

INTRUSIVE GEOTECHNICAL INVESTIGATION REPORT

Gillieston Public School redevelopment and new public preschool

17 January 2025

Prepared for: School Infrastructure NSW

Prepared by: Stantec Australia Pty Itd

Project Number: 304100928

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School ID:	1982
School Address:	Corner Northview Street & Ryans Road, Gillieston Heights, NSW 2321
School Region:	Hunter and Central Coast NSW
Company Name:	Stantec Australia Pty Ltd
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4	15/01/2025	Amendments to wording as per SI Planning and client request		

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Appendix A – Site Plans

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Activity

The Gillieston Public School have been identified by the NSW Department of Education (DoE) as requiring redevelopment. The proposed Gillieston Public School redevelopment and new public preschool is driven by service need including increase in expected student enrolments and the and removing demountable structure and replacement with permanent teaching spaces.

The Gillieston Public School redevelopment and new public preschool comprises the following activity:

- > Demolition and removal of existing temporary structures.
- > Site preparation activity, including demolition, earthworks, tree removal.
- > Construction of new:
 - 32 permanent general learning spaces and 3 support teaching spaces
 - Administration and staff hubs
 - Hall, canteen and library
 - Out of school hours care
 - Public preschool (standalone building for 60 places)
 - Covered Outdoor Learning Areas (COLAs)
 - Outdoor play areas, including games courts and yarning circle
 - New at-grade car parking
 - Extension of the existing drop-off / pick-up area and new bus bay
 - Realignment of the existing fencing
 - Associated stormwater infrastructure upgrades
 - Associated landscaping
 - Associated pedestrian and road upgrade activity

1 Introduction

Stantec Australia (Stantec, formerly Cardno) was engaged by SINSW to complete an Intrusive Geotechnical Investigation Report for the Gillieston Public School, which is located at 100 Ryans Road, Gillieston Heights, NSW (the site). At the time of preparing this report, this was the site assessed, however it is noted that the REF site boundary also includes Lot 2 DP1308605, located at 19 Northview Street. Geotechnical engineer from Stantec attended site between 19 and 21 December 2022. The purpose of this investigation was to assess the site's surface and subsurface conditions in order to provide recommendations from a geotechnical viewpoint for the design and construction of the proposed school redevelopment on the existing site.

The results of the investigation are detailed in this report. The site location and site layout are depicted on **Appendix A – Site Plan.**

The scope of work for this investigation was completed in accordance with work order DDWO03878/22.

1.1 Background and Proposed Activity

Gillieston Public School is located in Gillieston Heights which is a suburb of the City of Maitland local government area in the Hunter Region of New South Wales. It is located at the vicinity of residential properties and Hunter Land Management. The site's infrastructure is predominantly located in the West portion of site and surrounded by open grass areas.

At the time of preparing this report, it was understood that the proposed activity will include demolition of the existing facilities and the construction of new school buildings with carparks.

No basement will be proposed. Earthwork will be limited to site general levelling only.

1.2 Objectives

The objectives of the geotechnical investigation were to provide information regarding the existing condition and the required data for the proposed activity. The results from the investigation undertaken are collated in this Intrusive Geotechnical Investigation report (IGIR) which comprises:

- Site investigation and fieldwork description.
- Investigation results including fieldwork results, in situ tests, subsurface conditions and groundwater conditions (if encountered).
- Laboratory testing results.
- Assessment of soil aggressivity (salinity) conditions.
- Geotechnical design parameters suitable for the proposed activity infrastructure.
- Earthquake design parameters in accordance with 'AS 1170.4-2007'.
- Subgrade assessment including design CBR.
- Site classification in accordance with 'AS 2870'.
- Foundation recommendations.
- Recommendations on earthworks including commentary on site preparation, drainage, erosion and vibrations.

2 Significance of Environmental Aspects

Based on the identification of potential impacts and an assessment of the nature and extent of the impacts of the proposed activity, it is determined that all potential impacts can be appropriately mitigated to ensure that there is minimal impact on the locality, community and/or the environment.

See Section 6 for further details.

3 Site Details

The Site is identified as 100 Ryans Road and 19 Northview Street, Gillieston Heights, legally described as Lot 51 DP 1162489 and Part Lot 2 DP 1308605.

The Site is located within the Maitland Local Government Area (LGA) and is zoned RU2 Rural Landscape and R1 General Residential zone under the provisions of the Maitland Local Environmental Plan 2011 (MLEP2011).

Existing attributes of the subject site are noted as follows:

- The subject site exhibits an area of approximately 23,385m² and is located in the suburb of Gillieston Heights;
- The subject site has a frontage to Ryans Road to the east, Gillieston Road to the north, and Northview Street to the south;
- In its existing state, the subject site comprises the existing Gillieston Public School. Existing school buildings are primarily located in the west portion of the subject site with a large area of open space situated in the eastern portion. There are limited permanent structures located on the subject site with thirteen (13) existing demountable classrooms currently occupying the subject site. Permanent buildings consist of the Main Administration Building, Original Brick Cottage, Library and GLS building located in the centre of the subject site; and
- Carparking is provided from Gillieston Road for staff. Pedestrian access is available via this main entrance from Gillieston Road and via a separate pedestrian-only access gates on Northview Street and Ryans Road.

The existing site context is shown in Figure 1 and Figure 2 below.



Figure 1 – Cadastral Map (Source: NSW Spatial Viewer, 2024)



Figure 2 – Site Aerial Map (Source: Near Map, 2024)

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4 Findings of Investigation

4.1 Assessed Site Details

Details related to the site at the time of completing the investigation are included in **Table 4-1** below whilst site features are shown in **Appendix A**.

Table 4-1	Site Details
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Details	Comments
Site address	100 Ryans Road, Gillieston Heights, NSW 2321
Applicable Lot and Deposited Plan	51/DP1162489
Current land use	The land is currently used Gillieston Public School. This consists of school infrastructure and open grass areas.
Proposed land use	To Stantec's knowledge the selected land will be used for facilities, buildings and infrastructures activity to accommodate the increased local enrolment demand. No basement will be proposed. Earthwork will be limited to site general levelling only.
Local Government Authority (LGA)	City of Maitland Local Government Area
Current zoning (Maitland Local Environmental Plan 2011)	RU2: Rural Landscape, and R1: General Residential
Site coordinates (GDA1994 – MGA56)	362417.343, 6375244.41
Regional Contour (mAHD)	Site dips down North generally from about RL 30m at the South of the site to about RL 24m.
(Referenced to 2022 Lotsearch)	

4.2 Surrounding Land Use

The land uses immediately surrounding the site were identified using aerial imagery and are summarised below in **Table 4-2**. The site and surrounding land uses are shown in **Appendix A**.

Table 4-2	Surrounding Land Use
Direction	Land Use or Activity
North	Gillieston Road and low-density residential properties
East	Low-density residential properties followed by Brave Cosmetics and Aquilina Auto Electrical Mobile Service
South	Northview Street, General residential properties followed by Hunter Land Management
West	Ryans Road, Rural Landscapes, an unnamed creek followed by Low-density residential properties

4.3 Regional and Site Settings

Site setting information, as listed within publicly available data sets, is summarised in Table 4-3.

Table 4-3 S	ite Setting Information
Item	Details
Regional Soil	NSW DPIE <i>eSPADE</i> v2.1 website indicates that the site overlies on Bolwarra Heights Landscape (9232bh), which has the following characteristics:
Lanoscape	 Landscape—rolling low hills on Permian sediments in the centre-west of the sheet in the East Maitland Hills region. Slopes are 5–20%, elevation to 100 m, local relief to 80 m. Cleared tall open-forest.
	• Soils—moderately deep (<150cm) well-drained Yellow Podzolic Soils, Brown Podzolic Soils with some moderately deep (<100cm) well drained Lithosols on crests, moderately deep (<140cm) imperfectly drained yellow Soloths on lower slopes.
	 Qualities and Limitations—moderate foundation hazard, water erosion hazard, high run-on (localised), seasonal waterlogging (localised), localised steep slopes with mass movement hazard.
Atlas of Australian Soils	Atlas of Australian Soils indicated that the site overlies on unit Gb10 which is described as River terraces, levees, flood-plains, coastal swamps, and tidal flats. This unit contains the same land forms and soils as unit Gb9, but in addition has (i) swamps and levees of the lower river flood-plain of (Uf6.6), (Ug5), and other undescribed soils; (ii) estuarine flats of peaty or organic soils over acid clays; and (iii) tidal mud flats. The soils of these areas are not well known but probably have similarities with the soils of units J3, Mc4, NY1, and NN1. The smaller areas mapped as unit Gb10 consist mainly of areas of (i) and/or (iii) above. Gb9 is described as River terraces and flood-plains: chief soils are dark friable loamy soils (Um6.11) locally underlain by either sandy or clayey substrata, and occurring on the middle river terraces. Associated are hard alkaline dark soils (Dd1.33 and Dd1.43), and/or friable dark soils (Dd3.12), and/or hard alkaline brown soils (Db1.33) on terrace remnants flanking the valley slopes; siliceous sands (Uc1.23) on low terraces adjoining the river; and local areas of various soils including (Ug5.15), (Ug5.16) and possibly (Ug5.4), (Db1), and (Dy) soils. Locally the (Ug5) soils may form soil complexes with the (Dd) and (Db) soils.
Regional Geology	The MinView NSW surface geology (ge612) online map illustrates that the subject site is underlain by Branxton Formation (Pmtb) of the Maitland Group from Roadian age. The map shows the site is underlain by Branxton Formation (Pmtb) which is charactered as dominantly conglomerate, sandstone, siltstone.
Regional Groundwater	The Lotsearch report (LS038890 EP) with data sourced from WaterNSW showed no registered groundwater bores within a 500 m radius of the site. The nearest bore was GW201877, a stock and domestic bore 1258 m north east of site.
Surface Water Bodies	The nearest surface water body is an unnamed creek, which surrounds the site in an unenclosed oval shape with a minor radius of 250m and major radius of 530m approximately.
Acid Sulfate Soils	The NSW Government Planning Industry and Environment online mapping tool, eSPADE Version 2.1, indicates that the site is not mapped as being situated within or near an ASS risk area. The nearest mapped ASS risk area is approximately 250m east in an unnamed creek, which is identified as H1, High probability <1 m below ground surface.

4.4 Site Description

The site is in an irregular shape with dimension of approximately 195 m x 116 m, covering an area of about 20643m². It is bounded by Gillieston Road and low-density residential properties to the North, low-density residential properties followed by Brave Cosmetics and Aquilina Auto Electrical Mobile Service to the East, Northview Street, General residential properties followed by Hunter Land Management to the South, Ryans Road, Rural Landscapes, an unnamed creek followed by Low-density residential properties to the West. The site is currently occupied by Gillieston Public School.

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Site photos are shown below:



Photo 1 - Existing school site

Photo 2 - Existing school site looking west

4.5 Geology

The 1:100,000 Geological Series Sheet provided in Appendix – B indicates that the site is underlain by Branxton Formation (Pmtb) with the lithology of conglomerate, sandstone, siltstone from Maitland Group. The site is also adjacent to:

- Alluvial backswamp deposits (Q_ab) to the north west, described as Organic-rich mud, peat, silt, clay, and
- Alluvial terrace deposits (QP_at) to north, described as silt, clay, (fluvially- deposited) fine to medium grained quartz-lithic sand, polymictic gravel from Quaternary age, and
- Alluvial valley deposits (Q_av) to north east, described as silt, clay, (fluvially deposited) lithic to quartz-lithic sand, gravel from Quaternary age, and
- Greta Coal Measures (Pgr) to west, described as sandstone, siltstone, pellet claystone, coal, chert, sporadic conglomerate from Permian age, and
- Muree Sandstone (Pmtu) to east, described as fine- to coarse-grained sandstone, conglomerate, minor claystone from Roadian age.

The Central and Eastern NSW 1:100,000 Soil Landscape Sheet indicates that the site is entirely located on Bolwarra Heights (9232bh) depicts as moderately deep (<150cm) well-drained Yellow Podzolic Soils, Brown Podzolic Soils with some moderately deep (<100cm) well drained Lithosols on crests, moderately deep (<140cm) imperfectly drained yellow Soloths on lower slopes.

4.6 Fieldwork

Fieldwork for the geotechnical investigation was carried out between 19th and 21st December 2022 and comprised the following:

- A detailed walkover inspection of the site and surrounds.
- Drilling of a total of twenty-eight (28) auger boreholes (BH1 to BH28 inclusive) within the footprint of the proposed redevelopment, using a track mounted drill rig provided by Stratacore Drilling.
- DCP/SPT tests were carried out at regular interval to determine the soil consistency.
- Three (3) selected boreholes were advanced into rock coring (BH8, BH14, and BH25) in order to assess the subsurface bedrock conditions.
- Selection of representative soil samples to external NATA accredited labs for geotechnical lab testing.

The approximate boreholes locations are shown on the enclosed Test Location Plan referenced Figure 1 in Appendix A.

4.7 Surface Conditions

Based on the observations from the geotechnical investigation, the sub surface profile within the footprint of the proposed activity can be generalised as follows:

- Topsoil Silty Sand: brown to dark brown, fine to medium grained, to depths of up to 0.3m across the site, overlying;
- Colluvial Silty Sand: brown to dark brown, fine to medium grained, variable thickness across the site, overlying;
- Residual deposit Clay and Silty Clay: brown red, brown yellow and grey, medium to high plasticity, with sand and gravel, to depths of up to 1.5m across the site, overlying;
- Extremely Weathered (EWM) Silty Sand: orange brown, fine to medium grained, with ironstone gravel, overlying,
- Weathered Sandstone: pale grey and pale brown, fine to coarse grained, very low to medium strength.

The encountered subsurface materials and their relative strengths have been recorded and logged as Engineering Log of Boreholes and on a Penetration Resistance of Soil Test Sheet. These have been enclosed in Appendix B.

Groundwater table or seepage was not encountered in any of the boreholes during auger drilling to shallow depths of not more than about 3.1m below existing ground surface levels. It should be noted however, that variations in groundwater seepage flows may occur due to variations in rainfall duration and intensity. It is anticipated the proposed levelling earthwork will not intersect with the groundwater table.

4.8 Lab Test Results

Geotechnical testing was undertaken at STS Pty Ltd, an NATA accredited laboratory, with testing certificates included in Appendix C. Table 2-4 through to 2-7 summarise the laboratory test results undertaken on soil samples obtained from the borehole.

4.8.1 FIELD MOISTURE CONTENT

Moisture content tests were undertaken on selected samples. The results are summarised in Table 2-4 below

Borehole No	Depth (m)	Material Description	Field Moisture Content (%)
BH01	0.5 - 1	Silty Clay, brown, with some sand and gravel	12.8
BH03	0.5 - 1	Silty Clay, brown	13.4
BH05	0.5 - 1	Silty Clay, brown, some sand	15.1
BH08	0.5 - 1	Silty Sandy Clay, brown	12.8
BH13	0 – 0.5	Silty Sandy Clay, brown	14.9
BH20	0.5 - 1	Silty Clay, red brown	18.7

Table 2-4 Field Moisture

4.8.2 ATTERBERG LIMIT TEST RESULTS

Atterberg Limits tests were scheduled on selected samples. The results are summarised in Table 2-5 below.

Table 2-5 Atterberg	Limits T	est Results
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Borehole No	Depth (m)	Material Description	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)
BH01	0.5 – 1	Silty CLAY, brown	28	15	13
BH03	0.5 – 1	Silty CLAY, brown	AY, brown 29 14		15
BH05	0.5 – 1	Silty CLAY, brown	31	17	14
BH08	0.5 – 1	Silty Clay, brown	32	17	15
BH13	0 – 0.5	Silty Clay, brown	25	14	11
BH20	0.5 – 1	Silty Clay, brown	44	17	27

Borehole No	Depth (m)	Material Description	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)
BH26	0.5 – 1	Silty Clay, brown	18	16	2
BH28	0.5 – 1	Silty Clay, brown	22	17	5

4.8.3 PARTICLE SIZE DISTRIBUTION TEST AND EMERSON CRUMB TEST RESULTS

The Particle Size Distribution (PSD) and Emerson Class tests were performed on a selection of disturbed and SPT soil samples. The results are summarized in Table 2-5 below.

Borehole No	Depth (m)	Material Description	Gravels (%)	Sand (%)	Fines (Silt & Clay (%)	Emerson Class
BH01	0.5 – 1	Sandy CLAY, brown, trace gravel	14.7	37.9	47.4	3
BH03	0.5 – 1	Sandy CLAY, brown, trace gravel	7.2	45.7	47.1	-
BH05	0.5 – 1	CLAY, brown, with sand	7.2	15.7	77.1	5
BH09	0.5 – 1	Silty Clay	-	-	-	3
BH13	0 – 0.5	Silty Clay, brown	-	-	-	3
BH19	1 – 1.5	Silty Clay, brown	-	-	-	3
BH26	0.5 – 1	Silty Clay, brown	-	-	-	5

Table 2-5 Particle Size Distribution and Emerson Crumb Test Results

4.8.4 SOIL AGGRESSIVITY

Laboratory soil aggressivity testing was carried out on the soil sample taken on site. Result is summarised in Table 2-6 and attached in Appendix C.

Borehole No	Depth (m)	Chloride (mg/kg)	Conductivity (µS/cm)	рН	Resistivity (ohm.m)	Sulfate (mg/kg)
BH7	1 – 1.5	20	39	6	25600	40
BH12	0.2 – 0.5	<10	28	6	35700	<10
BH18	0.5 – 1	10	34	5.8	29400	30
BH25	0.9 – 1.3	20	32	5.9	31200	30
BH26	1 – 1.5	<50	30	5.9	33300	30

Table 2-6 Soil Aggressivity Test Results

Based on the above result and exposure classification outlined in AS 2159-2009, the subject alluvial and residual materials at both boreholes were assessed as non-aggressive for concrete piles in soil (Table 6.4.2 (C)) and non-aggressive for steel piles in soil (Table 6.5.2 (C)).

4.8.5 CBR

CBR test results are summarised as follows for the proposed carpark and driveway pavement design:

Table 2-7 CBR test results

Test ID	Depths (m)	Depths (m) Material FMC OMC %		MDD t/m ³	CBR %	
BH01	0.5 – 1	Sand / Clay	12.8	14.4	1.84	7.0
BH03	0.5 – 1	Sand / Clay	13.4	15.6	1.81	5.0
BH05	0.5 – 1	Clay	15.1	17.1	1.74	4.5

Based on the results of field investigation and laboratory testing results, value of CBR 3% subgrade is recommended at a project level for both colluvial and residual clay encountered across the site. Founding pavements on colluvial material would be subject inspection and approval by an experienced geotechnical consultant.

4.8.6 ACID SULPHATE SOIL

Five (5) selected soil samples were scheduled for SPOCAS Acid Sulfate Soil testing. The results of analysis for the soils are compared to the below ASSMAC assessment criteria. It is assumed that >1000 tonnes of material would be disturbed hence the action criteria for greater than 1000 tonnes have been applied.

Table 2-6 NSW ASSMAC Action Criteria

Type of Material Texture	Approx Clay Content (%<0.002mm)	Action Criteria >1000 tonnes Sulfur Trail Spos or Stos%	Action Criteria >1000 tonnes Acid Trail TPA or TSA mole H+/t			
Coarse e.g. Sands	< 5	0.03	18			
Loams / Light Clays	5 – 40	0.03	18			
Medium to Heavy Fine Clays / Silts (adopted)	<u>≥ 40</u>	<u>0.03</u>	<u>18</u>			

Results of SPOCAS testing results are shown below:

Sample	Depth (m)	Ph _{field}	Phox	TPA moles H+/ton	TSA moles H+/ton	Net Acidity %S	Net Acidity moles H+/ton
BH7	1 – 1.5	6	4.2	54	29	0.04	25
BH12	0.2 – 0.5	6	3.8	74	59	0.02	14
BH18	0.5 – 1	5.8	5.0	30	19	<0.02	12
BH25	0.9 – 1.3	5.9	4.5	42	14	0.04	27
BH26	1 – 1.5	5.9	4.2	60	39	0.03	21

Table 2-7 Results of SPOCAS Testing

Based on the SPOCAS test results summarised in Table 2-7, there are PASS encountered at the subject site as per the guideline of NSW ASSMAC. However, these minor detections have been influenced by the organic matter present in the tested soils. Therefore, further detailed testing should be undertaken to assess the requirement for an Acid Sulphate Soils Management Plan (ASSMP) for this proposed redevelopment.

4.8.7 ROCK STRENGTH TESTING

A summary of point load test results is provided in Table 2-8. Point load tests are conducted in accordance with AS 4133.4.1 – 2007 [1] on recovered rock core at intervals of approximately 1.5m, changes in lithology and/or above and below rock core samples, to aid on-site rock strength assessment using calibrated portable 6510 point load tester machines.

Rock strengths recorded on the borehole logs are based on field strength assessments confirmed onsite by point load index strength test (Is50) results. A standard conversion number of 20 has been adopted to convert the Is50 results into the empirical UCS values as part of the log preparation.

Borehole No	Rock Type	Depth (m)	Weathering	Orientation	l₅(50) MPa	Descriptive Strength
	Sandatana	2.2		D	0.17	L
	Sanusione	3.3		А	0.46	Μ
BH-00	Sandatana	A 45	S)//	D	0.33	L
	Sanusione	4.45	300	А	0.36	L
	Sandatana	1.62		D	0.025	VL
	Sanusione	1.03		А	0.03	VL
BH-18	Sandstone	2 56	N/1\//	D	0.14	L
DIFIO	Ganusione	2.50		А	0.96	Μ
	Sandstone	3 5 3	SW	D	0.91	М
	Sanuslone	3.33	300	A	0.96	М

Table 2-8 Point Load Test Result

Borehole No	Rock Type	Depth (m)	Weathering	Orientation	I₅(50) MPa	Descriptive Strength
	Sandstone	15	ш\л/	D	0.65	М
	Sanusione	1.5	1100	А	0.79	Μ
	Sandatana	2.24	N/1\A/	D	0.11	L
	Sanusione	2.31		А	0.16	L
ВП-20	Sandatana	2 1 2	N/1\A/	D	1.2	Μ
	Sanusione	3.12		А	0.67	М
	Sandatana	4 70	N/1\A/	D	0.33	L
	Sanusione	4.72	11111	A	0.25	L

Notes to table:

HW – Highly weathered MW – Moderately weathered SW – Slightly weathered FR – Fresh Rock D – Diametral

A – Axial

Uniaxial Compressive Strength (UCS) testing was conducted on two core samples.

Table 2-9 UCS Test Results

Borehole No	Depth (m)	Material Description	UCS strength (MPa)
BH08	3.43-3.57	Siltstone	2.5
BH25	2.73-2.92	Sandstone	13.0

4.9 Mine Subsidence

In 2024, Stantec were engaged to undertake a desktop mine subsidence assessment for the proposed redevelopment. The assessment was undertaken in order to support the Review of Environmental Factors (REF) for the proposed site redevelopment. To assist with the assessment Stantec were provided with a letter from Subsidence Advisory (SA) NSW (Ref.EOTH24-00188,Dated. 2 July 24) which upon review indicated the following regarding the site,

- > The property is not within a declared Mine Subsidence District and thus approval by SA NSW is not required.
- > The property is however underlain by workings of the Homeville Top Split Seam at 390 m depth of cover.
- > The property is within the angle of draw (zone of influence) of workings of the Greta Top Split Seam at 320 m cover.
- > Recommendations that a desktop mine subsidence study is undertaken by a suitable consultant and structures are designed 'to remain serviceable for any recommended subsidence parameters contained in the study'

A review of NSW Government's online Planning Portal "ePlanning Spatial viewer" [1] indicates that the site is not situated within a Mine Subsidence District. The eastern boundary of the 'Maitland West' mine subsidence district is noted to be on the other side of Ryans Road (west of the site). Further review of the underground mining layer on the planning portal indicates the site, although not in a mine subsidence district, is partially underlaid by known mine workings. The review of planning portal is consistent with SA NSW's advice (Ref.EOTH24-00188, Dated. 2 July 24).



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The desktop assessment undertaken by Stantec (reported under reference 30450162-004.2, dated. 26/11/24 [2]) concluded that there was a risk of mine subsidence impacting the site, albeit low. As such, subsidence impact parameters were estimated and recommended to be incorporated in the design of structures and infrastructure in order to mitigate the impacts of any subsidence.

Redevelopment of the site shall consider the findings and recommendations outlined in Stantec's desktop mine report and any advice/requirements from SA NSW (if provided).

5 Geotechnical Comments

5.1 Proposed Activity

It is understood that the redevelopment activities comprise the removal of selected buildings within the site and the construction of new permanent teaching blocks. The proposed permanent buildings are understood to be one and two storey and are expected to be founded on piers constructed within good quality rock. The design loads and other detail design information of the structures are unknown at the time of writing this report.

5.2 Excavation and Earthwork

Excavation will be limited to general levelling only for the proposed school buildings and is expected to encounter mostly soil and very low to low strength sandstone at a likely shallow depth. Medium to very high strength rock is expected in the deeper depths and therefore it is unlikely to be countered on the proposed earthwork.

Excavation of soil and very low to low strength rock may be readily achieved using conventional earthmoving equipment. Ripping or hammering may not be required for the proposed earthwork. However, considering the condition of the structures within the school, the induced vibration level control will be required to avoid impacting the adjacent properties.

Induced vibrations in structures adjacent to the excavation should not exceed a Peak Particle Velocity (PPV) of 10mm/sec for brick or unreinforced structures.

If vibrations in adjacent structures exceed the values recommended above or appear excessive during construction, excavation should cease and the project Geotechnical Engineer should be contacted immediately for appropriate reviews so that counter- measures/actions can be taken.

Earthwork should be carried out in compliance with AS3798-2007 "Guidelines on earthworks for commercial and residential developments".

5.3 Site Classification and Subgrade Preparation

It is considered that the subsurface conditions comprise topsoil overlying residual clay materials and sandstone. In strict accordance with AS2870-2011 the site would be classified as Class P given the presence of potential mine subsidence. When considering reactive soil movement only, an expected site classification of "Class M – Moderately reactive clay or silt site, which may experience moderate ground movement from moisture change" could be adopted (if applicable) for footings constructed in accordance with AS2870-2011. Additional lab tests during intrusive investigation will be required to verify this site classification. It should be noted that footings shall consider the recommendations outlined in Stantec's desktop mine report [2] and any advice/requirements from SA NSW (if provided).

The following site preparation measures are recommended:

- Remove all topsoil, fill and deleterious materials (including roots/vegetation);
- Proof roll and compact the exposed subgrade to at least 98% MMDD at +/- 2% OMC. Where the proof roll reveals soft-spots these should be excavated and replaced with approved engineering fill;
- Surface drainage should be maintained at all times by adopting appropriate cross-falls across the site. Surface drainage should be installed as soon as is practicable in order to capture and remove surface flows to prevent erosion and softening of the exposed surface.

Filling delivered to site must be approved by the geotechnical consultant prior to delivery to site. Highly reactive clay filling should be avoided.

Site observations and laboratory test results have indicated the presence of medium to high plasticity silty clays in some areas which could be adversely affected by inclement weather due to its moderate dispersive nature. Whilst these soils are typically of a stiff to very stiff consistency when dry, they can rapidly lose strength during rainfall and subsequent partial saturation and result in difficult trafficability conditions.

Conventional sediment and erosion control measures should be implemented during the construction phase, with exposed surfaces to be topsoiled and vegetated as soon as practicable following the completion of earthworks.

5.4 Temporary and Permanent Batter Slopes

Careful consideration must be given to the planning and design of excavation and excavation retention system (if required) to reduce the risks of destabilising and causing damage to the adjacent school structures and surrounding public footpaths/roads. As with any excavation (if any) some movement of the surrounding ground should be expected, the extent of which will depend on the encountered ground profile, support type and other factors such as stress relief in medium strength rock.

5.4.1.1 Temporary Cuts

Where open cuts are required as part of temporary activity during ground support. Recommendations for temporary unsupported cuts batters (if required) are presented in the following table.

Table 5-1Cut Batter Recommendations

Geotechnical profile	Temporary Batter (Horizontal to Vertical Ratio)
Colluvial Soil	2.5H:1V
Residual Soil & EWM	1.5H:1V
Sandstone Class IV - V	1H:1V

Notes:

- 1. Table 3-1 applies to temporary unsupported cut batters only, for a period of no greater than 3 months once constructed
- 2. Temporary batters apply to cuts no greater than 1.50m in vertical height. Where deeper cuts are proposed for each stratum, further geotechnical designed support or retention systems may be required.
- 3. Excavations in soil have assumed no groundwater table has been encountered;
- 4. The ground surface at the crest of the excavation is horizontal;
- 5. There is no surcharge at the crest of the excavation for a distance equal to the depth of the excavation;
- 6. All cuts are protected from erosion.

5.4.1.2 Permanent Cuts

Where permanent cuts will be required, it is proposed following measures would potentially be required.

Table 5-2Permanent Options

Geotechnical Profile	Permanent Options	Additional Comments					
Residual Soils	> Regrade batter slope> Soil nail and shotcrete	Residual soil encountered across subject site					
Sandstone Class IV – V	 > Regrade batter > Scaling, block removal and reprofiling > Rock / spot bolting > Rock fall netting > Catch fence and ditches 	Requires geotechnical input / site observations during top-down excavation activity to determine extend of stabilization options required					

5.5 Expected Structural Foundations

Foundation design will need to consider the recommendations outlined in Stantec's desktop mine report [2] and any advice/requirements from SA NSW (if provided).

Shallow footings comprising strip or pad footings founded and socketed a nominal 0.5m into the underlain residual stiff to very stiff soil may be designed for a serviceability end bearing capacity of 150 kPa.

Should higher bearing capacity be required, piers may be required and socked 0.5m into the underlain highly weathered sandstone could be designed for a serviceability end bearing capacity of 700kPa.

Foundations proportioned on the basis of the above allowable parameters would be expected to experience total settlements of less than 1% of the footing width (or pile diameter) under the applied working load, with differential settlements between adjacent columns expected to be less than half of this value.

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

5.6 Groundwater

It is anticipated that groundwater will be associated with seepage flows along the interface of the residual clay and bedrock and also minor seepage through fractures and joints in the rock above the permanent regional groundwater table. Considering the proposed earthwork will be limited to general levelling only, it is anticipated the proposed earthwork will not intersect with the groundwater table.

5.7 Earthquake Actions

The site stratigraphy comprises minor filling and topsoil underlain by stiff to hard silty clays, overlying bedrock at depths ranging from 1.8 m to 3 m within the footprint of the proposed structure. Therefore, the site's sub-soil class when assessed in accordance with AS 1170.4 - 2007 (Ref 4) is considered a rock site and a classification of Class Be is suggested.



6 Mitigation Measures

See the below table that outlines the appropriate mitigation measures for geotechnical risks outlined in this report.

Table 7-1 Mitigation Measu	Ires	
Project Stage Design (D) Construction (C) Operation (O)	Mitigation Measures	Relevant Section of report
D/C	Further intrusive geotechnical investigation must be undertaken to fill in data gaps and provide updated advice following recent design changes. This pertains particularly to the eastern section of the site previously not investigated, and areas where design changes have occurred (ie central portion of the site where deep cut is proposed)	Section 4 and Section 5
D/C	Additional testing to delineate / confirm presence of Acid Sulfate Soils.	Section 4.8.6



7 Limitations

The agreed scope of this assessment has been limited for the current purposes of the Client. Subsurface conditions may vary considerably away from the sample locations where information has been obtained.

This Document has been provided by Stantec subject to the following limitations:

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- > The scope and the period of Stantec's services are as described in Stantec's proposal and are subject to restrictions and limitations. Stantec did not perform a complete assessment of all possible conditions or circumstances that may exist at the site referenced in the Document. If a service is not expressly indicated, do not assume it has been provided. If a matter is not addressed, do not assume that any determination has been made by Stantec in regard to it.
- > Conditions may exist which were undetectable given the limited nature of the enquiry Stantec was retained to undertake with respect to the site. Variations in conditions may occur between investigatory locations, and there may be special conditions pertaining to the site which have not been revealed by the investigation and which have not therefore been taken into account in the Document. Accordingly, additional studies and actions may be required.
- In addition, it is recognised that the passage of time affects the information and assessment provided in this Document. Stantec's opinions are based upon information that existed at the time of the production of the Document. It is understood that the services provided allowed Stantec to form no more than an opinion of the actual conditions of the site at the time this Document was prepared and cannot be used to assess the effect of any subsequent changes in the quality of the site, or its surroundings, or any laws or regulations.
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References

- [1] NSW Government, "ePlanning Spatial Viewer," NSW Government Department of Customer Service, 2020. [Online]. Available: https://www.planningportal.nsw.gov.au/spatialviewer/#/find-a-property/address. [Accessed 07 10 2024].
- [2] Stantec Australia Pty Ltd, Report on Desktop Mine Subsidence Assessment Gillieston Public School Redevelopment 304501632-004.2, 26 November 2024.

Appendix A Site Plans



Appendix B Boreholes



Appendix C Test Results



Appendix A Site Plans







Maliland (NSW)

Cillipston Heights

Louth Park



Appendix B Boreholes



EXCAVATION - GEOLOGICAL LOG PIT NO : BH01 PROJECT : Proposed School Redevelopment FILE / JOB NO : 304100928 UCCATION - Cillipaten Public School SHEET : 1 OF 1																		
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LOCATION: Gillieston Public School POSITION: E: 362432.683, N: 6375153.028 (56 MGA2020) SURFACE ELEVATION: 24.879 (AHD)																					
EQUIPMENT TYPE : MI2 METHOD : Auger Drilling																					
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ee Explanat etails of abb basis of de	ory N previat script	otes fo tions ions.	or				CA	RDNC) NSV	V/ACT	PTYL	_TD							C) C al	rdn

PROJECT	. :	Propo	osed Scho	pol Red	develop	ment	EXCAVATION - GEOLOGICAL LOG		FILE / SHEE	NO: E JOB NO T: 1 OF	BH06 : 304100928 1
	1 : 1 • 1	Gillie E: 36	ston Publ 2436 988	IC Sch	ool 75233 ⁻	710 (98 (A	HD)		
EQUIPMEN	 NT T	YPE	: MI2	, 11. 00	10200.	10(METHOD : Auger Drilling	50 (71	110)		
DATE EXC	CAVA	TED	: 19/12/2	22			LOGGED BY : PB			C	CHECKED BY : TH
EXCAVAT	ION	DIME	NSIONS	: 0.10) m LO	NG (.10 m WIDE				
	DF	RILLIN	NG (n	1		7	MATERIAL	1			1
VE E penetration H	SUPPORT	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE	CONSISTENCY RELATIVE DENSITY	100 200 G HAND 300 ^M METER	STRUCTURE & Other Observations
	STABLE			0.5			0.40m 0.50m FILL: SANDY GRAVEL: grey, medium to coarse gravel, fine grained sand, trace low plasticity silt GRAVELLY SAND: orange brown, pale grey, fine grained sand, angular to sub-angular, medium to fine grained, ironstone gravel, trace low plasticity silt				FILL FILL WEATHERED ROCK
		Not Encountere	<u>1.50m</u> SPT 10/130mm HB N≅R	- 1.0 - - - 1.5 -				D			
			1.63m	2.0-			1.80m EXCAVATION BH06 TERMINATED AT 1.80 m Auger refusal on medium strength rock				
				- 2.5 - -							
3 10.03.00.09 Cardno M6i				- 3.0 — - - -							-
File>> 07/Nov/2024 16:4:				3.5							
ESTON.GPJ <5Drawing 				4.0							
TION 304100928_GILLI				4.5-							
	OTOG	RAPHS	, L	- 5.0 YES	•		X NO				
METHOD METHOD N Natuut E Exist B B Exist B Back B Bulld R Rippo R Rippo T Timb	METHOD PENETRATION SAMPLES & FIELD TESTS CLASSIFICATION SYMBOL N Natural Exposure Builton No Resistance U50 - Undisturbed Sample SOIL DESCRIPTION BH Backhoe Bucket Buildozer Blade No Resistance D - Disturbed Sample Based on Unified R Ripper WATER In Oct., 73 Water MOISTURE D D Dry Muter inflow water inflow water outflow PBT Plate Bearing Test W Wet								YMBOLS TION ffied ystem	S& C R V S F S V H V L M D V	CONSISTENCY/ RELATIVE DENSITY /S - Very Soft - Soft - Firm St - Stiff /St - Very Stiff - Hard /L - Very Loose - Loose MD - Medium Dense /D - Very Dense /D - Very Dense
See Explana details of ab & basis of de	atory brevi escrij	Notes ations otions	for S				CARDNO NSW/ACT PTY LTD				C Cardno

PROJECT	: :	Propo	osed Scho	ool Ree	develop	ment	EXCA	VATION - GE	EOLOGICA	AL LOG		FILE / SHEE	IO : JOB NO T:1 OF	BH07 : 304100 ⁼ 1	9928
	N : (Gillie E: 36	ston Publ 2431 770	IC Sch	ool 75215	274 (*	56 MGA2020)		SURFACE FLEV	ATION · 21 91	16 (AF	HD)			
EQUIPME	NT T	YPE	: MI2	, 14. 00	10210.	21 + (00 MG/ (2020)		METHOD : Aug	er Drilling		10)			
DATE EX	CAVA	ATED	: 19/12/	22					LOGGED BY : F	РВ			(CHECKE	DBY: TH
EXCAVAT	ION	DIME	NSIONS	: 0.10) m LO	NG ().10 m WIDE								
	DF		NG	1		z			MATI	ERIAL		⊳	ė		
VE E PENETRATION H	SUPPORT	GROUND WATEF LEVELS	SAMPLES 8 FIELD TEST	DEPTH (m)	GRAPHIC LOG	CLASSIFICATIO SYMBOL	Soil	MATERIAL DI I Type, Colour, Plasticit Secondary and M	ESCRIPTION y or Particle Charact inor Components	eristic	MOISTURE	CONSISTENC RELATIVE DENSITY	100 HAND 200 GPENETRC 300 METER	⁴⁰⁰	STRUCTURE Other Observations
	STABLE			- 0.0			FILL: SIL ⁻ angular, n	TY SAND: brown, fine grai nedium to fine grained grav	ned sand, low plasticity vel, trace of rootlets	v silt, trace				TOPS	
		ered		0.5			FILL: GR/ sub-round silt	AVELLY SAND: grey, mec	fine grained gravel, tra	sand, ice low plasticity				 FILL 	
		Not Encounte	<u>1.00m</u> D	- - 1.0 -			GRAVELI sub-round	LY SAND: orange brown, Jed, medium to coarse gra	medium to fine grained ined gravel, trace low p	sand, angular to plasticity silt	D			WEAT	
			1.50m SPT 5, 10/90mm HB N=R 1.74m	- - 1.5 -			1.74m								- - -
			1./4m	-			EXCAVA Auger ref	TION BH07 TERMINATEI	O AT 1.74 m ock						-
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	TES			YES			X NO								
N Natu N Natu N Natu BH Bacl B Bullo R Ripp R Ripp T T Timt	METHOD PENETRATION N Natural Exposure E Existing Excavation BH Backhoe Bucket B Bulldozer Blade R Ripper SUPPORT T T Timbering							SAMPLES & FIELD 1 U50 - Undisturbe 50 mm dia D - Disturbed 3 B - Bulk Distur MC - Moisture C HP - Hand Pene VS - Vane Shea R-Remoud PBT - Plate Bear	TESTS ed Sample meter Sample bed Sample content strometer (UCS kPa) ar; P-Peak, led (uncorrected kPa ing Test	CLASSIFICAT SOIL DE Based Classifica MOISTURE D - Dry M - Moist W - Wet	TON SY SCRIP on Unitation Sy	MBOLS TION fied ystem		CONSISTE RELATIVE /S 5 5 5 5 7 5 7 7 7 7 7 7 7 7 7 7 7 7 7	ENCY/ DENSITY - Very Soft - Soft - Firm - Stiff - Very Stiff - Hard - Very Loose - Loose - Medium Dense - Dense - Very Dense
See Explan details of at & basis of c	atory brevi escri	Notes iations ptions	for S				CA	RDNO NSW	ACT PTY	LTD			- 1	5	Cardno

PRO	DJEC	T :	Propo	sed Scho	ool Red	N levelop	ION ment	N-CORE DRILL HOLE - GEOLOGICA	L LOC		E NO : BH08 / JOB NO : 304100928 ET : 1 OF 2
POS	SITIO)N :	E: 362	2417.343	, N: 63	75244.4	410 (S	56 MGA2020) SURFACE ELEVATION : 22.156 (AHD)	AN	GLE FI	ROM HORIZONTAL : 90°
RIG	TYP	PE : N	112		MC	UNTIN	G :	Track CONTRACTOR : Stratacor	re	DR	ILLER : ML
DA	IESI	IARIE	:D:2	20/12/22	DATI	E COM	PLEI	ED : 20/12/22 DATE LOGGED : 20/12/22 LOGG	ED BY :	РВ	CHECKED BY : TH
		D	RILLIN	١G	1		1	MATERIAL	1	_	
PRO SVIP SVIP	GRESS	DRILLING ENETRATION	ROUND WATER LEVELS	SAMPLES &	DEPTH (m) RT (m AHD)	GRAPHIC LOG	ASSIFICATION SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE	ONSISTENCY RELATIVE DENSITY	STRUCTURE & Other Observations
A A	>		5		- 0.0 - 22.2			FILL: SILTY SAND: brown, fine grained sand, low plasticity silt, trace angular, medium to fine grained gravel, trace of rootlets		ō	TOPSOIL
		E		0.50m D	- 0.5 ^{21.7} -		сі-сн	0.50m CLAY: brown red, brown yellow and grey, medium to high plasticity, w fine to coarse grained sand, trace sub-angular to sub-rounded, mediu to fine grained gravel 0.90m	 m	St	
				1.00m	- 1.0 <i>-</i> ^{21.2} -			SILTY SAND: brown, fine to coarse grained sand, low plasticity silt, tra angular to sub-angular, medium to fine grained, ironstone gravel	ace		RESIDUAL SOIL
- AD/T		F	Not Encountered	1.50m SPT 5, 13/50mm HB N=R 1.70m	1.5		SM		D	D	-
03.00.0% Value IVIOE					2.0			2.10m SANDSTONE: recovered as silty sand, grey, orange brown, inferred extremely weathered sandstone, very low strength			WEATHERED ROCK
		н		3.00m	2.5						-
			-	14/10mm HB	19.2			3.10m Continued as Cored Drill Hole		-	
0 LE 2 304 1009 20 _ GILLIES 1 0N. GF3 .				3.01m	3.5 - 18.7 - -	-					-
					4.0 — ^{18.2}	•					-
					4.5 ^{17.7} 	- - - -					-
deta	Expla ails of asis o	anator abbre f desci	/ Note /iatior iption	es for is s.	5.0	1	1	STANTEC AUSTRALIA PTY LTD		1	Stantec

File: 304100928 BH08 2 OF 3

PRC	JEC	Г : F	Propo	sed Scho	ol Red	evelopr	CORED DRILL HC	DLE	LO	G	HO File She	LE NO : BH08 E/JOB NO : 304100928 EET : 2 OF 3
			Silles	ION PUDIC	NI 62			NI	22.45			
PUS		N : E	:: 362	417.343,	N: 637	5244.4	(10 (56 MGA2020) SURFACE ELEVATIO		22.15	6 (AHD)		
RIG				0/40/00					0R :	Stratacore		
			U. 2	· UNT	DATE		PLETED 20/12/22 DATE LOGGED 2	0/12/	22	LUGGE		
CAS						DF					BI	ERACTURES
PROG	RESS			~× 0					ESTIMA	ATED STRENGTH	NATURAL	
		» ۲۵	(%)	ES 8 EST	HD AHD	ЧЧС	DESCRIPTION ROCK TYPE : Colour, Grain size, Structure	ering		ls(50) • - Axial	FRACTURE	(ioints, partings, seams, zones, etc)
SING	TER	CORE	gg	-D T	ш ш	LOC	(texture, fabric, mineral composition, hardnes	sathe	5.2	2 - Diametral	(((((((((((((((((((((((((((((((((((((((Description, orientation, infilling
& CA	WA.		œ	SAI	DE RL	9	alteration, cementation, etc as applicable)	Š	_ ۲	ァ、ッ、 ਙェヺਜ਼	20 300 1000	or coating, shape, roughness, thickness, other
□ ∞		DEPTH			0.0 -							
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					19.2		3.10m START CORING AT 3.10m		L i			
A	A	0%	25				SANDSTONE: grey, orange brown and brown	MW				□ 3.12-3.14: JT 35° Clay IR S closed
		1055			-		red, fine grained, bedded at 0-10 degree, ironstained	sw				□— 3.18-3.21: JT 35° Clay IR S closed -
				ls(50) d=0.17	-			to MW	þ			
				a=0.46 MPa	-	· · · · · ·			l ¦			3.38-3.42: JT 45° Fe SN IR RF -
				UCS =2.5 MPa	3.5 —	: : : : :			l i			
				3.57m	18.7							L closed H - 3.47-3.53; JT 45° Fe SN IR RF -
												closed
					_	· · · · · ·		IVIVV				- 3.52-3.64: JT 45° Fe SN IR RF
	- SS				-	· · · · · ·		SW	11			
	ĽŐ				-	· · · · · ·		MW	'i i			
	10%				4.0 —	· · · · · ·						closed
Ξ					18.2							- 3.78-3.81: JT 30° Fe SN IR RF
					_	::::						- 3.80-3.84: J1 45° Fe SN IR RF - 3.85-3.92: JT 55° Fe SN CU RF
							4.28m					1 - 3.90: BP 5° Fe SN CU RF - 3.93: BP 10° Fe SN CU RF
							MUDSTONE: pale grey, indistinctly bedded, trace of sand and mudstone gravel clast	HW		i i i i		- 4.00: DB - 4.14-4.17: SM Clay
				le(50)	-		4.44m	_				- 4.17: BP 0° Fe SN CU RF
				d=0.33	4.5		SANDSTONE: grey, brown and orange brown, fine grained, 2-20 mm gravel in the strata,	MW				-4.10-4.30: JT 20° Fe SN IR RF
				MPa	-		ironstained	HW				4.25-4.29: FZ → 4.43: BP 10° Fe SN IR S -
		4.75			-							H 4.48: BP 10° Fe SN IR RF
	SS-	0%	48		_			sw	0.00	📰 i i		4.63-4.67: JT 70° Fe SN IR RF
	ΓΟ	LOSS			_			to MW				4.03-4.09. JT 60 Fe Sin IK KF
↓	10%	5.00			5.0		5.00m					4.75: DB
See	Expla	natory	Note	s for	• 5.0		BOREHOLE BH08 TERMINATED AT 5.00 m					
detai & ba	ls of a sis of	abbrev descri	iation ptions	S 5.			""STANTEC AUSTRAL	IA F	ͻΤϒ	′ LTD		() Stantec

RMS LIB 40.3 EXTERNAL MGE REV1.3.GLB Log RTA CORED DRILL HOLE 5 304100928_GILLESTON.GPJ <<DrawingFile>> 08/Feb/2023 14.29 10.03.00.09 Cardno M6E

PR	OJEC	T : F	Propos	sed Scho	ol Red	evelopr	CO	RED DRILL H	OLE	LC	DG	HO FILE SHE	LE NO : BH08 :/ JOB NO : 304100928 :ET : 3 OF 3
PO	SITIO	N : C	Silliest	417.343.	C Scho N: 637	ol 75244.4	10 (56 MGA2020)	SURFACE ELEVAT	ON :	22.1	56 (AHD)	ANGLE F	FROM HORIZONTAL : 90°
RIG	G TYPE	E : M	12		MO	UNTIN	G : Track	CON	RACT	OR	: Stratacore	DF	RILLER : ML
DA	TE ST	ARTE	D:2	0/12/22	DATE	COMF	PLETED : 20/12/22	DATE LOGGED :	20/12/	/22	LOGGE	DBY:PB	CHECKED BY : TH
CA	SING	DIAME	TER	: HWT		BA	RREL (Length) : 3.0	00 m BIT : Stepped				BIT	CONDITION : good
	[ING	(0	1			MATERIAL		FOTO		NATUDAL	FRACTURES
DRILLING A	GRESS	E (CORE LOS: E RUN %)	RQD (%)	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG	DES ROCK TYPE : Colu (texture, fabric, mine alteration, cement	CRIPTION our, Grain size, Structur eral composition, hardne tation, etc as applicable	S a Weathering	ESTI 	MATED STRENGTH Is(50) ● - Axial O - Diametral • · · · · · · · · · · · · · · · · · · ·	RATURAL FRACTURE (mm)	ADDITIONAL DATA (joints, partings, seams, zones, etc) Description, orientation, infilling or coating, shape, roughness, thickness, other
4L MEE REV1.3.GLB Log RTA CORED DRILL HOLE 5 304100528_GLLEESTON GPJ < <drawingfile>> 08/Feb/2023 14:29 10.03 00.09 Cardno M6E</drawingfile>				SAN FIELD	□ 17.2 5.5.0 - 17.2 - - -		alteration, cement	tation, etc as applicable		y			or coating, shape, roughness, thickness, other
RMS LIB 40.3 EXTER	Expla ails of a asis of	natory abbrev descri	Notes iations	s for s s.	10.0 12.2		STAN	FEC AUSTRA	_IA I	 PT`	Y LTD		Stantec





PROJECT : Propose	d School Rede	velopment	EXCA	VATION - GEOLOGI	CAL LOG		FILE /	IO: B JOB NO: T: 1 OF	H10 304100928 1
LOCATION : Gilliesto	n Public Schoo	5247 651 /F	56 MGA20201			92 (Δ1			
EQUIPMENT TYPE :	MI2	JZ41.001 (5	0 IVIGAZUZU)	METHOD :	Auger Drilling	32 (AI	יטי		
DATE EXCAVATED :	21/12/22			LOGGED BY	: PB			CI	HECKED BY : TH
EXCAVATION DIMENS	SIONS : 0.10 r	m LONG 0	.10 m WIDE	Λ					
	°S (c	C) R				u z	≿	ò	
VE E PENETRATIC H SUPPOR GROUND WAT LEVELS	SAMPLES FIELD TES	GRAPHIC LOG CLASSIFICATI SYMBOL	Soil	MATERIAL DESCRIPTION I Type, Colour, Plasticity or Particle Cha Secondary and Minor Componen	aracteristic ts	MOISTURE	CONSISTEN RELATIVE DENSITY	100 200 <mark>円 HAND</mark> 300 m METER 400	STRUCTURE & Other Observations
STABLE		SM	SILTY SA medium to	ND: brown, fine grained sand, low plasticity o fine grained gravel, trace of rootlets	silt, trace angular,				TOPSOIL -
Not Encountered	0.5-	SM	SILTY SA angular to	ND: orange brown, grey, fine grained sand, sub-angular, medium to fine grained gravel	low plasticity silt, trace	D	D		EXTREMELY WEATHERED MATERIAL -
		//// ····	0.90m 1.00m SILTY SA	ND: pale grey, fine grained sand, low plastic	city silt, trace angular to				WEATHERED ROCK
	1.5 - - - 1.5		EXCAVAT Auger refu	וחפישויות שיווים אודיין איז איז איז איז איז איז איז איז איז איז	veaurer eu sandstone				-
	2.0-								
	- - 2.5 -								-
3.00.09 Carcho MGE	3.0-								-
> 07/Now/2024 16:43 10.	3.5								
ON GPU <	4.0								
ON 304100928_GILLES1	4.5								
PHOTOGRAPHS	5.0								
METHOD NoTES METHOD N Natural Exposure E Existing Excavation BH Backhoe Bucket B Bulldozer Blade R Ripper SUPPORT T Timbering	VES	OCt., 73 Wat vel on Date s ter inflow ter outflow	istance er hown	SAMPLES & FIELD TESTS U50 - Undisturbed Sample 50 mm diameter D - Disturbed Sample B - Bulk Disturbed Sample MC - Moisture Content HP - Hand Penetrometer (UCS VS - Vane Shear; P-Peak, R-Remouded (uncorrected PBT - Plate Bearing Test	KPa) CLASSIFICA' SOIL DE Based Classific MOISTURE D - Dry M - Moist W - Wet	FION SY ESCRIP on Uni ation S	/MBOLS TION fied ystem	S& CC RE VS S F St VS H UL L MI D VC	DNSISTENCY/ LATIVE DENSITY - Soft - Firm - Stiff - Hard - Very Stiff - Hard - Very Loose - Loose D - Medium Dense - Dense - Very Dense
See Explanatory Notes for details of abbreviations & basis of descriptions.	-		CA	RDNO NSW/ACT PI	TY LTD				C Cardno

PROJECT : Proposed	d School Rede	velopment	EXCAVATION - GEOLOGICAL LOG	PIT NO FILE / JOB SHEET :	: BH11 NO : 304100928 1 OF 1
LOCATION : Gilliestor	Public School) 5210 150 (/			
EQUIPMENT TYPE : N	иі2	210.100 (METHOD : Auger Drilling		
DATE EXCAVATED : 2	21/12/22		LOGGED BY : PB		CHECKED BY : TH
EXCAVATION DIMENS	IONS : 0.10 n	m LONG ().10 m WIDE		
	- v	Z	MATERIAL	►	<u>.</u>
VE F PENETRATION H SUPPORT GROUND WATEI LEVELS	SAMPLES & SAMPLES & SAMPLES & DEPTH (m)	GRAPHIC LOG CLASSIFICATIC SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE CONDITION CONSISTENC RELATIVE DENSITY	Enc. STRUCTURE UIL STRUCTURE UIL & Other Observations KPa § § §
STABLE countered		SM	SILTY SAND: brown, fine grained sand, low plasticity silt, trace angular, medium to fine grained gravel, trace of rootlets	L L	TOPSOIL - -
Not En		<u>, , , , ,</u>	SILTY SAND: grey to pale grey, fine grained sand, low plasticity silt, trace angular, medium to fine grained, ironstone gravel		WEATHERED ROCK
			0.50m EXCAVATION BH11 TERMINATED AT 0.50 m Auger refusal on medium strength rock		
	- 1.0 -				
	- - 1.5 — - -				
	2.0-				
	2.5-				
0.03.00.09 Cardno M6F	3.0				
> 07/Noo/2024 16:43	- 3.5 - -				
N. GFJ <	4.0				
	4.5 — - - -				
	5.0				-
PHOTOGRAPHS NOTES METHOD N Natural Exposure E Existing Excavation BH Backhoe Bucket B Bulldozer Blade R Ripper SUPPORT T Timbering	S.0 → YES	ON No Res Oct., 73 Wa rel on Date s ter inflow ter outflow	NO SAMPLES & FIELD TESTS CLASSIFICATI iistance U50 - Undisturbed Sample 50 mm diameter D - Disturbed Sample B - Bulk Disturbed Sample MC - Moisture Content CLASSIFICATI SOIL DES Based d Classifica ter HP - Hand Penetrometer (UCS kPa) VS - Vane Shear; P-Peak, R-Remouded (uncorrected kPa) Moist W - Wet PBT - Plate Bearing Test W - Wet	ION SYMBOLS & SCRIPTION on Unified tion System	CONSISTENCY/ RELATIVE DENSITY VS - Very Soft S - Soft F - Firm St - Stiff VSt - Very Stiff H - Hard VL - Very Loose L - Loose MD - Medium Dense D - Dense VD - Very Dense
See Explanatory Notes for details of abbreviations & basis of descriptions.	<u> </u>		CARDNO NSW/ACT PTY LTD		C Cardno



PROJECT : Proposed School F	EXCAVATION - GEOLOGICAL LOG	PIT NO : FILE / JOB SHEET : 1	BH13 NO : 304100928 OF 1
LOCATION : Gillieston Public S	hool 375226 656 (56 MCA2020) SURFACE ELEV/ATION 25		
EQUIPMENT TYPE : MI2	METHOD : Auger Drilling		
DATE EXCAVATED : 21/12/22	LOGGED BY : PB		CHECKED BY : TH
	10 m LONG 0.10 m WIDE		
Z L H ∞ ^Q A			<u>ģ</u>
VE F PENETRATIO H SUPPORT GROUND WATE LEVELS FIELD TEST FIELD TEST H (m)	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE CONDITION CONSISTENC RELATIVE DENSITY	STRUCTURE STRUCTURE W & Other Observations Pa S & 0
0.0 D D D D D D D D D D D D D D D D D D D	SILTY SAND: brown, fine grained sand, low plasticity silt, trace angular, medium to fine grained gravel, trace of rootlets		TOPSOIL
	CLAY: brown red, brown yellow and grey, medium to high plasticity, with fine grained sand, trace sub-rounded to rounded, medium to fine grained gravel CL CL SILTY SAND: orange brown, brown-red, fine grained sand, low plasticity silt trace angular to sub-angular, medium to fine grained, ironstone gravel	D St	RESIDUAL SOIL EXTREMELY WEATHERED MATERIAL
0.70m	SILTY SAND: pale grey, fine to medium grained sand, low plasticity silt, trace angular to sub-angular, medium to fine grained, ironstone gravel,		
10/10/mm HB HB N=R 0.71m 1.0	EXCAVATION BH13 TERMINATED AT 0.71 m Auger refusal on medium strength rock		
			- - - - - - -
2.9			
	4		
C PHOTOGRAPHS 5.0			
NOTES	CONSISTENCY/ RELATIVE DENSITY VS - Very Soft S - Soft F - Firm St - Stiff VSt - Very Stiff H - Hard VL - Very Loose L - Loose MD - Medium Dense D - Dense VD - Very Dense		
See Explanatory Notes for details of abbreviations & basis of descriptions.	CARDNO NSW/ACT PTY LTD		C Cardno

PR	OJEC	т:І	Propo	sed Scho	ol Red	N levelopr	I <mark>ON</mark> ment	I-CC	DRE D	DRI	LLH	OLE	- G	EOLO	DGIC	AL L	.00	FILE SHEF	E NO : BH14 JOB NO : 30410092 T : 1 OF 2	28
		DN : (Gillies	ton Publi	c Scho	ol .	75 /5	C MO	10000				/47101	1 . 04 -	77 /					N . 00°
			=: 362 112	2352.234,	N: 63	75240.4 N INTIN	·/5 (5	6 MGA	42020)	S	JRFAC			1 : 24.7	· Strata	D)	ANC			AL : 90°
	TE ST		D: 2	20/12/22	DATE	ECOM	PLET	ED :	20/12/22		DATEI		D : 20	/12/22	LOC	GED B	Y : I	- РВ	CHECKE	D BY : TH
Ē																				
		DF	RILLIN	IG										MAT	ERIAL					
	GRESS	DRILLING PENETRATION	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	DEPTH (m) RL (m AHD)	GRAPHIC LOG	CLASSIFICATION SYMBOL		Soil	Type, (Se	MATER Colour, P condary	RIAL DES lasticity c and Mino	CRIPTIC or Particle or Compo)N Characte onents	eristic		MOISTURE CONDITION	CONSISTENCY RELATIVE DENSITY	STRU & Other C	CTURE Ibservations
		E			- 0.0 — 24.8 - -				FILL: SILTY angular, me	∕ SANE edium t	י: brown, 1 כ fine grai	fine grain ined grav	ed sand, /el, trace	low plastic of rootlets	city silt, tra	ice			TOPSOIL	-
AD/T	D		Not Encountered		0.5- 		СІ-СН	0.50m	CLAY: brow fine grainec gravel	vn red, I sand,	brown yel trace sub	llow and bo-rounded	grey, mee I to round	dium to hig led, mediu	gh plasticit im to fine (y, with grained	D	F	ALLUVIUM — — –	
					23.8 -			<u>1.10m</u>	SILTY SAN	 ID: pale ar to su	grey, fin ∍ grey, fin ıb-angula	ne to med r, mediun	lium grain n to fine g	ied sand, l grained, irc	low plastic onestone g	ity silt, gravel			WEATHERED ROCK	
	,	Н		1.50m SPT 10/100mm HB	1.5 — 23.3			1.60m	colour becc	omming	orange b	brown								-
				N=R 1.60m		-			Continued a	as Core	id Drill Ho	ble								-
					2.0 — ^{22.8} —	-														-
					- 2.5 — ^{22.3} -	-														- - -
					3.0 — 21.8	-														- - -
					- - 3.5 21.3	-														- - -
					-	-														-
					4.0	-														
					4.5 — ^{20.3} -															- - - -
Se det & k	e Expla ails of asis of	anatory abbrev f descr	/ Note /iation	es for is s.	5.0			S	STAN	TEC	C AU	ISTR	RALI	A PT	Y LT	D				Stantec

3 EXTERNAL M6E REV1.3.GLB Log RTA NON-CORE DRILL HOLE 2 304100928_GILLIESTON.GPJ <<DrawingFile>> 08/Feb/2023

File: 304100928 BH14 1 OF 2

ſ	PRO	JECT	Г : F	Propos	sed Scho	ol Red	evelopr	CO nent	RED DRIL	L HOL	LE	LOG	6	H FIL SH	DLE NO : BH14 .E / JOB NO : 304100928 IEET : 2 OF 2
┟	LOC			Gillies	ton Public	Scho	ol 75240-4	75 (56 MGA2020)			1 . 2	4 777			
ł	RIG [®]	TYPE	ч. Е:М	<u>302</u> 12	.552.254,	MO	UNTIN	G : Track	SOIN ACE LI	CONTRA		DR : S	tratacor	e E	DRILLER : ML
ľ	DAT	E ST.	ARTE	D: 2	0/12/22	DATE	COMF	PLETED : 20/12/22	DATE LOG	GED : 20	/12/2	2	LOGG	ED BY : PB	CHECKED BY : TH
┟	CAS	ING I			: HWT		BA	RREL (Length) : 3.	00 m BIT : St	epped				<u> </u>	IT CONDITION : good
ł	PROG	RESS		ING	ar io	~ ~			MATERIAL			ESTIMATE	D STRENGTH	NATURAL	ADDITIONAL DATA
	& CASING	WATER	표절 전에 %) 코티 RUN %)	RQD (%)	SAMPLES { FIELD TEST	DEPTH (m)	GRAPHIC LOG	DES ROCK TYPE : Co (texture, fabric, min- alteration, cemen	SCRIPTION lour, Grain size, S eral composition, tation, etc as app	Structure hardness licable)	Weathering	M L L -0.1 -0.4 -0.5 -0.8 -0.4 -0.1 -0.1 -0.1 -0.1	(50) • Axial iametral \mathcal{C}_{+}^{c} \mathcal{C}_{+}^{c} \mathcal{C}_{+}^{c} \pm Ξ	FRACTURE (mm)	(joints, partings, seams, zones, etc) Description, orientation, infilling or coating, shape, roughness, thickness, other
EV1.3.GLB Log RTA CORED DRILL HOLE 5 304100228_GLLIESTON GPJ < <cpremingfile>> 08/Feb/2023 14.29 10.03.00.09 Cardno M8E</cpremingfile>	A DRILLI 8 CASI	A	20.0% DRILL DEPTH LOSS 2.05 7% LOSS 3.00 0% LOSS 3.68	22 38 51	Is(50) d=0.03 a=0.03 MPa Is(50) d=0.14 a=0.96 MPa	L S 2 0.0- 24.8 0.0- 24.8 - - - - - - - - - - - - -		(Lexure, fabric, minalteration, cemenical alteration, cem	AT 1.60m AT 1.60m E: orange brown, coa ported, clast range fr down, orange brown al ine grained, bedded a e dominated, sub-rou , silicious and clay are al of fine grained, matrix sup- gravel to pebbles, gra ngular to sub-rounder sand and clay are th al and matrix Tm (2.93-3.00) own, pale grey, medi ular to sub-rounded, i 4 TERMINATED AT 3	nardness licable)	2 2 2 2 2 2 2 2 2				Descripuon, orentation, infilling or coating, shape, roughness, thickness, other 1.00-1.01. DB 1.01. DB 1.01. DB 1.01. DB 1.01. DB 1.01. DB 1.02. DP 0 - 5° Fe SN IR RF 1.03. BP 25° Fe SN CU RF 1.03. BP 25° Fe SN CU RF 1.04. DP 25° Fe SN CU RF 1.04. DP 25° Fe SN CU RF 1.04. DP 25° Fe SN CU RF 1.04. DP 25° Fe SN CU RF 1.04. DP 25° Fe SN CU RF 2.04. 24. 24. 24. 24. 24. 24. 24. 24. 24. 2
S LIB 40.3 EXTERNAL M6E	See I detai	Expla	natory	Note:	s for	- - 5.0 ^{19.8}		STAN	TEC AUS	[RALI#	A F	 	LTD		Stanter
ЯЙ	a ng	າວ ປໄ	นธรษท	PIONS											

File: 304100928 BH14 2 OF 2



PROJECT : Propos	ed School Red	development	EXCAVATION - GEOLOGICAL LOG		FILE /	NO: BI / JOB NO: ET: 1 OF 1	H15 304100928 1
LOCATION : Gilliest	on Public Sch	ool 75226 124 (80 (AI	HD)		
EQUIPMENT TYPE :	MI2	10220.124 (METHOD : Auger Drilling	00 (74	10)		
DATE EXCAVATED :	20/12/22		LOGGED BY : PB			CH	IECKED BY : TH
EXCAVATION DIMEN	ISIONS : 0.10	0 m LONG (0.10 m WIDE				
		Z	MATERIAL		≻	Ċ	
VE E PENETRATION H SUPPORT GROUND WATE LEVELS	SAMPLES & FIELD TEST	GRAPHIC LOG CLASSIFICATIC SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE	CONSISTENC RELATIVE DENSITY	100 200 G PENETRO 300 & METER 400	STRUCTURE & Other Observations
		SM	SILTY SAND: brown, fine grained sand, low plasticity silt, trace angular, medium to fine grained gravel, trace of rootlets	D			TOPSOIL - - -
untered	0.5-	SM	SILTY SAND: brown, grey, fine grained sand, low plasticity silt, trace sub-rounded to rounded, medium to fine grained, ironstone gravel, trace 0.60m medium to high plasticity clay	_	MD		
Not Enco	- - 1.0	С-СН	CLAY: brown red, brown yellow and grey, medium to high plasticity, with fine grained sand, trace sub-rounded to rounded, medium to fine grained gravel	м	VSt		-
1	.25m -		SANDSTONE: recovered as silty sand, grey, orange brown, inferred extremely weathered sandstone, very low strength	D			WEATHERED ROCK
	→ 0/50mm HB J=R .30m 1.5 —		EXCAVATION BH15 TERMINATED AT 1.30 m Auger refusal on medium strength rock				
	2.0-						-
	- 2.5 — -						-
3.00.09 Carcho M6E	- 3.0 — -						-
WINOW20241643-10.0	- - 3.5 -						-
	4.0-						-
00028_GILLEST CNV.	- - 4.5 – -						-
ATION 304:							-
PHOTOGRAPHS NOTES METHOD N Natural Exposure E Existing Excavatio BH Backhoe Bucket B Bulldozer Blade R Ripper SUPPORT T Timbering	yes PENETRA Summary Water Image: Summary V	No Res	NO SAMPLES & FIELD TESTS CLASSIFICAT sistance U50 - Undisturbed Sample Based 50 mm diameter D Disturbed Sample B Bulk Disturbed Sample MOISTURE MC Moisture Content D HP Hand Penetrometer (UCS kPa) M VS Vane Shear; P-Peak, W R-Remouded (uncorrected kPa) PBT Plate Bearing Test	FION SY ESCRIP on Uni ation S	/MBOLS TION fied ystem	S& CO RE VS F St VS H VL L D VD	NSISTENCY/ LATIVE DENSITY - Soft - Soft - Firm - Stiff - Hard - Very Stiff - Hard - Very Loose - Loose - Loose - Medium Dense Dense - Very Dense
See Explanatory Notes for details of abbreviations & basis of descriptions.	or		CARDNO NSW/ACT PTY LTD				C Cardno



PROJECT	· :	Propo	osed Sch	ool Re	develop	ment		VATION	N - GEOI		AL LOG		FILE /	10 : JOB	B NO:	H17 304100928 1	3
	N : (Gillie:	ston Pub		ool	385 (56 MCA20201					05 (Δ	וחר		0.	·	
EQUIPME	NT T	E. 30. YPE	: MI2	, IN. 03	75107.	505 (50 WGA2020)		MET	HOD : Aug	er Drilling	05 (Ar	(טר				
DATE EXC	CAVA	TED	: 21/12	/22					LOG	GED BY : F	PB				Cł	HECKED	BY : TH
EXCAVAT			NSIONS	\$: 0.10) m LO	NG (0.10 m WIDE			MATI							
z		сісціг Ж	യഗ യറ്			S				MAT	ERIAL		≿.		ò		
VE E PENETRATIOI H	SUPPORT	GROUND WATE LEVELS	SAMPLES	DEPTH (m	GRAPHIC LOG	CLASSIFICATIO SYMBOL	Soi	MA ⁻ I Type, Colour Seconda	TERIAL DESCR r, Plasticity or Pa ary and Minor C	IPTION article Charact omponents	eristic	MOISTURE	CONSISTENC RELATIVE DENSITY	100 200 - HAND	300 B METER 400	S & Oth	TRUCTURE er Observations
	STABLE	pə		- 0.0		SM	SILTY SA medium to 0.30m	AND: brown, fine o fine grained g	e grained sand, lo ravel, trace of roc	w plasticity silt, tr tlets	race angular,					TOPSOIL	
		ot Encounter		0.5-		SМ	SILTY SA with medi gravel 0.60m	AND: brown-red um to high plast	l, brown-yellow, fin ticity clay, trace ar	e grained sand, ngular, medium to	low plasticity silt, o fine grained	D	D			WEATHE	ELY RED MATERIAL
		z	0.90m				SILTY SA trace ang	ND: pale grey, jular, fine graine	medium to fine gr ed gravel, inferred	ained sand, low weathered sand	plasticity silt, dstone					WEATHE	RED ROCK
			SPT 10/10mm HB	1.0	-		EXCAVA Auger ref	TION BH17 TE fusal on medium	RMINATED AT 0	.91 m				ii	Ϊİ		-
			N=R 0.91m		-												
				1.5 -													-
				2.0-													-
				-	-												
				2.5 -	-												-
				3.0-													-
				-													
				- 3.5 —	-												-
					-												
				4.0-													-
				4.5-													-
				-	-												
PH	OTOG	RAPHS	; ;	→ 5.0 YES	·	ا	🗙 NO						.				
METHOD N Natu E Exist BH Back B Bullc R Ripp SUPPORT T Timb	ral Ex ing E thoe I lozer er	¢posur xcaval 3ucke Blade	e tion t		N TION TION S N 0 Oct., 7 evel on l vater infl vater out	o Res 3 Wa Date s ow flow	sistance tter shown	SAMPLES U50 - D - B - MC - HP - VS - PBT -	S & FIELD TESTS Jndisturbed Samp O mm diameter Disturbed Samp Bulk Disturbed S Moisture Conten Hand Penetrome /ane Shear; P-F R-Remouded (ur Plate Bearing Te	nple e ample t ter (UCS kPa) eak, ncorrected kPa st	CLASSIFICA SOIL DI Based Classific MOISTURE D - Dry M - Moist W - Wet	TION SY ESCRIP I on Unit ation Sy	TION FION fied ystem	5&	CC RE VS F StS VS H VL L MI D VC	St	Y/ NSITY - Very Soft - Soft - Firm - Stiff - Very Stiff - Hard - Very Loose - Very Loose - Loose - Dense - Dense - Very Dense
See Explana details of at & basis of d	atory obrev escri	Notes ations otions	for				CA	RDNO	NSW/AC	CT PTY	LTD					5	Cardno

PROJECT : Proposed	School Red	levelopment	EXCA	VATION - GE	OLOGICA	L LOG		PIT N FILE / SHEE	IO: JOB NO T: 1 O	BH18 : 30410092 F 1	28
LUCATION : Gillieston	Public Scho	001 75150 118 (4	56 MGA2020)	9	URFACE ELEVA)5 (AF	HD)			
EQUIPMENT TYPE : M	12		50 WIG/ (2020)	N	ETHOD : Auge	er Drilling	<i>i</i> (/ 1	10)			
DATE EXCAVATED : 2	1/12/22			L	OGGED BY : F	РВ				CHECKED	BY : TH
EXCAVATION DIMENSIO	ONS : 0.10	m LONG 0	0.10 m WIDE								
	S -	Z			MATE	ERIAL		≻	Ċ		
VE E PENETRATION H SUPPORT GROUND WATE LEVELS SAMPL FS &	FIELD TEST DEPTH (m)	GRAPHIC LOG CLASSIFICATIC SYMBOL	Soil	MATERIAL DES Type, Colour, Plasticity of Secondary and Mino	CRIPTION or Particle Characte or Components	eristic	MOISTURE	CONSISTENC RELATIVE DENSITY	100 200 GPENETRO 300 D METER	& Ot	STRUCTURE ther Observations
0.50r	0.0 	SM	SILTY SA medium to 0.60m SILTY SA angular, n	ND: brown, fine grained san o fine grained gravel, trace o network of the grained gravel, trace o ND: orange-brown, fine grained, ironst	d, low plasticity silt, tr f rootlets ned sand, low plastici one gravel, trace me	ace angular, ity silt, trace edium to high	D	L		TOPSOI	L
1.00r 1.00r </td <td>n 1.0</td> <td></td> <td>0.95m SILTY SA trace ang 1.21m EXCAVA Auger refr</td> <td>ND: pale grey, medium to fir ular, fine grained, ironstone (TION BH18 TERMINATED / usal on medium strength roci</td> <td>e grained sand, low p gravel, inferred weath NT 1.21 m c</td> <td>plasticity silt, hered sandstone</td> <td>-</td> <td>VD</td> <td></td> <td> WEATHI</td> <td>ERED ROCK</td>	n 1.0		0.95m SILTY SA trace ang 1.21m EXCAVA Auger refr	ND: pale grey, medium to fir ular, fine grained, ironstone (TION BH18 TERMINATED / usal on medium strength roci	e grained sand, low p gravel, inferred weath NT 1.21 m c	plasticity silt, hered sandstone	-	VD		WEATHI	ERED ROCK
	2.0-										- - - - - - - - - -
(03.00 03 Cardino MGE	2.5										
DrawingFile>> 07/Nov/2024 16:43 16											
TION 304100208_GILLESTON GFU <	4.5 4.5 - - - -										- - - - - - - - - - - - - -
PHOTOGRAPHS	5.0	<u>ا ا</u>					1				
METHOD METHOD N Natural Exposure E Existing Excavation BH Backhoe Bucket B Bulldozer Blade R Ripper SUPPORT T Timbering	YES PENETRA' ≫ u u ⊥ wu ⊥ 1 WATER 10 Le www.www.www.www.www.www.www.www.www.ww	No Res No Res O Oct., 73 Wai evel on Date s ater inflow ater outflow	istance ter hown	SAMPLES & FIELD TE U50 - Undisturbed 50 mm diam D - Disturbed Sa B - Bulk Disturbe MC - Moisture Cor HP - Hand Penetr VS - Vane Shear, R-Remouded PBT - Plate Bearing	STS Sample eter mple ad Sample tent ometer (UCS kPa) P-Peak, I (uncorrected kPa J Test	CLASSIFICAT SOIL DE Based Classifica MOISTURE D - Dry M - Moist W - Wet	ION SY SCRIP on Unif ation Sy	MBOLS FION fied /stem	&	CONSISTEND RELATIVE DI VS S F St VSt H VL L MD D VD	CY/ ENSITY - Very Soft - Soft - Firm - Stiff - Very Stiff - Hard - Very Loose - Loose - Dense - Dense - Very Dense
See Explanatory Notes for details of abbreviations & basis of descriptions.	-		CA	RDNO NSW/	ACT PTY	LTD			•	0	Cardno

PROJECT	. :	Propo	osed Scho	ool Red	develop	ment	EXCA	VATION - G	EOLOGICA	L LOG		FILE /	NO: / JOB N ET: 1	BH 10 : 3 0F 1	119 304100928
LOCATIO	N : (Gillie =· 36	ston Publ 2352 390	ic Scho N· 63	ool 75188 (685 (!	56 MGA2020)		SURFACE ELEV		57 (Al				
EQUIPME	NT T	YPE	: MI2	, 11. 00	10100.) 000	50 1110/ 12020)		METHOD : Auge	er Drilling	<i>// (/ u</i>	10)			
DATE EX	CAVA	TED	: 21/12/2	22					LOGGED BY : P	РВ				СН	ECKED BY : TH
EXCAVAT			NSIONS	: 0.10) m LOI I	NG (0.10 m WIDE		ΜΔΤΓ	ΞRIΔI					
ETRATION	PORT	ND WATER	PLES & D TESTS	TH (m)	APHIC .0G	IFICATION MBOL	Soi	MATERIAL D I Type, Colour, Plasticit	ESCRIPTION by or Particle Character	eristic	STURE	ISTENCY LATIVE NSITY	AND ENETRO-	IETER	STRUCTURE & Other Observations
н т к	SUF	GROUI	SAM FIELD	DEP	GR.	CLASS SY		Secondary and N	inor Components		C ON	CONS REL	100 200 A P	300 B 400 B	
	STABLE			- 0.0		SM	SILTY SA medium to 0.40m	ND: brown, fine grained s o fine grained gravel, trace	and, low plasticity silt, tra	ace angular,					TOPSOIL -
		Encountered		0.5		сі-сн	grained s	and, trace sub-rounded to	rounded, medium to find	e grained gravel	D	St			
		Not	1.00m D	1.0		SM	1.00m SILTY SA angular to medium to 1.30m SILTY SA	ND: orange brown, fine g o sub-angular, medium to f o high plasticity clay	rained sand, low plastici	ity silt, trace gravel, trace	-	D			EXTREMELY WEATHERED MATERIAL - - WEATHERED ROCK
	-		1.50m SPT 5, 15/50mm HB N=R 1 70m	1.5-			1.70m	ular to sub-angular, mediu andstone	m to fine grained, irones	stone gravel,					-
				- - 2.0 — - -			Auger ref	lion BH 19 TERMINATE	ock						
98 				- 2.5 — - -											- - - - -
3 10.03.00.09 Cardno M				3.0-											
rile>> 07/Nov/2024 16:4				3.5											
sTON. GPJ < <drawing:< td=""><td></td><td></td><td></td><td>4.0-</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></drawing:<>				4.0-											
DN 304100928_GILLIES				4.5-											
		RAPHS	L	5.0											
METHOD METHOD N Nature BH Back BH Back BH Back R Ripp SUPPORT T Timt	iral Ex ting E thoe I dozer er	¢posur xcava 3ucke Blade	e tiion t W	YES	TION 	o Res 3 Wa Date s ow flow	NO istance ter hown	SAMPLES & FIELD U50 - Undisturber 50 mm dia D - Disturbed B - Bulk Distu MC - Moisture (HP - Hand Pen VS - Vane She R-Remout PBT - Plate Beal	TESTS ad Sample umeter Sample rbed Sample content etrometer (UCS kPa) ar; P-Peak, Jed (uncorrected kPa ring Test	CLASSIFICAT SOIL DE Based Classifica MOISTURE D - Dry M - Moist W - Wet	TON SY SCRIP on Unitation S	TION fied ystem	S &	CO REI VS F StST H VL L MD D VD	NSISTENCY/ ATIVE DENSITY - Very Soft - Soft - Firm - Stiff - Very Stiff - Hard - Very Loose - Loose - Medium Dense - Dense - Very Dense
Gee Explan details of at & basis of d	atory obrev lescri	Notes ations otions	for				CA	RDNO NSW	//ACT PTY	LTD					Cardno [®]

PROJECT	· : I	Propo	sed Sch	ool Ree	developmer	EXCA	VATION - GEOLOGICA	L LOG		FILE /	IO : JOB NO T:10	BH2 : 30	20 4100928
	N : (Gillies	ston Publ	Ic Sch	ool	(56 MGA2020)			Ω (ΔΙ	וחי			
EQUIPME	<u>, .</u> NT Т	30/	: MI2	, N. 03	75140.450		METHOD : Auge	r Drilling		(U)			
DATE EX	CAVA	TED	: 21/12/	22			LOGGED BY : P	B				CHE	CKED BY : TH
EXCAVAT	ION	DIME	NSIONS	: 0.10) m LONG	0.10 m WIDE							
	DF	RILLIN	IG	1	7		MATE	RIAL	1				
VE E PENETRATION H	SUPPORT	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG CLASSIFICATION	Soi	MATERIAL DESCRIPTION I Type, Colour, Plasticity or Particle Characte Secondary and Minor Components	eristic	MOISTURE	CONSISTENCY RELATIVE DENSITY	100 200 G PENETRO 300 D METER	400	STRUCTURE & Other Observations
	STABLE		0.50m	- 0.0	SM	SILTY SA medium to 0.50m	ND: brown, fine grained sand, low plasticity silt, tra o fine grained gravel, trace of rootlets	ace angular,				Т Т 	OPSOIL
		Not Encountered	D 1.00m	- 1.0 -	CI-C	CLAY: br grained s	own red, brown yellow and grey, medium to high pla and, trace sub-rounded to rounded, medium to fine	asticity, with fine e grained gravel	D	St		F	RESIDUAL SOIL
				-	SM	SILTY SA angular to 1.30m medium to SILTY SA trace ang	ND: orange brown, fine grained sand, low plasticit o sub-angular, medium to fine grained, ironestone e o high plasticity clay ND: pale grey, fine to medium grained sand, low p ular to sub-angular, medium to fine grained, irones	ty silt, trace gravel, trace plasticity silt, stone gravel,		D			EXTREMELY VEATHERED MATERIAL VEATHERED ROCK
			1.50m SPT	1.5-		1.51m inferred s	TION BH20 TERMINATED AT 1 51 m	· ,			+++	i -	
			HB N=R 1.51m			Auger ref	usal on medium strength rock						
				2.5-									
				3.0-									
				3.5									
				4.0-									
				4.5-									
 PH	IOTOG DTES	RAPHS		5.0									
METHOD N Natu E Exist BH Back B Bullo R Ripp SUPPORT T Timb	iral Ex ting E thoe I dozer ter	posur xcaval 3ucke Blade	e ion W	ENETRA Suuu ATER 1 V v v v v v	TION = 5 No Re 0 Oct., 73 W evel on Date vater inflow vater outflow	esistance ater shown	SAMPLES & FIELD TESTS U50 Undisturbed Sample 50 mm diameter D Disturbed Sample B Bulk Disturbed Sample MC Moisture Content HP Hand Penetrometer (UCS kPa) VS Vane Shear; P-Peak, R-Remouded (uncorrected kPa) PBT Plate Bearing Test	CLASSIFICAT SOIL DE Based (Classifica MOISTURE D - Dry M - Moist W - Wet	ION SY SCRIP on Unit tion Sy	MBOLS TION fied ystem	÷&	CONS RELA VS S F St VSt H VL L MD D VD	SISTENCY/ TIVE DENSITY - Very Soft - Soft - Firm - Stiff - Hard - Very Loose - Loose - Medium Dens - Dense - Very Dense
See Explan details of at & basis of d	atory obrevi lescrij	Notes ations otions	for	1		CA	RDNO NSW/ACT PTY I	LTD			I		C) Cardno

	School Redev	(elopment	AVATION - GEOLOGICA	L LOG	PIT NO : I	BH21 : 304100928
LOCATION : Gillieston	Public School			TION 07.000 (AL	SHEET : 1 OF	· 1
EQUIPMENT TYPE : N	9.477, N: 63751 /112	104.014 (56 MGA202	METHOD : Auder	r Drilling	שר)	
DATE EXCAVATED : 2	1/12/22		LOGGED BY : PE	B	(CHECKED BY : TH
EXCAVATION DIMENSI	IONS : 0.10 m	LONG 0.10 m WID	EMATF	RIAL		
PORT PORT	D TESTS D TESTS TH (m)	APHIC OG MBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Character	ristic Is a restrict of the second se	ISTENCY ATIVE NSITY AND ENETRO- ETER	STRUCTURE
			Secondary and Minor Components SAND: brown, fine grained sand, low plasticity silt, tra	ice angular,		
STAB		SM 0.40m	m to fine grained gravel, trace of rootlets			
Loso Loso Loso Loso Loso Loso Loso Loso	m 0.5	SILTY angula weath	YSAND: orange brown, grey, fine grained sand, low pla ar to sub-angular, medium to fine grained, ironestone g ered sandstone	asticity silt, trace pravel, inferred		WEATHERED ROCK
	1.0-	EXCA	VATION BH21 TERMINATED AT 0.80 m refusal on medium strength rock			-
	- - 1.5 - -					
	2.0-					
	2.5 - - -					
	3.0					
	3.5					
	4.0					
	4.5					
PHOTOGRAPHS	5.0					
PHOTOGRAPHS NOTES METHOD N Natural Exposure E Existing Excavation BH Backhoe Bucket B Bulldozer Blade R Ripper SUPPORT T Timbering	VES	NO No Resistance	SAMPLES & FIELD TESTS U50 - Undisturbed Sample 50 mm diameter D - Disturbed Sample B - Bulk Disturbed Sample MC - Moisture Content HP - Hand Penetrometer (UCS kPa) VS - Vane Shear; P-Peak, R-Remouded (uncorrected kPa) PBT - Plate Bearing Test	CLASSIFICATION SY SOIL DESCRIP Based on Unit Classification Sy MOISTURE D - Dry M - Moist W - Wet	TMBOLS & C TION F fied V ystem F V V L L N U V V	CONSISTENCY/ RELATIVE DENSITY /S - Very Soft Firm St - Stiff /St - Very Stiff - Hard /L - Very Loose - Loose MD - Medium Dense - Dense /D - Very Dense
See Explanatory Notes for details of abbreviations & basis of descriptions.		C	ARDNO NSW/ACT PTY L	_TD	·	C Cardno

PROJECT :	Propo	sed Sch	ool Red	develop	ment	EXCA	VATION - (GEOLOGICA	AL LOG		FILE / SHEE	Ю : ЈОВ Т:1	BI NO: OF	H22 304100928 1
POSITION :	E: 36	2382.597	, N: 63	75162.2	292 (56 MGA2020)		SURFACE ELEV	ATION : 27.65	59 (Al	HD)			
	TYPE	: MI2				,		METHOD : Aug	er Drilling		,			
DATE EXCAV	ATED	: 21/12/	22					LOGGED BY : F	PB				CH	IECKED BY : TH
EXCAVATION	DIME	NSIONS	: 0.10) m LOI	NG ().10 m WIDE								
D	RILLIN	NG (n	1		2			MAT	ERIAL		<u> </u>		,	
PENETRATION	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	Soil	MATERIAI I Type, Colour, Plast Secondary and	- DESCRIPTION icity or Particle Charact Minor Components	eristic	MOISTURE CONDITION	CONSISTENCY RELATIVE DENSITY		00 ^b METER	STRUCTURE & Other Observations
ETABLE			- 0.0 -		SM	SILTY SA medium to	ND: brown, fine graine o fine grained gravel, t	ed sand, low plasticity silt, to ace of rootlets	race angular,					TOPSOIL
			0.5-		SM	SILTY SA medium to	ND: brown, fine graine o fine grained gravel	ed sand, low plasticity silt, to	race angular,					COLLUVIUM
	ountered		-			CLAY: bro grained sa	own red, brown yellow and, trace sub-rounde	and grey, medium to high p d to rounded, medium to fir	plasticity, with fine ne grained gravel					RESIDUAL SOIL
	Not End		- 1.0 —			1.10m			14		5.			EYTREMELY
			-		sм	angular to medium to	Sub-angular, medium b sub-angular, medium b high plasticity clay	e gramed sand, iow plastic to fine grained, ironestone	ary sin, (race e gravel, trace		D			WEATHERED MATERIAL
		1.50m SPT 5, 10/10mm HB N=R	- 1.5			SILTY SA trace ang inferred w 1.66m EXCAVA	ND: pale grey, fine to ular to sub-angular, me veathered sandstone	medium grained sand, low edium to fine grained, irone	plasticity silt, estone gravel,					
		1.66m	- - 2.0-			Auger ref	usal on medium streng	th rock						
			-	-										
			2.5											
			- - 3.0 —	-										
			-											
			3.5											
			4.0-											
			-	-										
			4.5-	-										
			-	-										
PHOTON	GRAPHS	·	- 5.0 YES			NO NO			CLASSIFICAT			38		
METHOD N Natural E E Existing I BH Backhoe B Bulldozel R Ripper SUPPORT T Timbering	xposur Excava Bucke Blade	e tion W		0 Oct., 7 evel on I vater inflo	o Res 3 Wa Date s ow flow	istance ter shown	SAMPLES & FIEI U50 - Undistu 50 mm D - Disturb B - Bulk Di MC - Moistur HP - Hand P VS - Vane S R-Rem PBT - Plate B	D TESTS ribed Sample diameter ed Sample sturbed Sample e Content enetrometer (UCS kPa) hear; P-Peak, ouded (uncorrected kPa earing Test	MOISTURE D - Dry W - Wet	on Unitation St	fied ystem		RE VS S VS H VL L D VD	LATIVE DENSITY - Very Soft - Soft - Firm - Stiff - Hard - Very Stiff - Hard - Very Loose - Loose D - Medium Der - Dense D - Very Dense
ee Explanatory etails of abbreve basis of descri	Notes	for				CA	RDNO NS'	W/ACT PTY	LTD				I	C Cardn



PROJECT :	Propo	sed Scho	ol Red	develop	ment	EXCA	VATION - (GEOLOGICA	L LOG		FILE / SHEE	IO : JOB T:1	B NO : OF	H24 304100928 1
LOCATION :	Gillies	ton Publi	C Sch	ool 75156 f	358 (4	56 MGA2020)		SURFACE ELEV		43 (AI	וחר			
EQUIPMENT	TYPE	: MI2	11.00	10100.0) 000	50 moi (2020)		METHOD : Auge	r Drilling	10 (7 4	10)			
DATE EXCA	/ATED	: 21/12/2	22					LOGGED BY : P	'B				С	HECKED BY : TH
EXCAVATION		NSIONS	: 0.10) m LOI	NG 0	.10 m WIDE								
L	RILLIN	പ്ര	_		z			MATE	ERIAL		<u>≻</u>		5	
E PENETRATION H SUPPORT	GROUND WATE LEVELS	SAMPLES { FIELD TEST	DEPTH (m)	GRAPHIC LOG	CLASSIFICATIC SYMBOL	Soil	MATERIAI I Type, Colour, Plast Secondary and	L DESCRIPTION ticity or Particle Characte Minor Components	eristic	MOISTURE	CONSISTENC RELATIVE DENSITY		300 B METER 400	STRUCTURE & Other Observations
			- 0.0		ѕм	SILTY SA medium to	AND: brown, fine graine o fine grained gravel, tr	ed sand, low plasticity silt, tr ace of rootlets	ace angular,					TOPSOIL
	Not Encountered	0.50m D	- 0.5 -			SILTY SA plasticity ironeston	ND: pale grey, orango silt, trace angular to su le gravel, inferred weat	e brown, fine to medium gra b-angular, medium to fine g hered sandstone	ined sand, low rained,	D				WEATHERED ROCK
		1.00m	- - -1.0-			1.01m								
		N=R 1.01m	-			EXCAVA Auger ref	TION BH24 TERMINA fusal on medium streng	.TED AT 1.01 m th rock						
			- 1.5— -											
			- 20-											
			-											
			- 2.5 — -											
			-											
			- 3.5 — -											
			-											
			- 4.5 — -											
			-											
PHOTO	GRAPHS		YES		[
METHOD N Natural I E Existing BH Backhoe B Bulldoze R Ripper SUPPORT T Timberin	Exposure Excavati ∋ Bucket r Blade g	on PE		TION 	o Res 3 Wat Date s ow flow	ler hown	SAMPLES & FIEI U50 - Undistu 50 mm D - Disturb B - Bulk Di MC - Moistuu HP - Hand P VS - Vane S R-Rem PBT - Plate B	LD TESTS urbed Sample diameter ed Sample sturbed Sample te Content tenetrometer (UCS kPa) ihear; P-Peak, ouded (uncorrected kPa earing Test	CLASSIFICAT SOIL DE Based Classifica MOISTURE D - Dry M - Moist W - Wet	FION SY ESCRIP on Uni ation Sy	/MBOLS TION fied ystem	8	CC RE S F St V H V L MI D V	NSISTENCY/ LATIVE DENSITY S - Very Soft - Stiff St - Very Stiff - Hard - Very Loose D - Medium Der - Dense D - Very Dense
See Explanator letails of abbre	y Notes viations riptions.	for	1			CA	RDNO NS'	W/ACT PTY	LTD				I	C Cardn

	PRC		T : F	Propo	sed Scho	ool Red	N levelop	ION ment	N-CORE DRILL HOLE - GEOLOGICAL I	-00	FILE /	E NO : BH25 JOB NO : 304100928 FT : 1 OF 2
ł	POS	SITIO	N : E	5111es E: 362	2395.898	, N: 637	01 75142.8	370 (5	56 MGA2020) SURFACE ELEVATION : 27.949 (AHD)	ANG	GLE FI	ROM HORIZONTAL : 90°
	RIG	TYPE		12 D · 1	00/10/00	MO		G:	Track CONTRACTOR : Stratacore	о <u>у</u> . г		
ł	DAI	E 31		.U. 2	20/12/22	DAT		FLEI	IED . 20/12/22 DATE LOGGED . 20/12/22 LOGGED E	or.r	-D	CHECKED BT . TH
			DF		IG	1		z	MATERIAL	1		
	& CASING	WATER	DRILLING PENETRATIO	GROUND WATE LEVELS	SAMPLES & FIELD TEST	DEPTH (m) RL (m AHD)	GRAPHIC LOG	CLASSIFICATIO SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE	CONSISTENC RELATIVE DENSITY	STRUCTURE & Other Observations
			E			- 0.0 <i></i> 27.9 -			FILL: SILTY SAND: brown, fine grained sand, low plasticity silt, trace angular, medium to fine grained gravel, trace of rootlets			TOPSOIL
	AD/T HWT Casing		F	Not Encountered	0.90m	0.5— ^{27.4}		5М	SILTY SAND: orange-brown, fine grained sand, low plasticity silt, trace sub-angular to sub-rounded, medium to fine grained gravel	D	D	FILL
			н		1.30m	1.0 — ^{26.9} -		СІ-СН	CLAY: brown red, brown yellow and grey, medium to high plasticity, with fine grained sand, trace sub-rounded to rounded, medium to fine grained gravel 	-	VSt	
$\left \right $	* *				15/80mm HB N=R	-	····		1.38m Continued as Cored Drill Hole			-
					1.3011	26.4 -						
7 10.03.00.09 Cardno M6E						25.9 - - 2.5 —						-
vingFile>> 08/Feb/2023 14:												- - - -
928_GILLIESTON.GPJ < <drav< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td>-</td><td></td><td></td><td></td><td></td><td>- - - -</td></drav<>							-					- - - -
ON-CORE DRILL HOLE 2 304100						- - 4.0- ^{23.9}						-
TERNAL M6E REV1.3.GLB Log RTA N						4.5						
RMS LIB 40.3 EX	See deta & ba	Expla ils of a asis of	natory abbrev descr	/ Note viation iption	es for Is s.	5.0 22.9			STANTEC AUSTRALIA PTY LTD	<u> </u>		Stantec

File: 304100928 BH25 1 OF 2

File: 304100928 BH25 2 OF 2



<<DrawingFile>> 08/Feb/2023 14:29 10.03.00.09 Cardno REV1.3.GLB Log RTA CORED DRILL HOLE 5 304100928_GILLIESTON.GPJ M6E EXTERNAL RMS LIB 40.3

	TITLE:	Borehol (e Core Photograph s – BH Billieston Public School	25
Stantec	PROJECT NO: 304100928	TEST DATE: 20/12/2022	INCLINATION: -90 degree	CORED LENGTH: BOX 1 OF 1 1.38-5.0m (3.62 m Length)
	DRILL RIG: MI2	CONTRACTOR: Stratacore	LOGGED BY: PB	CHECKED BY: TH
CTAPT (DP)	ton Public School	BH ID: BH. Depth: 1.38 Core Tray No. Date: 20 (12 (24)	25 -5.00 m 01 ot 01 22 X Chaik mar	ks denote handling or drilling breaks
Im START CON	Indi HI J.Søm	Sel aler		
211			Den HARTIL	1 de la
3m 4m NO (DRE 53)			NO (0 3-7-3-1	KF 82m Be NO (ORF

PROJECT	: :	Propo	sed Scho	ool Red	levelop	ment	EXCA	VATION	- GEOLOG	ICA	L L(DG		P F S	I T N ILE / . HEE1	0: JOB N : 1	B 10 : 0F ⁻	H26 304100928 1
POSITION	N : (illies: 362 :E:	ston Publ 2436.114	ic Scho , N: 63	ool 75141.:	277 (56 MGA2020)		SURFACE	ELEVA	TION	: 25.4	480 (AHD)			
EQUIPME	NT T	YPE	: MI2	,					METHOD :	: Auger	r Drillir	ng			/			
DATE EX			: 19/12/2	22					LOGGED B	3Y : PE	3						CH	IECKED BY : TH
EXCAVAT	DF		IG	: 0.10		NG	0.10 m WIDE			MATE	RIAL							
FENETRATION	SUPPORT	ROUND WATER LEVELS	SAMPLES &	DEPTH (m)	GRAPHIC LOG	ASSIFICATION SYMBOL	Soil Type, C Se	MATERIAL DE Colour, Plasticity condary and Mi	SCRIPTION or Particle Character nor Components	ristic	MOISTURE	ONSISTENCY RELATIVE DENSITY	HAND	B METER	(AS 12 Blo	0CP TE 289.6.3 ws/10	EST 6.2-199 0 mm	7) STRUCTURE & Other Observations
<u>з п п н</u>	BLE	U	하는	0.0		0 1	SILTY SA	ND: brown, fine g	rained sand, low plastici	ity silt,		o	- 100	400	5	10 15 :	20 25	TOPSOIL
	STA	Encountered	0.50m D	- - - 0.5 - -		SM SM	0.30m SILTY SA trace angu	ND: brown, fine g ular, medium to fir	rained sand, low plastici re grained gravel	ity silt,	D	MD - D					5 6 10 20 25	COLLUVIUM
		Not E	<u>1.00m</u> B	- - 1.0 -		сі-сн	1.10m SILTY SA grained sa	with fine grained s medium to fine gra ND: orange-brow and, low plasticity	n, pale grey, fine to mer silt, trace angular to	dium		St						-
	-		1.35m	-			1.35m Sub-angul EXCAVA	TION BH26 TERM	/INATED AT 1.35 m	avel					+			
				1.5			Augerren	usai on medium si	rengu rock									-
				- - - 2.5 -														-
3 10.03.00.09 Cardno M6E				- 3.0 — - - -														-
gFile>> 07/Nov/2024 16:4: 				3.5														-
81LLIESTON.GPJ < <drawin </drawin 				4.0														-
AVATION 304100928_C		RAPHS		5.0														
CONTROL OF CONTROL ON CONTROL OF CONTRO	iral Ex ting E choe I dozer ber	posur xcavat Blade	e ion W	YES NETRA [™] u u 1 [™] u u u 1 [™] u u u 1 [™] u u u 1 [™] u u u u u u u u u u u u u u u u u u u	TION 	o Res 3 Wa Date s ow flow	NO istance ter shown	SAMPLES & U50 - Unu 50 D - Dis B - Bul MC - Mo HP - Hau VS - Var R-F PBT - Pla	FIELD TESTS disturbed Sample mm diameter turbed Sample k Disturbed Sample isture Content nd Penetrometer (UC ne Shear; P-Peak, Remouded (uncorrect te Bearing Test	S kPa) ed kPa)	CLAS MOI: D M W	SSIFICA SOIL I Base Classifi STURE - Dry - Mois - Wet	ATION DESCF d on l ication st	SYME RIPTIO Jnifiec Syste	BOLS N i em	&	CCE VS FStS VS H VL D D VD	NSISTENCY/ LATIVE DENSITY - Very Soft - Firm - Stiff t - Very Stiff - Hard - Very Losse - Losse - Dense - Very Dense
See Explan details of at & basis of c	atory obrev lescri	Notes ations otions	for				CAI	RDNO N	ISW/ACT P	PTYL	TD							C) Cardno

PROJECT	- :	Propo	sed Sch	ool Red	develop	ment	EXCA	VATIO	ON - G	EOLOGIC	AL L	OG		Pľ Fil	T NO	: 3 NO 1 O	BH : 3	27 04100928	
	N : (Gillies	ton Publ	ic Sch	ool	206 (56 MC 42020)					. 10	016 (/			1 0			
EQUIPME	NT T	E. 302 YPE	: MI2	, N. 03	75194.	200 (;	50 MGA2020)			METHOD : A	uger Drill	ing	910 (7	4HD)					
DATE EXC	CAVA	TED	: 19/12/	22						LOGGED BY	: PB						CHE	ECKED BY	: TH
EXCAVAT			NSIONS	: 0.10) m LOI I	NG ().10 m WIDE			MA									
z		Щ.	_ss TS	Ê	0	NO				100		<u>ک</u>	ò		DCD	TEOT	-		
VE E PENETRATIC H	SUPPOR.	GROUND WAT LEVELS	SAMPLES FIELD TES	DEPTH (m	GRAPHIC LOG	CLASSIFICATI SYMBOL	Soil Type, C Se	MATERI Colour, Pla condary a	AL DESCRI asticity or Pa and Minor Co	PTION article Characteristic omponents		CONSISTEN RELATIVE DENSITY	100 200 즋 PENETF	300 & METER 400	5 10	6.3.2- 100 m	1997 1m) STR & Other	UCTURE Observations
	STABLE			- 0.0		sм	SILTY SA trace ang rootlets 0.30m	ND: brown ular, mediu	, fine grained m to fine grai	sand, low plasticity si ned gravel, trace of	lt,						2 5	TOPSOIL	
		•		0.5			SILTY SA trace ang	ND: brown ular, mediu	, fine grained m to fine grai	sand, low plasticity si ned gravel	lt,	_					5 7 6 5	COLLUVIUM	
				- - 1.0-		SM						MD					5 6 4		
				-		сі-сн	1.20m CLAY: bro plasticity, rounded, r	own red, bro with fine gr medium to t	own yellow an ained sand, ti fine grained g	d grey, medium to hig race sub-rounded to ravel	h	VSt					5 15 15	RESIDUAL S	OIL
	-			1.5			1.50m EXCAVA Target de	TION BH27 pth	TERMINAT	ED AT 1.50 m							17 16 15		
				2.0-	-												25		
					-														
				-	-														
				3.0-	-														
				3.5															
				4.0-	-														
				- - 4.5-	-														
				-	•														
PH	 IOTOG	RAPHS		5.0		r													
METHOD N Natu E Exist BH Back B Bullo R Ripp	iral Ex ting E (hoe I dozer	xposure xcavati 3ucket Blade	on W	YES ENETRA ♥ □ □ □ □ ■ ■ ATER 11	N N N N N N N N	o Res	istance	SAMP U50 - B - MC - HP -	LES & FIELD - Undisturt 50 mm d - Disturbee - Bulk Dist - Moisture - Hand Pe	D TESTS bed Sample iameter d Sample urbed Sample Content netrometer (UCS kf	CL/ MC Pa) M	ASSIFICA SOIL I Base Classifi DISTURE - Dry - Moi:	ATION S DESCRI d on Ur cation S	SYMB(PTION nified Syster	DLS & I m		CON REL VS S F St VSt H VL L	ISISTENCY/ ATIVE DENS - \ - \ - \ - \ - \ - \ - \ - \ - \ - \	ITY Very Soft Soft Firm Stiff Very Stiff Hard Very Loose Joose
SUPPORT T Timb	bering	Notes	for		evel on l vater inflo vater out	Date s ow flow	hown	VS - PBT -	 vane Sho R-Remoti Plate Bea 	ear; P-Peak, uded (uncorrected k aring Test	(Pa) W	- Wet	t				MD D VD	- - - \	Medium Dense Dense /ery Dense
details of at & basis of d	obrevi lescri	ations otions.					CA	RDN	O NSV	V/ACT PT	Y LTC)							ardno

PROJECT	: [Propo	sed Sch	ool Ree	develop	ment	EXCA	VATIC)N - G	EOLOC	GICA	L L(DG		P F S	ILE / A	Ю: ЈОВ Г:1	NO : OF	3 H2 : 30	8 4100928
POSITION	1 : 0 : 1	E: 362	2490.485	5, N: 63	75233.9	916 (56 MGA2020)			SURFACE	ELEVA	TION	: 16.0	031 (AHD)				
EQUIPME	NT T	YPE	: MI2				,			METHOD	: Auger	Drillir	ng			,				
DATE EXC	CAVA	TED	: 19/12/	22						LOGGED	BY : PE	3						С	HE	CKED BY : TH
EXCAVAT			INSIONS	5 : 0.10) m LOI I	NG (0.10 m WIDE				MATE									
z		ff.	୍ୟ <u>୯</u>			S							≿	ç	ģ					
VE E PENETRATIC H	SUPPOR ⁻	GROUND WAT LEVELS	SAMPLES FIELD TES	DEPTH (m	GRAPHIC LOG	CLASSIFICATI SYMBOL	Soil Type, C Se	MATERIA Colour, Plas condary an	L DESCR sticity or Pa Id Minor C	IPTION article Charact omponents	eristic	MOISTURE	CONSISTEN RELATIVE DENSITY	100 200 HAND	300 B METER	(AS 12 Blo	289.6. 289.6	EST 3.2-19 00 mm	997) n	STRUCTURE & Other Observatior
	STABLE			- 0.0		SM	SILTY SA trace ang rootlets 0.30m	ND: brown, i ular, medium	fine grained to fine grai	l sand, low plasti ined gravel, trace	city silt, e of								T 0 1	OPSOIL
		pe	0.50m B	- 0.5 -		sм	SILTY SA trace ang	ND: brown, t ular, medium	fine grained to fine grai	l sand, low plasti ined gravel	city silt,		L						1 C 1 1	COLLUVIUM
		ot Encounter				сі-сн	0.70m CLAY: bro plasticity, 0.90m rounded, i	own red, brow with fine gra medium to fii	wn yellow ar ined sand, t ne grained g	nd grey, medium race sub-rounde gravel	to high ed to	D	F					/ /	1 1 F 1	RESIDUAL SOIL
		2	1.00m	- 1.0		SM	SILTY SA grained sa sub-angul	ND: orange- and, low plas lar, medium t	-brown, pal ticity silt, tra to fine grain	e grey, fine to m ace angular to ed, ironestone g	edium ravel		MD						2 E 2 3 3 3	XTREMELY VEATHERED MATERIAI
				- <u>1.5</u> -			1.50m EXCAVA ⁻ Target de	TION BH28 [°] pth	TERMINAT	ED AT 1.50 m				 					4 4 5	
				2.0-															5 15 25	
				3.0-																
				3.5-																
				-																
				4.0-																
				- 4.5 —																
				- - 5.0-																
PH NO	DTOG TES	RAPHS		YES		[NO NO													
METHOD N Natur E Existi BH Back B Bulld R Rippo SUPPORT T Timb	ral Ex ing E: hoe E ozer l er ering	posur xcavat 3ucket Blade	e ion t		TION 	o Res 3 Wa Date s ow	istance ter hown	SAMPL U50 D B MC HP VS PBT	ES & FIELI Undistur 50 mm c Disturbe Bulk Dis Moisture Hand Pe Vane Sh R-Remo Plate Be	D TESTS bed Sample liameter d Sample turbed Sample Content corometer (U ear; P-Peak, uded (uncorrec aring Test	CS kPa) cted kPa)	CLAS C MOI D M W	SSIFICA SOIL E Base Classifi STURE - Dry - Dry - Mois - Wet	ATION DESCR d on U cation	SYME IPTIO Jnified Syste	BOLS N 1 em	&	CR VSFSVHVL MDV	SELA SELA S S t S t S t S t I D	SISTENCY/ TIVE DENSITY - Very Soft - Soft - Firm - Stiff - Hard - Very Stiff - Hard - Very Loose - Medium De - Dense - Verv Dense - Verv Dense
See Explana letails of ab	atory brevi escrit	Notes ations	for	<u> </u> ■ "			CA	i RDNC) NSV	V/ACT F		TD						<u> </u>		C) Cardn

	TITLE: Borehole SPT Photographs – BH06 Gillieston Public School				
Stantec	PROJECT NO: 304100928	TEST DATE: 19/12/2022	INCLINATION: -90 degree	SPT PHOTOS	
•	DRILL RIG: MI2	CONTRACTOR: Stratacore	LOGGED BY: PB	CHECKED BY: TH	
CD Cashapi Project: Pro Number:	arcino ing the Future ject in illies 30430032	ton public School	BH ID: Depth: Date: 1	BH06 1.5 - 1.64 (SPT) ay No.: g (12 (20 22)	

	TITLE: Borehole SPT Photographs – BH07 Gillieston Public School			
Stantec	PROJECT NO: 304100928	TEST DATE: 19/12/2022	INCLINATION: -90 degree	SPT PHOTOS
	DRILL RIG: MI2	CONTRACTOR: Stratacore	LOGGED BY: PB	CHECKED BY: TH
	Stantec	TITLE: PROJECT NO: 304100928 DRILL RIG: MI2	TITLE: Borehole Signification Stantec PROJECT NO: TEST DATE: 304100928 19/12/2022 DRILL RIG: CONTRACTOR: MI2 Stratacore	Stantec TITLE: Borehole SPT Photographs – BH07 Gillieston Public School PROJECT NO: 304100928 TEST DATE: 19/12/2022 INCLINATION: -90 degree DRILL RIG: MI2 CONTRACTOR: Stratacore LOGGED BY: PB



	TITLE: Borehole SPT Photographs – BH08 Gillieston Public School			
Stantec	PROJECT NO: 304100928	TEST DATE: 20/12/2022	INCLINATION: -90 degree	SPT PHOTOS
·	DRILL RIG: MI2	CONTRACTOR: Stratacore	LOGGED BY: PB	CHECKED BY: TH
CD Constant Project: Pro Number:	Carcino aping the Future oject Inilia 3043003	ston Public School	BH ID: Depth Core T Date:	BH.08 B-0-31 m (SPT) Tray No.: 20 (12 (2092

•	TITLE: Borehole SPT Photographs – BH12 Gillieston Public School				
Stantec	PROJECT NO: 304100928	TEST DATE: 21/12/2022	INCLINATION: -90 degree	SPT PHOTOS	
	DRILL RIG: MI2	CONTRACTOR: Stratacore	LOGGED BY: PB	CHECKED BY: TH	
BH ID: BH12 Depth: 1:5-16mlsrD Depth: 1:5-16mlsrD Core Tray No.: Date: 21/12/2022					


	TITLE: Borehole SPT Photographs – BH19 Gillieston Public School					
Stantec	PROJECT NO: 304100928	TEST DATE: 21/12/2022	INCLINATION: -90 degree	SPT PHOTOS		
	DRILL RIG: MI2	CONTRACTOR: Stratacore	LOGGED BY: PB	CHECKED BY: TH		
Project: Pro Number: 3	bing the Future	eston Public Sch 28	BH I Dept Core Date	D: BH19 th: 1:5-1.95 (SPT) Tray No.: :21/J2/2022		

	TITLE: Borehole SPT Photographs – BH22 Gillieston Public School					
Stantec	PROJECT NO: 304100928	TEST DATE: 21/12/2022	INCLINATION: -90 degree	SPT PHOTOS		
	DRILL RIG: MI2	CONTRACTOR: Stratacore	LOGGED BY: PB	CHECKED BY: TH		
CD C Shap Project: Pro Number: 3	Carcino bing the Future bject Gillie 041009	eston Public 9 28	BH Dep Core Date	ID: $BH 22$ th: $1.5 - 1.66(SPT)$ e Tray No.: e: $21/12/2022$		

	TITLE: Borehole SPT Photographs – BH23 Gillieston Public School						
Stantec	PROJECT NO: TEST DATE: 304100928 21/12/2022		INCLINATION: -90 degree	SPT PHOTOS			
	DRILL RIG: MI2	CONTRACTOR: Stratacore	LOGGED BY: PB	CHECKED BY: TH			
CD Cashap Project: Pro Number: 3	arcino [®] ing the Future ject Gillie 0410092	ston Public Scho	BH ID Depth Core 1 Date:	BH23 1.5-1.63 (SPT) Tray No.: 21/12/2022			

Appendix C Test Results



14/1 Cowpasture Place, Wetherill Park NSW 2164 Phone: (02)9756 2166 | Email: enquiries@stsgeo.com.au



Accredited for Compliance with ISO/IEC 17025 - Testing No. 2750

Moisture Content of Soil and Aggregate Samples

Project: GILLIESTON PUBLIC SCHOOL	Project No.:	32110
Client: STANTEC PTY LTD (CARDNO)	Report No.:	23/0154
Address: LEVEL 9 - THE FORUM, 203 PACIFIC HIGHWAY, ST LEONARDS, NSW 2065	Report Date:	24/01/2023
Test Method: AS1289.2.1.1	Page:	1 OF 2

Sampling Procedure: AS 1289.1.2.1 Clause 6.5.1 - Hand Excavated Pit or Trench (Not covered under NATA Scope of Accreditation)

STS / Sample No.	S1	S2	\$3	S5	S8	S11
Sample Location	BH01	BH03	BH05	BH08	BH13	BH20
Material Description	Silty, Clay, brown, some Sand and Gravel	Silty, Clay, brown	Silty, Clay, brown, some Sand	Silty, Sandy, Clay, brown	Silty, Sandy, Clay, brown	Silty, Clay, red/brown
Depth (mm)	0.5-1.0	0.5-1.0	0.5-1.0	0.5-1.0	0.0-0.5	0.5-1.0
Sample Date	19/12/2022	19/12/2022	19/12/2022	19/12/2022	19/12/2022	19/12/2022
Moisture Content (%)	12.8	13.4	15.1	12.8	14.9	18.7

Remarks:

Approved Signatory.....

Orlando Mendoza - Laboratory Manager

Technician: B.V.



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Accredited for Compliance with ISO/IEC 17025 - Testing No. 2750

Moisture Content of Soil and Aggregate Samples

Project: GILLIESTON PUBLIC SCHOOL	Project No.:	32110
Client: STANTEC PTY LTD (CARDNO)	Report No.:	23/0154
Address: LEVEL 9 - THE FORUM, 203 PACIFIC HIGHWAY, ST LEONARDS, NSW 2065	Report Date:	24/01/2023
Test Method: AS1289.2.1.1	Page:	2 OF 2

Sampling Procedure: AS 1289.1.2.1 Clause 6.5.1 - Hand Excavated Pit or Trench (Not covered under NATA Scope of Accreditation)

STS / Sample No.	S15	S17		
Sample Location	BH01	BH03		
Material Description	Silty, Sandy, Clay, brown	Silty, Sandy, Clay, brown		
Depth (mm)	0.5-1.0	0.5-1.0		
Sample Date	19/12/2022	19/12/2022		
Moisture Content (%)	5.1	9.4		

Remarks:

Approved Signatory.....

Orlando Mendoza - Laboratory Manager

Technician: B.V.









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Accredited for Compliance with ISO/IEC 17025 - Testing No. 2750

\degree Atterberg Limits and Linear Shrinkage Report $\overline{}$

Project: Gillieston Public School, Gillieston Heights	Project No.:	32110
Client: STANTEC PTY LTD (CARDNO)	Report No.:	23/0178
Address: LEVEL 9 - THE FORUM, 203 PACIFIC HWY, ST LEONARDS, NSW 2065	Report Date:	25/01/2023
Test Method: RMS T108,T109	Page:	1 OF 2
Client Request No.: 304100928		

Sampling Procedure: Samples Supplied By Client (Not covered under NATA Scope of Accreditation)

STS / Sample No.	7250D-L/1	7250D-L/2	7250D-L/3	7250D-L/4	7250D-L/5	7250D-L/6
Sample Location	BH01	BH03	BH05	BH08	BH13	BH20
Material Description	Sand, brown, with silt/clay/gravel	Sand, brown, with silt/clay/gravel	Sand, brown, with silt/clay/gravel	Silty Sandy Clay, brown	Silty Clay, brown	Silty Clay, brown
Depth (m)	0.5 - 1.0	0.5 - 1.0	0.5 - 1.0	0.5 - 1.0	0.0 - 0.5	0.5 - 1.0
Sample Date	19/12/2022	19/12/2022	19/12/2022	19/12/2022	19/12/2022	19/12/2022
Sample History	Oven Dried	Oven Dried	Oven Dried	Oven Dried	Oven Dried	Oven Dried
Method of Preparation	Dry sieved	Dry sieved	Dry sieved	Dry sieved	Dry sieved	Dry sieved
Liquid Limit (%)	28	29	31	32	25	44
Plastic Limit (%)	15	14	17	17	14	17
Plasticity Index	13	15	14	15	11	27
Linear Shrinkage (%)	N/A	N/A	N/A	N/A	N/A	N/A
Mould Size (mm)	N/A	N/A	N/A	N/A	N/A	N/A
Crumbing	N/A	N/A	N/A	N/A	N/A	N/A
Curling	N/A	N/A	N/A	N/A	N/A	N/A

Remarks:

Technician:

Approved Signatory.....

Orlando Mendoza - Laboratory Manager



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Accredited for Compliance with ISO/IEC 17025 - Testing No. 2750

[©] Atterberg Limits and Linear Shrinkage Report

Project: Gillieston Public School, Gillieston Heights	Project No.:	32110
Client: STANTEC PTY LTD (CARDNO)	Report No.:	23/0178
Address: LEVEL 9 - THE FORUM, 203 PACIFIC HWY, ST LEONARDS, NSW 2065	Report Date:	25/01/2023
Test Method: RMS T108,T109	Page:	2 OF 2
Client Request No.: 304100928		

Sampling Procedure: Samples Supplied By Client (Not covered under NATA Scope of Accreditation)

STS / Sample No.	7250D-L/7	7250D-L/8		
Sample Location	BH26	BH28		
Material Description	Silty Clay, brown	Silty Clay, brown		
Depth (m)	0.5 - 1.0	0.5 - 1.0		
Sample Date	19/12/2022	19/12/2022		
Sample History	Oven Dried	Oven Dried		
Method of Preparation	Dry Sieved	Dry Sieved		
Liquid Limit (%)	18	22		
Plastic Limit (%)	16	17		
Plasticity Index	2	5		
Linear Shrinkage (%)	N/A	N/A		
Mould Size (mm)	N/A	N/A		
Crumbing	N/A	N/A		
Curling	N/A	N/A		

Remarks:

Technician:

Approved Signatory.....

Orlando Mendoza - Laboratory Manager

ΒV



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Emerson Class No.

Project: Gillieston Public School, Gillieston Heights

Client: STANTEC PTY LTD (CARDNO)

Address: LEVEL 9 - THE FORUM, 203 PACIFIC HWY, ST LEONARDS, NSW 2065

Test Method: AS1289.3.8.1

Client Request No.: 304100928

Sampling Procedure: Samples Supplied By Client (Not covered under NATA Scope of Accreditation)

STS / Sample No.	7250D-L/1	7250D-L/2	7250D-L/3	7250D-L/4	7250D-L/5	7250D-L/6
Sample Location	BH01	BH05	BH09	BH13	BH19	BH26
Material Description	Silty Clay, brown	Silty Clay, brown	Silty Clay, brown	Silty Clay, brown	Silty Clay, brown	Silty Clay, brown
Depth (mm)	0.5 - 1.0	0.5 - 1.0	0.5 - 1.0	0.0 - 0.5	1.00 - 1.5	0.5 - 1.0
Sample Date	19/12/2022	19/12/2022	19/12/2022	19/12/2022	19/12/2022	19/12/2022
Date Tested	24/01/2023	24/01/2023	24-Jan-23	24-Jan-23	24-Jan-23	24-Jan-23
Source of Material	Disturbed	Disturbed	Disturbed	Disturbed	Disturbed	Disturbed
Water Temperature (°)	21	21	21	21	21	21
Emerson Class No.	3	5	3	3	3	5

Emerson Classification

Class 1: Slaking and complete dispersion before remoulding

Class 2: Slaking and some dispersion before remoulding

Class 3: Slaking and no dispersion before remoulding, dispersion after remoulding

Class 4: Slaking and no despersion before remoulding, no dispersion after remoulding, calcite or gypsum present

Class 5: Slaking and no dispersion before remoulding, no dispersion after remoulding, no calcite or gypsum present, dispersion after slaking in a 1:5 soil / water suspension

Class 6: Slaking and no dispersion before remoulding, no dispersion after remoulding, no calcite or gypsum present, flocculation after shaking in a 1:5 soil / water suspension

Class 7: No slaking, swelling occurs

Class 8: No slaking, swelling does not occur

BV

Remarks:

Approved Signatory......

Orlando Mendoza - Laboratory Manager

Project No.: 32110 Report No.: 23/0179 Report Date: 25/01/2023 Page: 1 OF 1

NATA ISO/I No. 2

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14/1 Cowpasture Place, Wetherill Park NSW 2164 Phone: (02)9756 2166 | Email: enquiries@smectesting.com.au



California Bearing Ratio Determination Report

Project: Gillieston Public School, Gillieston Heights
Client: STANTEC PTY LTD (CARDNO)
Address: LEVEL 9 - THE FORUM, 203 PACIFIC HWY, ST LEONARDS, NSW 2065
Test Method: AS1289.5.1.1,6.1.1,2.1.1
No. of Days Soaked: 4
Client Request No.: 304100928

Project No.: 32110 Report No.: 23/0175 Report Date: 25/01/2023 Page: 1 OF 1 Compactive Effort: Standard Target Compaction (%): 100

Sampling Procedure: Samples Supplied By Client (Not covered under NATA Scope of Accreditation)

Surcharge (Kg): 4.5

STS / Sai	mple No.	7250D-L/1	7250D-L/2	7250D-L/3					
Sample Location		BH01	вноз	BH05					
Material Description		Sand, brown, with silt/clay/gravel	Sand, brown, with silt/clay/gravel	Sand, brown, with silt/clay/gravel					
Depth of S	ample (m)	0.5 - 1.0	0.5 - 1.0	0.5 - 1.0					
Sampl	e Date	19/12/2022	19/12/2022	19/12/2022					
Oversize or +19m	n Wet Basis m (%)	0.2	0.0	0.0					
Field Moist (9	ure Content %)	12.8	13.4	15.1					
Optimum Conte	Moisture nt (%)	14.4	15.6	17.1					
Maximum (t/	Dry Density m³)	1.84	1.81	1.74					
Dry D (t/	Before Soaking	1.84	1.81	1.74					
ensity m³)	After Soaking	1.82	1.79	1.70					
Rela Comp (9	Before Soaking	99.8	100.1	100					
ative action %)	After Soaking	98.6	99.1	97.5					
Moi: Conte	Before Soaking	14.7	15.9	17.1					
sture ent (%)	After Soaking	17.7	17.6	20.6					
Moisture Ratio Before Soaking (%)		102.0	102.0	100.0					
Moi: Con after (१	Top 30mm	17.1	17.1	21					
sture tent ⁻ test %)	Entire Depth	17.4	17.7	20.6					
Swell after	Soaking (%)	1.2	1	2.5					
CBR Va	lue (%)	7.0	5.0	4.5					
Penetrat	ion (mm)	2.5	5.0	2.5					
Remarks:	emarks: +19mm material excluded from test								

Technician: BV

Approved Signatory.....

Orlando Mendoza - Laboratory Manager



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Accredited for Compliance with ISO/IEC 17025 - Testing No. 2750

Unconfined Compressive Strength of Rock Core

Project: GILLIESTON PUBLIC SCHOOL	Project No.:	32110
Client: STANTEC PTY LTD (CARDNO)	Report No.:	23/0187
Address: LEVEL 9 - THE FORUM, 203 PACIFIC HIGHWAY, ST LEONARDS, NSW 2065	Report Date:	27/01/23
Test Method: RMS T229, T120	Page:	1 OF 1

Sampling Procedure: Samples Supplied By Client (Not covered under NATA Scope of Accreditation)

Sample No.		7250D-L/1	7250D-L/2		
Location (BH)		BH 08	BH 25		
Depth	(m)	3.43 - 3.57	2.73 - 2.92		
Sample Descrip	otion	Claystone	Sandstone		
Date Cored	I	20/12/2022	21/12/2022		
Date Tested	k	25/01/2023	25/01/2023		
Testing Mach	ine	MAN Industries	MAN Industries		
Sample Diameter	(mm)	62.8	63.2		
Sample Height	(mm)	85.1	117.3		
L/D Ratio		1.4	1.9		
Sample Conditioning		Tested as Received	Tested as Received		
Test Duration	(min:sec)	7.5	7.5		
Failure Description		Tensile Dominated	Double Shear		
Uniaxial Compressive Strength *	(MPa)	2.5	13.0		
Initial Moisture Content	(%)	N/A	N/A		
Moisture Content as Tested	(%)	8.2	7.6		
Dry Density	(kg/m ³)	1850	2120		
Storage Conditions		Core Box	Core Box		
Other Comme	ents			 	
*) 4 / 1			the Character I		

Where L/D Ratio is less than 2, Unixaial Compressive Strength has been corrected.

* Where MPa is greater than 50, indicated strength is to be considered its minimum

Remarks:

Approved Signatory.....

Orlando Mendoza - Laboratory Manager

Technician: BV



STS Geotechnics Pty Ltd 14/1 Cowpasture Place, Wetherill Park NSW 2164 Phone: (02)9756 2166 | Email: enquiries@stsgeo.com.au

Unconfined Compressive Strength of Rock Cores

Project:GILLIESTON PUBLIC SCHOOL Client: STANTEC AUSTRALIA PTY LTD (CARDNO) Address: Level 9, 203 Pacific Highway, St Leonards
 Project No.:
 32110

 Report No.:
 23/0187

 Report Date:
 27/01/2023

 Page:
 2 of 2







CERTIFICATE OF ANALYSIS

Work Order	ES2301736	Page	: 1 of 4
Client	STS Geotechnics	Laboratory	Environmental Division Sydney
Contact	: Orlando Mendoza	Contact	: Customer Services ES
Address	: Unit 14/1 Cowpasture Place	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
	Wetherill Park 2164		
Telephone	:	Telephone	: +61-2-8784 8555
Project	: 32110/7250D-L	Date Samples Received	: 19-Jan-2023 11:15
Order number	: 2023-023	Date Analysis Commenced	: 23-Jan-2023
C-O-C number	:	Issue Date	27-Jan-2023 12:25
Sampler	:		Hac-MRA NATA
Site	:		
Quote number	: EN/222		Apprediction No. 825
No. of samples received	: 5		Accredited for compliance with
No. of samples analysed	: 5		ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Wisam Marassa	Inorganics Coordinator	Sydney Inorganics, Smithfield, NSW

Page	: 2 of 4
Work Order	: ES2301736
Client	: STS Geotechnics
Project	: 32110/7250D-L



General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract for details.

Key: CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- ED045G: LOR raised for Chloride on sample 5 due to sample matrix.
- ASS: EA029 (SPOCAS): Retained Acidity not required because pH KCI greater than or equal to 4.5
- ASS: EA029 (SPOCAS): Excess ANC not required because pH OX less than 6.5.
- ASS: EA029 (SPOCAS): Liming rate is calculated and reported on a dry weight basis assuming use of fine agricultural lime (CaCO3) and using a safety factor of 1.5 to allow for non-homogeneous mixing and poor reactivity of lime. For conversion of Liming Rate from kg/t dry weight to kg/m3 in-situ soil, multiply reported results x wet bulk density of soil in t/m3.

Page	: 3 of 4
Work Order	: ES2301736
Client	: STS Geotechnics
Project	: 32110/7250D-L



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	S4-BH7-1.0-1.5M	S7-BH12-0.2-0.5M	S9-BH18-0.5-1.0M	S14-BH25-0.9-1.3M	S16-BH26-1.0-1.5M
Sampling date / time			18-Jan-2023 00:00	18-Jan-2023 00:00	18-Jan-2023 00:00	18-Jan-2023 00:00	18-Jan-2023 00:00	
Compound	CAS Number	LOR	Unit	ES2301736-001	ES2301736-002	ES2301736-003	ES2301736-004	ES2301736-005
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value		0.1	pH Unit	6.0	6.0	5.8	5.9	5.9
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C		1	µS/cm	39	28	34	32	30
EA029-A: pH Measurements								
pH KCI (23A)		0.1	pH Unit	4.9	5.3	5.3	5.3	5.1
pH OX (23B)		0.1	pH Unit	4.2	3.8	5.0	4.5	4.2
EA029-B: Acidity Trail								
Titratable Actual Acidity (23F)		2	mole H+ / t	25	14	12	27	21
Titratable Peroxide Acidity (23G)		2	mole H+ / t	54	74	30	42	60
Titratable Sulfidic Acidity (23H)		2	mole H+ / t	29	59	19	14	39
sulfidic - Titratable Actual Acidity (s-23F)		0.020	% pyrite S	0.040	0.023	<0.020	0.044	0.034
sulfidic - Titratable Peroxide Acidity		0.020	% pyrite S	0.086	0.118	0.049	0.067	0.096
(s-23G)								
sulfidic - Titratable Sulfidic Acidity (s-23H)		0.020	% pyrite S	0.046	0.095	0.030	0.023	0.063
EA029-C: Sulfur Trail								
KCI Extractable Sulfur (23Ce)		0.020	% S	<0.020	<0.020	<0.020	<0.020	<0.020
Peroxide Sulfur (23De)		0.020	% S	<0.020	<0.020	<0.020	<0.020	<0.020
Peroxide Oxidisable Sulfur (23E)		0.020	% S	<0.020	<0.020	<0.020	<0.020	<0.020
acidity - Peroxide Oxidisable Sulfur		10	mole H+ / t	<10	<10	<10	<10	<10
KCI Extractable Calcium (23Vb)		0.020	% Ca	<0.020	0.065	<0.020	<0.020	<0.020
Peroxide Calcium (23Wh)		0.020	% Ca	<0.020	0.067	<0.020	<0.020	<0.020
Acid Reacted Calcium (23X)		0.020	% Ca	<0.020	<0.020	<0.020	<0.020	<0.020
acidity - Acid Reacted Calcium (a-23X)		10	mole H+/t	<10	<10	<10	<10	<10
sulfidic - Acid Reacted Calcium (s-23X)		0.020	% S	<0.020	<0.020	<0.020	<0.020	<0.020
EA029-E: Magnesium Values								
KCI Extractable Magnesium (23Sm)		0.020	% Mg	0.036	<0.020	0.048	0.038	0.034
Peroxide Magnesium (23Tm)		0.020	% Mg	0.040	<0.020	0.049	0.038	0.036
Acid Reacted Magnesium (23U)		0.020	% Mg	<0.020	<0.020	<0.020	<0.020	<0.020
Acidity - Acid Reacted Magnesium (a-23U)		10	mole H+/t	<10	<10	<10	<10	<10
sulfidic - Acid Reacted Magnesium		0.020	% S	<0.020	<0.020	<0.020	<0.020	<0.020
(s-23U)								
EA029-H: Acid Base Accounting								

Page	: 4 of 4
Work Order	: ES2301736
Client	: STS Geotechnics
Project	: 32110/7250D-L



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	S4-BH7-1.0-1.5M	S7-BH12-0.2-0.5M	S9-BH18-0.5-1.0M	S14-BH25-0.9-1.3M	S16-BH26-1.0-1.5M
		Sampli	ng date / time	18-Jan-2023 00:00	18-Jan-2023 00:00	18-Jan-2023 00:00	18-Jan-2023 00:00	18-Jan-2023 00:00
Compound	CAS Number	LOR	Unit	ES2301736-001	ES2301736-002	ES2301736-003	ES2301736-004	ES2301736-005
				Result	Result	Result	Result	Result
EA029-H: Acid Base Accounting - Continu	ed							
ANC Fineness Factor		0.5	-	1.5	1.5	1.5	1.5	1.5
Net Acidity (sulfur units)		0.02	% S	0.04	0.02	<0.02	0.04	0.03
Net Acidity (acidity units)		10	mole H+ / t	25	14	12	27	21
Liming Rate		1	kg CaCO3/t	2	1	<1	2	2
Net Acidity excluding ANC (sulfur units)		0.02	% S	0.04	0.02	<0.02	0.04	0.03
Net Acidity excluding ANC (acidity units)		10	mole H+ / t	25	14	12	27	21
Liming Rate excluding ANC		1	kg CaCO3/t	2	1	<1	2	2
EA055: Moisture Content (Dried @ 105-11	10°C)							
Moisture Content		0.1	%	7.5	4.7	8.0	7.2	6.8
EA080: Resistivity								
Resistivity at 25°C		1	ohm cm	25600	35700	29400	31200	33300
ED040S: Soluble Major Anions								
Sulfate as SO4 2-	14808-79-8	10	mg/kg	40	<10	30	30	30
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	10	mg/kg	20	<10	10	20	<50

Inter-Laboratory Testing

Analysis conducted by ALS Brisbane, NATA accreditation no. 825, site no. 818 (Chemistry) 18958 (Biology).

(SOIL) EA029-D: Calcium Values

(SOIL) EA029-E: Magnesium Values

(SOIL) EA029-F: Excess Acid Neutralising Capacity

(SOIL) EA029-H: Acid Base Accounting

(SOIL) EA029-G: Retained Acidity

(SOIL) EA029-A: pH Measurements

(SOIL) EA029-C: Sulfur Trail

(SOIL) EA029-B: Acidity Trail