DM McMahon Pty Ltd
6 Jones St (PO Box 6118)
Wagga Wagga NSW 2650
t (02) 6931 0510
www.dmmcmahon.com.au

8 March 2024

1500 x 450

Attention: Annalise ~~Kinstler~~ Robinson
120 Poiles Road
Brucedale NSW 2650
annaliser4@gmail.com
BY EMAIL

Dear Annalise

Re: Geotechnical Interpretive Report – 120 Poiles Road Brucedale NSW 2650

I refer to the verbal request from yourself to compile a geotechnical interpretive report for a proposed new dwelling to replace the existing one at 120 Poiles Road Brucedale NSW.

The intended recipient of this report is yourself for use in the preliminary design of foundations for the structural and civil work associated with the proposed new dwelling to be constructed on site. It is assumed that third parties will rely on this report for preliminary foundation design, however DM McMahon Pty Ltd is required to be consulted if the report is to be used for any other purpose.

Objective and agreed scope

The objective of this geotechnical interpretative report is to document the expressions of professional opinion around the geotechnical characteristics of the site relevant to the project derived from the consideration of relevant available facts, interpretations and analysis and judgement. Geotechnical interpretation is a continuous process and will be updated as more information about the project and ground conditions becomes available.

The agreed scope of works included:

- Where available, review plans and other general related documents provided to us to gain a comprehensive understanding of the site.
- Provide geotechnical interpretation around:
  - Site classification by reference to AS2870 (2011) Residential Slabs and Footings.
  - Bearing pressure.
- Supply a geotechnical interpretive report by reference to the Australian Standard 1726 (2017).

Reference to the data upon which the interpretation has been relied upon

- Associated Geotechnical Data Report (Report XXXX).
- Shrink-swell index (Iss) was estimated based on the laboratory result (Nguyen et al., unpublished data).
- Surface movement (Ys) was calculated based on AS 2870 using Iss data.

- Stockwell, M.J. (1977), Determination of Allowable Bearing Pressures Under Small Structures, New Zealand Engineering, Vol. 32, No. 6, Jun 1977: 132-135.

An interpretation of the site geology and the development of the geotechnical model

The site geology generally comprised of the following:

BH01

- A dry white non-plastic coarse sized gravel uncontrolled fill.
- A moist brown low to medium plasticity sandy clay
- A colluvial moist brown high plasticity clay.
- A colluvial moist yellow-brown high plasticity clay.
- A residual moist yellow medium to high plasticity clay.

BH02

- A dark brown moist low to medium plasticity silty clay topsoil.
- A colluvial moist brown high plasticity clay.
- A colluvial moist yellow-brown high plasticity clay.

A summary of the geotechnical properties of the ground applicable to the project

Based on laboratory results of this project the following interpretations can be made.

- Topsoil and uncontrolled fill is deemed unsuitable material due to having low bearing strength and containing organic matter.
- The underlying colluvial clay material is suitable for foundations. Based on laboratory results and interpretation, this soil is assessed to have a high reactivity, 40-60 mm in movement due to moisture variation.

An engineering interpretation of the implications of the ground conditions for the project

Based on the field assessment, laboratory data, data interpretation, and assumptions therein, the site may be classified as a **P-Problem site**. The removal of the existing dwelling to build the new dwelling can cause problems due to potential abnormal moisture conditions prior to construction. An adequate time allowance should be made for soil moisture conditions to reach a new equilibrium moisture regime prior to construction. Special consideration is needed for such and therefore the site is classified as a **Class P – Problem site**.

However, the site may be classified as **H1-D – Highly reactive clay site (deep drying)**, which may experience high ground movement from moisture changes if footings are founded into the underlying colluvial clay material and engineering principles are adopted to manage the identified problems.

The estimated allowable bearing pressures are as follows:

- The moist topsoil and uncontrolled fill 36-68kPa.
- The moist underlying colluvial brown clay subsoil 100-120kPa.

An assessment of potential geotechnical risk to the project

- Soils may be encountered on site outside of the tested areas that are different to that encountered at the tested locations. If any unconsolidated or saturated soils are encountered

during excavation, or conditions that are not alike the above description, the site supervisor should be informed, the work stopped, and this office be contacted immediately for further evaluation.

- Economical foundations designed in accordance with AS2870 that avoid significant damage are practicable only if the soil moisture content of the foundation material under the footing or slab is stable or within reasonable limits of stability over the design life of the structure. Drainage and soil moisture conditions around the building need to be managed to avoid abnormal moisture conditions which may result in building damage.
- There is a risk that bearing pressure is mischaracterised with terms often used interchangeably without being fully understood. Therefore, in this report the allowable bearing pressure has been provided. It is defined as the maximum allowable loading that allows for shear effects (not settlement) with a safety factor of three, for one and two storey buildings, portal framed buildings, and water towers, Stockwell (1997). The allowable bearing pressure is based on a visual and tactile assessment of the soil as well as in situ penetration testing. It is well established that penetration tests are not repeatable and are preferably used to establish the changes in strength of the soil profile rather than as an absolute measure from which the allowable bearing capacity may be characterised. Relationships between penetrometer tests and the allowable bearing pressure are based on the soil being in a moist state, noting that cohesive soils gain strength as the dry out and lose strength as they saturate. The estimated allowable bearing pressure provided in this report is preliminary in nature and can be updated with further laboratory testing (triaxial shear) and assessment once the building design is suitably advanced.
- If earthworks on site are not conducted to the Australian Standard 3798 (2011) Guidelines on Earthworks for Commercial and Residential Developments, there is the risk of compromising the suitability of the soil found on site for foundations.
- The information contained in this report has been extracted from sources believed to be reliable and accurate. DM McMahon Pty Ltd will not assume any responsibility for the misinterpretation of information supplied in this report. The accuracy and reliability of recommendations identified in this report need to be evaluated with due care according to individual circumstances. The results of the assessment undertaken are an overall representation of the conditions encountered. It should be noted that the recommendations and findings in this report are based solely upon the said site location and the ground level conditions at the time of testing. The properties of the soil within the location may change due to variations in ground conditions outside of the tested area. The author has no control or liability over site variability that may warrant further investigation that may lead to significant design changes.

If you have any queries about the contents of this geotechnical data report, please contact the undersigned.

Yours sincerely

David McMahon CEnvP SC
BAppSc SA
GradDip WRM
MEnvMgmt
MALGA MEIANZ MSSA

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8 March 2024

Attention: Annalise Kinstler
120 Poiles Road
Brucedale NSW 2650
annaliser4@gmail.com
BY EMAIL

Dear Annalise

Re: Geotechnical Data Report – 120 Poiles Road Brucedale NSW 2650

I refer to the verbal request from yourself to compile a geotechnical data report for a proposed new dwelling to replace the existing one at 120 Poiles Road Brucedale NSW. A site location map and plan of the proposed development can be seen in **Attachment A**. (Development plan unavailable).

The intended recipient of this report is yourself for use in the preliminary design of foundations for the structural and civil work associated with the proposed new dwelling to be constructed on site. It is assumed that third parties will rely on this report for preliminary foundation design, however DM McMahon Pty Ltd is required to be consulted if the report is to be used for any other purpose.

Objective and agreed scope

The objective of this geotechnical data report is to document the procedures employed and the data collected, and despite the fact that soil and rock logging has an interpretive nature attached to it, this geotechnical data report is considered predominantly factual.

The agreed scope of works included:

- Where available, review plans and other general related documents provided to us to gain a comprehensive understanding of the site.
- Drill two holes to 3m depth (or refusal) at locations determined by yourself and undertake a visual and tactile assessment of investigated locations by reference to the Australian Standard 1726 (2017) Geotechnical Site Investigations.
- Test representative soil samples for Atterberg limits in a NATA accredited laboratory to the relevant Australian Standards and Transport for NSW test methods.
- Supply a geotechnical data report by reference to the Australian Standard 1726 (2017).

Location and description of the project site and its history

The project site is a 2.83ha (approx.) land parcel with a real property description of Lot 1 DP 214337. From a review of available historical aerial photography and satellite imagery (1966-2022), the existing dwelling has been on site since at least 1966, an addition shed was added between 1998 and 2009 to the south of the existing dwelling. Minimal changes can be seen since that time. (**Attachment B**).

Plan showing investigation locations

A plan of the investigation locations can be seen in **Attachment C**.

Description of the regional and local geology

The regional geology consists of Silurian granites, mainly Wantabadgery Granodiorite and Collingullie Granite, with small parts of Burrandana Granite. Thick clay sequences, with significant windblown (aeolian) clay additions ("parna"), deposited on most side slopes and in drainage depressions. The local geology consists of uncontrolled fill and topsoil overlying colluvial and residual clays.

Records of fieldwork, including methods and results

Two boreholes were drilled using a power auger and hand auger approximately where the proposed new dwelling is to be built. Soil samples were taken at depths of 0.2-0.8m and 0.8-2.6m below ground level in accordance with sampling method AS1289.1.2.1 (1998) Methods of testing soils for engineering purposes, sampling and preparation of soils, disturbed samples, standard method.

The log sheets including the visual and tactile assessment of the surface and subsurface can be seen in **Attachment D**. Photographs of the site and soil can be seen in **Attachment E**.

Laboratory testing and summary of results

Tabulated laboratory results can be seen in **Attachment F**.

Laboratory reports can be seen in **Attachment G**.

If you have any queries about the contents of this geotechnical data report, please contact the undersigned.

Yours sincerely

David McMahon CEnvP SC
BAppSc SA
GradDip WRM
MEnvMgmt
MALGA MEIANZ MSSA

Disclaimer

The information contained in this report has been extracted from sources believed to be reliable and accurate. DM McMahon Pty Ltd will not assume any responsibility for the misinterpretation of information supplied in this report. The accuracy and reliability of recommendations identified in this report need to be evaluated with due care according to individual circumstances. The results of the assessment undertaken are an overall representation of the conditions encountered. It should be noted that the recommendations and findings in this report are based solely upon the said site location and the ground level conditions at the time of testing. The properties of the soil within the location may change due to variations in ground conditions outside of the tested area. The author has no control or liability over site variability that may warrant further investigation that may lead to significant design changes.

Notice of Copyright

Attachments

A. Site locations map and development plan
B. Aerial photography and satellite imagery
C. Plan of the investigation locations
D. Log sheets
E. Photographs
F. Tabulated results
G. Laboratory reports

Attachment A : *Site location and development plan*

120 Poiles Road Brucedale NSW 2650

Geotechnical Investigation
Report No. 9890
Google Earth Image 2022

Attachment B : *Aerial photography and satellite imagery*

120 Poiles Road Brucedale NSW 2650

Geotechnical Investigation
Report No. 9890
Historical Imagery 1966

120 Poiles Road Brucedale NSW 2650

Geotechnical Investigation
Report No. 9890
Historical Imagery 1980

120 Poiles Road Brucedale NSW 2650

Geotechnical Investigation
Report No. 9890
Historical Imagery 1998

120 Poiles Road Brucedale NSW 2650

Geotechnical Investigation
Report No. 9890
Historical Imagery 2009

120 Poiles Road Brucedale NSW 2650

Geotechnical Investigation
Report No. 9890
Historical Imagery 2016

Attachment C : *Plan of the investigation locations*

120 Poiles Road Brucedale NSW 2650

Geotechnical Investigation
Report No. 9890
Google Earth Image 2022

Attachment D : *Log sheets*

McMahon Earth Science
6 Jones St, Wagga Wagga
Phone: 02 6931 0510

Geotechnical Log - Borehole

BH01

UTM	: 55H	Drill Rig	: DMM Drilling Rig	Job Number	: 9890
Easting (m)	: 535,544.00	Driller Supplier	: McMahon Earth Science	Client	: Annalise Kinstler
Northing (m)	: 6,119,765.00	Logged By	: L.Nilsen	Project	: Geotechnical Investigation
Ground Elevation	: Not Surveyed	Reviewed By	: L.Nilsen	Location	: 120 Polles Road, Brucedale NSW 2650
Total Depth	: 3 m BGL	Date	: 01/03/2024	Loc Comment	:

Drilling Method	Depth (m)	Soil Origin	Graphic Log	Material Description	Samples	Observations
Solid flight auger	0.05	Uncontrolled Fill		Uncontrolled fill (GP) : GRAVEL, white, loose, coarse sized, dry.		
		Uncontrolled Fill		Uncontrolled fill (CL-CI) : Sandy CLAY, trace fine to medium sized gravel, brown, low to medium plasticity, firm, w < pl, fine to medium grained sand.		
	0.2	Colluvium		Colluvium (CI-CH) : CLAY, brown, high plasticity, firm to stiff, w > pl.	Plastic Bag: Atterberg limits - A	
	0.8	Colluvium		Colluvium (CI-CH) : CLAY, yellow brown, high plasticity, stiff, w < pl.	Plastic Bag: Atterberg limits - B	
	1					
	2					
	2.6	Residual		Residual (CI-CH) : CLAY, trace fine sized gravel, trace medium to coarse grained sand, yellow, medium to high plasticity, very stiff, w < pl.		
	3			**BH01 Terminated at 3m**		

McMahon Earth Science
6 Jones St, Wagga Wagga
Phone: 02 6931 0510

Geotechnical Log - Borehole

BH02

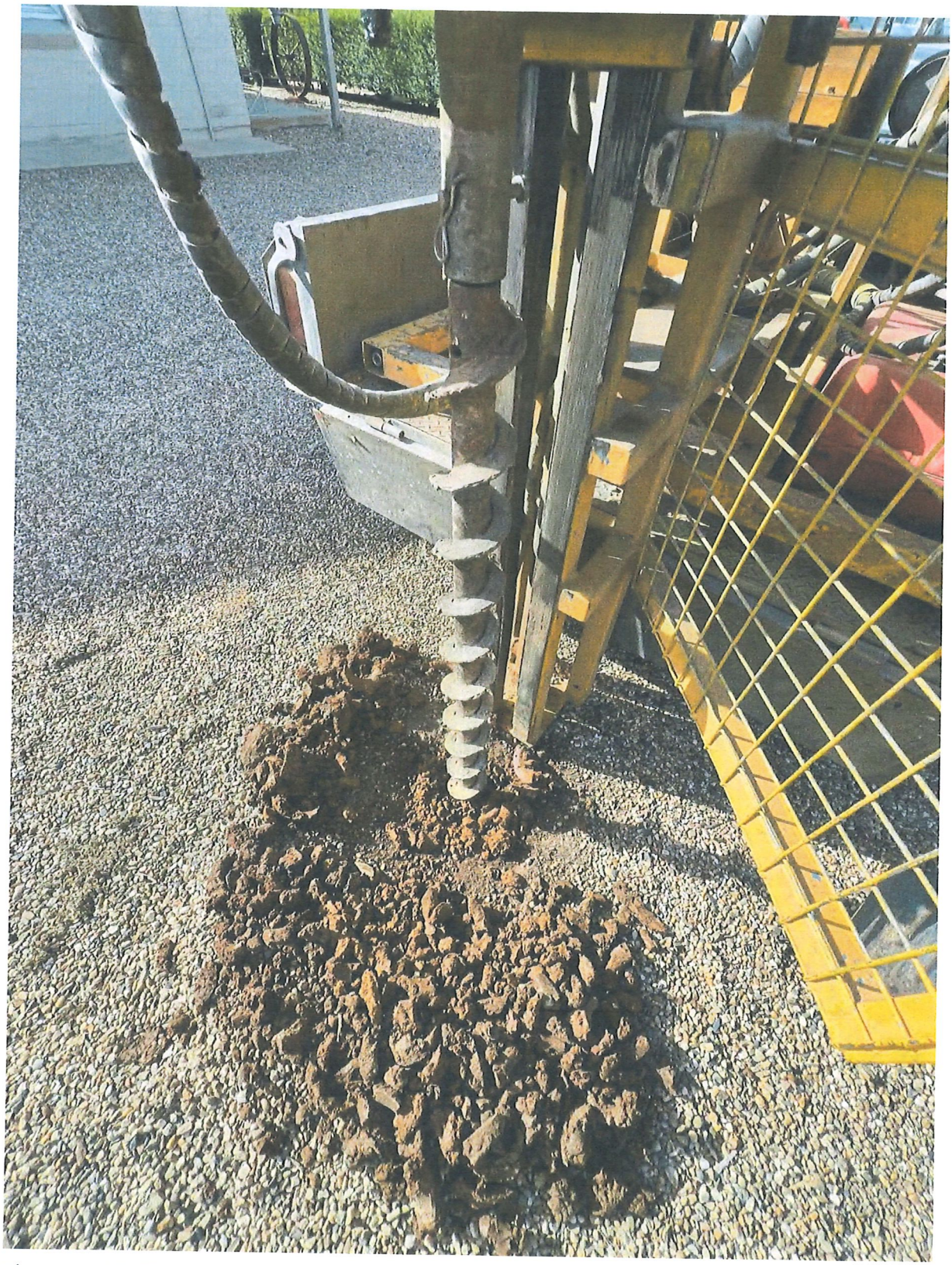
UTM	: 55H	Drill Rig	: Hand Auger	Job Number	: 9890
Easting (m)	: 535,574.00	Driller Supplier	: N/A	Client	: Annalise Kinstler
Northing (m)	: 6,119,761.00	Logged By	: L.Nilsen	Project	: Geotechnical Investigation
Ground Elevation	: Not Surveyed	Reviewed By	: L.Nilsen	Location	: 120 Poiles Road, Brucedale NSW 2650
Total Depth	: 1.5 m BGL	Date	: 01/03/2024	Loc Comment	:

Drilling Method	Depth (m)	Soil Origin	Graphic Log	Material Description	Samples	Observations
Hand auger	0.2	Topsoil		Topsoil (CL-CI) : Silty CLAY, dark brown, low to medium plasticity, firm, organic, w < pl.		
	0.8	Colluvium		Colluvium (CI-CH) : CLAY, brown, high plasticity, firm to stiff, w > pl.		
	1	Colluvium		Colluvium (CI-CH) : CLAY, yellow brown, high plasticity, stiff, w < pl.		
	2			**BH02 Terminated at 1.5m**		
	3					

Attachment E : *Photographs*

Photograph 1: The proposed building location facing northeast.

Photograph 2: The proposed building location facing northwest.



Photograph 3: The sampling method used on site – Power auger (AS 1289.1.2.1 6.5.3).

Photograph 4: The general soil profile across the site to 3.0m.

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Attachment F : *Tabulated results*

Page: 1 of 1
Job number: 9890
Project: Geotechnical data report - 120 Poiles Road Brucedale NSW

Sample date		1/3/24	1/3/24																
Sample location		BH01	BH01																
Sample ID		1771A	1771B																
Sample depth (m)		0.2-0.8	0.8-2.6																
Test	**Unit**	Result	Result																
Moisture content	%	23.1	26.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Liquid limit	%	48	56	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Plastic limit	%	18	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Plasticity index	%	30	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Linear shrinkage	%	13.5	16.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Shrink swell index	%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Maximum dry density	t/m^3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Optimum moisture content	%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
California bearing ratio	%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
California bearing ratio (swell)	%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19mm passing	%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13.2mm passing	%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9.5mm passing	%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6.7mm passing	%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4.75mm passing	%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2.36mm passing	%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0.425mm passing	%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0.075mm passing	%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0.0135mm passing	%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Emerson class number	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Falling Head Permeability	m/sec	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Attachment G : *Laboratory reports*

Material Test Report

Report Number: 9890-1
Issue Number: 1
Date Issued: 07/03/2024
Client: Annalise Kinstler

Project Number: 9890
Project Name: Geotechnical Investigation
Project Location: 120 Poiles Road Brucedale NSW 2650
Work Request: 1771
Dates Tested: 01/03/2024 - 07/03/2024
Location: 120 Poiles Road Brucedale NSW 2650

DM McMahon Pty Ltd
Wagga Wagga Laboratory
6 Jones Street Wagga Wagga NSW 2650
Phone: (02) 6931 0510
Email: han@dmmcmahon.com.au

Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Dr Hoang Han Nguyen
Lab manager
NATA Accredited Laboratory Number: 3349

Sample Details					
Sample Number	1771A	1771B			
Date Sampled	01/03/2024	01/03/2024			
Sample Location	BH01 E: 535544 N: 6119765	BH01 E: 535544 N: 6119765			
Sample Depth	0.2-0.8m	0.8-2.6m			
Material	CLAY	CLAY			
Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)				Min	Max
Sample History	Oven Dried	Oven Dried			
Preparation Method	Dry Sieve	Dry Sieve			
Liquid Limit (%)	48	56			
Plastic Limit (%)	18	21			
Plasticity Index (%)	30	35			
Linear Shrinkage (AS 1289 3.4.1)				Min	Max
Sample History	Oven Dried	Oven Dried			
Preparation Method	Dry Sieve	Dry Sieve			
Moisture Condition Determined By	AS 1289.3.1.2	AS 1289.3.1.2			
Linear Shrinkage (%)	13.5	16.5			
Cracking Crumbling Curling	Cracking	Cracking			
Moisture Content (AS 1289 2.1.1)				Min	Max
Moisture Content (%)	23.1	26.2			
Min (%)	**	**			
Max (%)	**	**			