Excavation Environmental & Civil Services P/L • Environmental and Geotechnical Engineering

HUNTER VALLEY OFFICE Ph: 0407 434 604
A.B.N: 65 113 418 223 A.C.N. 113 418 223
Email: seecservices@hotmail.com

GEOTECHNICAL ASSESSMENT

PAVEMENT INVESTIGATION AND DESIGN

PROPOSED REAR ACCESS ROAD

For: BWP MANAGEMENT LTD

07/07/2021

BUNNINGS WAREHOUSE
BUNGAREE STREET
MAITLAND, NSW

Lot 2 DP 1078905

Sanko
Excavation Environmental & Civil Services P/L • Environmental and Geotechnical Engineering

HUNTER VALLEY OFFICE Ph: 0407 434 604
A.B.N: 65 113 418 223 A.C.N. 113 418 223
Email: seecservices@hotmail.com

07/07/2021

Document – E21 053-A_BunningsMaitland_PAVE.Rpt

GEOTECHNICAL ASSESSMENT
PAVEMENT INVESTIGATION AND DESIGN
REAR ACCESS ROAD

BUNNINGS WAREHOUSE
BUNGAREE STREET
MAITLAND, NSW

Lot 2 DP 1078905

Report Issue #	Copies	Recipient
1	Email PDF	BWP Management Ltd Kate Corrigan
1	Secure PDF	Sanko Server

EXECUTIVE SUMMARY

We are pleased to provide this Geotechnical Site Assessment to assess the subgrade conditions onsite and the required pavement thickness design based on expected traffic loading.

The aim of this investigation is to provide recommendations including geotechnical parameters and specifications for the design of the above-mentioned pavement prior to construction activities.

A pavement 440mm thick in total is required (for a rigid pavement 180mm of concrete overlying 260mm of subbase material and for a flexible pavement 50mm AC Seal overlying 150mm of Basecourse material overlying 240mm of Sub-base material), based on the estimated design traffic loadings and for the geotechnical conditions encountered onsite.

1.0 Introduction

The site is located at the rear of the existing Bunnings complex on Bungaree Street in the industrial area in the north western corner of Maitland about 150m south of The New England Highway and immediately east of the rail line in the location shown on the attached Figure 1.

The location of the proposed road reconstruction is located at the rear access of the existing building in the location shown on the attached Figure 2.

Proposed development involves the construction of an access road in the designated road easement at the rear of the site.

We have previously carried out a Pavement Assessment on the section of pavement that connects the site located at the rear of the Bunnings via the existing road easement.

The scope of work for this pavement assessment included providing recommendations on:

- Surface and Sub-surface conditions;
- Excavation conditions;
- Parameters including design subgrade CBR, material thickness and material specifications for the pavement design of a Rigid concrete pavement to Maitland City Council specifications for the rear accessway;
- Construction recommendations.

2.0 Fieldwork

Field work was carried out on 23 June 2021 and comprised:

- Excavation of 4 boreholes (BH1 to BH4) to a termination depth of 1.5m.
- Dynamic Cone Penetrometer (DCP) testing was carried out at BH1 to BH4;
- Observation and mapping of relevant site features.

All field work was carried out in the full-time presence of a Senior Geotechnical Engineer from Sanko who located the boreholes, directed the sampling and testing and produced engineering logs of the boreholes. The engineering logs of the boreholes are presented in the appendix, together with explanation sheets defining the terms and symbols used in their preparation. The borehole locations are shown on the attached Figure 1.

3.0 Site Description

The site is located on the western side of Bungaree Street in an area of moderately undulating residual deposits that have a general topographical trend of running down from the north to the south.

The area where the access road is going is in the north eastern corner of the site where the rear access joins the access to the adjacent new development to the north of the site.

3.1 Surface Conditions

Topographically the area exhibits a general trend of running down from the north to the lower portions in the south of the site where a drainage channel runs under the building to the west of the proposed road area.

The area of the proposed pavement has been cut into the hillside and a retaining wall constructed on the northern boundary on the eastern portion of the proposed pavement and the western portion being either close to natural grade or located on minor regrade filling.

At the time of investigation, no evidence of significant areas of soil erosion or surface water seepage was noted over the proposed pavement area. Some areas of failure in the existing pavement were noted, especially in the area where the majority of parking and unloading of trucks is carried out. These areas were either repatched in the bitumen areas, or replaced with concrete slabs. There was no cracking of the upper soil profile at the time of assessment and some rain had occurred in the area in the preceding weeks.

3.2 Sub-surface Conditions

Reference to the 1:250K Newcastle Regional Geology Map S1 56-5 indicates that the site is underlain by Permian aged Maitland Group, namely the Branxton Formation comprising sandstone, siltstone and conglomerate.

Proposed pavement area geotechnical parameters are detailed below in Table 1;

TABLE 1 – SUMMARY OF SOIL TYPES ENCOUNTERED AT BOREHOLE LOCATIONS

SOIL UNIT	SOIL TYPE	DESCRIPTION
UNIT 1A	FILL	(BH1 and BH2) Asphaltic Cement overlying PAVEMENT GRAVELS; Clayey Sandy GRAVEL; fine to medium grained, brown, fine to medium sand, low plasticity fines, moist, firm. (BH3 and BH4) Sandy CLAY; medium to high plasticity, brown, fine to medium sand, moisture greater than the plastic limit, firm
UNIT 2A	RESIDUAL	CLAY; medium to high plasticity, dark brown / grey, some fine to medium sand, moisture greater than the plastic limit, firm becoming stiff.
UNIT 2B	RESIDUAL	CLAY; medium to high plasticity, grey mottled orange, some fine to medium sand increasing with depth, moisture greater than the plastic limit, stiff becoming very stiff.

Table 2 provides a summary of the distributions of the above soil units at each borehole location.

TABLE 2 – SUMMARY OF DISTRIBUTION OF GEOTECHNICAL UNITS AT borehole LOCATIONS

BOREHOLE	DEPTH ENCOUNTERED BELOW EXISTING GROUND LEVEL (m)		
	UNIT 1	UNIT 2A	UNIT 2B
BH1	0.0 – 0.5	0.5 – 0.8	0.8 – 1.5+
BH2	0.0 – 0.4	0.4 – 0.7	0.7 – 1.5+
BH3	0.0 – 0.2	0.2 – 1.1	1.1 – 1.5+
BH4	0.0 – 0.2	0.2 – 1.2	1.2 – 1.5+
NOTE: (+) denotes material continues for untested depth and NE denotes Not Encountered.			

Groundwater or seepage was not encountered in any of the boreholes on the day of investigation. It should be noted that fluctuations in the groundwater levels can occur as a result of seasonal variations, temperature, rainfall and other similar factors, the influence of which may not have been apparent at the time of investigation.

4.0 In-situ Testing

In-situ DCP testing was carried out to determine the appropriate subgrade design CBR. Results are detailed on the borelogs attached to this report. To obtain the information required, the following testing was carried out:

- 4 DCP tests.

5.0 Recommendations

5.1 Site Preparation

Site preparation and earthworks suitable for structure support should consist of:

- Proposed pavement areas should be stripped to remove all existing bitumen, vegetation, loose topsoil / loose slopewash, existing fill, root affected or other potentially deleterious materials and boxed out to the required depth. Boxing depth will be in the order of 440mm if design finished levels meet current level at BH1 to BH3;

- Approved fill beneath pavements should be engineer controlled fill compacted in layers not exceeding 300mm loose thickness to a minimum density ratio of 98% Standard Compaction in accordance with AS1289 5.1.1 or equivalent at 60% to 90% of OMC beneath pavements;

- Approved onsite sub-grade material should be in-situ rolled and compacted to 100% Standard at 60% to 90% of OMC;

- All fill should be supported by properly designed and constructed retaining walls or else battered at 1V:2H or flatter and protected against erosion;

- Earthworks should be carried out in accordance with the recommendations outlined in AS3798-2007 '*Guidelines for Earthworks for Commercial and Residential Developments'*.

5.2 Pavement Thickness Design

5.2.1 Design Parameters

Design traffic loadings have been adopted in accordance with Austroads Design Specifications and Maitland Council Engineering Design Specifications. The following design traffic loading has been adopted:

- Industrial (Minor): **5 X 10^6 ESA's**

Based on the results of the in-situ field testing and previous experience in similar material, a design subgrade California Bearing Ratio (CBR) value has been adopted;

- Subgrade: **UNIT 2A/B CLAY – 5%**

5.2.2 Thickness Design

A rigid pavement thickness design has been based on the procedures outlined in ARRB Special Report No 41, APRG Report No 21 and Austroads - Pavement Design 2017 - A Guide to the Structural Design of Road Pavements.

The recommended material, construction specification and pavement make-up are presented on the attached Pavement Design Summary.

At the time of the field investigation, moisture content for the subgrade material was close to Optimal Moisture Content at the time of investigation. It should therefore be anticipated that minor moisture conditioning of the subgrade may be necessary prior to compaction and placement of pavement materials. The required time period to prepare the subgrade is likely to be dependent on the prevailing weather conditions and final excavation depth at the time of construction.

In the unlikely event that over wet subgrades exist at the time of construction or deleterious fill materials are encountered at subgrade level, these materials should be over-excavated and be replaced with a minimum depth of 250mm of well graded granular select material with CBR of 15% or greater. The requirement for, and extent of subgrade replacement should be confirmed by the geotechnical authority at the time of construction.

It is recommended that each construction length be boxed out to the minimum subgrade level required by the relevant pavement thickness design. Prior to pavement construction, the exposed subgrade should be assessed by a geotechnical engineer to confirm that subgrade conditions are consistent with design assumptions.

5.2.3 Pavement Drainage

The attached pavement thickness designs assume the provision of adequate surface and subsurface drainage of the pavement and adjacent areas. It is recommended that subsoil drains be installed:

- Along the high side of pavement area aligned across site slopes;
- Behind all walls and beneath all proposed pavement areas.

6.0 Construction Risk

The extent of surface observation and testing associated with this assessment is limited to discrete borehole locations and variations in ground conditions can occur between and away from such locations. If subsurface conditions encountered during construction differ from those given in this report further advice should be sought without delay.

If you have any further questions about this report, please contact the undersigned.

For and on behalf of
Sanko Excavation Environmental and Civil Services P/L

Damien Sankowsky *BE(Env)*
Principal Geotechnical Engineer
Australian Geomechanics Society (AGS) Member – EA ID 5879317

Attachments:

Pavement Thickness Design Summary (2 pages)

Report Limitations

Photographs

Figure 1 – Site Location

Figure 2 – Test Locations

Log Explanation Sheets

Borehole Logs (4X BH's) and DCP Testing

References:

ARRB Special Report No 41

APRG Report No 21

TfNSW QA Specifications R73, R82 and R83

Austroads - Pavement Design 2017

AS3798-2007 "Guidelines for Earthworks for Commercial and Residential Developments"

Sanko

Excavation Environmental & Civil Services P/L • Environmental and Geotechnical Engineering

PAVEMENT THICKNESS DESIGN SUMMARY

PROPOSED REAR ACCESS
BUNNINGS MAITLAND
BUNGAREE STREET, MAITLAND, NSW

Council: Maitland City Council | Report Date: 07/07/2021

Job #:E21 053-A | Designed By: DS

P 1/2 | Thickness Design

Road:	*Subgrade Material and Design CBR(%):*	*Design Traffic Loading (ESA' s*):*	*Wearing Course Thickness (mm):*	*Concrete Thickness (mm):*	*Basecourse Thickness (mm):*	*Sub-base thickness (mm):*	*Total Thickness (mm):*
REAR ACCESS ROAD ***RIGID***	UNIT 2A/B CLAY 5%	5 X 10^6	NA	180	NA	260	**440**
REAR ACCESS ROAD ***FLEXIBLE***	UNIT 2A/B CLAY 5%	5 X 10^6	50	NA	150	240	**440**

Sanko

Excavation Environmental & Civil Services P/L • Environmental and Geotechnical Engineering

PAVEMENT THICKNESS DESIGN SUMMARY

PROPOSED REAR ACCESS
BUNNINGS MAITLAND
BUNGAREE STREET, MAITLAND, NSW

Council: Maitland City Council | Report Date: 07/07/2021

Job #:E21 053-A | Designed By: DS

P 2/2 | Material Specifications

Specifications:

Wearing Course: Confirming to MCC Specifications

Concrete: 3.2 MPa Flexural Strength (32 MPa Compressive Strength) WITH SHOULDER.

Basecourse : Conforming to TfNSW R71 compacted to 98% Mod.

.

Sub Base: Conforming to TfNSW R82/R83 compacted to 95% Mod.

Sub Grade: In-situ material compacted to 100% Standard at 60-90% of OMC.

OR

Engineer Controlled Fill compacted to 100% Standard at +/-2% of OMC.

This design assumes the adequate provision of drainage as per geotechnical investigation report.

Sanko

Excavation Environmental & Civil Services P/L • Environmental and Geotechnical Engineering

REPORT LIMITATIONS

Sanko Excavation Environmental and Civil Service Pty Ltd have undertaken a site assessment in accordance with current industry and professional standards. The scope of works were limited to that as set out in the proposal as refered to in this investigation. This report is based upon limited site investigation and subsurface sampling and laboratory testing of samples as set out in the forementioned proposal. Report findings are based upon site conditions at the time of investigation and as such can not be relied upon for unqualified warranties or assume liablity for site conditions not observed and/or accessable during or at the time of investigation. The works are restricted to the site detailed in the report with no offsite investigations conducted. Despite all resaonable care and dilligance taken ground conditions encountered and contaminant concentrations may not represent conditions between sample locations. Site characteristics may also change subsequent to this investigation due to natural processes, chemical reactions, spilling or leaking of contaminants, change in water levels or dumping of fill. All observations and interpretation is made from a limited number of observation points assuming geological and chemical conditions are representative across the site. No other warranties are made or intended. Third parties should seek their own independent advice regarding report contents. This report has been prepared exclusively for the client as detailed on the report and remains the property of this company and the client and can not be reproduced without the written consent of the client as detailed on the report and can then only be reproduced in its entirety.

BH1

AC SEAL

UNIT 1 – FILL

UNIT 2A – RESIDUAL

UNIT 2B - RESIDUAL

REAR ACCESS ROAD PAVEMENT INVESTIGATION

BUNNINGS MAITLAND, NSW **JULY 2021**

Sanko

Excavation Environmental & Civil Services P/L • Environmental and Geotechnical Engineering

BH2

AC SEAL

UNIT 1 – FILL

UNIT 2A – RESIDUAL

UNIT 2B - RESIDUAL

REAR ACCESS ROAD PAVEMENT INVESTIGATION

BUNNINGS MAITLAND, NSW **JULY 2021**

BH3

BH4

REAR ACCESS ROAD PAVEMENT INVESTIGATION

BUNNINGS MAITLAND, NSW JULY 2021

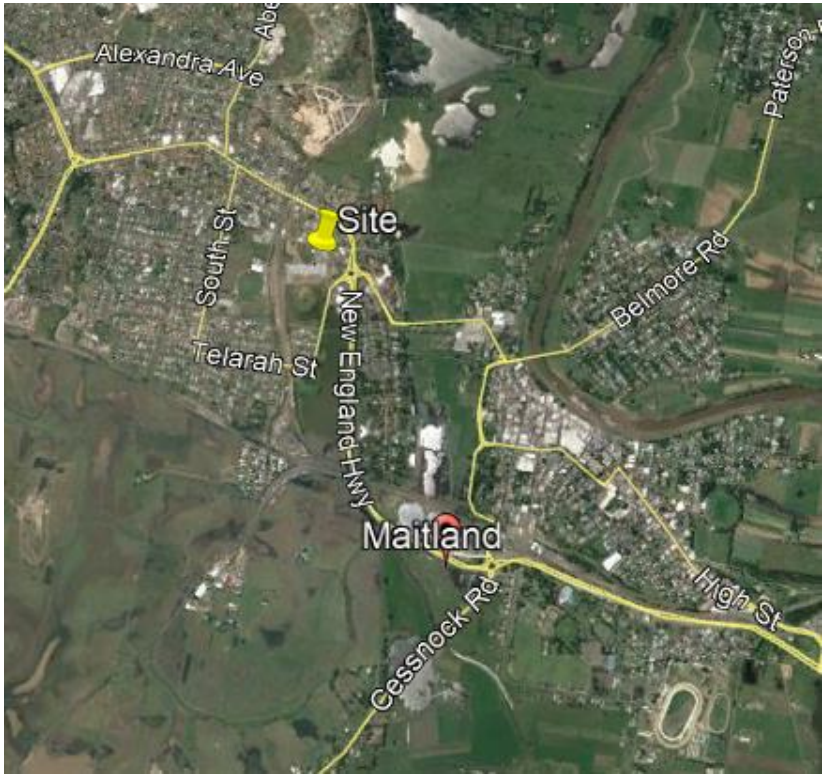


FIGURE 1 – SITE LOCATION

REAR ACCESS ROAD PAVEMENT INVESTIGATION – BUNNINGS MAITLAND, NSW JULY 2021

⊗ Borehole Location

FIGURE 2 – TEST LOCATIONS

REAR ACCESS ROAD PAVEMENT INVESTIGATION – BUNNINGS MAITLAND, NSW JULY 2021

DEFINITION:

In engineering terms soil includes every type of uncemented or partially cemented inorganic or organic material found in the ground. In practice, if the material can be remoulded or disintegrated by hand in its field condition or in water it is described as a soil. Other materials are described using rock description terms.

CLASSIFICATION SYMBOL & SOIL NAME

Soils are described in accordance with the Unified Soil Classification (UCS) as shown in the table on Sheet 2.

PARTICLE SIZE DESCRIPTIVE TERMS

NAME	SUBDIVISION	SIZE
Boulders		>200 mm
Cobbles		63 mm to 200 mm
Gravel	coarse	20 mm to 63 mm
	medium	6 mm to 20 mm
	fine	2.36 mm to 6 mm
Sand	coarse	600 µm to 2.36 mm
	medium	200 µm to 600 µm
	fine	75 µm to 200 µm

MOISTURE CONDITION

Dry Looks and feels dry. Cohesive and cemented soils are hard, friable or powdery. Uncemented granular soils run freely through hands.

Moist Soil feels cool and darkened in colour. Cohesive soils can be moulded. Granular soils tend to cohere.

Wet As for moist but with free water forming on hands when handled.

CONSISTENCY OF COHESIVE SOILS

TERM	UNDRAINED STRENGTH s_u (kPa)	FIELD GUIDE
Very Soft	<12	A finger can be pushed well into the soil with little effort.
Soft	12 - 25	A finger can be pushed into the soil to about 25mm depth.
Firm	25 - 50	The soil can be indented about 5mm with the thumb, but not penetrated.
Stiff	50 - 100	The surface of the soil can be indented with the thumb, but not penetrated.
Very Stiff	100 - 200	The surface of the soil can be marked, but not indented with thumb pressure.
Hard	>200	The surface of the soil can be marked only with the thumbnail.
Friable	–	Crumbles or powders when scraped by thumbnail.

DENSITY OF GRANULAR SOILS

TERM	DENSITY INDEX (%)
Very loose	Less than 15
Loose	15 - 35
Medium Dense	35 - 65
Dense	65 - 85
Very Dense	Greater than 85

MINOR COMPONENTS

TERM	ASSESSMENT GUIDE	PROPORTION OF MINOR COMPONENT IN:
Trace of	Presence just detectable by feel or eye, but soil properties little or no different to general properties of primary component.	Coarse grained soils: <5% Fine grained soils: <15%
With some	Presence easily detected by feel or eye, soil properties little different to general properties of primary component.	Coarse grained soils: 5 - 12% Fine grained soils: 15 - 30%

SOIL STRUCTURE

ZONING		CEMENTING	
Layers	Continuous across exposure or sample.	Weakly cemented	Easily broken up by hand in air or water.
Lenses	Discontinuous layers of lenticular shape.	Moderately cemented	Effort is required to break up the soil by hand in air or water.
Pockets	Irregular inclusions of different material.		

GEOLOGICAL ORIGIN

WEATHERED IN PLACE SOILS

Extremely weathered material	Structure and fabric of parent rock visible.
Residual soil	Structure and fabric of parent rock not visible.

TRANSPORTED SOILS

Aeolian soil	Deposited by wind.
Alluvial soil	Deposited by streams and rivers.
Colluvial soil	Deposited on slopes (transported downslope by gravity).
Fill	Man made deposit. Fill may be significantly more variable between tested locations than naturally occurring soils.
Lacustrine soil	Deposited by lakes.
Marine soil	Deposited in ocean basins, bays, beaches and estuaries.

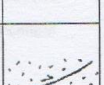
SOIL DESCRIPTION EXPLANATION SHEET 1/2

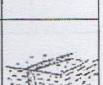
SOIL CLASSIFICATION INCLUDING IDENTIFICATION AND DESCRIPTION

FIELD IDENTIFICATION PROCEDURES (Excluding particles larger than 60 mm and basing fractions on estimated mass)							USC	PRIMARY NAME
COARSE GRAINED SOILS More than 50% of materials less than 63 mm is larger than 0.075 mm	(About the smallest particle visible to the naked eye)	GRAVELS More than half of coarse fraction is larger than 2.0 mm	CLEAN GRAVELS (Little or no fines)	Wide range in grain size and substantial amounts of all intermediate particle sizes.			GW	GRAVEL
				Predominantly one size or a range of sizes with more intermediate sizes missing.			GP	GRAVEL
			GRAVELS WITH FINES (Appreciable amount of fines)	Non-plastic fines (for identification procedures see ML below)			GM	SILTY GRAVEL
				Plastic fines (for identification procedures see CL below)			GC	CLAYEY GRAVEL
		SANDS More than half of coarse fraction is smaller than 2.0 mm	CLEAN SANDS (Little or no fines)	Wide range in grain sizes and substantial amounts of all intermediate sizes missing			SW	SAND
				Predominantly one size or a range of sizes with some intermediate sizes missing.			SP	SAND
			SANDS WITH FINES (Appreciable amount of fines)	Non-plastic fines (for identification procedures see ML below).			SM	SILTY SAND
				Plastic fines (for identification procedures see CL below).			SC	CLAYEY SAND
FINE GRAINED SOILS More than 50% of material less than 63 mm is smaller than 0.075 mm	(A 0.075 mm particle is about the smallest particle visible to the naked eye)		IDENTIFICATION PROCEDURES ON FRACTIONS <0.2 mm.					
				DRY STRENGTH	DILATANCY	TOUGHNESS		
		SILTS & CLAYS Liquid limit less than 50		None to Low	Quick to slow	None	ML	SILT
				Medium to High	None	Medium	CL	CLAY
				Low to medium	Slow to very slow	Low	OL	ORGANIC SILT
		SILTS & CLAYS Liquid limit greater than 50		Low to medium	Slow to very slow	Low to medium	MH	SILT
				High	None	High	CH	CLAY
				Medium to High	None	Low to medium	OH	ORGANIC CLAY
HIGHLY ORGANIC SOILS		Readily identified by colour, odour, spongy feel and frequently by fibrous texture.					Pt	PEAT

• Low plasticity – Liquid Limit W_L less than 35%. • Modium plasticity – W_L between 35% and 50%.

COMMON DEFECTS IN SOIL

TERM	DEFINITION	DIAGRAM
PARTING	A surface or crack across which the soil has little or no tensile strength. Parallel or sub parallel to layering (eg bedding). May be open or closed.	
JOINT	A surface or crack across which the soil has little or no tensile strength but which is not parallel or sub parallel to layering. May be open or closed. The term 'fissure' may be used for irregular joints <0.2 m in length.	
SHEARED ZONE	Zone in clayey soil with roughly parallel near planar, curved or undulating boundaries containing closely spaced, smooth or slickensided, curved intersecting joints which divide the mass into lenticular or wedge shaped blocks.	
SHEARED SURFACE	A near planar curved or undulating, smooth, polished or slickensided surface in clayey soil. The polished or slickensided surface indicates that movement (in many cases very little) has occurred along the defect.	

TERM	DEFINITION	DIAGRAM
SOFTENED ZONE	A zone in clayey soil, usually adjacent to a defect in which the soil has a higher moisture content than elsewhere.	
TUBE	Tubular cavity. May occur singly or as one of a large number of separate or inter-connected tubes. Walls often coated with clay or strengthened by denser packing of grains. May contain organic matter	
TUBE CAST	Roughly cylindrical elongated body of soil different from the soil mass in which it occurs. In some cases the soil which makes up the tube cast is cemented.	
INFILLED SEAM	Sheet or wall like body of soil substance or mass with roughly planar to irregular near parallel boundaries which cuts through a soil mass. Formed by infilling of open joints.	

72810 / 07-06

SOIL DESCRIPTION EXPLANATION SHEET 2/2

Location	Bunnings Maitland Rear Access				Date	23.6.21	
Method	Auger			**BH1**	Logger	DGS	
Method	DCP	Depth	Graphic	Material	Moisture	Con.Den	Obs
SFA		**0.03**		30mm AC SEAL			AC
		0.1		Clayey Sandy GRAVEL; fine to coarse grained, dark brown mottled orange, fine to medium sand, low plasicity fines	Moist	VD	Fill
		0.2					
		0.3					
		0.4					
		0.5					
	6	0.6		CLAY; medium to high plasticity, dark grey / brown	M>Wp	F	RES
	8	0.7					
		0.8					
	12	0.9		CLAY; medium to high plasticity, brown mottled orange			
	14	1				St	
		1.1					
		1.2					
		1.3					
		1.4					
		1.5					
		1.6		**BH1 TERMINATED @ 1.5m** **LIMIT OF INVESTIGATION**			
		1.7					
		1.8		DCP Blows/150mm			
		1.9					
		2					

Sanko

E21 053

Location	Bunnings Maitland Rear Access				Date	23.6.21	
Method	Auger			**BH2**	Logger	DGS	
Method	DCP	Depth	Graphic	Material	Moisture	Con.Den	Obs
SFA		**0.05**		50mm AC SEAL			AC
		0.1		Clayey Sandy GRAVEL; fine to coarse grained, dark brown mottled orange, fine to medium sand, low plasicity fines	Moist	VD	Fill
		0.2					
		0.3					
		0.4					
		0.5		CLAY; medium to high plasticity, dark grey / brown, some fine to medium gravel	M>Wp	F	RES
	4	0.6					
	6	0.7		CLAY; medium to high plasticity, dark grey / brown			
		0.8					
	12	0.9					
	18	1				St	
		1.1					
		1.2					
		1.3					
		1.4					
		1.5					
		1.6		**BH2 TERMINATED @ 1.5m** **LIMIT OF INVESTIGATION**			
		1.7					
		1.8		DCP Blows/150mm			
		1.9					
		2					

Sanko

E21 053

Location	Bunnings Maitland Rear Access				Date	23.6.21	
Method	Auger		**BH3**		Logger	DGS	
Method	DCP	Depth	Graphic	Material	Moisture	Con.Den	Obs
SFA	2	0.1		GRAVEL; medium grained, grey, angular	Dry	D	Fill
	3	0.2		Sandy CLAY; low to medium plasticity, grey, fine sand	>Wp	F	
	8	0.3		CLAY; medium to high plasticity, dark grey / brown, some fine to medium gravel			
	8	0.4					
	10	0.5					
	12	0.6					
	16	0.7					
		0.8					
		0.9					
		1					
		1.1		CLAY; medium to high plasticity, dark grey / brown		St	
		1.2					
		1.3					
		1.4					
		1.5					
		1.6		**BH3 TERMINATED @ 1.5m** **LIMIT OF INVESTIGATION**			
		1.7					
		1.8		DCP Blows/150mm			
		1.9					
		2					

Sanko

E21 053

Location	Bunnings Maitland Rear Access				Date	23.6.21	
Method	Auger			**BH4**	Logger	DGS	
Method	DCP	Depth	Graphic	Material	Moisture	Con.Den	Obs
SFA	2	0.1		Sandy CLAY; low to medium plasticity, grey, fine sand	>Wp	F	Fill
	3	0.2					
		0.3		CLAY; medium to high plasticity, dark grey / brown			
	8	0.4					
	8	0.5					
		0.6					
	10	0.7					
	12	0.8					
		0.9					
	15	1					
	18	1.1					
		1.2		CLAY; medium to high plasticity, dark grey / brown		St	
		1.3					
		1.4					
		1.5					
		1.6		**BH4 TERMINATED @ 1.5m** **LIMIT OF INVESTIGATION**			
		1.7					
		1.8		DCP Blows/150mm			
		1.9					
		2					