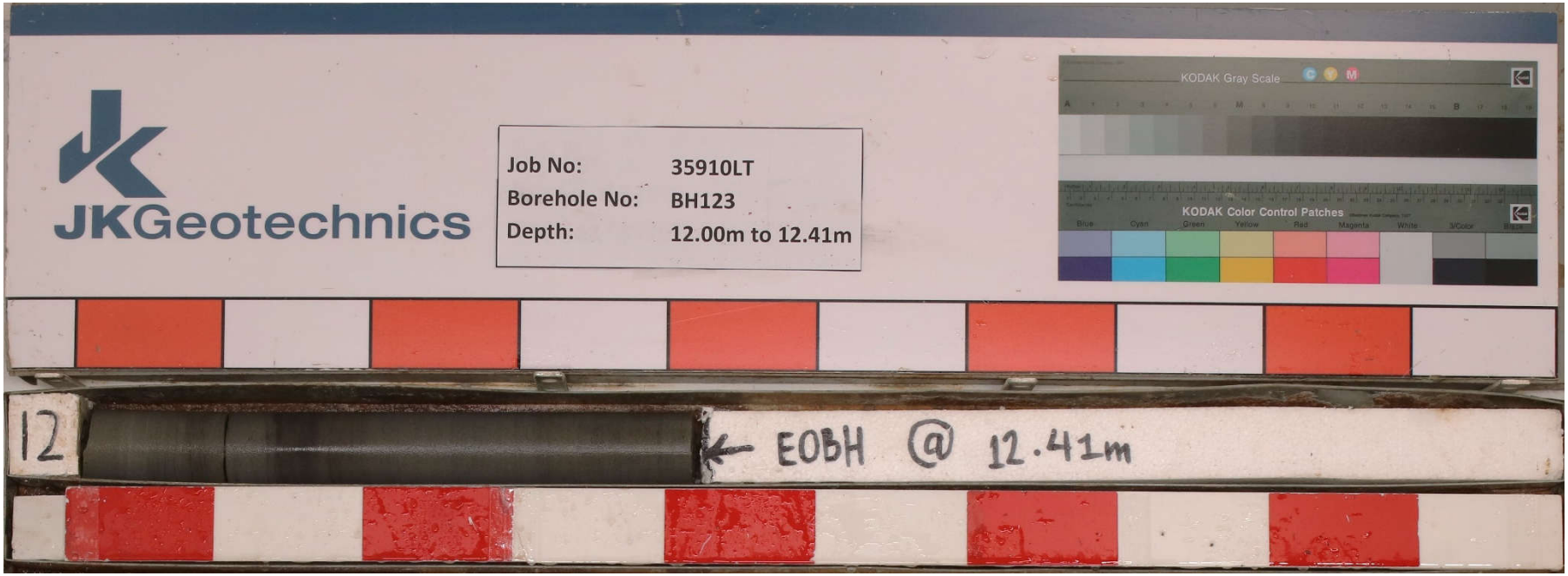
Date: 19/12/24 TO 20/12/24 **Inclination:** VERTICAL **Datum:** AHD

Plant Type: JK400 **Bearing:** N/A **Logged/Checked By:** C.A.R./A.B.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION: Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$ (VL 0.1, L 0.3, M 1, H 3, VH 10, EH)	DEFECT DETAILS: SPACING (mm) (600, 200, 60, 20)	DEFECT DETAILS: DESCRIPTION (Specific / General)	Formation
90% RETURN		84	11		SANDSTONE: fine to medium grained, grey, with occasional dark grey laminae. *(continued)*	FR	H	1.5, 2.8, 2.6, 1.2, 1.1		(10.98m) J, 70°, P, R, Fe Sn	Bringelly Shale
		83	12								
		82	13		END OF BOREHOLE AT 12.41 m						
		81	14								
		80	15								
		79	16								
		78									

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS


JKGeotechnics
Job No: 35910LT
Borehole No: BH123
Depth: 3.57m to 12.00m
KODAK Gray Scale
KODAK Color Control Patches
35910LT BH123 START CORING AT 3.57m
3
4
5
6
7
8
9
10
11


JKGeotechnics
Job No: 35910LT
Borehole No: BH123
Depth: 12.00m to 12.41m
KODAK Gray Scale
KODAK Color Control Patches
12
EOBH @ 12.41m

JKGeotechnics

BOREHOLE LOG

Borehole No. 124 1 / 3

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT **Method:** SPIRAL AUGER **R.L. Surface:** 93.61 m

Date: 19/12/24 **Datum:** AHD

Plant Type: JK400 **Logged/Checked By:** C.A.R./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION OF AUGERING										TOPSOIL: Silty clay, medium plasticity, brown, trace of root fibres.	w~PL			
									CH	Silty CLAY: high plasticity, red brown, orange brown and light grey, trace of fine grained ironstone gravel, and root fibres.	w~PL	VSt - Hd		RESIDUAL
				■	N = 6 3,3,3	93	1						360 420 480	
				■	N=SPT 8/ 100mm REFUSAL	92	2		-	CLAYSTONE: grey brown, with extremely weathered and iron indurated bands.	DW	VL - L		BRINGELLY SHALE VERY LOW TO LOW 'TC' BIT RESISTANCE
				■						SANDSTONE: fine to medium grained, brown grey.	MW	M		MODERATE RESISTANCE
						91	3			REFER TO CORED BOREHOLE LOG				
						90	4							
						89	5							
						88	6							
						87								

JKGeotechnics

CORED BOREHOLE LOG

Borehole No. 124 **2 / 3**

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT **Core Size:** NMLC **R.L. Surface:** 93.61 m

Date: 19/12/24 **Inclination:** VERTICAL **Datum:** AHD

Plant Type: JK400 **Bearing:** N/A **Logged/Checked By:** C.A.R./A.B.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION: Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$ (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	DEFECT DETAILS: SPACING (mm) (600, 200, 60, 20)	DEFECT DETAILS: DESCRIPTION (Type, orientation, defect shape and roughness, defect coatings and seams, openness and thickness) Specific / General	Formation
					START CORING AT 2.57m						
90% RETURN		91	3		SANDSTONE: fine to medium grained, brown grey and grey, with dark grey laminae and occasional claystone lenses, bedded at 0-10°.	MW	H	1.1, 1.3, 1.4		(2.77m) Be, 0°, Ir, R, Fe Sn (2.90m) CS, 0°, 2 mm.t	
		90	4		as above, but light brown.		VL	0.030, 0.060		(3.78m) Ji, 90°, Cn (3.93m) Be, 0°, P, S, Fe Sn (4.06m) Be, 0°, P, S, Fe Sn (4.21m) Be, 0°, P, R, Clay Ct (4.34m) Jh, 90°, C, Clay FILLED, 2 mm.t (4.40m) XWS, 10°, 45 mm.t (4.57m) CS, 0°, 15 mm.t (4.85m) XWS, 0°, 200 mm.t	
		89	5				M	0.60		(5.15m) J, 70°, P, R, Cn	
		88	6		CLAYSTONE: grey brown and dark grey, with occasional fine to medium grained sandstone and iron indurated bands, bedded at 0-10°.	SW		0.50	60	(5.48m) Be, 0°, P, R, Fe Sn (5.60m) J, 90°, Ir, R, Cn (5.75m) CS, 0°, 10 mm.t (5.90m) CS, 0°, 10 mm.t (6.00m) Cr, 0°, 30 mm.t (6.17m) J, 90°, St, S, Cn (6.36m) J, 90°, P, S, Clay Ct	Bringelly Shale
		87	7					0.60, 0.50, 0.40			
		86			SANDSTONE: fine to medium grained, grey and brown grey, with claystone and iron indurated bands and dark grey laminae, bedded at 0-10°.			0.50		(7.24m) Be, 0°, P, R, Fe Sn (7.40m) XWS, 0°, 10 mm.t (7.75m) Be, 0°, P, S, Fe Sn	
		85	8		SANDSTONE: fine to medium grained, grey, with dark grey laminae and occasional claystone clasts.	FR	H	1.2, 1.6, 1.6			

JK 9.02.4 LIB:GLB Log JK CORED BOREHOLE - MASTER 35910LT LEPPINGTON.GPJ <<DrawingFile>> 09/01/2025 10:35 10.01.00.01 Datgel Lab and In Situ Tool - DGD | Lib: JK 9.02.4 2019-05-31 Prj: JK 9.01.0 2018-03-20

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS

JKGeotechnics

CORED BOREHOLE LOG

Borehole No. 124

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

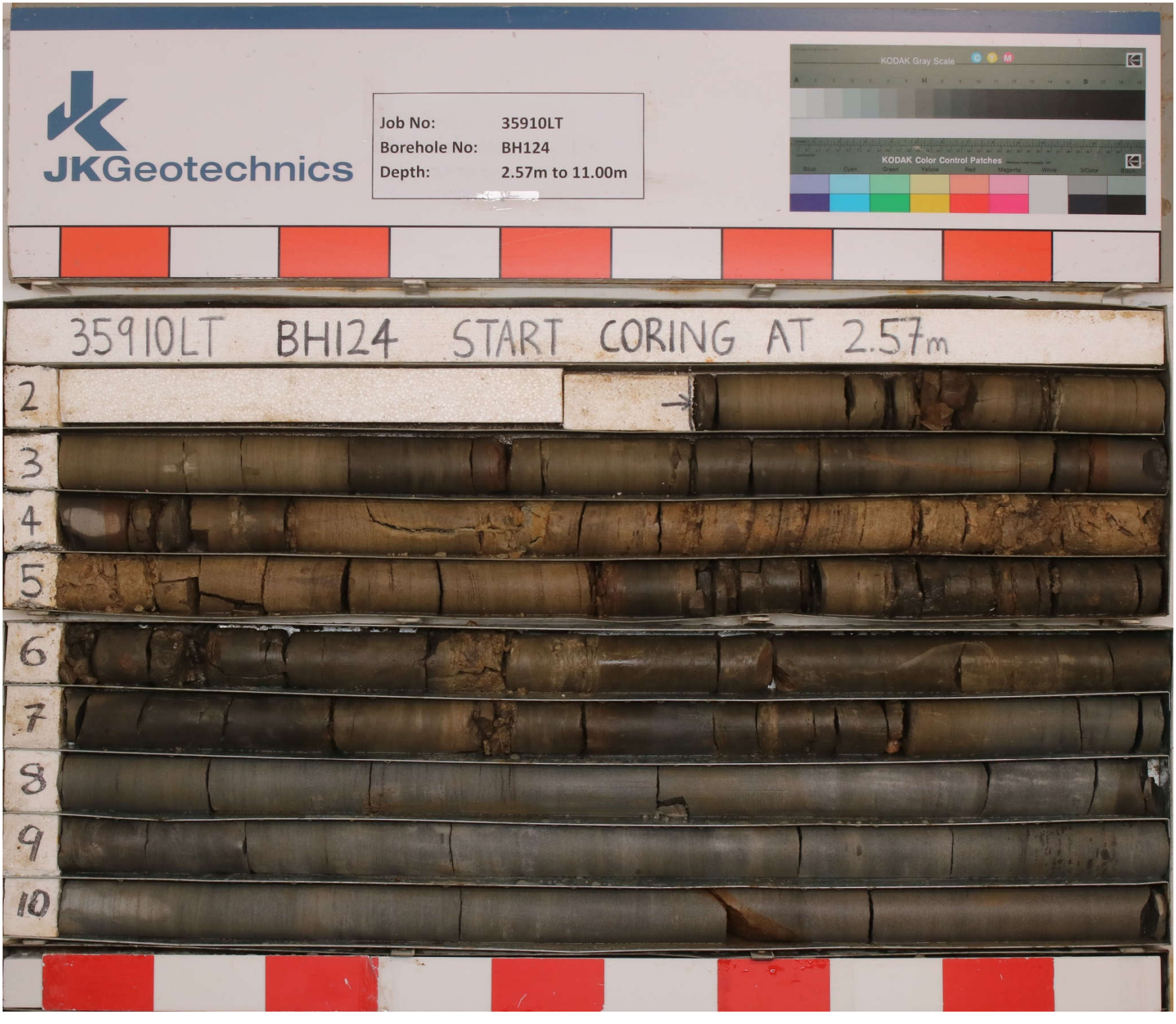
Job No.: 35910LT | **Core Size:** NMLC | **R.L. Surface:** 93.61 m

Date: 19/12/24 | **Inclination:** VERTICAL | **Datum:** AHD

Plant Type: JK400 | **Bearing:** N/A | **Logged/Checked By:** C.A.R./A.B.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION: Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$ (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	DEFECT DETAILS: SPACING (mm) (600, 200, 60, 20)	DEFECT DETAILS: DESCRIPTION (Specific / General)	Formation
90% RETURN		84	10		SANDSTONE: fine to medium grained, grey, with dark grey laminae and occasional claystone clasts. *(continued)*	FR	H	1.4; 1.6; 2.8			Bringelly Shale
		83	11					5.3; 4.6; 1.6		(10.62m) J x 2, 45°, P, R, Fe Sn; (11.30m) Jh, 50°, C	
		82	12		END OF BOREHOLE AT 11.57 m						
		81	13								
		80	14								
		79	15								
		78									

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS


JKGeotechnics
Job No: 35910LT
Borehole No: BH124
Depth: 2.57m to 11.00m
KODAK Gray Scale
KODAK Color Control Patches
35910LT BH124 START CORING AT 2.57m
2
3
4
5
6
7
8
9
10


JKGeotechnics
Job No: 35910LT
Borehole No: BH124
Depth: 11.00m to 11.57m
KODAK Gray Scale
KODAK Color Control Patches
11
END OF BOREHOLE AT 11.57m

JKGeotechnics

BOREHOLE LOG

Borehole No. 125

1 / 3

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT **Method:** SPIRAL AUGER **R.L. Surface:** 94.62 m

Date: 19/12/24 **Datum:** AHD

Plant Type: JK309 **Logged/Checked By:** A.M./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION OF AUGERING				■						TOPSOIL: Silty clay, medium plasticity, brown, trace of root fibres.	w<PL			
				■	N = 4 2,2,2	94	1		CH	Silty CLAY: high plasticity, grey and red brown.	w>PL	VSt	250 200 210	RESIDUAL
				■	N = 16 4,6,10	93	2		-	Extremely Weathered claystone: silty CLAY, medium plasticity, grey and orange brown, with iron indurated bands.	XW	Hd	>600 >600 >600	BRINGELLY SHALE
				■						CLAYSTONE: brown and dark grey.	DW	VL - L		VERY LOW TO LOW 'TC' BIT RESISTANCE
						92				as above, but with fine grained, brown grey sandstone bands.		L - M		LOW TO MODERATE RESISTANCE
							3			REFER TO CORED BOREHOLE LOG				
						91	4							
						90	5							
						89	6							
						88								

JKGeotechnics

CORED BOREHOLE LOG

Borehole No. 125 **2 / 3**

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT **Core Size:** NMLC **R.L. Surface:** 94.62 m

Date: 19/12/24 **Inclination:** VERTICAL **Datum:** AHD

Plant Type: JK309 **Bearing:** N/A **Logged/Checked By:** A.M./A.B.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION: Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$	DEFECT DETAILS: SPACING (mm)	DEFECT DETAILS: DESCRIPTION (Specific / General)	Formation
		92			START CORING AT 2.70m						
90% RETURN		91	3		SANDSTONE: fine to medium grained, light grey, with occasional claystone laminae and red brown iron indurated bands, bedded at 0-10°.	SW	H	1.6, 3.2, 1.2, 1.7, 2.2, 1.8, 2.2, 1.1, 1.6, 1.0, 1.1		(3.08m) CS, 0°, 1 mm.t (3.12m) CS, 0°, 1 mm.t (3.17m) Be, 0°, P, R, Fe Sn (3.80m) Be, 0°, P, R, Clay Ct (4.07m) CS, 0°, 1 mm.t (4.24m) CS, 0°, 20 mm.t (4.35m) Be, 0°, P, R, Fe Sn (4.71m) CS, 0°, 10 mm.t (4.87m) Be, 10°, P, R, Fe Sn (5.15m) Be, 0°, P, R, Fe Sn (5.32m) Be, 5°, P, R, Fe Sn (5.77m) Be, 0°, P, R, Fe Sn (5.80m) XWS, 0°, 50 mm.t (5.92m) XWS, 0°, 50 mm.t (6.11m) Be, 5°, P, R, Fe Sn (6.25m) XWS, 0°, 5 mm.t (6.78m) XWS, 0°, 50 mm.t (7.16m) XWS, 0°, 40 mm.t (7.56m) XWS, 0°, 40 mm.t (8.05m) CS, 0°, 40 mm.t (8.20m) Jh, 40°, P, Cn (8.65m) XWS, 0°, 20 mm.t (8.93m) Be, 0°, P, R, Fe Sn	Bringelly Shale
		89	6								
		88	7		CLAYSTONE: dark grey, with fine to medium grained, grey sandstone laminae, and occasional iron indurated bands, bedded at 0-10°.		VL - L	0.080, 0.20			
		87	8				M	0.80			
		86			SANDSTONE: as below		H	0.80			

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS

JKGeotechnics

CORED BOREHOLE LOG

Borehole No. 125 3 / 3

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT **Core Size:** NMLC **R.L. Surface:** 94.62 m

Date: 19/12/24 **Inclination:** VERTICAL **Datum:** AHD

Plant Type: JK309 **Bearing:** N/A **Logged/Checked By:** A.M./A.B.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION: Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$	DEFECT DETAILS: SPACING (mm)	DEFECT DETAILS: DESCRIPTION (Specific / General)	Formation
90% RETURN		85	10		SANDSTONE: fine to medium grained, light grey, with occasional dark grey claystone laminae bands, bedded at 0-10°.	SW / FR	H	1.1, 1.6, 1.8		(9.02m) Be, 0°, P, R, Fe Sn; (9.44m) Be, 0°, P, R, Fe Sn	Bringelly Shale
		84	11		as above, but without claystone inclusions.			1.4, 1.9, 3.5		(10.51m) Be, 10°, P, R, Fe Sn	
		83									
		82	12		END OF BOREHOLE AT 11.83 m						
		81	13								
		80	14								
		79	15								

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS


JKGeotechnics
Job No: 35910LT
Borehole No: BH125
Depth: 2.70m – 11.00m
KODAK Gray Scale
KODAK Color Control Patches
35910LT BH125 START CORING AT 2.70m
2
3
4
5
6
7
8
9
10


JKGeotechnics
Job No: 35910LT
Borehole No: BH125
Depth: 11.00m – 11.83m
KODAK Gray Scale
KODAK Color Control Patches
11
E.O.B.H AT 11.83 m

JKGeotechnics

BOREHOLE LOG

Borehole No. 126

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT **Method:** SPIRAL AUGER **R.L. Surface:** 95.06 m

Date: 19/12/24 **Datum:** AHD

Plant Type: JK400 **Logged/Checked By:** C.A.R./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION OF AUGERING						95				FILL: Sandy gravel, fine to coarse grained, sub-angular igneous and sandstone, brown, fine to medium grained sand.	D			
									CH	Silty CLAY: high plasticity, grey and red brown, trace of root fibres.	w<PL	Hd	>600 >600 >600	RESIDUAL
					N = 15 2,7,8	94	1							
									-	Extremely Weathered claystone: silty CLAY, medium plasticity, grey and grey brown, trace of iron indurated bands.	XW	Hd	>600 >600 >600	BRINGELLY SHALE
					N = 30 3,13,17	93	2			CLAYSTONE: grey brown, with extremely weathered bands.	DW	VL - L		VERY LOW TO LOW 'TC' BIT RESISTANCE
										as above, but without extremely weathered bands.		L - M		LOW TO MODERATE RESISTANCE
						92	3			REFER TO CORED BOREHOLE LOG				
						91	4							
						90	5							
						89	6							

JKGeotechnics

CORED BOREHOLE LOG

Borehole No. 126 **2 / 3**

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT **Core Size:** NMLC **R.L. Surface:** 95.06 m

Date: 19/12/24 **Inclination:** VERTICAL **Datum:** AHD

Plant Type: JK400 **Bearing:** N/A **Logged/Checked By:** C.A.R./A.B.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components START CORING AT 3.07m	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$	DEFECT DETAILS SPACING (mm) DESCRIPTION Type, orientation, defect shape and roughness, defect coatings and seams, openness and thickness Specific / General	Formation
90% RETURN		92	3		SANDSTONE: fine to medium grained, grey and brown grey, with dark grey laminae, iron indurated bands and occasional claystone bands, bedded at 0-10°.	SW	H	1.0, 4.4, 2.5, 1.3, 2.0	(3.09m) Be, 0°, P, R, Clay Ct (5.20m) Be, 5°, P, R, Fe Sn (5.39m) CS, 0°, 1 mm.t	Bringelly Shale
		91	4							
		90	5				M - H	0.80, 1.1, 1.0, 0.90	(5.84m) Be, 0°, P, R, Fe Ct (6.60m) Be, 0°, P, R, Fe Sn (7.20m) Be, 0°, P, S, XW FILLED, 5 mm.t	
		89	6							
		88	7		CLAYSTONE: grey brown and dark grey, bedded at 0-5°.	MW			(7.39m) XWS, 0°, 75 mm.t	
		87	8		CLAYSTONE: dark grey, with occasional fine to medium grained sandstone bands, bedded at 0-10°.	FR	M	1.0, 0.40, 0.90	(7.96m) XWS, 0°, 40 mm.t	
		86	9					0.50	(8.87m) J, 80°, P, R, Cn	
					SANDSTONE: as below		H	0.60		

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS

JKGeotechnics

CORED BOREHOLE LOG

Borehole No. 126

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT | **Core Size:** NMLC | **R.L. Surface:** 95.06 m

Date: 19/12/24 | **Inclination:** VERTICAL | **Datum:** AHD

Plant Type: JK400 | **Bearing:** N/A | **Logged/Checked By:** C.A.R./A.B.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION: Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$	DEFECT DETAILS: SPACING (mm)	DEFECT DETAILS: DESCRIPTION (Specific / General)	Formation
90% RETURN		85	11		SANDSTONE: fine to medium grained, grey, with dark grey laminae and occasional claystone bands and clasts, bedded at 0-10°.	FR	H	2.0, 1.7, 2.5, 1.1	600, 200, 60, 20	(10.02m) Be, 0°, P, R, Fe Sn; (11.88m) J, 80°, St, R, Cn	Bringelly Shale
		84									
		83	12		END OF BOREHOLE AT 12.00 m						
		82	13								
		81	14								
		80	15								
		79	16								

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS

JKGeotechnics

Job No: 35910LT
Borehole No: BH126
Depth: 3.07m to 12.00m

JKGeotechnics

BOREHOLE LOG

Borehole No. 127

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT **Method:** SPIRAL AUGER **R.L. Surface:** 95.85 m

Date: 17/12/24 **Datum:** AHD

Plant Type: JK400 **Logged/Checked By:** C.A.R./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION OF AUGERING										FILL: Sandy gravel, fine to coarse grained, sub-angular igneous and sandstone, brown, fine to medium grained sand, trace of clay nodules.	D			
									CH	Silty CLAY: high plasticity, light grey and orange brown, trace of fine grained ironstone gravel, roots and root fibres.	w>PL	St - VSt	190 190 220	RESIDUAL
				■	N = 4 1,2,2	95	1							
				■	N > 13 5,13/ 150mm REFUSAL				-	Extremely Weathered claystone: silty CLAY, medium plasticity, grey and grey brown, trace of iron indurated and very low strength claystone bands.	XW	Hd	480 520 550	BRINGELLY SHALE
				■		94	2			CLAYSTONE: grey brown.	DW	L		LOW 'TC' BIT RESISTANCE
				■		93	3					L - M		LOW TO MODERATE RESISTANCE
										REFER TO CORED BOREHOLE LOG				
						92	4							
						91	5							
						90	6							
						89								

JKGeotechnics

CORED BOREHOLE LOG

Borehole No. 127 **2 / 3**

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT **Core Size:** NMLC **R.L. Surface:** 95.85 m

Date: 17/12/24 **Inclination:** VERTICAL **Datum:** AHD

Plant Type: JK400 **Bearing:** N/A **Logged/Checked By:** C.A.R./A.B.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION (Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components)	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$	DEFECT DETAILS: SPACING (mm)	DEFECT DETAILS: DESCRIPTION (Type, orientation, defect shape and roughness, defect coatings and seams, openness and thickness)	Formation
					START CORING AT 3.18m						
90% RETURN		92	4		CLAYSTONE: brown.	MW	M	0.60		(3.28m) J, 80°, C, S, Fe Ct (3.31m) XWS, 0°, 150 mm.t	Bringelly Shale
					CLAYSTONE: grey brown and grey, with fine to medium grained sandstone and iron indurated bands, bedded at 0-10°.	SW		0.50 0.50		(3.56m) CS, 0°, 1 mm.t (3.67m) XWS, 0°, 15 mm.t (3.90m) J, 90°, P, R, Fe Ct (4.03m) Be, 5°, P, S, Fe Sn (4.34m) J, 90°, P, S, Fe Sn	
		91	5		SANDSTONE: fine to medium grained, grey and light grey, with dark grey laminae and occasional claystone and iron indurated bands, bedded at 0-10°.		H	1.1 1.0		(4.78m) Be, 5°, P, R, Fe Sn (5.41m) Be, 0°, P, S, Fe Sn	
		90	6					1.3 2.1		(6.06m) J, 90°, P, R, Fe Sn	
		89	7					1.0 2.0		(7.17m) J, 60°, St, R, Fe Sn (7.43m) Be, 5°, P, R, Clay Ct	
		88	8		CLAYSTONE: dark grey and grey, with occasional fine to medium grained sandstone bands, bedded at 0-10°.		M	0.70		(7.84m) Be, 5°, P, R, Fe Sn (7.96m) J, 90°, P, R, Fe Ct (8.01m) XWS, 0°, 70 mm.t (8.25m) J, 90°, P, R, Fe Sn, 100 mm.t (8.36m) XWS, 0°, 50 mm.t	
		87	9			FR		0.30 0.40 0.40		(9.37m) J, 40°, P, Fe XW FILLED	
		86						0.80			

JK 9.02.4 LIB GLB Log JK CORED BOREHOLE - MASTER 35910LT LEPPINGTON.GPJ <<DrawingFile>> 09/01/2025 10:35 10.01.00.01 Datgel Lab and In Situ Tool - DGD | Lib: JK 9.02.4 2019-05-31 Prj: JK 9.01.0 2018-03-20

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS

JKGeotechnics

CORED BOREHOLE LOG

Borehole No. 127

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT | **Core Size:** NMLC | **R.L. Surface:** 95.85 m

Date: 17/12/24 | **Inclination:** VERTICAL | **Datum:** AHD

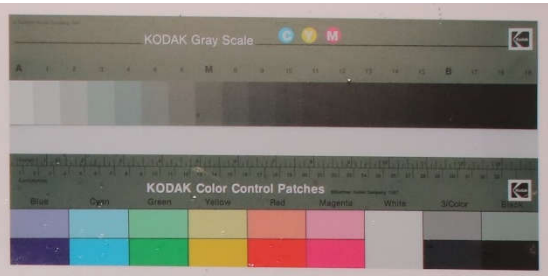
Plant Type: JK400 | **Bearing:** N/A | **Logged/Checked By:** C.A.R./A.B.

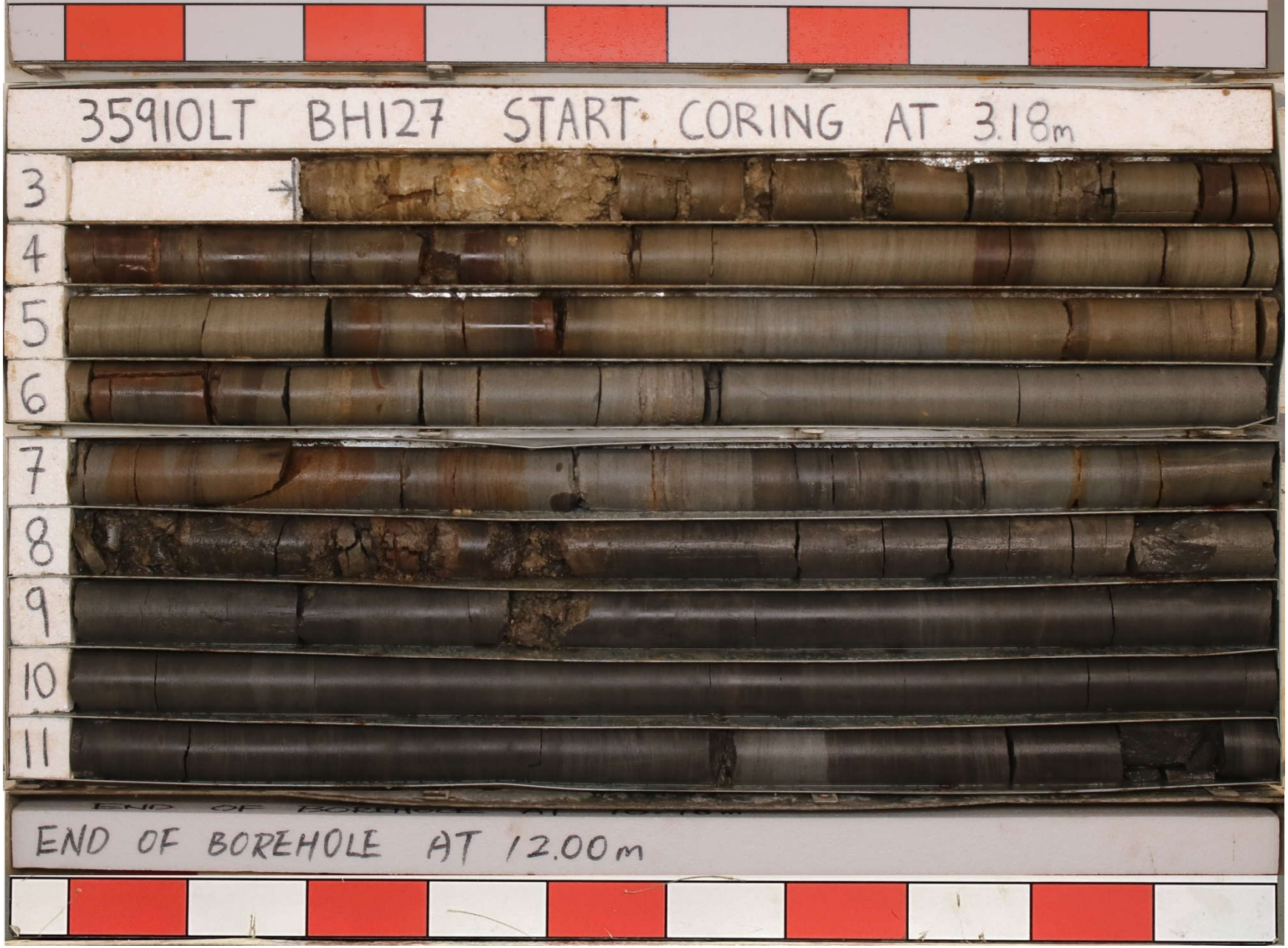
Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$ VL 0.1 L 0.3 M 1 H 3 VH 10 EH	DEFECT DETAILS SPACING (mm) 600 200 60 20 DESCRIPTION Type, orientation, defect shape and roughness, defect coatings and seams, openness and thickness Specific / General	Formation
90% RETURN		85	11		CLAYSTONE: dark grey and grey, with occasional fine to medium grained sandstone bands, bedded at 0-10°. *(continued)*	FR	M	0.70 0.50 0.40 0.70		Bringelly Shale
		84	12		END OF BOREHOLE AT 12.00 m					
		83	13							
		82	14							
		81	15							
		80	16							
		79								

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS

JKGeotechnics

Job No: 35910LT
Borehole No: BH127
Depth: 3.18m to 12.00m





JKGeotechnics

BOREHOLE LOG

Borehole No. 128

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT **Method:** SPIRAL AUGER **R.L. Surface:** 96.81 m

Date: 20/12/24 **Datum:** AHD

Plant Type: JK309 **Logged/Checked By:** A.M./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION OF AUGERING				■					CH	Silty CLAY: high plasticity, orange brown.	w>PL	VSt		
				■	N = 13 3,7,6	96	1			as above, but grey, orange brown and red brown, with occasional very low to low strength claystone bands.			240 220 350	
				■	N = 9 3,3,6	95	2						300 300 250	
				■	N=SPT 10/ 100mm REFUSAL	94	3		-	Extremely Weathered claystone: silty CLAY, medium plasticity, with very low to low strength claystone bands and occasional iron indurated bands.	XW	Hd	>600 >600 >600	BRINGELLY SHALE VERY LOW 'TC' BIT RESISTANCE
						93	4			as above, but with low to medium strength claystone bands.				LOW TO MODERATE RESISTANCE
						92	5			REFER TO CORED BOREHOLE LOG				
						91	6							
						90								

JKGeotechnics

CORED BOREHOLE LOG

Borehole No. 128

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT | **Core Size:** NMLC | **R.L. Surface:** 96.81 m

Date: 20/12/24 | **Inclination:** VERTICAL | **Datum:** AHD

Plant Type: JK309 | **Bearing:** N/A | **Logged/Checked By:** A.M./A.B.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$	SPACING (mm)	DEFECT DETAILS DESCRIPTION Type, orientation, defect shape and roughness, defect coatings and seams, openness and thickness Specific / General	Formation
					START CORING AT 4.22m						
		92	5		CLAYSTONE: grey brown, with occasional iron indurated bands, bedded at 0-10°.	HW	L - M	0.10 0.70		(4.49m) XWS, 0°, 160 mm.t (4.72m) Be, 0°, P, R, Clay FILLED (4.81m) Be, 0°, P, R, Clay Vn (4.83m) CS, 0°, 20 mm.t (4.93m) J, 90°, P, R, Cn	
					as above, but interbedded with fine to medium grained, grey sandstone bands, bedded at 0-10°.	MW	H	2.0			
ON COMPLETION OF DRILLING		91	6		SANDSTONE: fine to medium grained, grey, with occasional dark grey claystone bands, up to 200mm.t, and claystone clasts, bedded at 0-10°, .	SW		2.0 2.8			
		90	7					8.5		(6.78m) Be, 5°, P, R, Fe Sn	
90% RETURN								1.8			Bringelly Shale
		89	8					1.2 0.90			
								1.4		(8.57m) XWS, 0°, 50 mm.t	
		88	9			FR					
					CLAYSTONE: dark grey, bedded at 0-5°.		M	0.40		(9.35m) Jh, 90°, C	
		87	10					0.40 0.40		(10.22m) J, 80°, P, R, Fe Sn	
					SANDSTONE: fine to medium grained, grey, with dark grey laminae and claystone bands up to 50mm.t, bedded at 0-5° .		H	1.5		(10.59m) XWS, 0°, 10 mm.t	
		86									

JK 9.02.4 LIB:GLB Log JK CORED BOREHOLE - MASTER 35910LT LEPPINGTON.GPJ <<DrawingFile>> 09/01/2025 10:36 10.01.00.01 Datgel Lab and In Situ Tool - DGD | Lib: JK 9.02.4 2019-05-31 Prj: JK 9.01.0 2018-03-20

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS

JKGeotechnics

CORED BOREHOLE LOG

Borehole No. 128

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT | **Core Size:** NMLC | **R.L. Surface:** 96.81 m

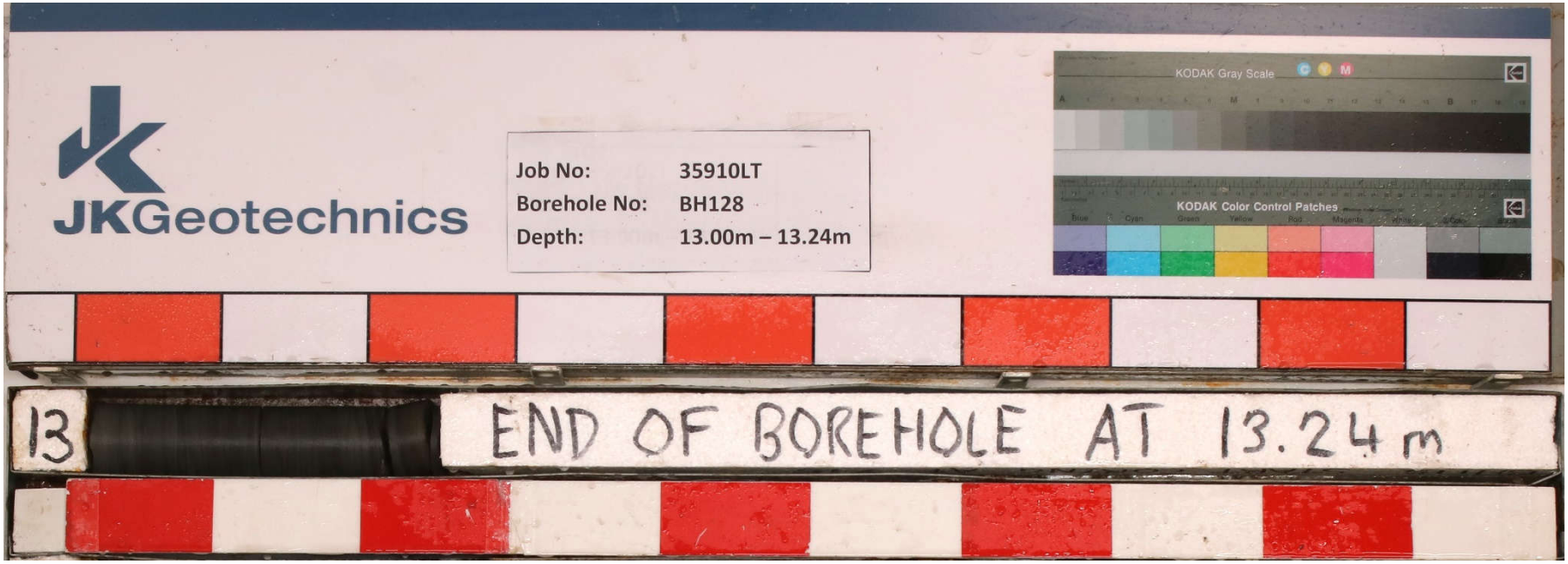
Date: 20/12/24 | **Inclination:** VERTICAL | **Datum:** AHD

Plant Type: JK309 | **Bearing:** N/A | **Logged/Checked By:** A.M./A.B.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$ VL 0.1 L 0.3 M 1 H 3 VH 10 EH	DEFECT DETAILS SPACING (mm) 600 200 60 20 DESCRIPTION Type, orientation, defect shape and roughness, defect coatings and seams, openness and thickness Specific / General	Formation
90% RETURN		85	12		SANDSTONE: fine to medium grained, grey, with dark grey laminae and claystone bands up to 50mm.t, bedded at 0-5° . *(continued)*	FR	H	1.0 1.7 2.2 2.5 0.80		Bringelly Shale
		84	13							
		83	14		END OF BOREHOLE AT 13.24 m					
		82	15							
		81	16							
		80	17							
		79								

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS


JKGeotechnics
Job No: 35910LT
Borehole No: BH128
Depth: 4.22m – 13.00m
KODAK Gray Scale
KODAK Color Control Patches
35910LT BH128 START CORING AT 4.22m
4
5
6
7
8
9
10
11
12


JKGeotechnics
Job No: 35910LT
Borehole No: BH128
Depth: 13.00m – 13.24m
KODAK Gray Scale
KODAK Color Control Patches
13
END OF BOREHOLE AT 13.24 m

JKGeotechnics

BOREHOLE LOG

Borehole No. 129

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT **Method:** SPIRAL AUGER **R.L. Surface:** 96.11 m

Date: 17/12/24 TO 18/12/24 **Datum:** AHD

Plant Type: JK400 **Logged/Checked By:** C.A.R./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION OF AUGERING						96				FILL: Sandy gravel, fine to coarse grained, sub-angular igneous and sandstone, brown, fine to medium grained sand, trace of clay nodules and terracotta fragments.	D			
				■	N = 4 3,2,2				CH	Silty CLAY: high plasticity, red brown and light grey, trace of fine grained ironstone gravel and root fibres.	w>PL	St	140 150 180	RESIDUAL
						95	1			as above, but light grey and grey.		VSt		
				■	N = 19 3,7,12				-	Extremely Weathered claystone: silty CLAY, medium plasticity, grey, trace of iron indurated bands.	XW	Hd	240 260 320 >600 >600 >600	BRINGELLY SHALE
				■		94	2			CLAYSTONE: grey brown.	DW	L - M		LOW TO MODERATE 'TC' BIT RESISTANCE
						93	3			REFER TO CORED BOREHOLE LOG				
						92	4							
						91	5							
						90	6							

JKGeotechnics

CORED BOREHOLE LOG

Borehole No. 129

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT | **Core Size:** NMLC | **R.L. Surface:** 96.11 m

Date: 17/12/24 TO 18/12/24 | **Inclination:** VERTICAL | **Datum:** AHD

Plant Type: JK400 | **Bearing:** N/A | **Logged/Checked By:** C.A.R./A.B.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION: Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$	DEFECT DETAILS: SPACING (mm)	DEFECT DETAILS: DESCRIPTION (Specific / General)	Formation
		93			START CORING AT 3.16m						
90% RETURN					CLAYSTONE: brown.	MW	L	0.10			Bringelly Shale
					Extremely Weathered claystone: silty CLAY, medium plasticity, grey brown.	XW	Hd				
		92	4		SANDSTONE: fine to medium grained, grey, interbedded with claystone bands, bedded at 0-10°.	SW	H	1.4		(4.03m) J, 90°, P, R, Clay FILLED, 2 mm.t	
										(4.35m) Be, 5°, P, R, Fe Sn	
										(4.40m) Be, 0°, P, R, Clay FILLED, 2 mm.t	
										(4.47m) J, 70°, C, R, Cn	
					SANDSTONE: fine to medium grained, grey brown and light brown, with dark grey laminae, bedded at 0-10°.			1.5			
		91	5					1.4			
								1.8		(5.73m) Be, 0°, P, R, Fe Ct	
		90	6							(6.09m) Be, 0°, P, R, Fe Sn	
					as above, but light grey.	FR	M	1.4			
								0.60			
			7					0.70			
		89			CLAYSTONE: dark grey and grey, with occasional fine to medium grained sandstone bands, bedded at 0-5°.					(7.71m) XWS, 0°, 70 mm.t	
										(7.83m) XWS, 0°, 55 mm.t	
			8					0.20			
		88								(8.17m) J, 90°, Ir, R, Clay Ct	
										(8.27m) J, 50 - 90°, C, S, Fragmented	
								0.40			
			9					0.50			
		87						0.50			
										(9.21m) XWS, 0°, 90 mm.t	
								0.50			

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS

JKGeotechnics

CORED BOREHOLE LOG

Borehole No. 129

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT **Core Size:** NMLC **R.L. Surface:** 96.11 m

Date: 17/12/24 TO 18/12/24 **Inclination:** VERTICAL **Datum:** AHD

Plant Type: JK400 **Bearing:** N/A **Logged/Checked By:** C.A.R./A.B.

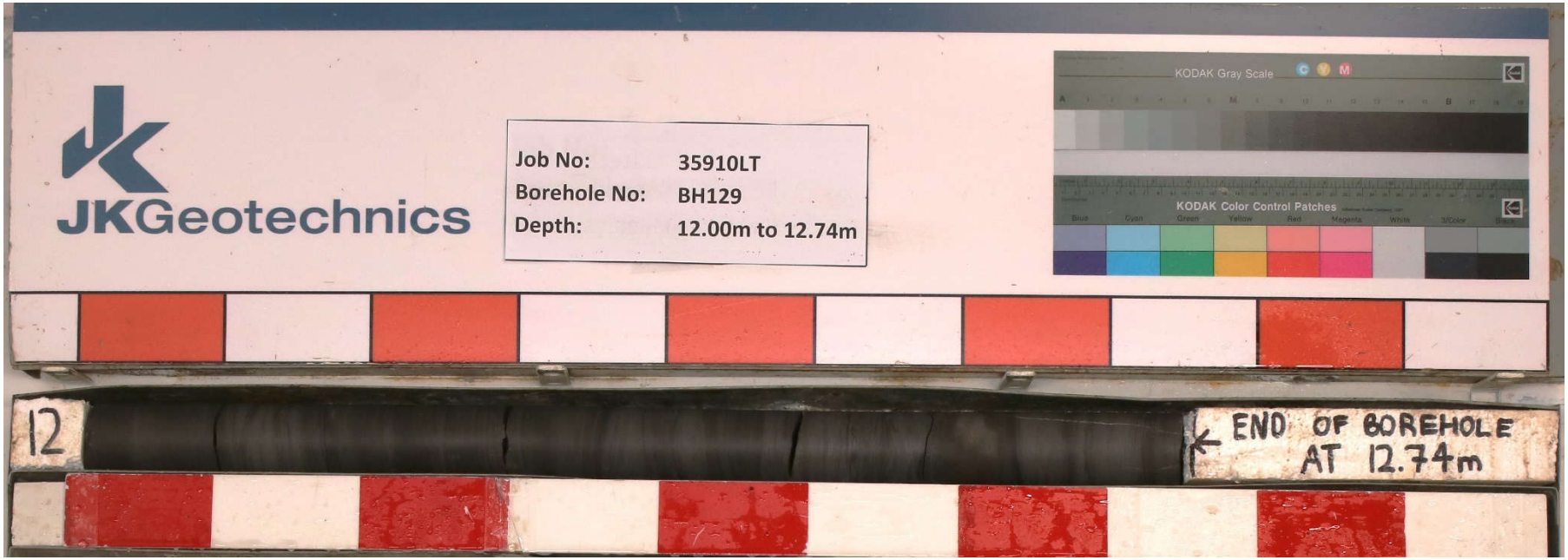
Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION: Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$	DEFECT DETAILS: SPACING (mm)	DEFECT DETAILS: DESCRIPTION (Specific / General)	Formation
90% RETURN		86	11		CLAYSTONE: dark grey and grey, with occasional fine to medium grained sandstone bands, bedded at 0-5°. *(continued)*	FR	M	0.60			Bringelly Shale
		85					H	1.1			
								1.0			
		84	12		LAMINITE: Claystone, dark grey, interbedded with Sandstone, grey, bedded at 0-10°, with occasional cross bedding at 20-30°.			1.7			
								2.1			
								2.5			
		83	13		END OF BOREHOLE AT 12.74 m						
		82	14								
		81	15								
		80	16								

POINT LOAD STRENGTH INDEX $I_s(50)$ scale: VL 0.1, L 0.3, M 1, H 3, VH 10, EH

DEFECT DETAILS SPACING (mm) scale: 600, 200, 60, 20

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS


JKGeotechnics
Job No: 35910LT
Borehole No: BH129
Depth: 3.16m to 12.00m
KODAK Gray Scale
KODAK Color Control Patches
35910LT BH129 START CORING AT 3.16m
3
4
5
6
7
8
9
10
11


JKGeotechnics
Job No: 35910LT
Borehole No: BH129
Depth: 12.00m to 12.74m
KODAK Gray Scale
KODAK Color Control Patches
12
END OF BOREHOLE AT 12.74m

JKGeotechnics

BOREHOLE LOG

Borehole No. 130

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT **Method:** SPIRAL AUGER **R.L. Surface:** 96.66 m

Date: 20/12/24 **Datum:** AHD

Plant Type: JK309 **Logged/Checked By:** A.M./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION OF AUGERING									CH	Silty CLAY: high plasticity, red brown.	w>PL	St		RESIDUAL
					N = 6 2,2,4	96	1			as above, but grey and orange brown, trace of fine grained, very low strength claystone bands.		St - VSt	200 170 170 240 150 200	
						95	2		-	Extremely Weathered claystone: silty CLAY, medium to high plasticity, grey and grey brown, with very low to low strength claystone bands and occasional iron indurated bands.	XW	Hd		BRINGELLY SHALE VERY LOW 'TC' BIT RESISTANCE
					N > 10 10,10/ 50mm REFUSAL	94	3						>600 >600 >600	
						93	4			CLAYSTONE: dark grey and brown, with iron indurated and extremely weathered bands.	DW	L - M		LOW TO MODERATE RESISTANCE
						92	5			REFER TO CORED BOREHOLE LOG				
						91	6							
						90								

JKGeotechnics

CORED BOREHOLE LOG

Borehole No. 130

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT | **Core Size:** NMLC | **R.L. Surface:** 96.66 m

Date: 20/12/24 | **Inclination:** VERTICAL | **Datum:** AHD

Plant Type: JK309 | **Bearing:** N/A | **Logged/Checked By:** A.M./A.B.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$ (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	DEFECT DETAILS SPACING (mm) (600, 200, 60, 20) DESCRIPTION Type, orientation, defect shape and roughness, defect coatings and seams, openness and thickness Specific / General	Formation
					START CORING AT 4.20m					
		92	5		Extremely Weathered claystone: silty CLAY, medium to high plasticity, grey brown, with occasional very low to low strength, dark grey and brown claystone bands, and iron indurated bands.	XW	Hd	0.40		
		91	6		SANDSTONE: fine to medium grained, grey, with occasional claystone laminae and iron indurated bands, bedded at 0-5°.	SW	M - H	2.1 0.70	(5.04m) Be, 0°, P, R, Fe Sn	
		90	7		as above, but with claystone bands up to 100mm.t.		H	1.1 1.7 1.5	(6.79m) Be, 0°, P, R, Fe Sn	Bringelly Shale
		89	8					0.60 1.1		
		88	9		CLAYSTONE: dark grey, with occasional fine to medium grained, grey sandstone bands, bedded at 0-5°.		M	0.80 0.60		
		87	10					0.60 0.40	(9.85m) XWS, 0°, 50 mm.t	
		86			SANDSTONE: fine to medium grained, grey, with dark grey claystone laminae and bands, bedded at 0-5°.		H	1.0		

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS

JKGeotechnics

CORED BOREHOLE LOG

Borehole No. 130

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT | **Core Size:** NMLC | **R.L. Surface:** 96.66 m

Date: 20/12/24 | **Inclination:** VERTICAL | **Datum:** AHD

Plant Type: JK309 | **Bearing:** N/A | **Logged/Checked By:** A.M./A.B.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$ VL 0.1 L 0.3 M 1 H 3 VH 10 EH	DEFECT DETAILS SPACING (mm) 600 200 60 20 DESCRIPTION Type, orientation, defect shape and roughness, defect coatings and seams, openness and thickness Specific / General	Formation
		85	12		SANDSTONE: fine to medium grained, grey, with dark grey claystone laminae and bands, bedded at 0-5°. *(continued)*	FR	H	2.1 3.1 1.4 2.7 5.1		Bringelly Shale
		84	13							
		83	14		END OF BOREHOLE AT 13.05 m					
		82	15							
		81	16							
		80	17							
		79								

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS


JKGeotechnics
Job No: 35910LT
Borehole No: BH130
Depth: 4.20m – 13.00m
KODAK Gray Scale
KODAK Color Control Patches
35910LT BH130 START CORING AT 4.20m
4
5
6
7
8
9
10
11
12


JKGeotechnics
Job No: 35910LT
Borehole No: BH130
Depth: 13.00m – 13.05m
KODAK Gray Scale
KODAK Color Control Patches
13 ← EOBH @ 13.05m

JKGeotechnics

BOREHOLE LOG

Borehole No. 131

1 / 1

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT **Method:** SPIRAL AUGER **R.L. Surface:** 93.86 m

Date: 19/12/24 **Datum:** AHD

Plant Type: JK308 **Logged/Checked By:** J.F./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION										FILL: Silty clay, medium plasticity, grey brown, trace of root fibres.	w<PL			
					N = 16 4,7,9	93	1		CH	Silty CLAY: high plasticity, red brown and light grey, trace of root fibres.	w>PL	Hd	>600 >600 >600	RESIDUAL
					N=SPT 4/ 100mm REFUSAL					as above, but with extremely weathered fabric.				
						92	2		-	CLAYSTONE: dark grey, with iron indurated sandstone and extremely weathered bands.	DW	M		BRINGELLY SHALE MODERATE 'TC' BIT RESISTANCE WITH LOW BANDS
										SANDSTONE: fine grained, light grey, with claystone bands.		H		HIGH RESISTANCE
						91	3							
						90	4			END OF BOREHOLE AT 3.30 m				'TC' BIT REFUSAL
						89	5							
						88	6							
						87								

JKGeotechnics

BOREHOLE LOG

Borehole No. 132
1 / 1

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT **Method:** SPIRAL AUGER **R.L. Surface:** 94.44 m

Date: 19/12/24 **Datum:** AHD

Plant Type: JK308 **Logged/Checked By:** J.F./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION						94				FILL: Silty clay, medium plasticity, grey brown, trace of root fibres.	w<PL			
				■	N = 13 4,6,7		1		CH	Silty CLAY: high plasticity, red brown and light grey, trace of roots and root fibres.	w>PL	Hd	>600 >600 >600	RESIDUAL
				■	N > 19 15,19/ 150mm REFUSAL	93			-	Extremely Weathered claystone: silty CLAY, high plasticity, grey and red brown.	XW	Hd	>600 >600 >600	BRINGELLY SHALE
				■			2			CLAYSTONE: dark grey, with iron indurated bands.	DW	VL - L		VERY LOW 'TC' BIT RESISTANCE
				■		92						H		HIGH RESISTANCE
										END OF BOREHOLE AT 2.50 m				'TC' BIT REFUSAL
						91	3							
							4							
						90								
							5							
						89								
							6							
						88								

JKGeotechnics

BOREHOLE LOG

Borehole No. 133
1 / 1

Client: SCHOOL INFRASTRUCTURE NSW
Project: PROPOSED HIGH SCHOOL
Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT **Method:** SPIRAL AUGER **R.L. Surface:** 98.14 m
Date: 19/12/24 **Datum:** AHD
Plant Type: JK309 **Logged/Checked By:** A.M./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION						98				TOPSOIL: Silty clay, high plasticity, brown, trace of fine grained ironstone gravel, and root fibres.	w<PL			GRASS COVER
									CH	Silty CLAY: high plasticity, grey, brown and orange brown, trace of fine grained ironstone gravel and root fibres.	w<PL	Hd		RESIDUAL
					N = 10 3,5,5	97	1						450 550 600	
					N = 17 4,7,10				-	Extremely Weathered claystone: silty CLAY, high plasticity, grey and red brown, trace of fine to medium grained ironstone gravel.	XW	Hd		BRINGELLY SHALE
						96	2			SANDSTONE: fine to medium grained, grey brown, with occasional extremely weathered bands.	DW	VL - L		LOW 'TC' BIT RESISTANCE
						95	3					L - M		BANDS OF MODERATE RESISTANCE
										CLAYSTONE: brown and grey, with occasional extremely weathered bands.				
						94	4							
										as above, but with extremely weathered bands.		VL - L		LOW RESISTANCE
						93	5							
						92	6			END OF BOREHOLE AT 6.00 m				

JKGeotechnics

BOREHOLE LOG

Borehole No. 134

1 / 1

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT **Method:** SPIRAL AUGER **R.L. Surface:** 98.38 m

Date: 19/12/24 **Datum:** AHD

Plant Type: JK309 **Logged/Checked By:** A.M./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION						98	0			FILL: Silty sand, fine to medium grained, brown, with wood fragments, trace of clay nodules and root fibres.	M			
									CH	Silty CLAY: high plasticity, grey and red brown, trace of fine grained ironstone gravel, and root fibres.	w>PL	VSt		RESIDUAL
					N = 8 2,3,5								250 270 200	
							1		CI-CH	Silty CLAY: medium to high plasticity.	w<PL	VSt - Hd		
						97								VERY LOW 'TC' BIT RESISTANCE
					N = 17 6,6,11					as above, but with extremely weathered fabric.			350 350 400	
							2							
						96			-	CLAYSTONE: brown, with occasional extremely weathered bands.	DW	VL - L		BRINGELLY SHALE VERY LOW TO LOW RESISTANCE
							3			END OF BOREHOLE AT 3.00 m				
						95	4							
						94	5							
						93	6							
						92								

JKGeotechnics

BOREHOLE LOG

Borehole No. 135

1 / 1

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT **Method:** SPIRAL AUGER **R.L. Surface:** 98.54 m

Date: 18/12/24 **Datum:** AHD

Plant Type: JK309 **Logged/Checked By:** A.M./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION										TOPSOIL: Silty clay, medium to high plasticity, brown and orange brown.	w>PL			
					N = 14 4,7,7	98	1		CH	Silty CLAY: high plasticity, orange brown and brown, trace of fine to coarse grained ironstone gravel.	w~PL	VSt	250 240 230	RESIDUAL
					N = 15 4,7,8	97				Silty CLAY: high plasticity, grey and red brown, trace of root fibres.		VSt - Hd	320 450 350	
						96	2		-	Extremely Weathered claystone: silty CLAY, medium to high plasticity, grey and red brown, with occasional very low to low strength claystone bands.	XW	Hd		BRINGELLY SHALE VERY LOW 'TC' BIT RESISTANCE
										CLAYSTONE: brown, with occasional iron indurated bands.	DW	L - M		LOW TO MODERATE RESISTANCE
						95	3			END OF BOREHOLE AT 3.00 m				
						94	4							
						93	5							
						92	6							

JKGeotechnics

BOREHOLE LOG

Borehole No. 136

1 / 1

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT **Method:** SPIRAL AUGER **R.L. Surface:** 100.04 m

Date: 18/12/24 **Datum:** AHD

Plant Type: JK309 **Logged/Checked By:** A.M./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION		■				100				TOPSOIL: Silty clay, medium to high plasticity, brown, trace of fine grained ironstone gravel, and root fibres.	w<PL			GRASS COVER
									CH	Silty CLAY: high plasticity, grey and red brown, with fine to medium grained ironstone gravel, trace of root fibres.	w<PL	Hd		RESIDUAL
				■	N = 14 5,6,8	99	1						>600 >600 >600	
									-	Extremely Weathered claystone: silty CLAY, medium to high plasticity, grey and red brown.	XW	Hd		BRINGELLY SHALE
				■	N > 22 10,10,12/ 100mm REFUSAL	98	2						>600 >600 >600	
														VERY LOW 'TC' BIT RESISTANCE
				■						CLAYSTONE: grey, with occasional iron indurated bands.	DW	VL - L		LOW RESISTANCE
						97	3			END OF BOREHOLE AT 3.00 m				
						96	4							
						95	5							
						94	6							

JKGeotechnics

BOREHOLE LOG

Borehole No. 137
1 / 1

Client: SCHOOL INFRASTRUCTURE NSW
Project: PROPOSED HIGH SCHOOL
Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT **Method:** SPIRAL AUGER **R.L. Surface:** 99.06 m
Date: 18/12/24 **Datum:** AHD
Plant Type: JK309 **Logged/Checked By:** A.M./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION						99				TOPSOIL: Silty clay, medium to high plasticity, brown, trace of fine grained ironstone gravel, and root fibres.	w<PL			GRASS COVER
					N = 8 4,4,4				CH	Silty CLAY: high plasticity, grey and red brown, trace of fine grained ironstone gravel, and root fibres.	w~PL	Hd	>600 >600 >600	RESIDUAL
						98	1							
					N = 21 5,11,10				-	Extremely Weathered claystone: silty CLAY, medium to high plasticity, grey and red brown.	XW	Hd	>600 >600 >600	BRINGELLY SHALE
						97	2			CLAYSTONE: brown and grey, with iron indurated and extremely weathered bands.	DW	VL - L		VERY LOW 'TC' BIT RESISTANCE
														LOW RESISTANCE
						96	3							
						95	4							MODERATE RESISTANCE
										as above, but grey, without extremely weathered bands.		M		
						94	5							
						93	6			END OF BOREHOLE AT 6.00 m				

JKGeotechnics

BOREHOLE LOG

Borehole No. 138

1 / 1

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT **Method:** SPIRAL AUGER **R.L. Surface:** 100.65 m

Date: 18/12/24 **Datum:** AHD

Plant Type: JK309 **Logged/Checked By:** A.M./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION						100	0			TOPSOIL: Silty clay, medium plasticity, brown, trace of fine grained ironstone gravel, and root fibres.	w<PL			GRASS COVER
									CH	Silty CLAY: high plasticity, grey and red brown, trace of fine grained ironstone gravel, and root fibres.	w<PL	Hd		RESIDUAL
					N = 21 8,8,13		1		-	Extremely Weathered CLAYSTONE: silty CLAY, medium to high plasticity, grey and red brown, with iron indurated bands.	XW	Hd	>600 >600 >600 >600 >600 >600	BRINGELLY SHALE
					N=SPT 5/ 100mm REFUSAL	99	2			CLAYSTONE: grey and brown, with extremely weathered and iron indurated bands.	DW	VL - L		VERY LOW 'TC' BIT RESISTANCE
						98	3			as above, but grey, with occasional extremely weathered bands.		L - M		LOW RESISTANCE
						97	4					M		MODERATE RESISTANCE
						96	5			SANDSTONE: fine grained, brown.				
						95	6			END OF BOREHOLE AT 6.00 m				
						94								

JKGeotechnics

BOREHOLE LOG

Borehole No. 139

1 / 1

Client: SCHOOL INFRASTRUCTURE NSW

Project: PROPOSED HIGH SCHOOL

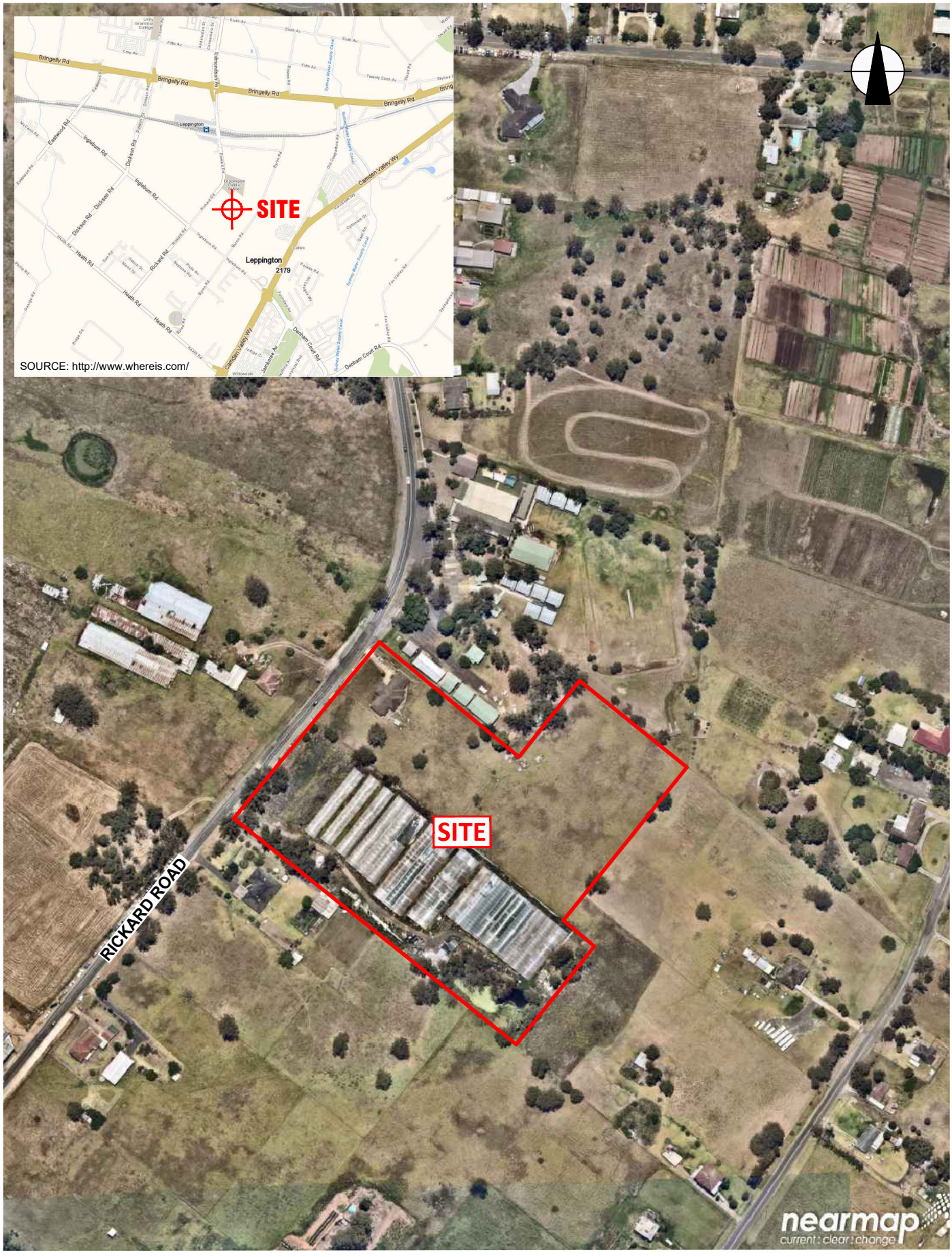
Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Job No.: 35910LT **Method:** SPIRAL AUGER **R.L. Surface:** 100.26 m

Date: 19/12/24 **Datum:** AHD

Plant Type: JK309 **Logged/Checked By:** A.M./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION						100				TOPSOIL: Silty clay, medium plasticity, brown, trace of fine grained ironstone gravel, and root fibres.	w<PL			GRASS COVER
									CH	Silty CLAY: high plasticity, grey, red brown and brown, trace of root fibres.	w<PL			RESIDUAL
					N = 14 6,4,10		1		-	Extremely Weathered claystone: silty CLAY, medium plasticity, grey, brown and orange brown, with occasional very low strength claystone bands.	XW	Hd	>600 >600 >600	BRINGELLY SHALE
						99								VERY LOW 'TC' BIT RESISTANCE
					N=SPT 10/ 150mm REFUSAL					CLAYSTONE: brown and grey, with occasional extremely weathered and iron indurated bands.	DW	VL - L		
						98	2					L		LOW RESISTANCE
						97	3							
							4					M		MODERATE RESISTANCE
						96								
							5			as above, but grey.				
						95								
							6			END OF BOREHOLE AT 6.00 m				
						94								



AERIAL IMAGE SOURCE: MAPS.AU.NEARMAP.COM

This plan should be read in conjunction with the JK Geotechnics report.

Title:	**SITE LOCATION PLAN**
Location:	128-134 RICKARD ROAD, LEPPINGTON, NSW
Report No:	35910LT
Figure No:	1

JKGeotechnics

PLOT DATE: 17/01/2025 11:37:03 AM DWG FILE: S:\6 GEOTECHNICAL\6F GEOTECHNICAL JOBS\35000'S\35910 LEPPINGTON\CAD\35910LT.DWG

LEGEND

- BOREHOLE
- APPROXIMATE OUTLINE OF PROPOSED BUILDINGS
- APPROXIMATE OUTLINE OF PROPOSED CARPARKS AND DRIVEWAYS
- APPROXIMATE EXTENT OF PROPOSED ACTIVITY

NOTES:
1. REFER TO FIGURE 5 FOR CROSS SECTION A-A.
2. REFER TO FIGURE 6 FOR CROSS SECTION B-B.

AERIAL IMAGE SOURCE: MAPS.AU.NEARMAP.COM

0 15 30 45 60 75
SCALE 1:1500 @A3 METRES

This plan should be read in conjunction with the JK Geotechnics report.

Title: **BOREHOLE LOCATION PLAN**

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Report No: 35910LT

Figure No: 2

JKGeotechnics

PLOT DATE: 17/01/2025 11:37:13 AM DWG FILE: S:\6 GEOTECHNICAL\6F GEOTECHNICAL JOBS\35000'S\35910B LEPPINGTON\CAD\35910LT.DWG

LEGEND

- BOREHOLE
- APPROXIMATE OUTLINE OF PROPOSED BUILDINGS
- APPROXIMATE OUTLINE OF PROPOSED CARPARKS AND DRIVEWAYS
- APPROXIMATE EXTENT OF PROPOSED ACTIVITY

NOTES:
1. REFER TO FIGURE 5 FOR CROSS SECTION A-A.
2. REFER TO FIGURE 6 FOR CROSS SECTION B-B.

AERIAL IMAGE SOURCE: MAPS.AU.NEARMAP.COM

0 15 30 45 60 75

SCALE 1:1500 @A3 METRES

This plan should be read in conjunction with the JK Geotechnics report.

Title: **INFERRED TOP OF CLASS V OR BETTER BEDROCK**

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Report No: 35910LT

Figure No: 3

JKGeotechnics

PLOT DATE: 17/01/2025 12:26:07 PM DWG FILE: S:\6 GEOTECHNICAL\6F GEOTECHNICAL JOBS\35000'S\35910 LEPPINGTON\CAD\35910LT.DWG

LEGEND

- BOREHOLE
- APPROXIMATE OUTLINE OF PROPOSED BUILDINGS
- APPROXIMATE OUTLINE OF PROPOSED CARPARKS AND DRIVEWAYS
- APPROXIMATE EXTENT OF PROPOSED ACTIVITY

NOTES:
1. REFER TO FIGURE 5 FOR CROSS SECTION A-A.
2. REFER TO FIGURE 6 FOR CROSS SECTION B-B.
* POOERER-QUALITY BEDROCK ENCOUNTERED WITHIN CLASS III OR BETTER BEDROCK.

AERIAL IMAGE SOURCE: MAPS.AU.NEARMAP.COM

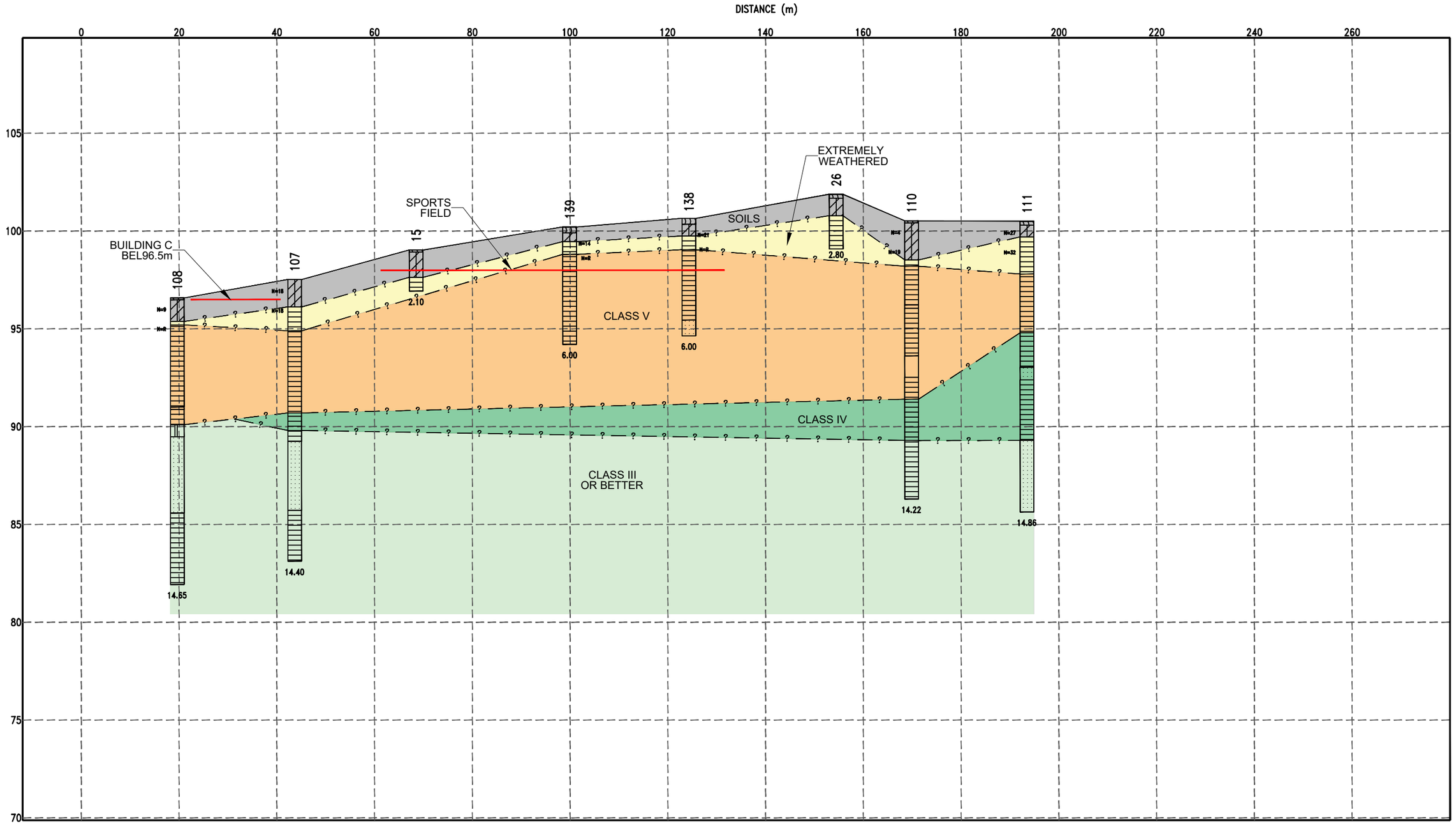
0 15 30 45 60 75
SCALE 1:1500 @A3 METRES

This plan should be read in conjunction with the JK Geotechnics report.

Title:	INFERRED TOP OF CLASS III OR BETTER BEDROCK
Location:	128-134 RICKARD ROAD, LEPPINGTON, NSW
Report No:	35910LT
Figure No:	4

JKGeotechnics

PLOT DATE: 20/01/2025 12:00:29 PM DWG FILE: S:\6 GEOTECHNICAL\6F GEOTECHNICAL JOBS\35000'S\35910B LEPPINGTON\CAD\35910LT.DWG



MATERIAL GRAPHIC

- NO CORE
- SILTY CLAY (CL, CI, CH)
- CLAYSTONE
- LAMINITE (SILTSTONE, SANDSTONE)
- SANDSTONE
- TOPSOIL

H:SCALE 0 8 16 24 32 40 METRES 1:800 @A3

V:SCALE 0 2 4 6 8 10 METRES 1:200 @A3

This plan should be read in conjunction with the JK Geotechnics report.

Title: **SECTION A-A**
GRAPHICAL BOREHOLE SUMMARY

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Report No: 35910LT

Figure No: 5

JKGeotechnics

PLOT DATE: 17/01/2025 11:39:05 AM DWG FILE: S:\6 GEOTECHNICAL\6F GEOTECHNICAL JOBS\35000'S\35910B LEPPINGTON\CAD\35910LT.DWG

DISTANCE (m)

ELEVATION (m AHD)

BUILDING A
BEL96.5m

HALL GFL 98.8m

104 105 137 110 112 116 115

SOILS

EXTREMELY WEATHERED

CLASS V

CLASS IV

CLASS III OR BETTER

6.00 12.54 15.00 14.46 14.22 13.44 14.47

MATERIAL GRAPHIC

NO CORE
FILL
SILTSTONE
SILTY CLAY (CL, CI, CH)
LAMINITE (SILTSTONE, SANDSTONE)
TOPSOIL
CLAYSTONE
SANDSTONE

H:SCALE 1:800 @A3 METRES

V:SCALE 1:200 @A3 METRES

This plan should be read in conjunction with the JK Geotechnics report.

Title: **SECTION B-B**
GRAPHICAL BOREHOLE SUMMARY

Location: 128-134 RICKARD ROAD, LEPPINGTON, NSW

Report No: 35910LT

Figure No: 6

JKGeotechnics

PLOT DATE: 17/01/2025 11:39:16 AM DWG FILE: S:\6 GEOTECHNICAL\6F GEOTECHNICAL JOBS\35000'S\35910B LEPPINGTONICAD\35910LT.DWG

VIBRATION EMISSION DESIGN GOALS

German Standard DIN 4150 – Part 3: 1999 provides guideline levels of vibration velocity for evaluating the effects of vibration in structures. The limits presented in this standard are generally recognised to be conservative.

The DIN 4150 values (maximum levels measured in any direction at the foundation, OR, maximum levels measured in (x) or (y) horizontal directions, in the plane of the uppermost floor), are summarised in Table 1 below.

It should be noted that peak vibration velocities higher than the minimum figures in Table 1 for low frequencies may be quite 'safe', depending on the frequency content of the vibration and the actual condition of the structure.

It should also be noted that these levels are 'safe limits', up to which no damage due to vibration effects has been observed for the particular class of building. 'Damage' is defined by DIN 4150 to include even minor non-structural effects such as superficial cracking in cement render, the enlargement of cracks already present, and the separation of partitions or intermediate walls from load bearing walls. Should damage be observed at vibration levels lower than the 'safe limits', then it may be attributed to other causes. DIN 4150 also states that when vibration levels higher than the 'safe limits' are present, it does not necessarily follow that damage will occur. Values given are only a broad guide.

Table 1: DIN 4150 – Structural Damage – Safe Limits for Building Vibration

Group	Type of Structure	Peak Vibration Velocity in mm/s			
		At Foundation Level at a Frequency of:			Plane of Floor of Uppermost Storey
		Less than 10Hz	10Hz to 50Hz	50Hz to 100Hz	All Frequencies
1	Buildings used for commercial purposes, industrial buildings and buildings of similar design.	20	20 to 40	40 to 50	40
2	Dwellings and buildings of similar design and/or use.	5	5 to 15	15 to 20	15
3	Structures that because of their particular sensitivity to vibration, do not correspond to those listed in Group 1 and 2 and have intrinsic value (eg. buildings that are under a preservation order).	3	3 to 8	8 to 10	8

Note: For frequencies above 100Hz, the higher values in the 50Hz to 100Hz column should be used.

REPORT EXPLANATION NOTES

INTRODUCTION

These notes have been provided to amplify the geotechnical report in regard to classification methods, field procedures and certain matters relating to the Comments and Recommendations section. Not all notes are necessarily relevant to all reports.

The ground is a product of continuing natural and man-made processes and therefore exhibits a variety of characteristics and properties which vary from place to place and can change with time. Geotechnical engineering involves gathering and assimilating limited facts about these characteristics and properties in order to understand or predict the behaviour of the ground on a particular site under certain conditions. This report may contain such facts obtained by inspection, excavation, probing, sampling, testing or other means of investigation. If so, they are directly relevant only to the ground at the place where and time when the investigation was carried out.

DESCRIPTION AND CLASSIFICATION METHODS

The methods of description and classification of soils and rocks used in this report are based on Australian Standard 1726:2017 *'Geotechnical Site Investigations'*. In general, descriptions cover the following properties – soil or rock type, colour, structure, strength or density, and inclusions. Identification and classification of soil and rock involves judgement and the Company infers accuracy only to the extent that is common in current geotechnical practice.

Soil types are described according to the predominating particle size and behaviour as set out in the attached soil classification table qualified by the grading of other particles present (eg. sandy clay) as set out below:

Soil Classification	Particle Size
Clay	< 0.002mm
Silt	0.002 to 0.075mm
Sand	0.075 to 2.36mm
Gravel	2.36 to 63mm
Cobbles	63 to 200mm
Boulders	> 200mm

Non-cohesive soils are classified on the basis of relative density, generally from the results of Standard Penetration Test (SPT) as below:

Relative Density	SPT 'N' Value (blows/300mm)
Very loose (VL)	< 4
Loose (L)	4 to 10
Medium dense (MD)	10 to 30
Dense (D)	30 to 50
Very Dense (VD)	> 50

Cohesive soils are classified on the basis of strength (consistency) either by use of a hand penetrometer, vane shear, laboratory testing and/or tactile engineering examination. The strength terms are defined as follows.

Classification	Unconfined Compressive Strength (kPa)	Indicative Undrained Shear Strength (kPa)
Very Soft (VS)	≤ 25	≤ 12
Soft (S)	> 25 and ≤ 50	> 12 and ≤ 25
Firm (F)	> 50 and ≤ 100	> 25 and ≤ 50
Stiff (St)	> 100 and ≤ 200	> 50 and ≤ 100
Very Stiff (VSt)	> 200 and ≤ 400	> 100 and ≤ 200
Hard (Hd)	> 400	> 200
Friable (Fr)	Strength not attainable – soil crumbles	

Rock types are classified by their geological names, together with descriptive terms regarding weathering, strength, defects, etc. Where relevant, further information regarding rock classification is given in the text of the report. In the Sydney Basin, 'shale' is used to describe fissile mudstone, with a weakness parallel to bedding. Rocks with alternating inter-laminations of different grain size (eg. siltstone/claystone and siltstone/fine grained sandstone) is referred to as 'laminite'.

SAMPLING

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

Disturbed samples taken during drilling provide information on plasticity, grain size, colour, moisture content, minor constituents and, depending upon the degree of disturbance, some information on strength and structure. Bulk samples are similar but of greater volume required for some test procedures.

Undisturbed samples are taken by pushing a thin-walled sample tube, usually 50mm diameter (known as a U50), into the soil and withdrawing it with a sample of the soil contained in a relatively undisturbed state. Such samples yield information on structure and strength, and are necessary for laboratory determination of shrink-swell behaviour, strength and compressibility. Undisturbed sampling is generally effective only in cohesive soils.

Details of the type and method of sampling used are given on the attached logs.

INVESTIGATION METHODS

The following is a brief summary of investigation methods currently adopted by the Company and some comments on their use and application. All methods except test pits, hand auger drilling and portable Dynamic Cone Penetrometers require the use of a mechanical rig which is commonly mounted on a truck chassis or track base.

Test Pits: These are normally excavated with a backhoe or a tracked excavator, allowing close examination of the insitu soils and 'weaker' bedrock if it is safe to descend into the pit. The depth of penetration is limited to about 3m for a backhoe and up to 6m for a large excavator. Limitations of test pits are the problems associated with disturbance and difficulty of reinstatement and the consequent effects on close-by structures. Care must be taken if construction is to be carried out near test pit locations to either properly recompact the backfill during construction or to design and construct the structure so as not to be adversely affected by poorly compacted backfill at the test pit location.

Hand Auger Drilling: A borehole of 50mm to 100mm diameter is advanced by manually operated equipment. Refusal of the hand auger can occur on a variety of materials such as obstructions within any fill, tree roots, hard clay, gravel or ironstone, cobbles and boulders, and does not necessarily indicate rock level.

Continuous Spiral Flight Augers: The borehole is advanced using 75mm to 115mm diameter continuous spiral flight augers, which are withdrawn at intervals to allow sampling and insitu testing. This is a relatively economical means of drilling in clays and in sands above the water table. Samples are returned to the surface by the flights or may be collected after withdrawal of the auger flights, but they can be very disturbed and layers may become mixed. Information from the auger sampling (as distinct from specific sampling by SPTs or undisturbed samples) is of limited reliability due to mixing or softening of samples by groundwater, or uncertainties as to the original depth of the samples. Augering below the groundwater table is of even lesser reliability than augering above the water table.

Rock Augering: Use can be made of a Tungsten Carbide (TC) bit for auger drilling into rock to indicate rock quality and continuity by variation in drilling resistance and from examination of recovered rock cuttings. This method of investigation is quick and relatively inexpensive but provides only an indication of the likely rock strength and predicted values may be in error by a strength order. Where rock strengths may have a significant impact on construction feasibility or costs, then further investigation by means of cored boreholes may be warranted.

Wash Boring: The borehole is usually advanced by a rotary bit, with water being pumped down the drill rods and returned up the annulus, carrying the drill cuttings. Only major changes in stratification can be assessed from the cuttings, together with some information from "feel" and rate of penetration.

Mud Stabilised Drilling: Either Wash Boring or Continuous Core Drilling can use drilling mud as a circulating fluid to stabilise the borehole. The term 'mud' encompasses a range of products ranging from bentonite to polymers. The mud tends to mask the cuttings and reliable identification is only possible from intermittent intact sampling (eg. from SPT and U50 samples) or from rock coring, etc.

Continuous Core Drilling: A continuous core sample is obtained using a diamond tipped core barrel. Provided full core recovery is achieved (which is not always possible in very low strength rocks and granular soils), this technique provides a very reliable (but relatively expensive) method of investigation. In rocks, NMLC or HQ triple tube core barrels, which give a core of about 50mm and 61mm diameter, respectively, is usually used with water flush. The length of core recovered is compared to the length drilled and any length not recovered is shown as NO CORE. The location of NO CORE recovery is determined on site by the supervising engineer; where the location is uncertain, the loss is placed at the bottom of the drill run.

Standard Penetration Tests: Standard Penetration Tests (SPT) are used mainly in non-cohesive soils, but can also be used in cohesive soils, as a means of indicating density or strength and also of obtaining a relatively undisturbed sample. The test procedure is described in Australian Standard 1289.6.3.1–2004 (R2016) *'Methods of Testing Soils for Engineering Purposes, Soil Strength and Consolidation Tests – Determination of the Penetration Resistance of a Soil – Standard Penetration Test (SPT)'*.

The test is carried out in a borehole by driving a 50mm diameter split sample tube with a tapered shoe, under the impact of a 63.5kg hammer with a free fall of 760mm. It is normal for the tube to be driven in three successive 150mm increments and the 'N' value is taken as the number of blows for the last 300mm. In dense sands, very hard clays or weak rock, the full 450mm penetration may not be practicable and the test is discontinued.

The test results are reported in the following form:

- In the case where full penetration is obtained with successive blow counts for each 150mm of, say, 4, 6 and 7 blows, as

  N = 13
  4, 6, 7

- In a case where the test is discontinued short of full penetration, say after 15 blows for the first 150mm and 30 blows for the next 40mm, as

  N > 30
  15, 30/40mm

The results of the test can be related empirically to the engineering properties of the soil.

A modification to the SPT is where the same driving system is used with a solid 60° tipped steel cone of the same diameter as the SPT hollow sampler. The solid cone can be continuously driven for some distance in soft clays or loose sands, or may be used where damage would otherwise occur to the SPT. The results of this Solid Cone Penetration Test (SCPT) are shown as 'N_c' on the borehole logs, together with the number of blows per 150mm penetration.

Cone Penetrometer Testing (CPT) and Interpretation: The cone penetrometer is sometimes referred to as a Dutch Cone. The test is described in Australian Standard 1289.6.5.1–1999 (R2013) *'Methods of Testing Soils for Engineering Purposes, Soil Strength and Consolidation Tests – Determination of the Static Cone Penetration Resistance of a Soil – Field Test using a Mechanical and Electrical Cone or Friction-Cone Penetrometer'*.

In the tests, a 35mm or 44mm diameter rod with a conical tip is pushed continuously into the soil, the reaction being provided by a specially designed truck or rig which is fitted with a hydraulic ram system. Measurements are made of the end bearing resistance on the cone and the frictional resistance on a separate 134mm or 165mm long sleeve, immediately behind the cone. Transducers in the tip of the assembly are electrically connected by wires passing through the centre of the push rods to an amplifier and recorder unit mounted on the control truck. The CPT does not provide soil sample recovery.

As penetration occurs (at a rate of approximately 20mm per second), the information is output as incremental digital records every 10mm. The results given in this report have been plotted from the digital data.

The information provided on the charts comprise:

- Cone resistance – the actual end bearing force divided by the cross sectional area of the cone – expressed in MPa. There are two scales presented for the cone resistance. The lower scale has a range of 0 to 5MPa and the main scale has a range of 0 to 50MPa. For cone resistance values less than 5MPa, the plot will appear on both scales.
- Sleeve friction – the frictional force on the sleeve divided by the surface area – expressed in kPa.
- Friction ratio – the ratio of sleeve friction to cone resistance, expressed as a percentage.

  The ratios of the sleeve resistance to cone resistance will vary with the type of soil encountered, with higher relative friction in clays than in sands. Friction ratios of 1% to 2% are commonly encountered in sands and occasionally very soft clays, rising to 4% to 10% in stiff clays and peats. Soil descriptions based on cone resistance and friction ratios are only inferred and must not be considered as exact.

Correlations between CPT and SPT values can be developed for both sands and clays but may be site specific.

Interpretation of CPT values can be made to empirically derive modulus or compressibility values to allow calculation of foundation settlements.

Stratification can be inferred from the cone and friction traces and from experience and information from nearby boreholes etc. Where shown, this information is presented for general guidance, but must be regarded as interpretive. The test method provides a continuous profile of engineering properties but, where precise information on soil classification is required, direct drilling and sampling may be preferable.

There are limitations when using the CPT in that it may not penetrate obstructions within any fill, thick layers of hard clay and very dense sand, gravel and weathered bedrock. Normally a 'dummy' cone is pushed through fill to protect the equipment. No information is recorded by the 'dummy' probe.

Flat Dilatometer Test: The flat dilatometer (DMT), also known as the Marchetti Dilometer comprises a stainless steel blade having a flat, circular steel membrane mounted flush on one side.

The blade is connected to a control unit at ground surface by a pneumatic-electrical tube running through the insertion rods. A gas tank, connected to the control unit by a pneumatic cable, supplies the gas pressure required to expand the membrane. The control unit is equipped with a pressure regulator, pressure gauges, an audio-visual signal and vent valves.

The blade is advanced into the ground using our CPT rig or one of our drilling rigs, and can be driven into the ground using an SPT hammer. As soon as the blade is in place, the membrane is inflated, and the pressure required to lift the membrane (approximately 0.1mm) is recorded. The pressure then required to lift the centre of the membrane by an additional 1mm is recorded. The membrane is then deflated before pushing to the next depth increment, usually 200mm down. The pressure readings are corrected for membrane stiffness.

The DMT is used to measure material index (I_D), horizontal stress index (K_D), and dilatometer modulus (E_D). Using established correlations, the DMT results can also be used to assess the 'at rest' earth pressure coefficient (K_o), over-consolidation ratio (OCR), undrained shear strength (C_u), friction angle (ϕ), coefficient of consolidation (C_h), coefficient of permeability (K_h), unit weight (γ), and vertical drained constrained modulus (M).

The seismic dilatometer (SDMT) is the combination of the DMT with an add-on seismic module for the measurement of shear wave velocity (V_s). Using established correlations, the SDMT results can also be used to assess the small strain modulus (G_o).

Portable Dynamic Cone Penetrometers: Portable Dynamic Cone Penetrometer (DCP) tests are carried out by driving a 16mm diameter rod with a 20mm diameter cone end with a 9kg hammer dropping 510mm. The test is described in Australian Standard 1289.6.3.2–1997 (R2013) *'Methods of Testing Soils for Engineering Purposes, Soil Strength and Consolidation Tests – Determination of the Penetration Resistance of a Soil – 9kg Dynamic Cone Penetrometer Test'*.

The results are used to assess the relative compaction of fill, the relative density of granular soils, and the strength of cohesive soils. Using established correlations, the DCP test results can also be used to assess California Bearing Ratio (CBR).

Refusal of the DCP can occur on a variety of materials such as obstructions within any fill, tree roots, hard clay, gravel or ironstone, cobbles and boulders, and does not necessarily indicate rock level.

Vane Shear Test: The vane shear test is used to measure the undrained shear strength (C_u) of typically very soft to firm fine grained cohesive soils. The vane shear is normally performed in the bottom of a borehole, but can be completed from surface level, the bottom and sides of test pits, and on recovered undisturbed tube samples (when using a hand vane).

The vane comprises four rectangular blades arranged in the form of a cross on the end of a thin rod, which is coupled to the bottom of a drill rod string when used in a borehole. The size of the vane is dependent on the strength of the fine grained cohesive soils; that is, larger vanes are normally used for very low strength soils. For borehole testing, the size of the vane can be limited by the size of the casing that is used.

For testing inside a borehole, a device is used at the top of the casing, which suspends the vane and rods so that they do not sink under self-weight into the 'soft' soils beyond the depth at which the test is to be carried out. A calibrated torque head is used to rotate the rods and vane and to measure the resistance of the vane to rotation.

With the vane in position, torque is applied to cause rotation of the vane at a constant rate. A rate of 6° per minute is the common rotation rate. Rotation is continued until the soil is sheared and the maximum torque has been recorded. This value is then used to calculate the undrained shear strength. The vane is then rotated rapidly a number of times and the operation repeated until a constant torque reading is obtained. This torque value is used to calculate the remoulded shear strength. Where appropriate, friction on the vane rods is measured and taken into account in the shear strength calculation.

LOGS

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

The terms and symbols used in preparation of the logs are defined in the following pages.

Interpretation of the information shown on the logs, and its application to design and construction, should therefore take into account the spacing of boreholes or test pits, the method of drilling or excavation, the frequency of sampling and testing and the possibility of other than 'straight line' variations between the boreholes or test pits. Subsurface conditions between boreholes or test pits may vary significantly from conditions encountered at the borehole or test pit locations.

GROUNDWATER

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

- Although groundwater may be present, in low permeability soils it may enter the hole slowly or perhaps not at all during the time it is left open.
- A localised perched water table may lead to an erroneous indication of the true water table.
- Water table levels will vary from time to time with seasons or recent weather changes and may not be the same at the time of construction.
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must be washed out of the hole or 'reverted' chemically if reliable water observations are to be made.

More reliable measurements can be made by installing standpipes which are read after the groundwater level has stabilised at intervals ranging from several days to perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from perched water tables or surface water.

FILL

The presence of fill materials can often be determined only by the inclusion of foreign objects (eg. bricks, steel, etc) or by distinctly unusual colour, texture or fabric. Identification of the extent of fill materials will also depend on investigation methods and frequency. Where natural soils similar to those at the site are used for fill, it may be difficult with limited testing and sampling to reliably assess the extent of the fill.

The presence of fill materials is usually regarded with caution as the possible variation in density, strength and material type is much greater than with natural soil deposits. Consequently, there is an increased risk of adverse engineering characteristics or behaviour. If the volume and quality of fill is of importance to a project, then frequent test pit excavations are preferable to boreholes.

LABORATORY TESTING

Laboratory testing is normally carried out in accordance with Australian Standard 1289 *'Methods of Testing Soils for Engineering Purposes'* or appropriate NSW Government Roads & Maritime Services (RMS) test methods. Details of the test procedure used are given on the individual report forms.

ENGINEERING REPORTS

Engineering reports are prepared by qualified personnel and are based on the information obtained and on current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal (eg. a three storey building) the information and interpretation may not be relevant if the design proposal is changed (eg. to a twenty storey building). If this happens, the Company will be pleased to review the report and the sufficiency of the investigation work.

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

- Unexpected variations in ground conditions – the potential for this will be partially dependent on borehole spacing and sampling frequency as well as investigation technique.
- Changes in policy or interpretation of policy by statutory authorities.
- The actions of persons or contractors responding to commercial pressures.
- Details of the development that the Company could not reasonably be expected to anticipate.

If these occur, the Company will be pleased to assist with investigation or advice to resolve any problems occurring.

SITE ANOMALIES

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

REPRODUCTION OF INFORMATION FOR CONTRACTUAL PURPOSES

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

Copyright in all documents (such as drawings, borehole or test pit logs, reports and specifications) provided by the Company shall remain the property of Jeffery and Katauskas Pty Ltd. Subject to the payment of all fees due, the Client alone shall have a licence to use the documents provided for the sole purpose of completing the project to which they relate. Licence to use the documents may be revoked without notice if the Client is in breach of any obligation to make a payment to us.

REVIEW OF DESIGN

Where major civil or structural developments are proposed or where only a limited investigation has been completed or where the geotechnical conditions/constraints are quite complex, it is prudent to have a joint design review which involves an experienced geotechnical engineer/engineering geologist.

SITE INSPECTION

The Company will always be pleased to provide engineering inspection services for geotechnical aspects of work to which this report is related.

Requirements could range from:

i) a site visit to confirm that conditions exposed are no worse than those interpreted, to

ii) a visit to assist the contractor or other site personnel in identifying various soil/rock types and appropriate footing or pile founding depths, or

iii) full time engineering presence on site.

SYMBOL LEGENDS

SOIL


FILL


TOPSOIL


CLAY (CL, CI, CH)


SILT (ML, MH)


SAND (SP, SW)


GRAVEL (GP, GW)


SANDY CLAY (CL, CI, CH)


SILTY CLAY (CL, CI, CH)


CLAYEY SAND (SC)


SILTY SAND (SM)


GRAVELLY CLAY (CL, CI, CH)


CLAYEY GRAVEL (GC)


SANDY SILT (ML, MH)


PEAT AND HIGHLY ORGANIC SOILS (Pt)

ROCK


CONGLOMERATE


SANDSTONE


SHALE/MUDSTONE


SILTSTONE


CLAYSTONE


COAL


LAMINITE


LIMESTONE


PHYLLITE, SCHIST


TUFF


GRANITE, GABBRO


DOLERITE, DIORITE


BASALT, ANDESITE


QUARTZITE

OTHER MATERIALS


BRICKS OR PAVERS


CONCRETE


ASPHALTIC CONCRETE

CLASSIFICATION OF COARSE AND FINE GRAINED SOILS

Major Divisions		Group Symbol	Typical Names	Field Classification of Sand and Gravel	Laboratory Classification	
Coarse grained soil (more than 65% of soil excluding oversize fraction is greater than 0.075mm)	GRAVEL (more than half of coarse fraction is larger than 2.36mm	GW	Gravel and gravel-sand mixtures, little or no fines	Wide range in grain size and substantial amounts of all intermediate sizes, not enough fines to bind coarse grains, no dry strength	≤ 5% fines	$C_u > 4$ $1 < C_c < 3$
		GP	Gravel and gravel-sand mixtures, little or no fines, uniform gravels	Predominantly one size or range of sizes with some intermediate sizes missing, not enough fines to bind coarse grains, no dry strength	≤ 5% fines	Fails to comply with above
		GM	Gravel-silt mixtures and gravel-sand-silt mixtures	'Dirty' materials with excess of non-plastic fines, zero to medium dry strength	≥ 12% fines, fines are silty	Fines behave as silt
		GC	Gravel-clay mixtures and gravel-sand-clay mixtures	'Dirty' materials with excess of plastic fines, medium to high dry strength	≥ 12% fines, fines are clayey	Fines behave as clay
	SAND (more than half of coarse fraction is smaller than 2.36mm)	SW	Sand and gravel-sand mixtures, little or no fines	Wide range in grain size and substantial amounts of all intermediate sizes, not enough fines to bind coarse grains, no dry strength	≤ 5% fines	$C_u > 6$ $1 < C_c < 3$
		SP	Sand and gravel-sand mixtures, little or no fines	Predominantly one size or range of sizes with some intermediate sizes missing, not enough fines to bind coarse grains, no dry strength	≤ 5% fines	Fails to comply with above
		SM	Sand-silt mixtures	'Dirty' materials with excess of non-plastic fines, zero to medium dry strength	≥ 12% fines, fines are silty	N/A
		SC	Sand-clay mixtures	'Dirty' materials with excess of plastic fines, medium to high dry strength	≥ 12% fines, fines are clayey	

Major Divisions		Group Symbol	Typical Names	Field Classification of Silt and Clay			Laboratory Classification
				Dry Strength	Dilatancy	Toughness	% < 0.075mm
Fine grained soils (more than 35% of soil excluding oversize fraction is less than 0.075mm)	SILT and CLAY (low to medium plasticity)	ML	Inorganic silt and very fine sand, rock flour, silty or clayey fine sand or silt with low plasticity	None to low	Slow to rapid	Low	Below A line
		CL, CI	Inorganic clay of low to medium plasticity, gravelly clay, sandy clay	Medium to high	None to slow	Medium	Above A line
		OL	Organic silt	Low to medium	Slow	Low	Below A line
	SILT and CLAY (high plasticity)	MH	Inorganic silt	Low to medium	None to slow	Low to medium	Below A line
		CH	Inorganic clay of high plasticity	High to very high	None	High	Above A line
		OH	Organic clay of medium to high plasticity, organic silt	Medium to high	None to very slow	Low to medium	Below A line
	Highly organic soil	Pt	Peat, highly organic soil	–	–	–	–

Laboratory Classification Criteria

A well graded coarse grained soil is one for which the coefficient of uniformity $Cu > 4$ and the coefficient of curvature $1 < C_c < 3$. Otherwise, the soil is poorly graded. These coefficients are given by:

$$C_U = \frac{D_{60}}{D_{10}} \qquad and \qquad C_C = \frac{(D_{30})^2}{D_{10}\, D_{60}}$$

Where D_{10}, D_{30} and D_{60} are those grain sizes for which 10%, 30% and 60% of the soil grains, respectively, are smaller.

NOTES:

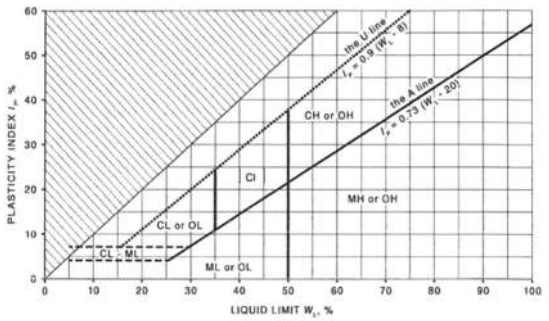
1 For a coarse grained soil with a fines content between 5% and 12%, the soil is given a dual classification comprising the two group symbols separated by a dash; for example, for a poorly graded gravel with between 5% and 12% silt fines, the classification is GP-GM.

2 Where the grading is determined from laboratory tests, it is defined by coefficients of curvature (C_c) and uniformity (C_u) derived from the particle size distribution curve.

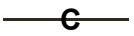
3 Clay soils with liquid limits > 35% and ≤ 50% may be classified as being of medium plasticity.

4 The U line on the Modified Casagrande Chart is an approximate upper bound for most natural soils.

Modified Casagrande Chart for Classifying Silts and Clays according to their Behaviour



LOG SYMBOLS

Log Column	Symbol	Definition
Groundwater Record		Standing water level. Time delay following completion of drilling/excavation may be shown.
		Extent of borehole/test pit collapse shortly after drilling/excavation.
		Groundwater seepage into borehole or test pit noted during drilling or excavation.
Samples	ES	Sample taken over depth indicated, for environmental analysis.
	U50	Undisturbed 50mm diameter tube sample taken over depth indicated.
	DB	Bulk disturbed sample taken over depth indicated.
	DS	Small disturbed bag sample taken over depth indicated.
	ASB	Soil sample taken over depth indicated, for asbestos analysis.
	ASS	Soil sample taken over depth indicated, for acid sulfate soil analysis.
	SAL	Soil sample taken over depth indicated, for salinity analysis.
Field Tests	N = 17 4, 7, 10	Standard Penetration Test (SPT) performed between depths indicated by lines. Individual figures show blows per 150mm penetration. 'Refusal' refers to apparent hammer refusal within the corresponding 150mm depth increment.
	N_c = 5 7 3R	Solid Cone Penetration Test (SCPT) performed between depths indicated by lines. Individual figures show blows per 150mm penetration for 60° solid cone driven by SPT hammer. 'R' refers to apparent hammer refusal within the corresponding 150mm depth increment.
	VNS = 25	Vane shear reading in kPa of undrained shear strength.
	PID = 100	Photoionisation detector reading in ppm (soil sample headspace test).
Moisture Condition (Fine Grained Soils)	w > PL	Moisture content estimated to be greater than plastic limit.
	$w \approx$ PL	Moisture content estimated to be approximately equal to plastic limit.
	w < PL	Moisture content estimated to be less than plastic limit.
	$w \approx$ LL	Moisture content estimated to be near liquid limit.
	w > LL	Moisture content estimated to be wet of liquid limit.
(Coarse Grained Soils)	D	DRY – runs freely through fingers.
	M	MOIST – does not run freely but no free water visible on soil surface.
	W	WET – free water visible on soil surface.
Strength (Consistency) Cohesive Soils	VS	VERY SOFT – unconfined compressive strength ≤ 25kPa.
	S	SOFT – unconfined compressive strength > 25kPa and ≤ 50kPa.
	F	FIRM – unconfined compressive strength > 50kPa and ≤ 100kPa.
	St	STIFF – unconfined compressive strength > 100kPa and ≤ 200kPa.
	VSt	VERY STIFF – unconfined compressive strength > 200kPa and ≤ 400kPa.
	Hd	HARD – unconfined compressive strength > 400kPa.
	Fr	FRIABLE – strength not attainable, soil crumbles.
	( )	Bracketed symbol indicates estimated consistency based on tactile examination or other assessment.
Density Index/ Relative Density (Cohesionless Soils)		**Density Index (I_D) Range (%)** / **SPT 'N' Value Range (Blows/300mm)**
	VL	VERY LOOSE – ≤ 15 – 0 – 4
	L	LOOSE – > 15 and ≤ 35 – 4 – 10
	MD	MEDIUM DENSE – > 35 and ≤ 65 – 10 – 30
	D	DENSE – > 65 and ≤ 85 – 30 – 50
	VD	VERY DENSE – > 85 – > 50
	( )	Bracketed symbol indicates estimated density based on ease of drilling or other assessment.
Hand Penetrometer Readings	300 250	Measures reading in kPa of unconfined compressive strength. Numbers indicate individual test results on representative undisturbed material unless noted otherwise.

Log Column	Symbol	Definition
Remarks	'V' bit	Hardened steel 'V' shaped bit.
	'TC' bit	Twin pronged tungsten carbide bit.
	T_{60}	Penetration of auger string in mm under static load of rig applied by drill head hydraulics without rotation of augers.
	Soil Origin	The geological origin of the soil can generally be described as: RESIDUAL – soil formed directly from insitu weathering of the underlying rock. No visible structure or fabric of the parent rock. EXTREMELY WEATHERED – soil formed directly from insitu weathering of the underlying rock. Material is of soil strength but retains the structure and/or fabric of the parent rock. ALLUVIAL – soil deposited by creeks and rivers. ESTUARINE – soil deposited in coastal estuaries, including sediments caused by inflowing creeks and rivers, and tidal currents. MARINE – soil deposited in a marine environment. AEOLIAN – soil carried and deposited by wind. COLLUVIAL – soil and rock debris transported downslope by gravity, with or without the assistance of flowing water. Colluvium is usually a thick deposit formed from a landslide. The description 'slopewash' is used for thinner surficial deposits. LITTORAL – beach deposited soil.

Classification of Material Weathering

Term		Abbreviation		Definition
Residual Soil		RS		Material is weathered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are no longer visible, but the soil has not been significantly transported.
Extremely Weathered		XW		Material is weathered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are still visible.
Highly Weathered	Distinctly Weathered (Note 1)	HW	DW	The whole of the rock material is discoloured, usually by iron staining or bleaching to the extent that the colour of the original rock is not recognisable. Rock strength is significantly changed by weathering. Some primary minerals have weathered to clay minerals. Porosity may be increased by leaching, or may be decreased due to deposition of weathering products in pores.
Moderately Weathered		MW		The whole of the rock material is discoloured, usually by iron staining or bleaching to the extent that the colour of the original rock is not recognisable, but shows little or no change of strength from fresh rock.
Slightly Weathered		SW		Rock is partially discoloured with staining or bleaching along joints but shows little or no change of strength from fresh rock.
Fresh		FR		Rock shows no sign of decomposition of individual minerals or colour changes.

NOTE 1: The term 'Distinctly Weathered' is used where it is not practicable to distinguish between 'Highly Weathered' and 'Moderately Weathered' rock. 'Distinctly Weathered' is defined as follows: *'Rock strength usually changed by weathering. The rock may be highly discoloured, usually by iron staining. Porosity may be increased by leaching, or may be decreased due to deposition of weathering products in pores'*. There is some change in rock strength.

Rock Material Strength Classification

Term	Abbreviation	Uniaxial Compressive Strength (MPa)	Guide to Strength	
			Point Load Strength Index $Is_{(50)}$ (MPa)	Field Assessment
Very Low Strength	VL	0.6 to 2	0.03 to 0.1	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 Strength	L	2 to 6	0.1 to 0.3	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 by 50mm diameter may be broken by hand. Sharp edges of core may be friable and break during handling.
Medium Strength	M	6 to 20	0.3 to 1	Scored with a knife; a piece of core 150mm long by 50mm diameter can be broken by hand with difficulty.
High Strength	H	20 to 60	1 to 3	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 Strength	VH	60 to 200	3 to 10	Hand specimen breaks with pick after more than one blow; rock rings under hammer.
Extremely High Strength	EH	> 200	> 10	Specimen requires many blows with geological pick to break through intact material; rock rings under hammer.

Abbreviations Used in Defect Description

Cored Borehole Log Column		Symbol Abbreviation	Description
Point Load Strength Index		• 0.6	Axial point load strength index test result (MPa)
		x 0.6	Diametral point load strength index test result (MPa)
Defect Details	– Type	Be	Parting – bedding or cleavage
		CS	Clay seam
		Cr	Crushed/sheared seam or zone
		J	Joint
		Jh	Healed joint
		Ji	Incipient joint
		XWS	Extremely weathered seam
	– Orientation	Degrees	Defect orientation is measured relative to normal to the core axis (ie. relative to the horizontal for a vertical borehole)
	– Shape	P	Planar
		C	Curved
		Un	Undulating
		St	Stepped
		Ir	Irregular
	– Roughness	Vr	Very rough
		R	Rough
		S	Smooth
		Po	Polished
		Sl	Slickensided
	– Infill Material	Ca	Calcite
		Cb	Carbonaceous
		Clay	Clay
		Fe	Iron
		Qz	Quartz
		Py	Pyrite
	– Coatings	Cn	Clean
		Sn	Stained – no visible coating, surface is discoloured
		Vn	Veneer – visible, too thin to measure, may be patchy
		Ct	Coating ≤ 1mm thick
		Filled	Coating > 1mm thick
	– Thickness	mm.t	Defect thickness measured in millimetres