Douglas PARTNERS

GROUNDED EXPERTISE

Report on Preliminary Geotechnical Investigation

Proposed Quarry

1848 Castlereagh Hwy, Tallawang NSW

Prepared for Talinga Pastoral Co

Project 228775.00

4 June 2024

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The undersigned, on behalf of Douglas Partners Pty Ltd, confirm that this document and all attached drawings, logs and test results have been checked and reviewed for errors, omissions and inaccuracies.

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Douglas Partners acknowledges Australia's First Peoples as the Traditional Owners of the Land and Sea on which we operate. We pay our respects to Elders past and present and to all Aboriginal and Torres Strait Islander peoples across the many communities in which we live, visit and work. We recognise and respect their ongoing cultural and spiritual connection to Country.

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Report on Preliminary Geotechnical Investigation
Proposed Quarry

1848 Castlereagh Hwy, Tallawang NSW

1. Introduction

This report prepared by Douglas Partners Pty Ltd (Douglas) presents the results of a preliminary geotechnical investigation undertaken for a proposed quarry at 1848 Castlereagh Hwy, Tallawang NSW (the site). The investigation was commissioned by email instructing to proceed dated 6 April 2024 from Hamish and Sally Drury of Talinga Pastoral Co and was undertaken in accordance with Douglas' email proposal dated 4 April 2024.

It is understood that a new quarry is proposed, to supply earthworks materials during the construction of the Central West Orana Renewable Energy Zone (CWO REZ).

Geotechnical investigation has been carried out to provide information on the following:

- Subsurface conditions at test locations;
- Results of laboratory testing; and
- Apparent suitability of the materials encountered for use as earthworks materials.

The investigation included the drilling of two boreholes, sampling from an existing stockpile of excavated material and laboratory testing of selected samples. The details of the field work are presented in this report, together with comments and recommendations on the items listed above.

This report must be read in conjunction with all appendices including the notes provided in Appendix A.

2. Site description

The proposed quarry is currently planned to be located within Lot 1 in DP 1239728, No. 1848 Castlereagh Highway, Tallawang. The exact extent of the proposed quarry is yet to be determined.

At the time of the investigation, some excavation had already been undertaken in the central-northern area of the abovementioned lot, with excavated material stockpiled on the floor of the excavation. This area was accessed via an unsealed gravel access track which had been constructed using the site won materials.

The remaining area of the site was generally grass covered with some shrubs and scattered trees.

An aerial view of the site is shown in Drawing 1, Appendix D.

Surface levels at the site range from about RL 515 m AHD at the floor of the existing excavation to approximately RL 540 m AHD at the top of the adjacent hill.

Photographs of the site are provided in Figure 1 to Figure 4 below.

Figure 1 – Panoramic view of the site, looking north-west

Figure 2 – View of existing access road, constructed of site won material

Figure 3 – View of area of existing excavation and stockpiled material, near Bore 1

Figure 4 – View atop hill, Bore 2.

3. Regional geology

Reference to the NSW Seamless geology mapping indicates that the site lies over the boundary of two geological units, which are mapped to be separated by a faulted boundary. Table 1 below describes the mapped geology as shown in Figure 1 below.

Table 1: Mapped Geology

Geological Unit	Description	Shading in Figure 1
Dungeree Volcanics (Stad_f)	Shale, slate, quartz and felsic volcanic rich sandstone.	Purple
Tucklan Formation (Ocat)	Dark mudstone, basalt to latite boulder conglomerate or breccia, lithic sandstone, basalt, andesite, dolerite, latite, limestone and rare chert.	Green

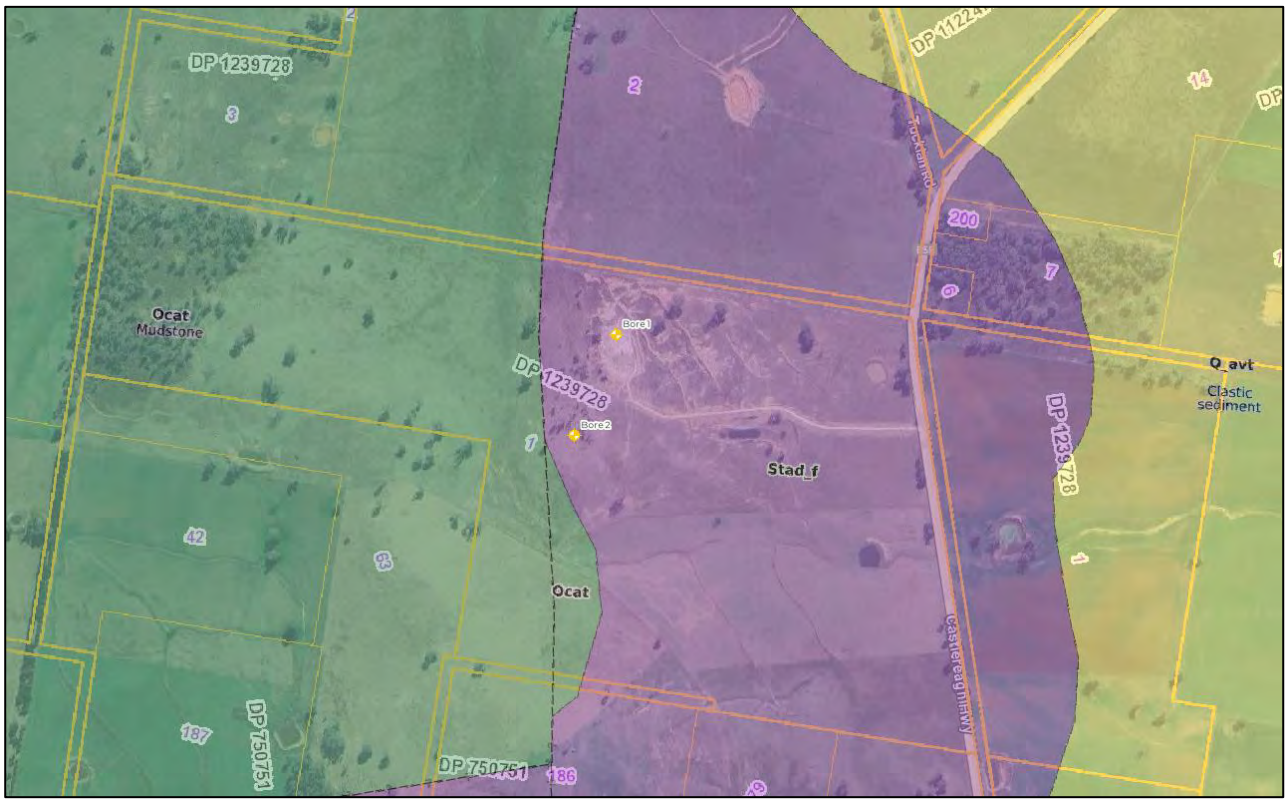

Figure 5 – NSW Seamless Geology map covering site, with approximate borehole locations and lot boundaries shown.

4. Field work

4.1 Field work methods

The field work was carried out between 4 to 15 April 2024 and comprised the following:

- Boreholes (4 to 8 April 2024):
  - Drilling of two (2) boreholes (designated Bores 1 and 2) at locations indicated by the client, to depths ranging from 13.54 m to 15.55 m. The boreholes were drilled using a 4WD truck mounted drilling rig utilising spiral flight augers within the top 1 m, then wash boring and NMLC rock coring techniques;
  - Point load testing on recovered rock samples, the results of which are presented on the attached borehole logs;
  - The subsurface soil and rock encountered and observed groundwater conditions were logged by Douglas personnel. Photographs of the recovered core were also taken and are presented in the core photoplates which accompany the logs in Appendix B;
  - Upon completion of drilling, the boreholes were backfilled using cuttings won during drilling.
- Stockpile sampling (15 April 2024):
  - Bulk sampling was undertaken of the existing excavated material that was stockpiled at the site. A total of three samples (S1 to S3) were collected from various locations within the stockpile.

The locations of the boreholes were set out in consultation with the client. The locations (MGA2020) and elevations (AHD) of the boreholes were obtained using a differential GPS, which is typically accurate to ±0.1 m depending on satellite coverage.

The stockpile sampling locations were sketched on site plan at the time of sampling.

The approximate locations of the boreholes and stockpile sampling are shown on Drawing 1 in Appendix D.

4.2 Field work results

4.2.1 Boreholes

Detailed results of the boreholes are provided in Appendix B. The borehole logs should be read in conjunction with the accompanying notes which explain the descriptive terms and classification methods used in the reports.

A summary of the borehole locations is provided below in Table 2.

Table 2: Summary of Boreholes

Borehole ID	Depth of Borehole (m)	Easting (m)	Northing (m)	Surface RL (AHD)
Bore 1	15.55	728147.7	6433639.4	517.1
Bore 2	13.54	728072.5	6433457.9	535.7

The subsurface conditions encountered generally comprised the following:

- Bore 1 – Typically medium and medium to high strength, highly fractured phyllite. Some very low strength bands were also recorded.
- Bore 2 – Shallow surficial soils overlying typically medium to high and high strength, moderately fractured meta-siltstone. Some low and medium strength bands were also recorded.

Groundwater observations within the bedrock profile was not possible due to the introduction of the drilling fluids for rock coring.

4.2.2 Stockpile sampling

As indicated in Section 2 above, a stockpile of excavated material was present within the central-northern area of the site. It was evident that the stockpiled material had been excavated from an east facing flank of hill in the same area. The stockpiled material comprised phyllite, consistent with that exposed in the adjacent cut batters and encountered in Bore 1.

Three samples were collected from various locations within the stockpile, as shown in Figure 6 to Figure 8.

Figure 6 – Material sampled at location S1

Figure 7 – Material sampled at location S2

Figure 8 – Material sampled at location S3

5. Laboratory testing

Material quality testing was carried out on the rock core samples collected from the boreholes, as well as the samples collected from the stockpiled material. The laboratory testing undertaken comprised the following suite of testing, using the Transport for NSW (TfNSW) methods listed:

- Atterberg limits (T108 and T109);
- Linear shrinkage (T113);
- Particle size distribution (T106 and T107); and
- 4 day soak California bearing ratio (T117).

Prior to testing, the samples also underwent pre-treatment by repeated compaction (T102) and artificial weathering (T103).

It is also noted that the recovered rock core from Bores 1 and 2 was crushed to 19 mm minus prior to testing. No crushing was undertaken on the stockpiled samples, however, any oversized material was removed prior to testing.

Detailed results of the laboratory testing are provided in Appendix C. A summary of the results is also provided in Table 3 and Table 4 below which also includes limits specified in TfNSW (2022).

Table 3: Summary of Laboratory Test Results (Rock Core from Boreholes)

Property / Test Method		Specification Requirement	Bore 1 Phyllite		Bore 2 Meta-Siltstone	
			Depth (m)		Depth (m)	
			1.12-5.0[1]	10.0-15.0	1.35-6.0	8.5-13.54
Particle Size Distribution (T106)		**Table 3071.1**				
% passing 53.0mm		100	100[2]	100[2]	100[2]	100[2]
% passing 37.5mm		95-100	100[2]	100[2]	100[2]	100[2]
% passing 19.0mm		50-85	100[2]	100[2]	100[2]	100[2]
% passing 6.7mm		40-80	82	78	62	57
% passing 2.36mm		35-70	60	56	37	33
% passing 0.075mm		NA	34	32	11	10
Other Properties		**Table 3071.2**				
Plasticity Index (T108, T109)		15 max	8	9	5	4
Linear Shrinkage (T113)		NA	2.0	2.0	1.0	1.0
CBR_{4day} (%)	SMZ Upper	33 min	20	25	80	80
	SMZ Lower	19 min				

Notes to table
1 Also blended with some sample from 8.0 – 9.0m depth.
2 Material crushed to 19 mm minus prior to testing and hence all material passed through the 19 mm sieve.
NA No specification provided in TfNSW (2022).

Table 4: Summary of Laboratory Test Results (Stockpile Samples)

Property / Test Method		Specification Requirement	S1 Phyllite	S2 Phyllite	S3 Phyllite
Particle Size Distribution (T106)		**Table 3071.1**			
% passing 53.0mm		100	100	100	100
% passing 37.5mm		95-100	98	98	99
% passing 19.0mm		50-85	92	89	90
% passing 6.7mm		40-80	67	68	62
% passing 2.36mm		35-70	44	45	38
% passing 0.075mm		NA	NT	NT	NT
Other Properties		**Table 3071.2**			
Plasticity Index (T108, T109)		15 max	5	7	10
Linear Shrinkage (T113)		NA	3.0	3.0	4.5
CBR_{4day} (%)	SMZ Upper	33 min	17	20	25
	SMZ Lower	19 min			

Notes to table
NT Not tested, as per test method.
NA No specification provided in TfNSW (2022).

6. Comments

The results of the laboratory testing undertaken to date was compared to the material specification (TfNSW, 2022) for 'select' quality materials. The following is noted:

- The CBR values obtained for the Phyllite, collected from Bore 1 and the stockpiled material, generally met the specification for the lower layer Selected Material Zone (SMZ), but not the upper, 150 mm thick, SMZ layer. Sample S1 (CBR = 17%), was marginally lower than the specification (CBR = 19%);
- The CBR values obtained for the Meta-Siltstone, collected from Bore 2 met the specification for the lower and upper SMZ;
- The plasticity index for all materials tested met the specification;
- The particle size distribution for the material collected in Bores 1 and 2 did not strictly meet the specification, however, it is noted that this material was crushed from the core samples to 19 minus to enable testing. Hence the process of the crushing has impacted on the results. It is expected that the particle size distribution would be able to be managed on-site with appropriate crushing / grading equipment; and
- The particle size distribution for the material collected from the stockpile, which would be typical of what would be produced following excavation, generally met the specification with the exception of some marginal exceedances for the % passing 19 mm.

Given the results of the preliminary investigation, it is recommended that the material encountered may be suitable for use as 'Select' quality material as referenced in TfNSW (2022).

The material would also be suitable for general fill. Consideration may also be given to the use of the material in unsealed access roads, subject to confirmation of the specification for such material and designer's approval.

Given the preliminary nature of the investigation, additional investigation and testing may be appropriate once the planned quarry layout is known. Additional investigation may also be required to meet authority conditions.

7. References

TfNSW. (2022). *Specification D&C 3071, Selected Material for Earthworks*. Edition 2 / Revision 3: Transport for NSW.

8. Limitations

Douglas Partners Pty Ltd (Douglas) has prepared this report for this project at 1848 Castlereagh Hwy, Tallawang NSW in accordance with Douglas' email proposal dated 4 April 2024 and acceptance received from Hamish and Sally Drury dated 6 April 2024. The work was carried out under Douglas' Engagement Terms. This report is provided for the exclusive use of Talinga Pastoral Co for this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of Douglas, does so entirely at its own risk and without recourse to Douglas for any loss or damage. In preparing this report Douglas has necessarily relied upon information provided by the client and/or their agents.

The results provided in the report are indicative of the sub-surface conditions on the site only at the specific sampling and/or testing locations, and then only to the depths investigated and at the time the work was carried out. Sub-surface conditions can change abruptly due to variable geological processes and also as a result of human influences. Such changes may occur after Douglas' field testing has been completed.

Douglas' advice is based upon the conditions encountered during this investigation. The accuracy of the advice provided by Douglas in this report may be affected by undetected variations in ground conditions across the site between and beyond the sampling and/or testing locations. The advice may also be limited by budget constraints imposed by others or by site accessibility.

The assessment of atypical safety hazards arising from this advice is restricted to the geotechnical components set out in this report and based on known project conditions and stated design advice and assumptions. While some recommendations for safe controls may be provided, detailed 'safety in design' assessment is outside the current scope of this report and requires additional project data and assessment.

This report must be read in conjunction with all of the attached and should be kept in its entirety without separation of individual pages or sections. Douglas cannot be held responsible for interpretations or conclusions made by others unless they are supported by an expressed statement, interpretation, outcome or conclusion stated in this report.

This report, or sections from this report, should not be used as part of a specification for a project, without review and agreement by Douglas. This is because this report has been written as advice and opinion rather than instructions for construction.

Appendix A

About this Report

Terminology, Symbols and Abbreviations

Soil Descriptions

Rock Descriptions

Sampling, Testing and Excavation Methodology

About this Report

November 2023

Introduction

These notes have been provided to amplify DP's report in regard to classification methods, field procedures and the comments section. Not all are necessarily relevant to all reports.

DP's reports are based on information gained from limited subsurface excavations and sampling, supplemented by knowledge of local geology and experience. For this reason, they must be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely.

Copyright

Borehole and Test Pit Logs

The borehole and test pit logs presented in this report are an engineering and/or geological interpretation of the subsurface conditions, and their reliability will depend to some extent on frequency of sampling and the method of drilling or excavation. Ideally, continuous undisturbed sampling or core drilling will provide the most reliable assessment, but this is not always practicable or possible to justify on economic grounds. In any case the boreholes and test pits represent only a very small sample of the total subsurface profile.

Interpretation of the information and its application to design and construction should therefore take into account the spacing of boreholes or pits, the frequency of sampling, and the possibility of other than 'straight line' variations between the test locations.

Groundwater

Where groundwater levels are measured in boreholes there are several potential problems, namely:

- In low permeability soils groundwater may enter the hole very slowly or perhaps not at all during the time the hole is left open;
- A localised, perched water table may lead to an erroneous indication of the true water table;
- Water table levels will vary from time to time with seasons or recent weather changes. They may not be the same at the time of construction as are indicated in the report; and
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water measurements are to be made.

More reliable measurements can be made by installing standpipes which are read at intervals over several days, or perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from a perched water table.

Reports

The report has been prepared by qualified personnel, is based on the information obtained from field and laboratory testing, and has been undertaken to current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal, the information and interpretation may not be relevant if the design proposal is changed. If this happens, DP will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface conditions, discussion of geotechnical and environmental aspects, and recommendations or suggestions for design and construction. However, DP cannot always anticipate or assume responsibility for:

- Unexpected variations in ground conditions. The potential for this will depend partly on borehole or pit spacing and sampling frequency;
- Changes in policy or interpretations of policy by statutory authorities; or
- The actions of contractors responding to commercial pressures.

If these occur, DP will be pleased to assist with investigations or advice to resolve the matter.

continued next page

About this Report

Site Anomalies

In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, DP requests that it be immediately notified. Most problems are much more readily resolved when conditions are exposed rather than at some later stage, well after the event.

Information for Contractual Purposes

Where information obtained from this report is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. DP would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

Site Inspection

The company will always be pleased to provide engineering inspection services for geotechnical and environmental aspects of work to which this report is related. This could range from a site visit to confirm that conditions exposed are as expected, to full time engineering presence on site.

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Terminology, Symbols and Abbreviations

November 2023

Introduction to Terminology, Symbols and Abbreviations

Douglas Partners' reports, investigation logs, and other correspondence may use terminology which has quantitative or qualitative connotations. To remove ambiguity or uncertainty surrounding the use of such terms, the following sets of notes pages may be attached Douglas Partners' reports, depending on the work performed and conditions encountered:

- Soil Descriptions;
- Rock Descriptions; and
- Sampling, insitu testing, and drilling methodologies

In addition to these pages, the following notes generally apply to most documents.

Abbreviation Codes

Site conditions may also be presented in a number of different formats, such as investigation logs, field mapping, or as a written summary. In some of these formats textual or symbolic terminology may be presented using textual abbreviation codes or graphic symbols, and, where commonly used, these are listed alongside the terminology definition. For ease of identification in these note pages, textual codes are presented in these notes in the following style XW. Code usage conforms with the following guidelines:

- Textual codes are case insensitive, although herein they are generally presented in upper case; and
- Textual codes are contextual (i.e. the same or similar combinations of characters may be used in different contexts with different meanings (for example `PL` is used for plastic limit in the context of soil moisture condition, as well as in `PL(A)` for point load test result in the testing results column)).

Data Integrity Codes

Subsurface investigation data recorded by Douglas Partners is generally managed in a highly structured database environment, where records "span" between a top and bottom depth interval. Depth interval "gaps" between records are considered to introduce ambiguity, and, where appropriate, our practice guidelines may require contiguous data sets. Recording meaningful data is not always appropriate (for example assigning a "strength" to a concrete pavement) and the following codes may be used to maintain contiguity in such circumstances.

Term	Description	Abbreviation Code
Core loss	No core recovery	KL
Unknown	Information was not available to allow classification of the property. For example, when auguring in loose, saturated sand auger cuttings may not be returned.	UK
No data	Information required to allow classification of the property was not available. For example if drilling is commenced from the base of a hole predrilled by others	ND
Not Applicable	Derivation of the properties not appropriate or beyond the scope of the investigation. For example providing a description of the strength of a concrete pavement	NA

Graphic Symbols

Douglas Partners' logs contain a "graphic" column which provides a pictorial representation of the basic composition of the material. The symbols used are directly representing the material name stated in the adjacent "Description of Strata" column, and as such no specific graphic symbology legend has been provided in these notes.

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Soil Descriptions

Terminology
Symbols
Abbreviations

March 2024

Introduction

All materials which are not considered to be "in-situ rock" are described in general accordance with the soil description model of AS 1726-2017 Part 6.1.3, and can be broken down into the following description structure:

The "classification" comprises a two character "group symbol" providing a general summary of dominant soil characteristics. The "name" summarises the particle sizes within the soil which most influence its behaviour. The detailed description presents more information about composition, condition, structure, and origin of the soil.

Classification, naming and description of soils require the relative proportion of particles of different sizes within the whole soil mixture to be considered.

Particle size designation and Behaviour Model

Solid particles within a soil are differentiated on the basis of size.

The engineering behaviour properties of a soil can subsequently be modelled to be either "fine grained" (also known as "cohesive" behaviour) or "coarse grained" ("non cohesive" behaviour), depending on the relative proportion of fine or coarse fractions in the soil mixture.

Particle Size Designation	Particle Size (mm)	Behaviour Model	
		Behaviour	Approximate Dry Mass
Boulder	>200	Excluded from particle behaviour model as "oversize"	
Cobble	63 - 200		
Gravel[1]	2.36 - 63	Coarse	>65%
Sand[1]	0.075 - 2.36		
Silt	0.002 - 0.075	Fine	>35%
Clay	<0.002		

[1] – refer grain size subdivision descriptions below

The behaviour model boundaries defined above are not precise, and the material behaviour should be assumed from the name given to the material (which considers the particle fraction which dominates the behaviour, refer "component proportions" below), rather than strict observance of the proportions of particle sizes. For example, if a material is named a "Sandy CLAY", this is indicative that the material exhibits fine grained behaviour, even if the dry mass of coarse grained material may exceed 65%.

Component proportions

The relative proportion of the dry mass of each particle size fraction is assessed to be a "primary", "secondary", or "minor" component of the soil mixture, depending on its influence over the soil behaviour.

Component Proportion Designation	Definition[1]	Relative Proportion	
		In Fine Grained Soil	In Coarse Grained Soil
Primary	The component (particle size designation, refer above) which dominates the engineering behaviour of the soil	The clay/silt component with the greater proportion	The sand/gravel component with the greater proportion
Secondary	Any component which is not the primary, but is significant to the engineering properties of the soil	Any component with greater than 30% proportion	Any granular component with greater than 30%; or Any fine component with greater than 12%
Minor[2]	Present in the soil, but not significant to its engineering properties	All other components	All other components

[1] As defined in AS1726-2017 6.1.4.4

[2] In the detailed material description, minor components are split into two further sub-categories. Refer "identification of minor components" below.

Composite Materials

In certain situations, a lithology description may describe more than one material, for example, collectively describing a layer of interbedded sand and clay. In such a scenario, the two materials would be described independently, with the names preceded or followed by a statement describing the arrangement by which the materials co-exist. For example, "INTERBEDDED Silty CLAY AND SAND".

Soil Descriptions

Classification

The soil classification comprises a two character group symbol. The first character identifies the primary component. The second character identifies either the grading or presence of fines in a coarse grained soil, or the plasticity in a fine grained soil. Refer AS1726-2017 6.1.6 for further clarification.

Soil Name

For most soils, the name is derived with the primary component included as the noun (in upper case), preceded by any secondary components stated in an adjective form. In this way, the soil name also describes the general composition and indicates the dominant behaviour of the material.

Component [1]	Prominence in Soil Name
Primary	Noun (eg "CLAY")
Secondary	Adjective modifier (eg "Sandy")
Minor	No influence

[1] – for determination of component proportions, refer component proportions on previous page

For materials which cannot be disaggregated, or which are not comprised of rock or mineral fragments, the names "ORGANIC MATTER" or "ARTIFICIAL MATERIAL" may be used, in accordance with AS1726-2017 Table 14.

Commercial or colloquial names are not used for the soil name where a component derived name is possible (for example "Gravelly SAND" rather than "CRACKER DUST").

Materials of "fill" or "topsoil" origin are generally assigned a name derived from the primary/secondary component (where appropriate). In log descriptions this is preceded by uppercase "FILL" or "TOPSOIL". Origin uncertainty is indicated in the description by the characters (?), with the degree of uncertainty described (using the terms "probably" or "possibly" in the origin column, or at the end of the description).

Identification of minor components

Minor components are identified in the soil description immediately following the soil name. The minor component fraction is usually preceded with a term indicating the relative proportion of the component.

Minor Component Proportion Term	Relative Proportion	
	In Fine Grained Soil	In Coarse Grained Soil
With	All fractions: 15-30%	Clay/silt: 5-12% sand/gravel: 15-30%
Trace	All fractions: 0-15%	Clay/silt: 0-5% sand/gravel: 0-15%

The terms "with" and "trace" generally apply only to gravel or fine particle fractions. Where cobbles/boulders are encountered in minor proportions (generally less than about 12%) the term "occasional" may be used. This term describes the sporadic distribution of the material within the confines of the investigation excavation only, and there may be considerable variation in proportion over a wider area which is difficult to factually characterise due to the relative size of the particles and the investigation methods.

Soil Composition

Plasticity

Descriptive Term	Laboratory liquid limit range	
	Silt	Clay
Non-plastic materials	Not applicable	Not applicable
Low plasticity	≤50	≤35
Medium plasticity	Not applicable	>35 and ≤50
High plasticity	>50	>50

Note, Plasticity descriptions generally describe the plasticity behaviour of the whole of the fine grained soil, not individual fine grained fractions.

Grain Size

Type		Particle size (mm)
Gravel	Coarse	19 - 63
	Medium	6.7 - 19
	Fine	2.36 – 6.7
Sand	Coarse	0.6 - 2.36
	Medium	0.21 - 0.6
	Fine	0.075 - 0.21

Grading

Grading Term	Particle size (mm)
Well	A good representation of all particle sizes
Poorly	An excess or deficiency of particular sizes within the specified range
Uniformly	Essentially of one size
Gap	A deficiency of a particular size or size range within the total range

Note, AS1726-2017 provides terminology for additional attributes not listed here.

Soil Condition

Moisture

The moisture condition of soils is assessed relative to the plastic limit for fine grained soils, while for coarse grained soils it is assessed based on the appearance and feel of the material. The moisture condition of a material is considered to be independent of stratigraphy (although commonly these are related), and this data is presented in its own column on logs.

Applicability	Term	Tactile Assessment	Abbreviation code
Fine	Dry of plastic limit	Hard and friable or powdery	w<PL
	Near plastic limit	Can be moulded	w=PL
	Wet of plastic limit	Water residue remains on hands when handling	w>PL
	Near liquid limit	"oozes" when agitated	w=LL
	Wet of liquid limit	"oozes"	w>LL
Coarse	Dry	Non-cohesive and free running	D
	Moist	Feels cool, darkened in colour, particles may stick together	M
	Wet	Feels cool, darkened in colour, particles may stick together, free water forms when handling	W

The abbreviation code NDF, meaning "not-assessable due to drilling fluid use" may also be used.

Note, observations relating to free ground water or drilling fluids are provided independent of soil moisture condition.

Consistency/Density/Compaction/Cementation/Extremely Weathered Material

These concepts give an indication of how the material may respond to applied forces (when considered in conjunction with other attributes of the soil). This behaviour can vary independent of the composition of the material, and on logs these are described in an independent column and are generally mutually exclusive (i.e it is inappropriate to describe both consistency and compaction at the same time). The method by which the behaviour is described depends on the behaviour model and other characteristics of the soil as follows:

- In fine grained soils, the "consistency" describes the ease with which the soil can be remoulded, and is generally correlated against the materials undrained shear strength;
- In granular materials, the relative density describes how tightly packed the particles are, and is generally correlated against the density index;
- In anthropogenically modified materials, the compaction of the material is described qualitatively;
- In cemented soils (both natural and anthropogenic), the cemented "strength" is described qualitatively, relative to the difficulty with which the material is disaggregated; and
- In soils of extremely weathered material origin, the engineering behaviour may be governed by relic rock features, and expected behaviour needs to be assessed based the overall material description.

Quantitative engineering performance of these materials may be determined by laboratory testing or estimated by correlated field tests (for example penetration or shear vane testing). In some cases, performance may be assessed by tactile or other subjective methods, in which case investigation logs will show the estimated value enclosed in round brackets, for example (VS).

Consistency (fine grained soils)

Consistency Term	Tactile Assessment	Undrained Shear Strength (kPa)	Abbreviation Code
Very soft	Extrudes between fingers when squeezed	<12	VS
Soft	Mouldable with light finger pressure	>12 - ≤25	S
Firm	Mouldable with strong finger pressure	>25 - ≤50	F
Stiff	Cannot be moulded by fingers	>50 - ≤100	St
Very stiff	Indented by thumbnail	>100 - ≤200	VSt
Hard	Indented by thumbnail with difficulty	>200	H
Friable	Easily crumbled or broken into small pieces by hand	-	Fr

Relative Density (coarse grained soils)

Relative Density Term	Density Index	Abbreviation Code
Very loose	<15	VL
Loose	>15 - ≤35	L
Medium dense	>35 - ≤65	MD
Dense	>65 - ≤85	D
Very dense	>85	VD

Note, tactile assessment of relative density is difficult, and generally requires penetration testing, hence a tactile assessment guide is not provided.

Compaction (anthropogenically modified soil)

Compaction Term	Abbreviation Code
Well compacted	WC
Poorly compacted	PC
Moderately compacted	MC
Variably compacted	VC

Cementation (natural and anthropogenic)

Cementation Term	Abbreviation Code
Moderately cemented	MOD
Weakly cemented	WEK

Extremely Weathered Material

AS1726-2017 considers weathered material to be soil if the unconfined compressive strength is less than 0.6 MPa (i.e. less than very low strength rock). These materials may be identified as "extremely weathered material" in reports and by the abbreviation code XWM on log sheets. This identification is not correlated to any specific qualitative or quantitative behaviour, and the engineering properties of this material must therefore be assessed according to engineering principles with reference to any relic rock structure, fabric, or texture described in the description.

Soil Origin

Term	Description	Abbreviation Code
Residual	Derived from in-situ weathering of the underlying rock	RS
Extremely weathered material	Formed from in-situ weathering of geological formations. Has strength of less than 'very low' as per as1726 but retains the structure or fabric of the parent rock.	XWM
Alluvial	Deposited by streams and rivers	ALV
Fluvial	Deposited by channel fill and overbank (natural levee, crevasse splay or flood basin)	FLV
Estuarine	Deposited in coastal estuaries	EST
Marine	Deposited in a marine environment	MAR
Lacustrine	Deposited in freshwater lakes	LAC
Aeolian	Carried and deposited by wind	AEO
Colluvial	Soil and rock debris transported down slopes by gravity	COL
Slopewash	Thin layers of soil and rock debris gradually and slowly deposited by gravity and possibly water	SW
Topsoil	Mantle of surface soil, often with high levels of organic material	TOP
Fill	Any material which has been moved by man	FILL
Littoral	Deposited on the lake or seashore	LIT
Unidentifiable	Not able to be identified	UID

Cobbles and Boulders

The presence of particles considered to be "oversize" may be described using one of the following strategies:

- Oversize encountered in a minor proportion (when considered relative to the wider area) are noted in the soil description; or
- Where a significant proportion of oversize is encountered, the cobbles/boulders are described independent of the soil description, in a similar manner to composite soils (described above) but qualified with "MIXTURE OF".

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Rock Strength

Rock strength is defined by the unconfined compressive strength, and it refers to the strength of the rock substance and not the strength of the overall rock mass, which may be considerably weaker due to defects.

The Point Load Strength Index $I_{s(50)}$ is commonly used to provide an estimate of the rock strength and site specific correlations should be developed to allow UCS values to be determined. The point load strength test procedure is described by Australian Standard AS4133.4.1-2007. The terms used to describe rock strength are as follows:

Strength Term	Unconfined Compressive Strength (MPa)	Point Load Index[1] $I_{s(50)}$ MPa	Abbreviation Code
Very low	0.6 - 2	0.03 - 0.1	VL
Low	2 - 6	0.1 - 0.3	L
Medium	6 - 20	0.3 - 1.0	M
High	20 - 60	1 - 3	H
Very high	60 - 200	3 - 10	VH
Extremely high	>200	>10	EH

[1] Rock strength classification is based on UCS. The UCS to $I_{s(50)}$ ratio varies significantly for different rock types and specific ratios may be required for each site. The point load Index ranges shown above are as suggested in AS1726 and should not be relied upon without supporting evidence.

The following abbreviation codes are used for soil layers or seams of material "within rock" but for which the equivalent UCS strength is less than 0.6 MPa.

Scenario	Abbreviation Code
The material encountered has an equivalent UCS strength of less than 0.6 MPa, and therefore is considered to be soil (as per Note 1 of Table 20 of AS 1726-2017). The properties of the material encountered over this interval are described in the "Description of Strata" and soil properties columns.	SOIL
The material encountered has an equivalent UCS strength of less than 0.6 MPa, and therefore is considered to be soil (as per Note 1 of Table 20 of AS 1726-2017). The prominence of the material is such that it can be considered to be a seam (as defined in Table 22 of AS1726-2017) and the properties of the material are described in the defect column.	SEAM

Degree of Weathering

The degree of weathering of rock is classified as follows:

Weathering Term	Description	Abbreviation Code
Residual Soil[1]	Material is weathered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are no longer visible, but the soil has not been significantly transported.	RS
Extremely weathered[1]	Material is weathered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are still visible	XW
Highly weathered	The whole of the rock material is discoloured, usually by iron staining or bleaching to the extent that the colour of the original rock is not recognisable. Rock strength is significantly changed by weathering. Some primary minerals have weathered to clay minerals. Porosity may be increased by leaching or may be decreased due to deposition of weathering products in pores.	HW
Moderately weathered	The whole of the rock material is discoloured, usually by iron staining or bleaching to the extent that the colour of the original rock is not recognisable but shows little or no change of strength from fresh rock.	MW
Slightly weathered	Rock is partially discoloured with staining or bleaching along joints but shows little or no change of strength from fresh rock.	SW
Fresh	No signs of decomposition or staining.	FR
Note: If HW and MW cannot be differentiated use DW (see below)		
Distinctly weathered	Rock strength usually changed by weathering. The rock may be highly discoloured, usually by iron staining. Porosity may be increased by leaching or may be decreased due to deposition of weathered products in pores.	DW

[1] The parent rock type, of which the residual/extremely weathered material is a derivative, will be stated in the description (where discernible).

Degree of Alteration

The degree of alteration of the rock material (physical or chemical changes caused by hot gasses or liquids at depth) is classified as follows:

Term	Description	Abbreviation Code
Extremely altered	Material is altered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are still visible.	XA
Highly altered	The whole of the rock material is discoloured, usually by staining or bleaching to the extent that the colour of the original rock is not recognisable. Rock strength is changed by alteration. Some primary minerals are altered to clay minerals. Porosity may be increased by leaching or may be decreased due to precipitation of secondary materials in pores.	HA
Moderately altered	The whole of the rock material is discoloured, usually by staining or bleaching to the extent that the colour of the original rock is not recognisable but shows little or no change of strength from fresh rock.	MA
Slightly altered	Rock is slightly discoloured but shows little or no change of strength from fresh rock	SA
Note: If HA and MA cannot be differentiated use DA (see below)		
Distinctly altered	Rock strength usually changed by alteration. The rock may be highly discoloured, usually by staining or bleaching. Porosity may be increased by leaching or may be decreased due to precipitation of secondary minerals in pores.	DA

Degree of Fracturing

The following descriptive classification apply to the spacing of natural occurring fractures in the rock mass. It includes bedding plane partings, joints and other defects, but excludes drilling breaks. These terms are generally not required on investigation logs where fracture spacing is presented as a histogram, and where used are presented in an unabbreviated format.

Term	Description
Fragmented	Fragments of <20 mm
Highly Fractured	Core lengths of 20-40 mm with occasional fragments
Fractured	Core lengths of 30-100 mm with occasional shorter and longer sections
Slightly Fractured	Core lengths of 300 mm or longer with occasional sections of 100-300 mm
Unbroken	Core contains very few fractures

Rock Quality Designation

The quality of the cored rock can be measured using the Rock Quality Designation (RQD) index, defined as:

$$\text{RQD \%} = \frac{\text{cumulative length of 'sound' core sections > 100 mm long}}{\text{total drilled length of section being assessed}}$$

where 'sound' rock is assessed to be rock of low strength or stronger. The RQD applies only to natural fractures. If the core is broken by drilling or handling (i.e., drilling breaks) then the broken pieces are fitted back together and are not included in the calculation of RQD.

Stratification Spacing

These terms may be used to describe the spacing of bedding partings in sedimentary rocks. Where used, these terms are generally presented in an unabbreviated format

Term	Separation of Stratification Planes
Thinly laminated	< 6 mm
Laminated	6 mm to 20 mm
Very thinly bedded	20 mm to 60 mm
Thinly bedded	60 mm to 0.2 m
Medium bedded	0.2 m to 0.6 m
Thickly bedded	0.6 m to 2 m
Very thickly bedded	> 2 m

Defect Descriptions

Defect Type

Term	Abbreviation Code
Bedding plane	B
Cleavage	CL
Crushed seam	CS
Crushed zone	CZ
Drilling break	DB
Decomposed seam	DS
Drill lift	DL
Extremely Weathered seam	EW
Fault	F
Fracture	FC
Fragmented	FG
Handling break	HB
Infilled seam	IS
Joint	JT
Lamination	LAM
Shear seam	SS
Shear zone	SZ
Vein	VN
Mechanical break	MB
Parting	P
Sheared Surface	S

Rock Defect Orientation

Term	Abbreviation Code
Horizontal	H
Vertical	V
Sub-horizontal	SH
Sub-vertical	SV

Rock Defect Coating

Term	Abbreviation Code
Clean	CN
Coating	CT
Healed	HE
Infilled	INF
Stained	SN
Tight	TI
Veneer	VNR

Rock Defect Infill

Term	Abbreviation Code
Calcite	CA
Carbonaceous	CBS
Clay	CLAY
Iron oxide	FE
Manganese	MN
Pyrite	Py
Secondary material	MS
Silt	M
Quartz	Qz
Unidentified material	MU

Rock Defect Shape/Planarity

Term	Abbreviation Code
Curved	CU
Discontinuous	DIS
Irregular	IR
Planar	PR
Stepped	ST
Undulating	UN

Rock Defect Roughness

Term	Abbreviation Code
Polished	PO
Rough	RF
Smooth	SM
Slickensided	SL
Very rough	VR

Defect Orientation

The inclination of defects is always measured from the perpendicular to the core axis.

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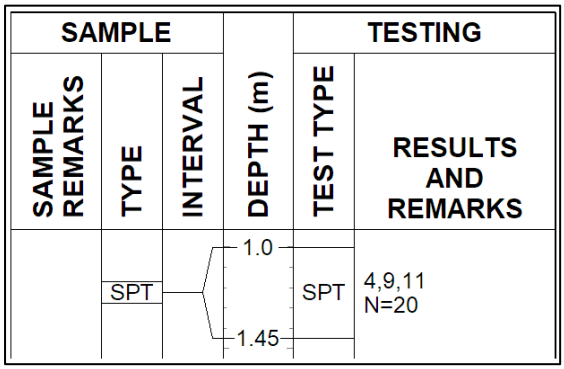
Sampling, Testing and Excavation Methodology

Terminology
Symbols
Abbreviations

March 2024

Sampling and Testing

A record of samples retained, and field testing performed is usually shown on a Douglas Partners' log with samples appearing to the left of a depth scale, and selected field and laboratory testing (including results, where relevant) appearing to the right of the scale, as illustrated below:



Sampling

The type or intended purpose for which a sample was taken is indicated by the following abbreviation codes.

Sample Type	Code
Auger sample	A
Acid Sulfate sample	ASS
Bulk sample	B
Core sample	C
Disturbed sample	D
Environmental sample	ES
Gas sample	G
Piston sample	P
Sample from SPT test	SPT
Undisturbed tube sample	U[1]
Water sample	W
Material Sample	MT
Core sample for unconfined compressive strength testing	UCS

[1] – numeric suffixes indicate tube diameter/width in mm

The above codes only indicate that a sample was retained, and not that testing was scheduled or performed.

Field and Laboratory Testing

A record that field and laboratory testing was performed is indicated by the following abbreviation codes.

Test Type	Code
Pocket penetrometer (kPa)	PP
Photo ionisation detector (ppm)	PID
Standard Penetration Test x/y =x blows for y mm penetration HB = hammer bouncing HW = fell under weight of hammer	SPT
Shear vane (kPa)	V
Unconfined compressive strength, (MPa)	UCS

Field and laboratory testing (continued)

Test Type	Code
Point load test, (MPa), axial (A), diametric (D), irregular (I)	PLT(_)
Dynamic cone penetrometer, followed by blow count penetration increment in mm (cone tip, generally in accordance with AS1289.6.3.2)	DCP/150
Perth sand penetrometer, followed by blow count penetration increment in mm (flat tip, generally in accordance with AS1289.6.3.3)	PSP/150

Groundwater Observations

▷	seepage/inflow
▽	standing or observed water level
NFGWO	no free groundwater observed
OBS	observations obscured by drilling fluids

Drilling or Excavation Methods/Tools

The drilling/excavation methods used to perform the investigation may be shown either in a dedicated column down the left-hand edge of the log, or stated in the log footer. In some circumstances abbreviation codes may be used.

Method	Abbreviation Code
Direct Push	DP
Solid flight auger. Suffixes: /T = tungsten carbide tip, /V = v-shaped tip	AD[1]
Air Track	AT
Diatube	DT[1]
Hand auger	HA[1]
Hand tools (unspecified)	HAND
Existing exposure	X
Hollow flight auger	HSA[1]
HQ coring	HQ3
HMLC series coring	HMLC
NMLC series coring	NMLC
NQ coring	NQ3
PQ coring	PQ3
Predrilled	PD
Push tube	PT[1]
Ripping tyne/ripper	R
Rock roller	RR[1]
Rock breaker/hydraulic hammer	EH
Sonic drilling	SON[1]
Mud/blade bucket	MB[1]
Toothed bucket	TB[1]
Vibrocore	VC[1]
Vacuum excavation	VE
Wash bore (unspecified bit type)	WB[1]

[1] – numeric suffixes indicate tool diameter/width in mm

Douglas PARTNERS

Appendix B

Borehole Logs

Core Photoplates

BOREHOLE LOG

CLIENT: Talinga Pastoral Co
PROJECT: Proposed Quarry
LOCATION: 1848 Castlereagh Hwy, Tallawang, NSW

SURFACE LEVEL: 517.1 AHD
COORDINATE: E:728147.7, N:6433639.4
DATUM/GRID: MGA2020 Zone 55
DIP/AZIMUTH: 90°/---°

LOCATION ID: 1
PROJECT No: 228775.00
DATE: 04-04-24 - 05-04-24
SHEET: 1 of 4

CONDITIONS ENCOUNTERED																			SAMPLE				TESTING	
				SOIL				ROCK																
GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN(#)	CONSIS.(*) DENSITY.(*)	MOISTURE	WEATH.	DEPTH (m)	STRENGTH VL L M H VH EH	RECOVERY (%)	RQD	FRACTURE SPACING (m) 0.06 0.18 0.60 1.00 3.00	DEFECTS & REMARKS	SAMPLE REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
04-04-24 No free groundwater observed whilst augering	S17	0	PHYLLITE: pale grey; inferred very low to low strength, highly to moderately weathered, with iron staining.		XWM	ND	ND									D	0.50			
																D	0.80			
	S16	1														SPT	1.00 1.05	SPT	25/50 (HB)	
		1.12	PHYLLITE: pale brown pale grey orange; with iron staining and iron laminations, weakly bedded, heavy iron staining in cross section 1.61m-1.63m: interbedded clay seam					SW	1.12	M				1.15-1.35m: JT, 70°, PR, SM						
	S15	2						SW	1.61 1.63	M	100	84		1.55-1.61m: FG 1.61-1.63m: CS, SH, PR, INF Clay, SM 1.77m: JT, 40-50°, PR, SM 1.88m: JT, 30-40°, PR, SM				2	PLT	PL(D)=0.32MPa
			2.36m-2.40m: interbedded clay seam											2.19m: JT, 10°, PR, SM						
								SEAM	2.36 2.40	SEAM				2.36-2.40m: CS, SG, PR, INF Clay, SM 2.40-2.50m: FG						
														2.52m: JT, 10-20°, PR, SM 2.59m: DB 2.70m: JT, 10°, PR, SM 2.72-2.86m: FG						
	S14	3						SW		M	100	84		3.05m: JT, 30°, PR, SM 3.14-3.23m: FG 3.42m: JT, 10°, PR, SM				3	PLT	PL(D)=0.3MPa
																UCS	3.43			
														3.73m: JT, 5-10°, IR, SM 3.87m: JT, 10°, IR, SM			3.73		PLT	PL(D)=0.67MPa
	S13	4												4.00m: JT, 10°, UN, TI, SM 4.08m: DB				4	PLT	PL(D)=0.86MPa
									4.15					4.15m: DB						
								HW		VL				4.15-4.42m: FG						
									4.42											
											100	12		4.42-4.80m: FG						
								SW		M										
														4.92-5.00m: FG					PLT	PL(D)=0.36MPa

NOTES: (#) Soil origin is "probable" unless otherwise stated. (*) Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: 14T Truck Mounted Drill Rig
METHOD: SFA to 1.0m, WB to 1.12m, NMLC to 15.55m depth
REMARKS:

OPERATOR: Tightsite Drilling

LOGGED: Reiher-Smith
CASING: HQ to 1m

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

BOREHOLE LOG

CLIENT: Talinga Pastoral Co
PROJECT: Proposed Quarry
LOCATION: 1848 Castlereagh Hwy, Tallawang, NSW

SURFACE LEVEL: 517.1 AHD
COORDINATE: E:728147.7, N:6433639.4
DATUM/GRID: MGA2020 Zone 55
DIP/AZIMUTH: 90°/---°

LOCATION ID: 1
PROJECT No: 228775.00
DATE: 04-04-24 - 05-04-24
SHEET: 2 of 4

CONDITIONS ENCOUNTERED																				SAMPLE				TESTING	
				SOIL				ROCK																	
GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN(#)	CONSIS.(*) DENSITY.(*)	MOISTURE	WEATH.	DEPTH (m)	STRENGTH	RECOVERY (%)	RQD	FRACTURE SPACING (m)	DEFECTS & REMARKS	SAMPLE REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
	512	6	[CONT] PHYLLITE: pale brown pale grey orange; with iron staining and iron laminations, weakly bedded, heavy iron staining in cross section					SW	5.65	M	100	12		5.09-5.15m: FG 5.20-5.27m: JT, 45°, PR, SM 5.27-5.45m: FG 5.47-5.59m: JT, 70-80°, PR, SM 5.60-5.64m: FG 5.78m: JT, 10°, PR, SM				6	PLT	PL(D)=0.57MPa
	511										100	89		5.98m: JT, 10°, PR, SM 6.13m: JT, SH-5, PR, SM 6.37m: P, SH, PR, SN Fe, SM 6.54m: JT, SH, IR, SM 6.65-6.72m: FG						
	510	7									100	84		6.75m: JT, 20°, PR, SN Fe, SM 6.83m: JT, 20-30°, PR, SM 7.31m: JT, 30°, PR, SM 7.59m: JT, 5-10°, PR, TI, SM 7.64m: JT, 10°, PR, SM 7.73m: JT, 10°, IR, SM 7.92m: DB		UCS		7.00 7.33	PLT PLT PLT	PL(D)=1MPa PL(A)=0.93MPa PL(D)=0.61MPa
	509	8						FR		M to H								8	PLT	PL(D)=0.78MPa
	508	9									100	82		8.11m: DB 8.29m: DB 8.36m: JT, SH, PR, TI, SM 8.41m: JT, 20°, PR, TI, SM 8.45m: JT, 10°, PR, SM 8.57m: JT, 10-20°, PR, TI, SM 8.73m: JT, 20°, PR, TI, SM 8.85m: JT, 5-10°, UN, SM 9.02m: JT, 10°, PR, SM 9.11m: P, SH, UN, SM				9 9.27 9.51	PLT PLT	PL(D)=1.1MPa PL(D)=1.1MPa
														9.57m: JT, 5-10°, PR, SM		UCS				
											100	61		9.75-9.85m: FG 9.85-10.03m: FG					PLT	PL(D)=0.8MPa

NOTES: (#)Soil origin is "probable" unless otherwise stated. (*)Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: 14T Truck Mounted Drill Rig
METHOD: SFA to 1.0m, WB to 1.12m, NMLC to 15.55m depth
REMARKS:

OPERATOR: Tightsite Drilling

LOGGED: Reiher-Smith
CASING: HQ to 1m

Refer to explanatory notes for symbol and abbreviation definitions

Generated with CORE-GS by Geroc - Combined Log

BOREHOLE LOG

CLIENT: Talinga Pastoral Co
PROJECT: Proposed Quarry
LOCATION: 1848 Castlereagh Hwy, Tallawang, NSW

SURFACE LEVEL: 517.1 AHD
COORDINATE: E:728147.7, N:6433639.4
DATUM/GRID: MGA2020 Zone 55
DIP/AZIMUTH: 90°/---°

LOCATION ID: 1
PROJECT No: 228775.00
DATE: 04-04-24 - 05-04-24
SHEET: 3 of 4

GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	SOIL ORIGIN(#)	SOIL CONSIS.(*) DENSITY.(*)	SOIL MOISTURE	ROCK WEATH.	ROCK DEPTH (m)	ROCK STRENGTH	RECOVERY (%)	RQD	FRACTURE SPACING (m)	DEFECTS & REMARKS	SAMPLE REMARKS	SAMPLE TYPE	SAMPLE INTERVAL	DEPTH (m)	TESTING TEST TYPE	TESTING RESULTS AND REMARKS
	507		[CONT] PHYLLITE: pale brown pale grey orange; with iron staining and iron laminations, weakly bedded, heavy iron staining in cross section					FR		M to H	100	61		10.29m: JT, 20°, PR, TI, SM 10.43m: P, SH, PR, SM 10.71m: JT, 30°, PR, SM 10.98m: JT, 20-30°, IR, SN Fe, SM 11.02m: JT, 30°, PR, SM 11.08-11.40m: FG				11	PLT	PL(A)=0.57MPa
	506	11																11.40		
																UCS		11.85		
	505	12	11.87m-11.90m: quartz fragments in fractured zone					HW 11.87 11.90						11.87-12.00m: FG				12	PLT	PL(D)=0.52MPa
								SW		M										
								HW to MW	12.10	VL	100	39								
								SW	12.30	M				12.10-12.83m: FG						
								HW	12.58	VL										
	504	13						SW	12.68	M	79	10		12.96m: JT, 20°, IR, SN Fe, SM 13.05m: JT, 10°, PR, SM 13.09m: JT, 10-20°, IR, SN Fe, SM 13.15m: JT, 10°, PR, SM 13.19-13.59m: FG				13	PLT	PL(D)=0.72MPa
			CORE LOSS: 0.2m						13.59											
		13.59							13.79											
		13.79	PHYLLITE: pale brown pale grey orange; with iron staining and iron laminations, weakly bedded, heavy iron staining in cross section					HW		VL				13.79-14.20m: FG						
	503	14						MW to SW	14.20	M	100	0		14.20-14.56m: FG				14		
								FR	14.56	M to H	100	49		14.75m: JT, 45°, PR, SM 14.85m: P, SH, PR, SM						
									14.97										PLT	PL(D)=0.9MPa

NOTES: (#) Soil origin is "probable" unless otherwise stated. (*) Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: 14T Truck Mounted Drill Rig
METHOD: SFA to 1.0m, WB to 1.12m, NMLC to 15.55m depth
REMARKS:

OPERATOR: Tightsite Drilling

LOGGED: Reiher-Smith
CASING: HQ to 1m

Refer to explanatory notes for symbol and abbreviation definitions

Generated with CORE-GS by Geroc - Combined Log

BOREHOLE LOG

CLIENT: Talinga Pastoral Co
PROJECT: Proposed Quarry
LOCATION: 1848 Castlereagh Hwy, Tallawang, NSW

SURFACE LEVEL: 517.1 AHD
COORDINATE: E:728147.7, N:6433639.4
DATUM/GRID: MGA2020 Zone 55
DIP/AZIMUTH: 90°/---°

LOCATION ID: 1
PROJECT No: 228775.00
DATE: 04-04-24 - 05-04-24
SHEET: 4 of 4

CONDITIONS ENCOUNTERED																		SAMPLE				TESTING	
				SOIL			ROCK																
GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN(#)	CONSIS.(†) DENSITY.(†)	MOISTURE	WEATH.	DEPTH (m)	STRENGTH	RECOVERY (%)	RQD	FRACTURE SPACING (m)	DEFECTS & REMARKS	SAMPLE REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
	502		[CONT] PHYLLITE: pale brown pale grey orange; with iron staining and iron laminations, weakly bedded, heavy iron staining in cross section					HW FR	15.10	VL M to H	100	49		14.97-15.10m: FG 15.16m: JT, 30-40°, PR, SM 15.29m: JT, SH, PR, TI, SM 15.42-15.55m: FG						
		16	Borehole discontinued at 15.55m depth. Limit of investigation.																	
		17																		
		18																		
		19																		

NOTES: (#)Soil origin is "probable" unless otherwise stated. (†)Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: 14T Truck Mounted Drill Rig
METHOD: SFA to 1.0m, WB to 1.12m, NMLC to 15.55m depth
REMARKS:

OPERATOR: Tightsite Drilling

LOGGED: Reiher-Smith
CASING: HQ to 1m

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

CORE PHOTO LOG

CLIENT: Talinga Pastoral Co
PROJECT: Proposed Quarry
LOCATION: 1848 Castlereagh Hwy, Tallawang, NSW

SURFACE LEVEL: 517.1 AHD
COORDINATE: E:728147.7, N:6433639.4
DATUM/GRID: MGA2020 Zone 55
DIP/AZIMUTH: 90°/---°

LOCATION ID: 1
PROJECT No: 228775.00
DATE: 04-04-24 - 05-04-24
SHEET: 1 of 2

Box 1 of 4: 1.12-5.00 m depth

Box 2 of 4: 5.00-10.00 m depth

CORE PHOTO LOG

CLIENT: Talinga Pastoral Co
PROJECT: Proposed Quarry
LOCATION: 1848 Castlereagh Hwy, Tallawang, NSW

SURFACE LEVEL: 517.1 AHD
COORDINATE: E:728147.7, N:6433639.4
DATUM/GRID: MGA2020 Zone 55
DIP/AZIMUTH: 90°/---°

LOCATION ID: 1
PROJECT No: 228775.00
DATE: 04-04-24 - 05-04-24
SHEET: 2 of 2

Box 3 of 4: 10.00-15.00 m depth

Box 4 of 4: 15.00-15.55 m depth

BOREHOLE LOG

CLIENT: Talinga Pastoral Co
PROJECT: Proposed Quarry
LOCATION: 1848 Castlereagh Hwy, Tallawang, NSW

SURFACE LEVEL: 535.7 AHD
COORDINATE: E:728072.5, N:6433457.9
DATUM/GRID: MGA2020 Zone 55
DIP/AZIMUTH: 90°/---°

LOCATION ID: 2
PROJECT No: 228775.00
DATE: 08-04-24
SHEET: 1 of 3

GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	SOIL ORIGIN(#)	SOIL CONSIS.(†)/ DENSITY.(†)	SOIL MOISTURE	ROCK WEATH.	ROCK DEPTH (m)	ROCK STRENGTH	ROCK RECOVERY (%)	ROCK RQD	ROCK FRACTURE SPACING (m)	ROCK DEFECTS & REMARKS	SAMPLE REMARKS	SAMPLE TYPE	SAMPLE INTERVAL	DEPTH (m)	TESTING TEST TYPE	TESTING RESULTS AND REMARKS
08-04-24 No free groundwater observed whilst augering	535	0.10	TOPSOIL / Silty Gravelly SAND (SM), with clay: dark brown, brown; fine to coarse; sub-angular to sub-rounded gravel; gravel content composed of siltstone fragments, abundant organics, with cobbles / boulders of varying size.		TOP	NA	D									D	0.20		
					COL	D to VD	D									D	0.50		
	0.70		Silty Gravelly SAND (SM): brown; fine to coarse; sub-angular to sub-rounded gravel; gravel content composed of siltstone fragments, with cobbles /boulders of varying size.		XWM	ND	ND									D	0.80		
		1														SPT	1.00	SPT	25/140
		1.35							1.35								1.14		
	534		META-SILTSTONE: pale grey orange; inferred very low to low strength; highly to moderately weathered; with iron staining.											1.39-1.41m: FG		UCS	1.41		
														1.69m: JT, 45°, PR, SM			1.67		
														1.75m: JT, sv, UN, SM					
														1.79-1.89m: FG					
		2	META-SILTSTONE: orange brown grey; with iron staining 1.50m: with dark grey laminations							M to H	100	66		2.07m: JT, 50-60°, UN, TI, SM			2	PLT	PL(D)=0.5MPa
														2.16m: JT, 20-30°, PR, SM					
														2.25m: JT, 30°, UN, SM					
	533													2.50m: JT, SH, UN, SM					
														2.58m: JT, 10°, PR, SM				PLT	PL(D)=0.94MPa
									2.70									PLT	PL(A)=1.8MPa
														2.83m: JT, 45-50°, IR, SN Fe, SM					
		3						SW to FR		H	100	91		2.89m: DB			3	PLT	PL(D)=1.8MPa
														3.45m: JT, 10-20°, UN, SM					
	532													3.62m: JT, 10°, IR, TI, SM			3.66		
																UCS	3.92		
		4												4.09m: JT, 40-50°, PR, SM			4	PLT	PL(D)=2.3MPa
														4.14m: JT, 60-70°, PR, SM					
														4.23m: JT, 10-20°, PR, TI, SM					
														4.45m: DB					
	531										100	87		4.62m: JT, 20-30°, PR, SM					
														4.83m: JT, 20°, UN, SM					
									4.90					4.90-4.92m: FG				PLT	PL(D)=0.48MPa

NOTES: (#)Soil origin is "probable" unless otherwise stated. (†)Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: 14T Truck Mounted Drill Rig
METHOD: SFA to 1.0m, WB to 1.35m, NMLC to 13.54m depth
REMARKS:

OPERATOR: Tightsite Drilling

LOGGED: Reiher-Smith
CASING: HQ to 1m

Refer to explanatory notes for symbol and abbreviation definitions

Generated with CORE-GS by Geroc - Combined Log

BOREHOLE LOG

CLIENT: Talinga Pastoral Co
PROJECT: Proposed Quarry
LOCATION: 1848 Castlereagh Hwy, Tallawang, NSW

SURFACE LEVEL: 535.7 AHD
COORDINATE: E:728072.5, N:6433457.9
DATUM/GRID: MGA2020 Zone 55
DIP/AZIMUTH: 90°/---°

LOCATION ID: 2
PROJECT No: 228775.00
DATE: 08-04-24
SHEET: 2 of 3

GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	SOIL ORIGIN(#)	SOIL CONSIS.(†) DENSITY.(†)	SOIL MOISTURE	ROCK WEATH.	ROCK DEPTH (m)	ROCK STRENGTH	ROCK RECOVERY (%)	ROCK RQD	FRACTURE SPACING (m)	DEFECTS & REMARKS	SAMPLE REMARKS	SAMPLE TYPE	SAMPLE INTERVAL	DEPTH (m)	TESTING TEST TYPE	TESTING RESULTS AND REMARKS
	530	6	[CONT] META-SILTSTONE: orange brown grey; with iron staining					SW to FR		M to H	100	87		4.97m: JT, 40-50°, IR, RF 5.03m: JT, 10°, IR, SM 5.17m: JT, 20°, PR, SM 5.31m: JT, 10°, PR, SM 5.55m: JT, 10-30°, IR, SM 5.92m: JT, 30-40°, UN, TI, SM 6.03m: DB				6	PLT	PL(D)=0.31MPa
	529	7	6.20m: with clay infill in joints					MW	6.12	M	100	7		6.13m: JT, 40-50°, UN, SM 6.15-7.55m: FG, INF Clay				7		
	528	8						HW to MW	7.40	VL								8	PLT	PL(D)=0.19MPa
									7.55					7.63m: P, SH, UN, SM 7.83m: JT, 20°, IR, SM 8.00m: JT, 10°, PR, SM 8.14-8.18m: FG						
	527	9						MW to SW		L	100	81		8.46m: JT, 45-50°, IR, INF Clay, SM 8.65m: JT, 30-40°, PR, INF Clay, SM 8.72-8.80m: FG 8.84m: JT, 20°, IR, INF Clay, SM						
									9.11					9.05-9.11m: FG						
	526		9.60m: colour change to dark grey orange brown					SW to FR		H	100	87		9.17m: JT, 20°, PR, SM 9.30m: JT, 10°, UN, SM 9.64m: JT, 10°, IR, SM 9.85m: JT, 20°, UN, SM		UCS		9.30 9.62		

NOTES: (#) Soil origin is "probable" unless otherwise stated. (†) Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: 14T Truck Mounted Drill Rig
METHOD: SFA to 1.0m, WB to 1.35m, NMLC to 13.54m depth
REMARKS:

OPERATOR: Tightsite Drilling

LOGGED: Reiher-Smith
CASING: HQ to 1m

Refer to explanatory notes for symbol and abbreviation definitions

Generated with CORE-GS by Geroc - Combined Log

BOREHOLE LOG

CLIENT: Talinga Pastoral Co
PROJECT: Proposed Quarry
LOCATION: 1848 Castlereagh Hwy, Tallawang, NSW

SURFACE LEVEL: 535.7 AHD
COORDINATE: E:728072.5, N:6433457.9
DATUM/GRID: MGA2020 Zone 55
DIP/AZIMUTH: 90°/---°

LOCATION ID: 2
PROJECT No: 228775.00
DATE: 08-04-24
SHEET: 3 of 3

CONDITIONS ENCOUNTERED																			SAMPLE				TESTING	
				SOIL				ROCK																
GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN(#)	CONSIS.(†) DENSITY.(†)	MOISTURE	WEATH.	DEPTH (m)	STRENGTH	RECOVERY (%)	RQD	FRACTURE SPACING (m)	DEFECTS & REMARKS	SAMPLE REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
	525	11	[CONT] META-SILTSTONE: orange brown grey; with iron staining					SW to FR		H	100	87		10.32-1035m: FG 10.43m: DB 10.45m: JT, 20°, PR, SM 10.70m: JT, 10-20°, UN, SM 10.99m: JT, 10°, IR, SM 11.08m: JT, 10°, IR, SM				11	PLT	PL(D)=2.2MPa
	524	12	11.30m: with dark red staining								100	79		11.27m: JT, 20°, IR, SM 11.45m: JT, 20-30°, PR, SM 11.54-11.56m: FG 11.72m: JT, 30°, PR, SM 11.79-11.83m: FG 12.02m: DB 12.13m: JT, 20°, PR, SM 12.26m: JT, 10-20°, UN, SM 12.34m: JT, 10°, PR, SM		UCS		12.35		
	523	13									100	78		12.64m: JT, 10°, PR, SM 12.78-12.80m: FG 12.93m: JT, 30-40°, IR, SM 13.02m: JT, 10°, IR, SM 13.16m: JT, 10°, IR, SM 13.40m: JT, 30°, PR, SM 13.48m: JT, 10°, PR, SM 13.54m: DB				12.66 12 13	PLT PLT	PL(D)=1.6MPa PL(D)=1.7MPa
		14	Borehole discontinued at 13.54m depth. Limit of investigation.																		

NOTES: (#) Soil origin is "probable" unless otherwise stated. (†) Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: 14T Truck Mounted Drill Rig
METHOD: SFA to 1.0m, WB to 1.35m, NMLC to 13.54m depth
REMARKS:

OPERATOR: Tightsite Drilling

LOGGED: Reiher-Smith
CASING: HQ to 1m

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

CORE PHOTO LOG

CLIENT: Talinga Pastoral Co
PROJECT: Proposed Quarry
LOCATION: 1848 Castlereagh Hwy, Tallawang, NSW

SURFACE LEVEL: 535.7 AHD
COORDINATE: E:728072.5, N:6433457.9
DATUM/GRID: MGA2020 Zone 55
DIP/AZIMUTH: 90°/---°

LOCATION ID: 2
PROJECT No: 228775.00
DATE: 08-04-24
SHEET: 1 of 2

Box 1 of 3: 1.35-6.00 m depth

Box 2 of 3: 6.00-11.00 m depth

CORE PHOTO LOG

CLIENT: Talinga Pastoral Co
PROJECT: Proposed Quarry
LOCATION: 1848 Castlereagh Hwy, Tallawang, NSW

SURFACE LEVEL: 535.7 AHD
COORDINATE: E:728072.5, N:6433457.9
DATUM/GRID: MGA2020 Zone 55
DIP/AZIMUTH: 90°/---°

LOCATION ID: 2
PROJECT No: 228775.00
DATE: 08-04-24
SHEET: 2 of 2

Box 3 of 3: 11.00-13.54 m depth

Appendix C

Laboratory Test Results

Material Test Report

Report Number: **228775.00-2**
Issue Number: 1
Date Issued: 28/05/2024
Client: Talinga Pastoral Co
"Talinga" 1848 Castlereagh Highway, Gulgong NSW
Contact: Sally Drury
Project Number: 228775.00
Project Name: Proposed Quarry
Project Location: 1848 Castlereagh Hwy, Tallawang NSW
Work Request: 16177
Sample Number: PM-16177A
Date Sampled: 15/04/2024
Dates Tested: 29/04/2024 - 27/05/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: **BH 1, Depth: 1.12 - 5 / 8.0 - 9.0**
Material: Phyllite

Douglas Partners Pty Ltd
Port Macquarie Laboratory
Unit 2, 32 Geebung Drive Port Macquarie NSW 2444
Phone: (02) 6581 5992
Email: adam.jeffery@douglaspartners.com.au

Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Adam Jeffery
Assistant Laboratory Manager
Laboratory Accreditation Number: 828

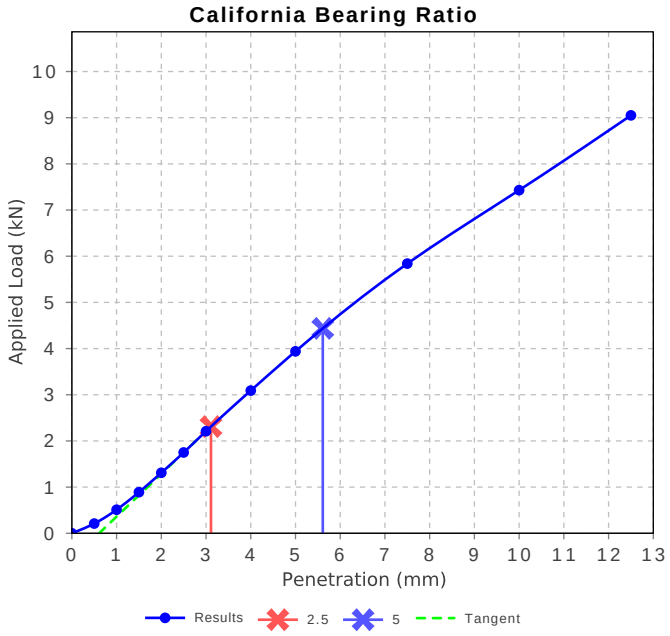
Pretreatment (RMS T102 :2012& T103:2012)	
% retained on 53mm Sieve	0

Pretreatment (RMS T103:2012)	
Method of Pretreatment	W10

Pretreatment (RMS T102:2012)	
Method of Pretreatment	CA3

California Bearing Ratio (RMS T117 & T120)		Min	Max
CBR taken at	5 mm		
CBR %	**20**		
Method of Compactive Effort	Standard		
Method used to Determine MDD	RMS T111 & T120		
Maximum Dry Density (t/m^3)	1.858		
Optimum Moisture Content (%)	15.4		
Target Laboratory Density Ratio (%)	100		
Laboratory Density Ratio (%)	100		
Target Laboratory Moisture Ratio (%)	100		
Laboratory Moisture Ratio (%)	101		
Dry Density after Soaking (t/m^3)	1.860		
Field Moisture Content (%)	15.4		
Moisture Content Top 30mm (%)	16.4		
Moisture Content Full Depth (%)	15.9		
Mass Surcharge (kg)	4.5		
Soaking Period (days)	4		
Swell (%)	-0.0		
Material Retained on 19 mm (%)	0		
Oversize Material Included	Excluded		

Coarse Particle Distribution (RMS T106 & T120:2012)						
Sieve	Passing %	Passing Limits		Retained %	Retained Limits	
19 mm	100			0		
13.2 mm	99			1		
9.5 mm	92			7		
6.7 mm	82					
4.75 mm	75			17		
2.36 mm	60			14		



Fine Particle Distribution (RMS T106:2012 & T107:2012)						
Sieve	Passing %	Passing Limits		Retained %	Retained Limits	
0.425 mm	42			18		
0.075 mm	34			9		
0.0135 mm	26			8		

Ratios (RMS T107:2012)		Min	Max
Ratio A	71		
Ratio B	79		
Ratio C	78		

Atterberg Limit (RMS T108:2012 & T109:2012)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	32		
Plastic Limit (%)	24		
Plasticity Index (%)	**8**		

Linear Shrinkage (RMS T113:2012)		Min	Max
Linear Shrinkage (%)	**2.0**		
Cracking Crumbling Curling	None		

Material Test Report

Report Number: **228775.00-2**
Issue Number: 1
Date Issued: 28/05/2024
Client: Talinga Pastoral Co
"Talinga" 1848 Castlereagh Highway, Gulgong NSW
Contact: Sally Drury
Project Number: 228775.00
Project Name: Proposed Quarry
Project Location: 1848 Castlereagh Hwy, Tallawang NSW
Work Request: 16177
Sample Number: PM-16177B
Date Sampled: 15/04/2024
Dates Tested: 29/04/2024 - 27/05/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: **BH 1, Depth: 10 - 15**
Material: Phyllite

Douglas Partners Pty Ltd
Port Macquarie Laboratory
Unit 2, 32 Geebung Drive Port Macquarie NSW 2444
Phone: (02) 6581 5992
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Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Adam Jeffery
Assistant Laboratory Manager
Laboratory Accreditation Number: 828

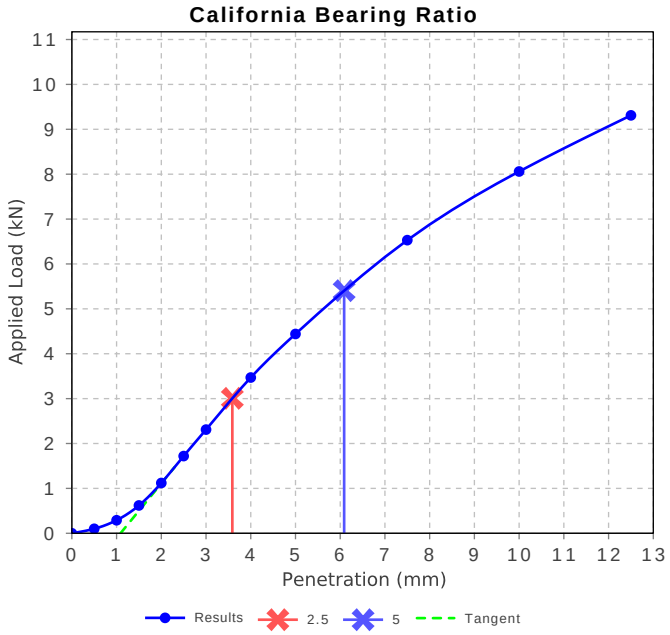
Pretreatment (RMS T102 :2012& T103:2012)	
% retained on 53mm Sieve	0

Pretreatment (RMS T103:2012)	
Method of Pretreatment	W10

Pretreatment (RMS T102:2012)	
Method of Pretreatment	CA3

California Bearing Ratio (RMS T117 & T120)		Min	Max
CBR taken at	5 mm		
CBR %	**25**		
Method of Compactive Effort	Standard		
Method used to Determine MDD	RMS T111 & T120		
Maximum Dry Density (t/m^3)	1.868		
Optimum Moisture Content (%)	14.3		
Target Laboratory Density Ratio (%)	100		
Laboratory Density Ratio (%)	100		
Target Laboratory Moisture Ratio (%)	100		
Laboratory Moisture Ratio (%)	102		
Dry Density after Soaking (t/m^3)	1.865		
Field Moisture Content (%)	13.7		
Moisture Content Top 30mm (%)	15.7		
Moisture Content Full Depth (%)	14.9		
Mass Surcharge (kg)	4.5		
Soaking Period (days)	4		
Swell (%)	0.3		
Material Retained on 19 mm (%)	0		
Oversize Material Included	Excluded		

Coarse Particle Distribution (RMS T106 & T120:2012)						
Sieve	Passing %	Passing Limits		Retained %	Retained Limits	
19 mm	100			0		
13.2 mm	98			2		
9.5 mm	88			9		
6.7 mm	78					
4.75 mm	70			18		
2.36 mm	56			14		



Fine Particle Distribution (RMS T106:2012 & T107:2012)						
Sieve	Passing %	Passing Limits		Retained %	Retained Limits	
0.425 mm	40			16		
0.075 mm	32			9		
0.0135 mm	24			7		

Ratios (RMS T107:2012)		Min	Max
Ratio A	72		
Ratio B	78		
Ratio C	77		

Atterberg Limit (RMS T108:2012 & T109:2012)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	33		
Plastic Limit (%)	24		
Plasticity Index (%)	**9**		

Linear Shrinkage (RMS T113:2012)		Min	Max
Linear Shrinkage (%)	**2.0**		
Cracking Crumbling Curling	None		

Material Test Report

Report Number: **228775.00-2**
Issue Number: 1
Date Issued: 28/05/2024
Client: Talinga Pastoral Co
"Talinga" 1848 Castlereagh Highway, Gulgong NSW
Contact: Sally Drury
Project Number: 228775.00
Project Name: Proposed Quarry
Project Location: 1848 Castlereagh Hwy, Tallawang NSW
Work Request: 16177
Sample Number: PM-16177C
Date Sampled: 15/04/2024
Dates Tested: 29/04/2024 - 27/05/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: **BH 2, Depth: 1.35 - 6**
Material: Meta-Siltstone

Douglas Partners Pty Ltd
Port Macquarie Laboratory
Unit 2, 32 Geebung Drive Port Macquarie NSW 2444
Phone: (02) 6581 5992
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Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Adam Jeffery
Assistant Laboratory Manager
Laboratory Accreditation Number: 828

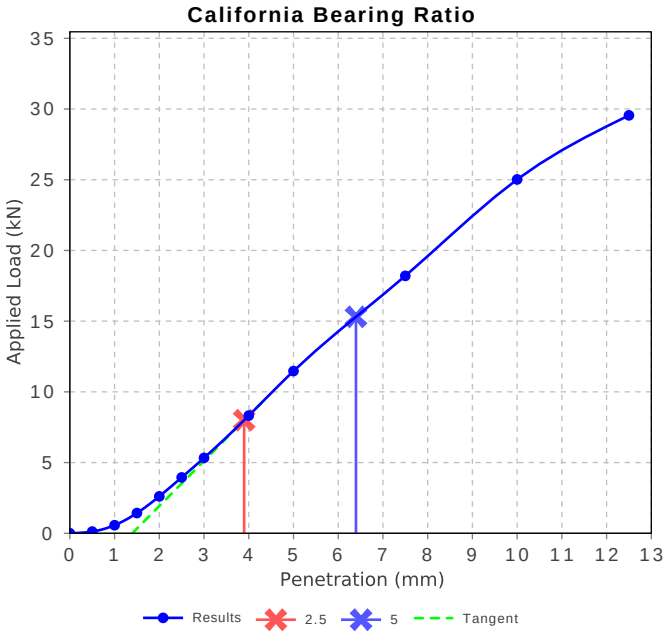
Pretreatment (RMS T102 :2012& T103:2012)	
% retained on 53mm Sieve	0

Pretreatment (RMS T103:2012)	
Method of Pretreatment	W10

Pretreatment (RMS T102:2012)	
Method of Pretreatment	CA3

California Bearing Ratio (RMS T117 & T120)		Min	Max
CBR taken at	5 mm		
CBR %	**80**		
Method of Compactive Effort	Standard		
Method used to Determine MDD	RMS T111 & T120		
Maximum Dry Density (t/m^3)	2.123		
Optimum Moisture Content (%)	10.2		
Target Laboratory Density Ratio (%)	100		
Laboratory Density Ratio (%)	100		
Target Laboratory Moisture Ratio (%)	100		
Laboratory Moisture Ratio (%)	98		
Dry Density after Soaking (t/m^3)	2.137		
Field Moisture Content (%)	7.6		
Moisture Content Top 30mm (%)	10.1		
Moisture Content Full Depth (%)	8.8		
Mass Surcharge (kg)	4.5		
Soaking Period (days)	4		
Swell (%)	-0.4		
Material Retained on 19 mm (%)	0		
Oversize Material Included	Excluded		

Coarse Particle Distribution (RMS T106 & T120:2012)						
Sieve	Passing %	Passing Limits		Retained %	Retained Limits	
19 mm	100			0		
13.2 mm	95			5		
9.5 mm	77			18		
6.7 mm	62					
4.75 mm	51			26		
2.36 mm	37			14		



Fine Particle Distribution (RMS T106:2012 & T107:2012)						
Sieve	Passing %	Passing Limits		Retained %	Retained Limits	
0.425 mm	18			19		
0.075 mm	11			7		
0.0135 mm	8			4		

Ratios (RMS T107:2012)		Min	Max
Ratio A	50		
Ratio B	61		
Ratio C	68		

Atterberg Limit (RMS T108:2012 & T109:2012)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	22		
Plastic Limit (%)	17		
Plasticity Index (%)	**5**		

Linear Shrinkage (RMS T113:2012)		Min	Max
Linear Shrinkage (%)	**1.0**		
Cracking Crumbling Curling	None		

Material Test Report

Report Number: **228775.00-2**
Issue Number: 1
Date Issued: 28/05/2024
Client: Talinga Pastoral Co
"Talinga" 1848 Castlereagh Highway, Gulgong NSW
Contact: Sally Drury
Project Number: 228775.00
Project Name: Proposed Quarry
Project Location: 1848 Castlereagh Hwy, Tallawang NSW
Work Request: 16177
Sample Number: PM-16177D
Date Sampled: 15/04/2024
Dates Tested: 29/04/2024 - 27/05/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: **BH 2, Depth: 8.5 - 13.54**
Material: Meta-Siltstone

Douglas Partners Pty Ltd
Port Macquarie Laboratory
Unit 2, 32 Geebung Drive Port Macquarie NSW 2444
Phone: (02) 6581 5992
Email: adam.jeffery@douglaspartners.com.au

Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Adam Jeffery
Assistant Laboratory Manager
Laboratory Accreditation Number: 828

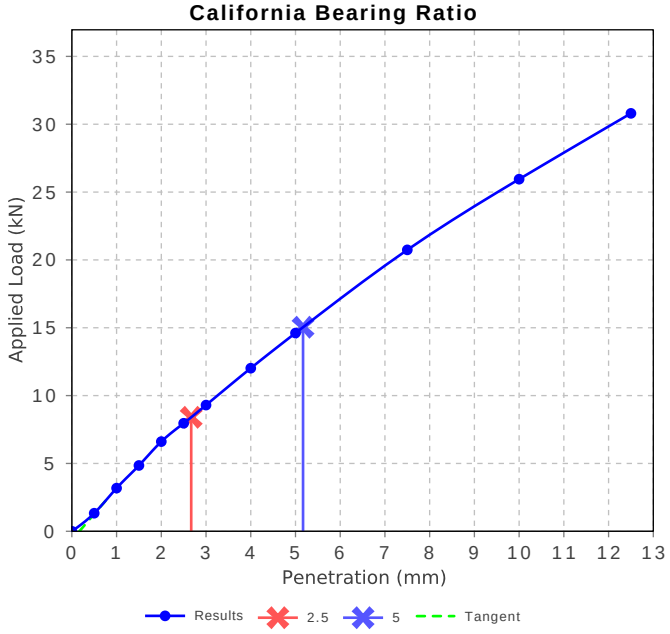
Pretreatment (RMS T102 :2012& T103:2012)	
% retained on 53mm Sieve	0

Pretreatment (RMS T103:2012)	
Method of Pretreatment	W10

Pretreatment (RMS T102:2012)	
Method of Pretreatment	CA3

California Bearing Ratio (RMS T117 & T120)		Min	Max
CBR taken at	5 mm		
CBR %	**80**		
Method of Compactive Effort	Standard		
Method used to Determine MDD	RMS T111 & T120		
Maximum Dry Density (t/m^3)	2.083		
Optimum Moisture Content (%)	10.0		
Target Laboratory Density Ratio (%)	100		
Laboratory Density Ratio (%)	101		
Target Laboratory Moisture Ratio (%)	100		
Laboratory Moisture Ratio (%)	97		
Dry Density after Soaking (t/m^3)	2.099		
Field Moisture Content (%)	7.3		
Moisture Content Top 30mm (%)	9.9		
Moisture Content Full Depth (%)	9.4		
Mass Surcharge (kg)	4.5		
Soaking Period (days)	4		
Swell (%)	-0.1		
Material Retained on 19 mm (%)	0		
Oversize Material Included	Excluded		

California Bearing Ratio



Coarse Particle Distribution (RMS T106 & T120:2012)						
Sieve	Passing %	Passing Limits		Retained %	Retained Limits	
19 mm	100			0		
13.2 mm	91			9		
9.5 mm	71			20		
6.7 mm	57					
4.75 mm	46			24		
2.36 mm	33			14		

Fine Particle Distribution (RMS T106:2012 & T107:2012)						
Sieve	Passing %	Passing Limits		Retained %	Retained Limits	
0.425 mm	16			16		
0.075 mm	10			6		
0.0135 mm	7			3		

Ratios (RMS T107:2012)		Min	Max
Ratio A	50		
Ratio B	60		
Ratio C	67		

Atterberg Limit (RMS T108:2012 & T109:2012)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	20		
Plastic Limit (%)	16		
Plasticity Index (%)	**4**		

Linear Shrinkage (RMS T113:2012)		Min	Max
Linear Shrinkage (%)	**1.0**		
Cracking Crumbling Curling	None		

Material Test Report

Report Number: **228775.00-1**
Issue Number: 1
Date Issued: 15/05/2024
Client: Talinga Pastoral Co
"Talinga" 1848 Castlereagh Highway, Gulgong NSW
Project Number: 228775.00
Project Name: Proposed Quarry
Project Location: 1848 Castlereagh Hwy, Tallawang NSW
Work Request: 11481
Sample Number: NC-11481A
Date Sampled: 15/04/2024
Dates Tested: 19/04/2024 - 09/05/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Preparation Method: AS 1289.1.1 - Sampling and Preparation of Soils
Sample Location: **S1**
Material: Phyllite

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Phone: (02) 4960 9600
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Approved Signatory: Peter Gorseski
Laboratory Manager
Laboratory Accreditation Number: 828

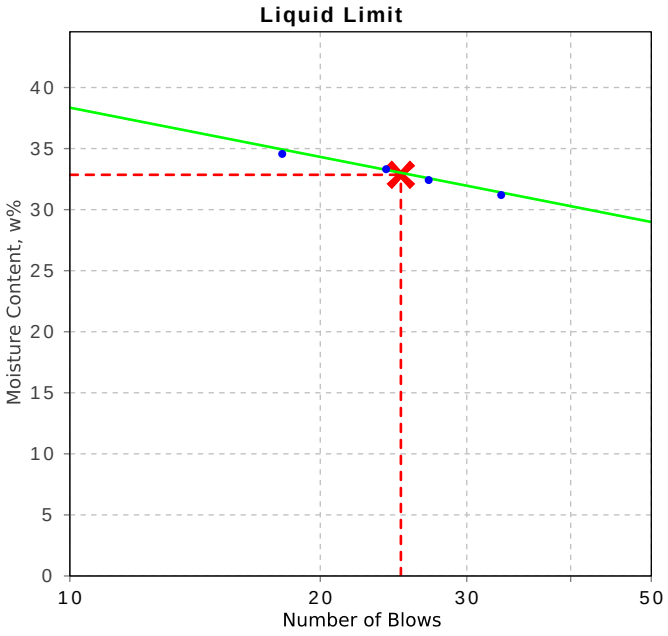
Pretreatment (TS 02794.02 & 02794.03)	
% retained on 53mm Sieve	0

Pretreatment (TS 02794.03)	
Method of Pretreatment	W10

Pretreatment (TS 02794.02)	
Method of Pretreatment	CA3

Atterberg Limit (RMS T108:2012 & T109:2012)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	33		
Plastic Limit (%)	28		
Plasticity Index (%)	**5**		

Linear Shrinkage (RMS T113:2012)		Min	Max
Linear Shrinkage (%)	**3.0**		
Cracking Crumbling Curling	None		



Material Test Report

Report Number: **228775.00-1**
Issue Number: 1
Date Issued: 15/05/2024
Client: Talinga Pastoral Co
"Talinga" 1848 Castlereagh Highway, Gulgong NSW
Project Number: 228775.00
Project Name: Proposed Quarry
Project Location: 1848 Castlereagh Hwy, Tallawang NSW
Work Request: 11481
Sample Number: NC-11481A
Date Sampled: 15/04/2024
Dates Tested: 19/04/2024 - 07/05/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Preparation Method: AS 1289.1.1 - Sampling and Preparation of Soils
Sample Location: **S1**
Material: Phyllite

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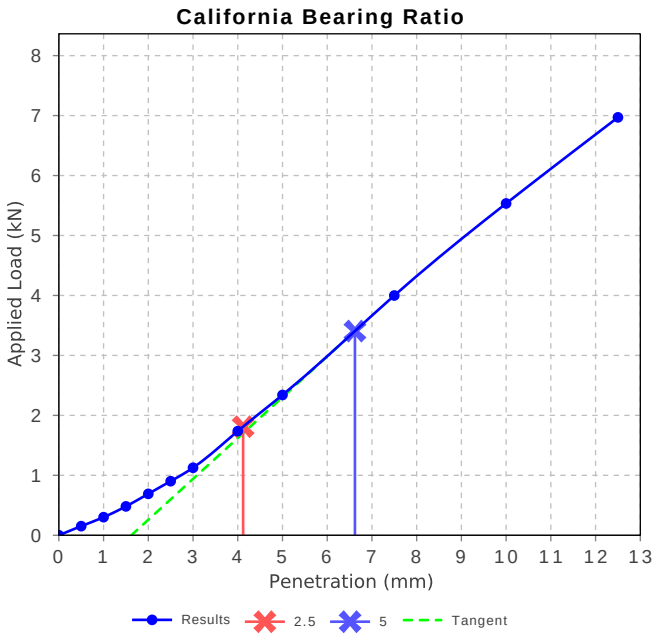
California Bearing Ratio (TS 02795.11 & 02795.14)		Min	Max
CBR taken at	5 mm		
CBR %	**17**		
Method of Compactive Effort	Standard		
Method used to Determine MDD	TS 02795.06 & 02795.14		
Maximum Dry Density (t/m^3)	1.812		
Optimum Moisture Content (%)	15.9		
Target Laboratory Density Ratio (%)	100		
Laboratory Density Ratio (%)	100		
Target Laboratory Moisture Ratio (%)	100		
Laboratory Moisture Ratio (%)	98		
Dry Density after Soaking (t/m^3)	1.796		
Field Moisture Content (%)	12.3		
Moisture Content Top 30mm (%)	17.9		
Moisture Content Full Depth (%)	16.6		
Mass Surcharge (kg)	4.5		
Soaking Period (days)	4		
Swell (%)	0.8		
Material Retained on 19 mm (%)			
Oversize Material Included	Excluded		



Material Test Report

Report Number: **228775.00-1**
Issue Number: 1
Date Issued: 15/05/2024
Client: Talinga Pastoral Co
"Talinga" 1848 Castlereagh Highway, Gulgong NSW
Project Number: 228775.00
Project Name: Proposed Quarry
Project Location: 1848 Castlereagh Hwy, Tallawang NSW
Work Request: 11481
Sample Number: NC-11481A
Date Sampled: 15/04/2024
Dates Tested: 19/04/2024 - 09/05/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Preparation Method: AS 1289.1.1 - Sampling and Preparation of Soils
Sample Location: **S1**
Material: Phyllite

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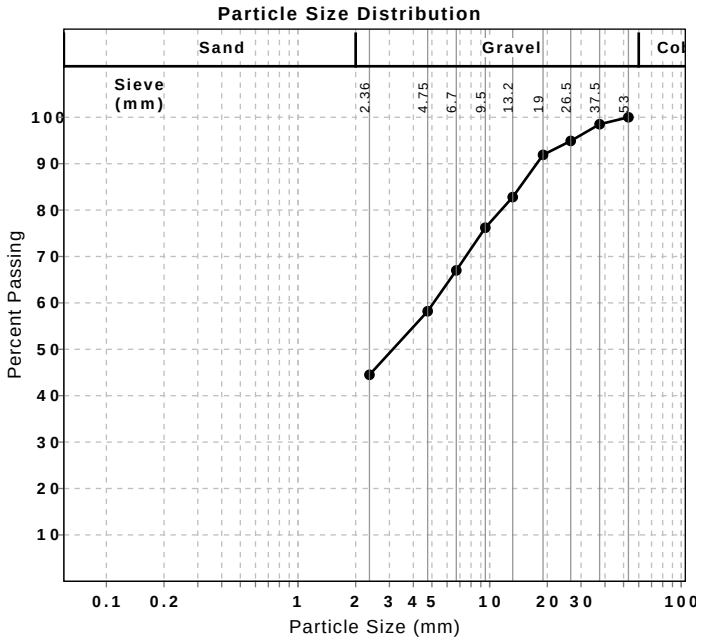
Coarse Particle Distribution (RMS T106 & T120)						
Sieve	Passing %	Passing Limits		Retained %	Retained Limits	
53 mm	100			0		
37.5 mm	98			2		
26.5 mm	95			4		
19 mm	92			3		
13.2 mm	83			9		
9.5 mm	76			7		
6.7 mm	67					
4.75 mm	58			18		
2.36 mm	44			14		
Test discontinued due to reaching maximum pours. Sample did not disperse.						

Fine Particle Distribution (RMS T106 & T107)				
Sieve	Passing %	Passing Limits	Retained %	Retained Limits
Test discontinued due to reaching maximum pours. Sample did not disperse.				

Ratios (RMS T106 & T107)			
		Min	**Max**
Ratio A			
Ratio B			
Ratio C			
Test discontinued due to reaching maximum pours. Sample did not disperse.			



Material Test Report

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Approved Signatory: Peter Gorseski
Laboratory Manager
Laboratory Accreditation Number: 828

Report Number:	**228775.00-1**
Issue Number:	1
Date Issued:	15/05/2024
Client:	Talinga Pastoral Co
	"Talinga" 1848 Castlereagh Highway, Gulgong NSW
Project Number:	228775.00
Project Name:	Proposed Quarry
Project Location:	1848 Castlereagh Hwy, Tallawang NSW
Work Request:	11481
Sample Number:	NC-11481B
Date Sampled:	15/04/2024
Dates Tested:	19/04/2024 - 09/05/2024
Sampling Method:	Sampled by Engineering Department
	The results apply to the sample as received
Preparation Method:	AS 1289.1.1 - Sampling and Preparation of Soils
Sample Location:	**S2**
Material:	Phyllite

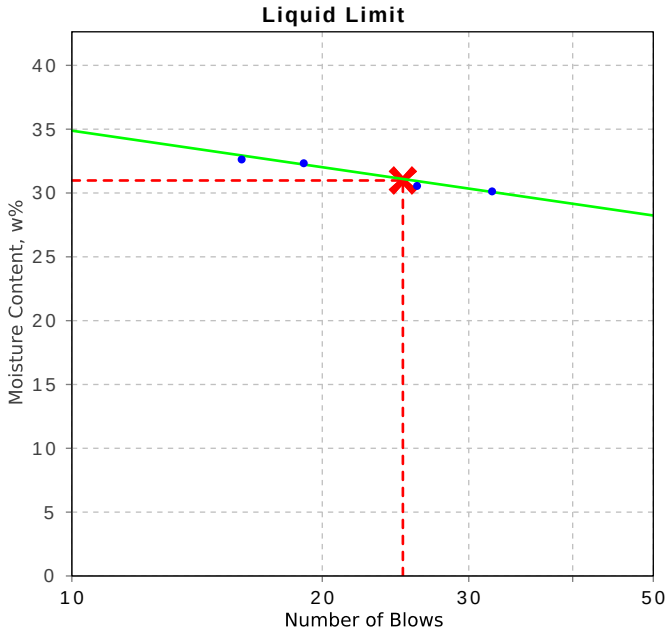
Pretreatment (TS 02794.02 & 02794.03)	
% retained on 53mm Sieve	0

Pretreatment (TS 02794.03)	
Method of Pretreatment	W10

Pretreatment (TS 02794.02)	
Method of Pretreatment	CA3

Atterberg Limit (RMS T108:2012 & T109:2012)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	31		
Plastic Limit (%)	24		
Plasticity Index (%)	**7**		

Linear Shrinkage (RMS T113:2012)		Min	Max
Linear Shrinkage (%)	**3.0**		
Cracking Crumbling Curling	Cracking		



Material Test Report

Report Number: **228775.00-1**
Issue Number: 1
Date Issued: 15/05/2024
Client: Talinga Pastoral Co
"Talinga" 1848 Castlereagh Highway, Gulgong NSW
Project Number: 228775.00
Project Name: Proposed Quarry
Project Location: 1848 Castlereagh Hwy, Tallawang NSW
Work Request: 11481
Sample Number: NC-11481B
Date Sampled: 15/04/2024
Dates Tested: 19/04/2024 - 07/05/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Preparation Method: AS 1289.1.1 - Sampling and Preparation of Soils
Sample Location: **S2**
Material: Phyllite

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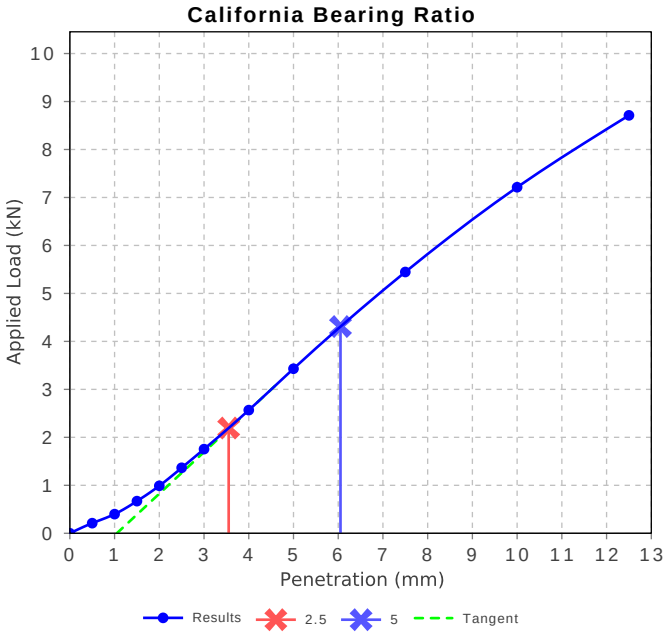
Laboratory Accreditation Number: 828

California Bearing Ratio (TS 02795.11 & 02795.14)		Min	Max
CBR taken at	5 mm		
CBR %	**20**		
Method of Compactive Effort	Standard		
Method used to Determine MDD	TS 02795.06 & 02795.14		
Maximum Dry Density (t/m^3)	1.873		
Optimum Moisture Content (%)	14.9		
Target Laboratory Density Ratio (%)	100		
Laboratory Density Ratio (%)	99		
Target Laboratory Moisture Ratio (%)	100		
Laboratory Moisture Ratio (%)	103		
Dry Density after Soaking (t/m^3)	1.854		
Field Moisture Content (%)	13.0		
Moisture Content Top 30mm (%)	16.5		
Moisture Content Full Depth (%)	15.1		
Mass Surcharge (kg)	4.5		
Soaking Period (days)	4		
Swell (%)	0.4		
Material Retained on 19 mm (%)	11		
Oversize Material Included	Excluded		



Material Test Report

Report Number: **228775.00-1**
Issue Number: 1
Date Issued: 15/05/2024
Client: Talinga Pastoral Co
"Talinga" 1848 Castlereagh Highway, Gulgong NSW
Project Number: 228775.00
Project Name: Proposed Quarry
Project Location: 1848 Castlereagh Hwy, Tallawang NSW
Work Request: 11481
Sample Number: NC-11481B
Date Sampled: 15/04/2024
Dates Tested: 19/04/2024 - 09/05/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Preparation Method: AS 1289.1.1 - Sampling and Preparation of Soils
Sample Location: **S2**
Material: Phyllite

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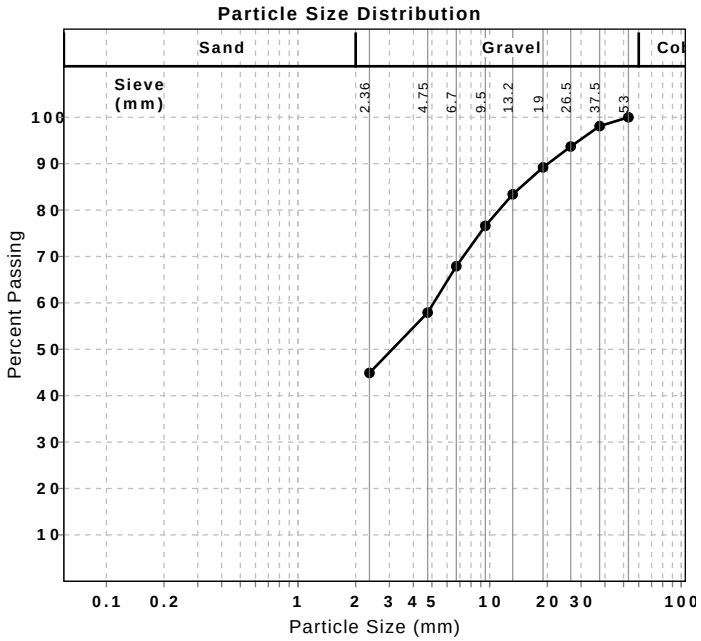
Coarse Particle Distribution (RMS T106 & T120)						
Sieve	Passing %	Passing Limits		Retained %	Retained Limits	
53 mm	100			0		
37.5 mm	98			2		
26.5 mm	94			4		
19 mm	89			4		
13.2 mm	83			6		
9.5 mm	77			7		
6.7 mm	68					
4.75 mm	58			19		
2.36 mm	45			13		
Test discontinued due to reaching maximum pours. Sample did not disperse.						

Fine Particle Distribution (RMS T106 & T107)				
Sieve	Passing %	Passing Limits	Retained %	Retained Limits
Test discontinued due to reaching maximum pours. Sample did not disperse.				

Ratios (RMS T106 & T107)			
		Min	**Max**
Ratio A			
Ratio B			
Ratio C			
Test discontinued due to reaching maximum pours. Sample did not disperse.			



Material Test Report

Report Number: **228775.00-1**
Issue Number: 1
Date Issued: 15/05/2024
Client: Talinga Pastoral Co
"Talinga" 1848 Castlereagh Highway, Gulgong NSW
Project Number: 228775.00
Project Name: Proposed Quarry
Project Location: 1848 Castlereagh Hwy, Tallawang NSW
Work Request: 11481
Sample Number: NC-11481C
Date Sampled: 15/04/2024
Dates Tested: 19/04/2024 - 09/05/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Preparation Method: AS 1289.1.1 - Sampling and Preparation of Soils
Sample Location: **S3**
Material: Phyllite

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Laboratory Manager
Laboratory Accreditation Number: 828

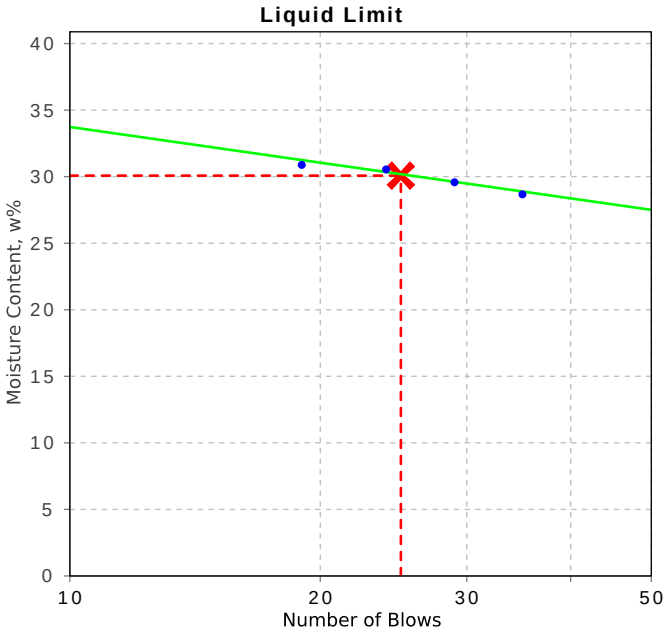
Pretreatment (TS 02794.02 & 02794.03)	
% retained on 53mm Sieve	0

Pretreatment (TS 02794.03)	
Method of Pretreatment	W10

Pretreatment (TS 02794.02)	
Method of Pretreatment	CA3

Atterberg Limit (RMS T108:2012 & T109:2012)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	30		
Plastic Limit (%)	20		
Plasticity Index (%)	**10**		

Linear Shrinkage (RMS T113:2012)		Min	Max
Linear Shrinkage (%)	**4.5**		
Cracking Crumbling Curling	None		



Material Test Report

Report Number: **228775.00-1**
Issue Number: 1
Date Issued: 15/05/2024
Client: Talinga Pastoral Co
"Talinga" 1848 Castlereagh Highway, Gulgong NSW
Project Number: 228775.00
Project Name: Proposed Quarry
Project Location: 1848 Castlereagh Hwy, Tallawang NSW
Work Request: 11481
Sample Number: NC-11481C
Date Sampled: 15/04/2024
Dates Tested: 19/04/2024 - 07/05/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Preparation Method: AS 1289.1.1 - Sampling and Preparation of Soils
Sample Location: **S3**
Material: Phyllite

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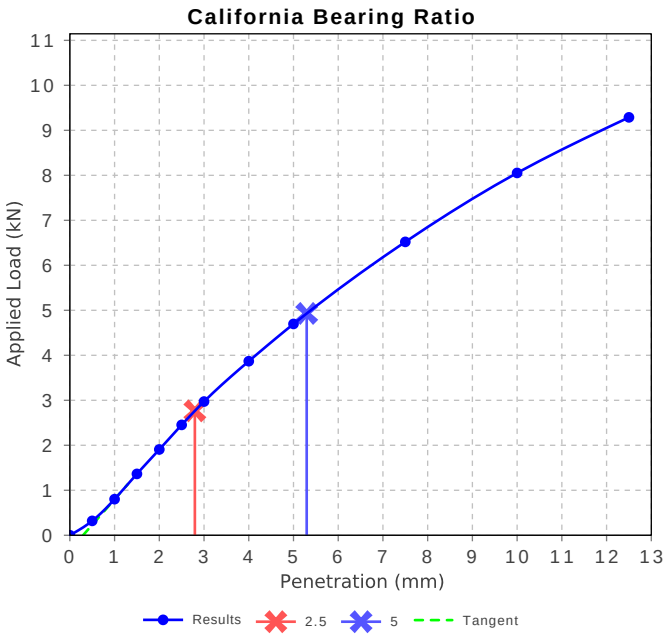
California Bearing Ratio (TS 02795.11 & 02795.14)		Min	Max
CBR taken at	5 mm		
CBR %	**25**		
Method of Compactive Effort	Standard		
Method used to Determine MDD	TS 02795.06 & 02795.14		
Maximum Dry Density (t/m^3)	1.872		
Optimum Moisture Content (%)	13.7		
Target Laboratory Density Ratio (%)	100		
Laboratory Density Ratio (%)	101		
Target Laboratory Moisture Ratio (%)	100		
Laboratory Moisture Ratio (%)	95		
Dry Density after Soaking (t/m^3)	1.876		
Field Moisture Content (%)	13.5		
Moisture Content Top 30mm (%)	15.1		
Moisture Content Full Depth (%)	14.2		
Mass Surcharge (kg)	4.5		
Soaking Period (days)	4		
Swell (%)	0.3		
Material Retained on 19 mm (%)	10		
Oversize Material Included	Excluded		



Material Test Report

Report Number: **228775.00-1**
Issue Number: 1
Date Issued: 15/05/2024
Client: Talinga Pastoral Co
"Talinga" 1848 Castlereagh Highway, Gulgong NSW
Project Number: 228775.00
Project Name: Proposed Quarry
Project Location: 1848 Castlereagh Hwy, Tallawang NSW
Work Request: 11481
Sample Number: NC-11481C
Date Sampled: 15/04/2024
Dates Tested: 19/04/2024 - 09/05/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Preparation Method: AS 1289.1.1 - Sampling and Preparation of Soils
Sample Location: **S3**
Material: Phyllite

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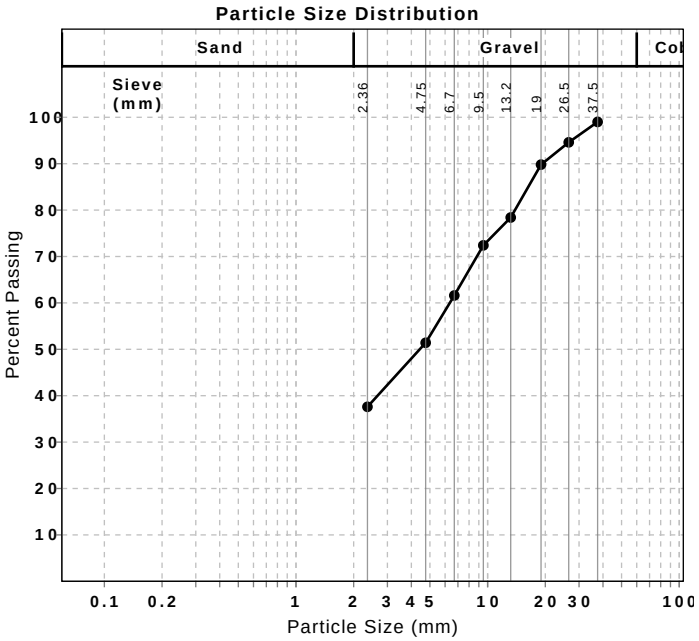
Coarse Particle Distribution (RMS T106 & T120)						
Sieve	Passing %	Passing Limits		Retained %	Retained Limits	
37.5 mm	99			1		
26.5 mm	95			4		
19 mm	90			5		
13.2 mm	78			11		
9.5 mm	72			6		
6.7 mm	62					
4.75 mm	51			21		
2.36 mm	38			14		
Test discontinued due to reaching maximum pours. Sample did not disperse.						

Fine Particle Distribution (RMS T106 & T107)				
Sieve	Passing %	Passing Limits	Retained %	Retained Limits
Test discontinued due to reaching maximum pours. Sample did not disperse.				

Ratios (RMS T106 & T107)			
		Min	**Max**
Ratio A			
Ratio B			
Ratio C			
Test discontinued due to reaching maximum pours. Sample did not disperse.			



Appendix D

Drawing 1 - Test Location Plan

REV	DESCRIPTION/COMMENT	DATE	DRAWN BY
0	-	03.06.2024	TDM

SCALE: 0 20 40 60 80 m
1:2,000 @ A3

Douglas PARTNERS
OFFICE: CENTRAL COAST
Unit 5, 3 Teamster Close, Tuggerah NSW 2259
(02) 4351 1422

CLIENT:
TALINGA PASTORAL CO

NOTE:
1: Basemap sourced from Google Hybrid Map

COORDINATE REFERENCE SYSTEM: GDA2020, MGA ZONE 55

PROJECT NAME:
PROPOSED QUARRY

PROJECT ADDRESS:
1848 CASTLEREAGH HWY, TALLAWANG NSW

DRAWING TITLE:
TEST LOCATION PLAN

PROJECT NO: **228775.00**
DRAWING NO: **1**
REVISION: **0**