Brookfield Multiplex Australasia

Material Science Building
University of New South Wales

Geotechnical Investigation Report

4 February 2016

To find the smartest solutions sometimes you need to dig deeper

This page has been left intentionally blank

Material Science Building University of New South Wales

Prepared for
Brookfield Multiplex Australasia

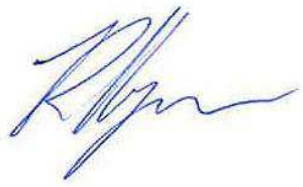
Prepared by
Coffey Geotechnics Pty Ltd
Level 19, Tower B, 799 Pacific Highway
Chatswood NSW 2067 Australia
t: +61 2 9406 1000 f: +61 2 9406 1002
ABN: 93 056 929 483

4 February 2016

Document authorisation

Our ref: GEOTLCOV24080AS-AE Rev 2

For and on behalf of Coffey



Raphael Hyde
Geotechnical Engineer

Quality information

Revision history

Revision	Description	Date	Author	Reviewer	Signatory
0	Geotechnical Investigation Report	15/08/2015	Bernice Cahill	Ross Best	Bernice Cahill
2	Revised – Include reference to correct basement area, no technical changes	4/02/2016	RH	-	RH

Distribution

Report Status	No. of copies	Format	Distributed to	Date
Final	1	PDF	Brookfield Multiplex Australasia	4/02/2016

Table of contents

Tables

Figures

Appendices

1. Introduction

This report presents the results of a geotechnical investigation carried out by Coffey Geotechnics Pty Ltd (Coffey) for the proposed Material Science Building at the University of New South Wales (UNSW), Kensington. The investigation was commissioned by Brookfield Australasia (Brookfield) and undertaken in general accordance with our proposal, reference GEOTLCOV24080AS-AD, dated 10 July 2015.

The objective of our investigation was to assess subsurface conditions across the site to support a feasibility assessment and preliminary structural design for the proposed development. The development is understood to involve the extension of the Physical Sciences Precinct which will provide a new home for the Materials Science and Engineering Centre. While still at concept design stage, the proposed development is understood to comprise a seven storey structure with a provision for a basement. Brookfield has advised that basement excavations are likely to extend to approximately 5 m below current surface levels. The site has an approximate area of 7,000 m^2. It is understood that the proposed structure is to be situated on the southern portion of the site with the basement under the footprint of the proposed structure only.

The investigation was carried out to obtain information on subsurface conditions across the site as a basis for comments and recommendations on the following geotechnical aspects of the proposed development:

- Site ground conditions, geotechnical model and two interpreted geotechnical sections.
- Basement excavation conditions.
- Excavation retention systems and design parameters.
- Site preparatory earthworks, fill compaction and suitability of site soils for reuse as engineered fill.
- Foundation conditions, suitable footing systems and geotechnical design parameters.
- Advice on earthquake requirements in accordance to AS1170.4-2007.
- Groundwater conditions.
- Soil and groundwater aggressivity to buried structures.

The geotechnical site investigation was completed in conjunction with an environmental site assessment. The environmental assessment is presented in a separate report.

2. Investigation methodology

Fieldwork for the geotechnical investigation was carried out between 13 and 22 July 2015 and comprised the drilling of four deep boreholes (BH01 to BH04), two shallow boreholes (BH05 and BH06) and four Cone Penetration Tests (CPTs) (CPT01 to CPT04). The results of CPT testing are presented in Appendix B.

Figure 1 shows the approximate borehole and CPT locations. Reduced Levels (RL) were interpreted from a client supplied survey drawing and are shown on the Engineering Borehole Logs presented in Appendix A.

The boreholes were drilled using solid flight augers and wash boring techniques to depths ranging between 1.5 m to 45 m.

Standard Penetration Tests (SPT) were carried out at selected depths to assess soil strength and to obtain samples for logging. Two boreholes were completed as standpipe piezometers and the remainder were backfilled with cuttings to the ground surface and plugged with a 200 mm concrete cap.

Borehole drilling was observed by a Coffey Geotechnical Engineer who was present throughout the drilling operations to undertake sampling and testing, record test results and log materials encountered. The Engineering Borehole Logs are presented in Appendix A, together with Coffey soil and rock explanation sheets which describe the terms and symbols used in log preparation.

On completion of fieldwork, selected soil samples were submitted to our NATA accredited laboratory. The results of soil testing are presented in Appendix C.

3. Results of investigation

3.1. Site description

The site is currently occupied by a number of structures, Brookfield has advised that as part of the proposed development, all existing structures will be demolished and a new Material Science Building will be constructed.

The site is generally near level and is situated within a slight depression with changes in elevation of up to 1.5 m in the immediate vicinity. Ground surface levels across the site ranged from approximately 27.5 m AHD and 29.2 m AHD, dipping to the east at 2°.

3.2. Regional geology

The 1:100,000 Geological Series Sheet of Sydney indicates the site is underlain medium to fine grained marine sand and medium to coarse grained sandstone of the Hawkesbury Sandstone geological unit.

3.3. Subsurface conditions

For specific details at each borehole location reference should be made to the attached borehole logs and CPT test results in Appendices A and B. A general description of the encountered subsurface conditions for the site and observed groundwater is discussed below.

In summary, the boreholes encountered a ground profile comprising:

- Asphalt and concrete road surface and sandy fill up to 1.7 m deep. The fill was deepest in the northeast portion of the site; overlying
- Marine sands up to 30.8 m deep. The sands are fine to medium grained and are typically dense to very dense; overlying
- Marine clayey sand. The sands are typically fine to medium grained and are typically medium dense to very dense.

Figures 1 to 3 indicate our investigation locations and inferred subsurface cross sections respectively.

Groundwater was measured within installed standpipes at depths ranging from 5.55 to 5.6 m below ground level, i.e. at approximately 22.77 m to 23.19 m AHD, with an inferred hydraulic gradient trending in a southerly direction.

3.4. Geotechnical model

Using the subsurface information from the geotechnical investigation, the encountered ground conditions may be characterised into the geotechnical units presented in Table 1 below. Interpreted geotechnical sections through the site showing the inferred distribution of geotechnical units along each section are presented in Figures 2 and 3.

Table 1 - Summary of Subsurface Conditions and Inferred Geotechnical Model

Unit	Material	Description	Depth to Top of Unit (m)	Range of Unit Thickness (m)[a)]
1	Fill	Sand and Gravelly SAND, overlain by asphalt or concrete pavements	0.0	0.6 to 1.7
2	Marine Deposits	Sand, fine to medium grained, dense to very dense	0.6 to 1.7	30.8 [b)]
3[b)]		Clayey Sand, fine to medium grained, medium dense to very dense	32.5	Unproven

Notes on Table 1:

a) The depths and unit thicknesses are based on the boreholes and may not represent the maximum or minimum depths and thicknesses across the site.

b) Observed in BH03 only.

4. Discussion and recommendations

4.1. Excavations

4.1.1. Excavatability

We understand that the currently proposed single level basement excavation will be underneath the proposed structure only and will likely extend to approximately 5 m below current surface levels (i.e. approximately 23 m AHD).

Excavation contractors should be provided with the Engineering Borehole Logs and CPT results and be required to make their own assessment of the suitability and productivity of particular excavation plant.

Based on a single level basement excavation, excavations will penetrate through Units 1 and 2. Where basement excavations extend to or below groundwater levels, inflows to excavations are expected. It will be necessary to maintain groundwater levels 0.5 m below bulk excavation levels during construction to provide workable conditions within the excavation. To facilitate excavation and the construction of structural elements below the groundwater table it may be necessary to dewater the site using spear points or drilled dewatering wells dependent upon the chosen retention system and its effectiveness to retain groundwater.

4.1.2. Groundwater conditions

Groundwater was observed at a depth of approximately 5.6 m, i.e. approximately 22.8 m to 23.4 m AHD. Where the proposed excavation extends below groundwater, the basement will need to be designed for tanked conditions. For a tanked basement structure, the basement floor will need to be designed to withstand uplift hydrostatic pressures.

In addition, during periods of rainfall, groundwater levels may rise. To establish design groundwater levels, it may be prudent to record groundwater level fluctuations at the site over an initial three month period, upon completion; the need for subsequent monitoring could be reviewed in consultation with the design team.

Based on Coffey archive information groundwater response in developed areas within the site locality typically varies within a 2 m vertical fluctuation. At this stage, we suggest a potential groundwater rise of 1 m above measured groundwater levels be adopted for design.

Where excavations extend to or below ground level, inflows to excavations are expected. To facilitate excavation and the construction of structural elements below the groundwater table it will be necessary to dewater the site. The method of dewatering will depend upon the chosen retention system and its effectiveness to retain groundwater

4.1.3. Excavation retention

We understand that the proposed development will require excavation up to 5 m below ground level for basements and as such temporary and permanent retention systems are likely to be required. Retention systems that could be considered include:

- Sheet Piled Walls
- Secant Piled Walls
- Diaphragm Walls

Sheet piles may be a feasible retention option to provide temporary support for the basement excavations. However, the effectiveness of sheet piles for controlling groundwater seepage would need to be considered. A cast in-situ concrete wall would be required to provide a permanent retention system. Driving in dense to very dense sands may be difficult and is not recommended for certain methods of installation. Impact driving may be a practicable technique for driving sheet piles in this stratum, subject to noise and vibration considerations. Specialist advice should be sought from a piling contractor with experience in these ground conditions.

Secant piles comprising alternate soft and hard piles may be used to provide temporary support. Close control of pile verticality is critical to achieving interlock of the piles for secant pile walls. Contiguous piled walls may be a suitable retention system where design groundwater levels are below the maximum depth of excavation.

A diaphragm wall may be an appropriate solution to provide permanent groundwater cut off but is generally more costly than the above retaining wall types.

Where excavations extend to or below design groundwater levels, permanent retention of groundwater will be required for the basement. The design should make allowance for a permanent groundwater table and the effects of dewatering. We recommend that the impact of dewatering and the construction inflow rates be assessed for the adopted shoring design.

The use of retaining walls such as sheet pile, CSM or secant pile walls could be considered for the proposed excavation retention systems. Retaining wall analyses will need to consider surcharges, footing loads from adjacent structures, and hydrostatic pressures due to groundwater fluctuations. Preliminary parameters for retaining wall design are presented in Table 2.

Table 2 – Preliminary Parameters for Retaining Wall Design

Unit	Active Earth Pressure Coefficient (Ka)	At Rest Earth Pressure Coefficient (Ko)	Passive Earth Pressure Coefficient (Kp)	Bulk Density γ (kN/m^3)	Effective Cohesion c' (kPa)	Effective Friction Angle Φ' (degrees)	Young's Modulus (MPa)
Unit 1: Fill	0.4	0.5	2.50	20	0	25	10
Unit 2: Sand	0.27	0.5	3.69	21	0	35	60
Unit 3: Clayey Sand	0.3	0.5	3.39	19	0	33	40

4.1.4. Excavation induced ground movements

The potential impact of the proposed construction on adjoining properties will need to be considered during design. Dewatering systems will need to consider potential effects of drawdown on nearby structures, roads and major services. Where adjacent structures are located within the zone of influence of the excavation, the foundation stratum may experience horizontal and vertical movements from excavation induced ground movements and this should be assessed as part of excavation retention design.

We recommend that prior to the commencement of the bulk excavation works dilapidation surveys of the adjacent structures be carried out to provide a baseline for excavation monitoring and management works.

Where sensitive structures or services are situated in close proximity to the proposed development, a relatively stiff shoring with bracing and/or tie-back anchors designed to resist pressures higher than active earth pressures may be required. Conventional grouted anchors in sand typically have low load capacity. There are specialist multi-bonded anchor systems that could be considered to develop higher capacity anchors in sand. The permission of adjacent landowners and authorities would be required to install temporary anchors. Table 3 includes recommended allowable bond stresses for preliminary design of anchors.

Table 3 - Design Parameters for Anchors

Material	Allowable Bond Stress (kPa)
Units 2 and 3	30

The allowable bond stresses in Table 3 are based on anchors with bonded lengths of between 3 m and 7 m. Anchors in sand should be such that their bond length is established outside of the active wedge formed by a line from the toe of the wall rising to the ground surface at 45 degrees to the horizontal. Anchors should be proof loaded to at least 1.4 times their working load.

Staged excavation and installation of internal bracing may be an alternative to external anchoring. We suggest that anchoring requirements be specifically addressed by Coffey during detailed design when details of sensitive structures, adjacent footings and loadings are known.

4.2. Foundations

TTW has advised that CFA piles founded on Unit 2 (dense to very dense sand) will be adopted for the proposed development. Piled footings founded Unit 2 may be designed using the recommended the design parameters in Table 4.

Table 4 - Recommended Geotechnical Design Parameters for CFA piles

Unit	Geotechnical Unit	Elastic Modulus E' (MPa)	Ultimate Skin Friction f_s (kPa)	Ultimate End Bearing f_b (MPa)
2	Dense to Very Dense Sand	60	120[(1)]	7[(1)]

Notes: [(1)] A minimum pile embedment of 8 pile diameters below the basement slab level is required.

In order to adopt the above ultimate geotechnical parameters for CFA pile design (skin friction and end bearing), we emphasise that a minimum embedment in corresponding soil layers and below the proposed basement level must be achieved.

For limit state design, the design ultimate geotechnical pile capacity is derived by applying a geotechnical strength reduction factor (ϕ_g) to the ultimate geotechnical pile capacity assessed using the ultimate shaft resistance and end bearing values shown in Table 4.

In accordance with AS2159-2009, ϕ_g is dependent on an Average Risk Rating (ARR) which takes into account various geotechnical uncertainties, foundation system redundancy, construction supervision, quantity and type of pile testing.

We've conducted a preliminary assessment of ARR and ϕ_g values given the extent of geotechnical investigations performed and findings at this site, based on the following assumptions:

- Low redundancy foundation system
- The design will be carried out by an experienced geotechnical professional using well-established and soundly based methods
- Well established construction processes will be adopted and detailed professional geotechnical supervision will be provided during pile construction
- Performance of the supported structure is not monitored.

Based on our current understanding of the project and the above assumptions, the following preliminary values have been assessed:

- Average Risk Rating = 3.1
- Geotechnical strength reduction factor, ϕ_g, = 0.48 assuming no pile testing is undertaken.

We recommend that you review our assumptions and resulting ϕ_g value. Testing may provide the degree of confidence required to achieve a higher ϕ_g value and more economical design. Coffey will review the final ϕ_g selection at the detailed design stage.

Limit state design also requires assessment of the serviceability performance of the foundation system, including pile group interaction effects. This should be carried out by experienced geotechnical professional using well-established and soundly based methods. The modulus values given in Table 4 can be used, though the accuracy of settlement prediction is dependent on construction methods as well as material stiffness, both of which can involve considerable uncertainty. Settlement predictions can have a large margin for error, and in some cases serviceability pile load testing should be completed when foundation settlement is critical to the structure's performance.

If foundations are to resist uplift, the ultimate shaft adhesion should be further reduced by a factor of 0.7. Uplift piles should also be checked for an inverted cone pullout mechanism.

4.2.1. Raft and piled raft

Piled raft foundations utilise piles for control of settlements with the piles providing most of the stiffness at serviceability loads and the raft providing additional capacity at ultimate loading. A geotechnical assessment for design of such a foundation system therefore needs to consider not only the capacity of the pile elements and the raft elements but their combined capacity and interaction under serviceability loading.

Coffey has specialist skills in the assessment raft and piled raft foundation systems. Typically, we work with the structural engineer to assess the feasibility with preliminary assessments of building loads. If the preliminary assessment indicates savings over conventional piled foundations, we can assist with detailed design, undertaking soil structure interaction analysis to provide bearing moments and shear forces in a raft and pile loads for structural detailing.

4.3. Earthworks

4.3.1. Suitability of existing fill for re-use as engineered fill

Units 1, 2 and 3 observed within the boreholes are assessed to be reusable for engineered fill provided unsuitable and/or deleterious inclusions are removed. Some unsuitable materials should be expected and will require separation prior to reuse.

Further geotechnical assessment, sampling and testing would be required during construction to assess the suitability of particular soils for reuse.

4.3.2. Engineered fill compaction

Where filling is required to form the foundation for floor slabs or pavements, the ground should be prepared by stripping Unit 1 and unsuitable materials, and benching the ground surface so that fill can be placed in near horizontal layers.

Each bench should be proof rolled with 4 passes of smooth single-drum, non-vibratory roller of minimum weight 12 tonnes. An experienced earthworks practitioner should observe the proof rolling to detect soft, wet or heaving zones. Where these zones are encountered the affected area should be improved by appropriate methods, such as:

- Excavation of the affected soil and replacement with Engineered Fill;
- Tyning and moisture conditioning of the *in situ* material and compaction to achieve the criteria given below for Engineered Fill.

Fill embankments supporting structures or pavements should be compacted to at least 98% Standard Maximum Dry Density (SMDD) or 70% maximum density index for sandy soils. Engineered fill should be spread in layers not 300 mm loose thickness and moisture conditioned to Standard Optimum Moisture Content (SOMC) ±2% then compacted without delay with appropriate compaction plant.

Fill within 300 mm depth of floor slab/pavement subgrade level should be compacted to at least 100% SMDD or 75% maximum dry density for sandy soils.

Preparation for, and placement of Engineered Fill should be carried out under Level 1 Geotechnical Inspection and Testing as defined in Section 8.2 of *AS 3798 – 2007 Guidelines on earthworks for commercial and residential developments*

4.4. Soil aggressivity

The results of Soil Aggressivity testing were assessed in accordance with Australian Standard AS2159-2009 Piling – “Design and Installation”. Chemical test results indicated non-aggressive ground conditions to buried steel and concrete structural elements.

4.5. Earthquake design

We recommend that the site be classified as Class D_e in accordance with the site sub-soil classes defined in AS1170.4-2007 Part 4, Earthquake Actions in Australia. A hazard factor of 0.08 is recommended.

4.6. Recommendations for further investigation and assessment

We recommend:

- Continuous monitoring of groundwater level over an initial three month period to provide a basis for assessment of design groundwater level for the basement floor slab;
- Upon completion of the monitoring period it may be prudent to carry out a groundwater inflow and drawdown assessments for the proposed basement excavation to assess potential impacts of dewatering.
- Dilapidation surveys be carried out on adjacent structures and services prior to the commencement of any work, if settlement or vibration sensitive structures or buried services are located adjacent to the proposed excavations;
- Coffey recommends that the site geotechnical conditions are reviewed once the proposed basement details are clarified. We have expertise in soil - structure interaction numerical modelling that can be used to optimise basement excavation design, including excavation support concept design, retaining all/support analysis and surrounding ground deformation analysis. We would be happy to assist with such an assessment in collaboration with the structural design team for the optimisation of excavation design, if required.
- The limit state design geotechnical reduction factor (Φg) be reviewed once the pile designer has evaluated the Average Risk Rating in accordance with AS2159-2009; and
- Assessment by an experienced geotechnical engineer / engineering geologist should be carried out during the construction phase of the project to confirm the suitability of fill placement and construction methodology.

5. Closure

Subsurface conditions can be complex and may vary over relatively short distances – and over time. The inferred geotechnical model and recommendations in this report are based on limited subsurface investigations at discrete locations. The engineering logs describe subsurface conditions only at the investigation locations.

Further investigations may be required to support detailed design if there are scope limitations or changes to the nature of the project. We can assist with detailed design and/or to review designs, and verify that the conditions exposed are consistent with design assumptions during construction.

The attached document entitled “Important information about your Coffey report” forms an integral part of this report and presents additional information about its uses and limitations.

Important information about your **Coffey** Report

As a client of Coffey you should know that site subsurface conditions cause more construction problems than any other factor. These notes have been prepared by Coffey to help you interpret and understand the limitations of your report.

Your report is based on project specific criteria

Your report has been developed on the basis of your unique project specific requirements as understood by Coffey and applies only to the site investigated. Project criteria typically include the general nature of the project; its size and configuration; the location of any structures on the site; other site improvements; the presence of underground utilities; and the additional risk imposed by scope-of-service limitations imposed by the client. Your report should not be used if there are any changes to the project without first asking Coffey to assess how factors that changed subsequent to the date of the report affect the report's recommendations. Coffey cannot accept responsibility for problems that may occur due to changed factors if they are not consulted.

Subsurface conditions can change

Subsurface conditions are created by natural processes and the activity of man. For example, water levels can vary with time, fill may be placed on a site and pollutants may migrate with time. Because a report is based on conditions which existed at the time of subsurface exploration, decisions should not be based on a report whose adequacy may have been affected by time. Consult Coffey to be advised how time may have impacted on the project.

Interpretation of factual data

Site assessment identifies actual subsurface conditions only at those points where samples are taken and when they are taken. Data derived from literature and external data source review, sampling and subsequent laboratory testing are interpreted by geologists, engineers or scientists to provide an opinion about overall site conditions, their likely impact on the proposed development and recommended actions. Actual conditions may differ from those inferred to exist, because no professional, no matter how qualified, can reveal what is hidden by earth, rock and time. The actual interface between materials may be far more gradual or abrupt than assumed based on the facts obtained. Nothing can be done to change the actual site conditions which exist, but steps can be taken to reduce the impact of unexpected conditions. For this reason, owners should retain the services of Coffey through the development stage, to identify variances, conduct additional tests if required, and recommend solutions to problems encountered on site.

Your report will only give preliminary recommendations

Your report is based on the assumption that the site conditions as revealed through selective point sampling are indicative of actual conditions throughout an area. This assumption cannot be substantiated until project implementation has commenced and therefore your report recommendations can only be regarded as preliminary. Only Coffey, who prepared the report, is fully familiar with the background information needed to assess whether or not the report's recommendations are valid and whether or not changes should be considered as the project develops. If another party undertakes the implementation of the recommendations of this report there is a risk that the report will be misinterpreted and Coffey cannot be held responsible for such misinterpretation.

Your report is prepared for specific purposes and persons

To avoid misuse of the information contained in your report it is recommended that you confer with Coffey before passing your report on to another party who may not be familiar with the background and the purpose of the report. Your report should not be applied to any project other than that originally specified at the time the report was issued.

Important information about your **Coffey** Report

Interpretation by other design professionals

Costly problems can occur when other design professionals develop their plans based on misinterpretations of a report. To help avoid misinterpretations, retain Coffey to work with other project design professionals who are affected by the report. Have Coffey explain the report implications to design professionals affected by them and then review plans and specifications produced to see how they incorporate the report findings.

Data should not be separated from the report*

The report as a whole presents the findings of the site assessment and the report should not be copied in part or altered in any way. Logs, figures, drawings, etc. are customarily included in our reports and are developed by scientists, engineers or geologists based on their interpretation of field logs (assembled by field personnel) and laboratory evaluation of field samples. These logs etc. should not under any circumstances be redrawn for inclusion in other documents or separated from the report in any way.

Geoenvironmental concerns are not at issue

Your report is not likely to relate any findings, conclusions, or recommendations about the potential for hazardous materials existing at the site unless specifically required to do so by the client. Specialist equipment, techniques, and personnel are used to perform a geoenvironmental assessment. Contamination can create major health, safety and environmental risks. If you have no information about the potential for your site to be contaminated or create an environmental hazard, you are advised to contact Coffey for information relating to geoenvironmental issues.

Rely on Coffey for additional assistance

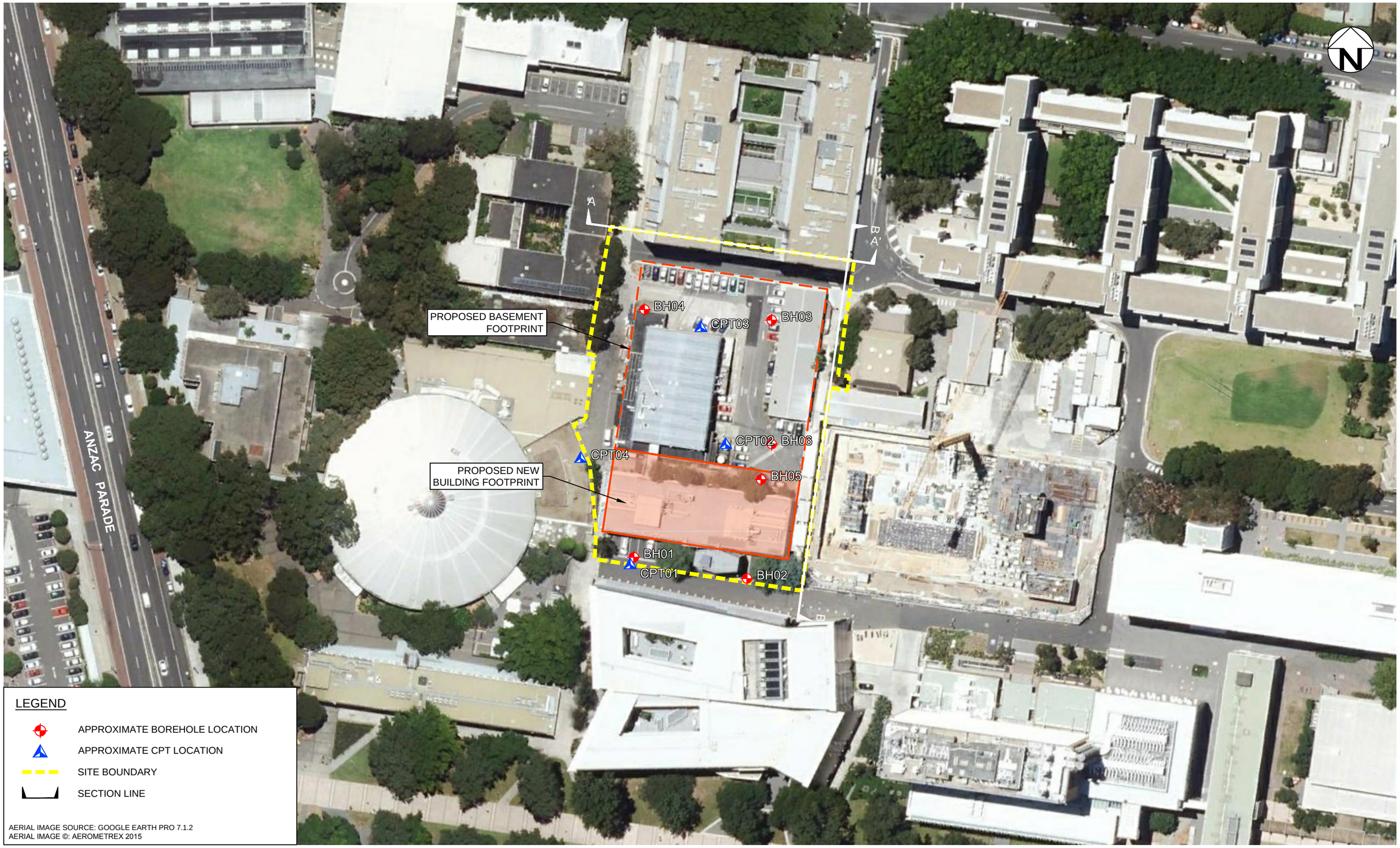
Coffey is familiar with a variety of techniques and approaches that can be used to help reduce risks for all parties to a project, from design to construction. It is common that not all approaches will be necessarily dealt with in your site assessment report due to concepts proposed at that time. As the project progresses through design towards construction,
speak with Coffey to develop alternative approaches to problems that may be of genuine benefit both in time and cost.

Responsibility

Reporting relies on interpretation of factual information based on judgement and opinion and has a level of uncertainty attached to it, which is far less exact than the design disciplines. This has often resulted in claims being lodged against consultants, which are unfounded. To help prevent this problem, a number of clauses have been developed for use in contracts, reports and other documents. Responsibility clauses do not transfer appropriate liabilities from Coffey to other parties but are included to identify where Coffey's responsibilities begin and end. Their use is intended to help all parties involved to recognise their individual responsibilities. Read all documents from Coffey closely and do not hesitate to ask any questions you may have.

* For further information on this aspect reference should be made to "Guidelines for the Provision of Geotechnical information in Construction Contracts" published by the Institution of Engineers Australia, National headquarters, Canberra, 1987.

Figures



LEGEND

- APPROXIMATE BOREHOLE LOCATION
- APPROXIMATE CPT LOCATION
- SITE BOUNDARY
- SECTION LINE

AERIAL IMAGE SOURCE: GOOGLE EARTH PRO 7.1.2
AERIAL IMAGE ©: AEROMETREX 2015

revision	no.	description	drawn	approved	date
	A	ORIGINAL ISSUE			

20 0 20 40 60 80 100

Scale (metres) 1:2000

drawn	BC / AW
approved	BC
date	13 / 08 / 15
scale	AS SHOWN
original size	A3

coffey

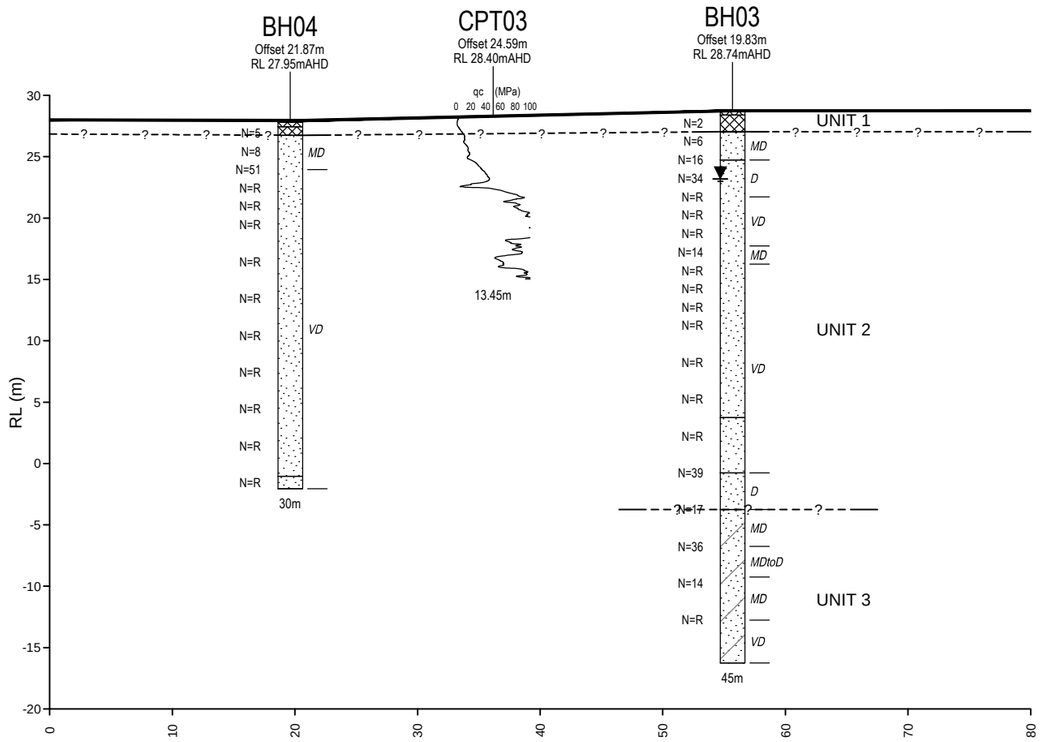
client: BROOKFIELD MULTIPLEX AUSTRALASIA

project: MATERIAL SCIENCE BUILDING
UNSW, KENSINGTON, NSW

title: BOREHOLE LOCATION PLAN

project no: GEOTLCOV24080AS-AE | figure no: FIGURE 1 | rev: A

PLOT DATE: 13/08/2015 11:02:05 AM DWG FILE: F:\GEOTECHNICS\1.PROJECTS\GEOTLCOV24\GEOTLCOV24080AS UNSW MATERIAL SCIENCE BUILDING\GCAD\GEOTLCOV24080AS-AE.DWG



SECTION A-A'

LEGEND

- FILL
- SAND
- CLAYEY SAND
- WATER LEVEL
- N*=17 STANDARD PENETRATION TEST RESULT
- EXISTING GROUND SURFACE
- INFERRED GEOLOGICAL BOUNDARY

revision	no.	description	drawn	approved	date
	A	ORIGINAL ISSUE			

Horizontal Scale (metres) 1:500

Vertical Scale (metres) 1:500

drawn	BC / AW
approved	BC
date	13 / 08 / 15
scale	AS SHOWN
original size	A3

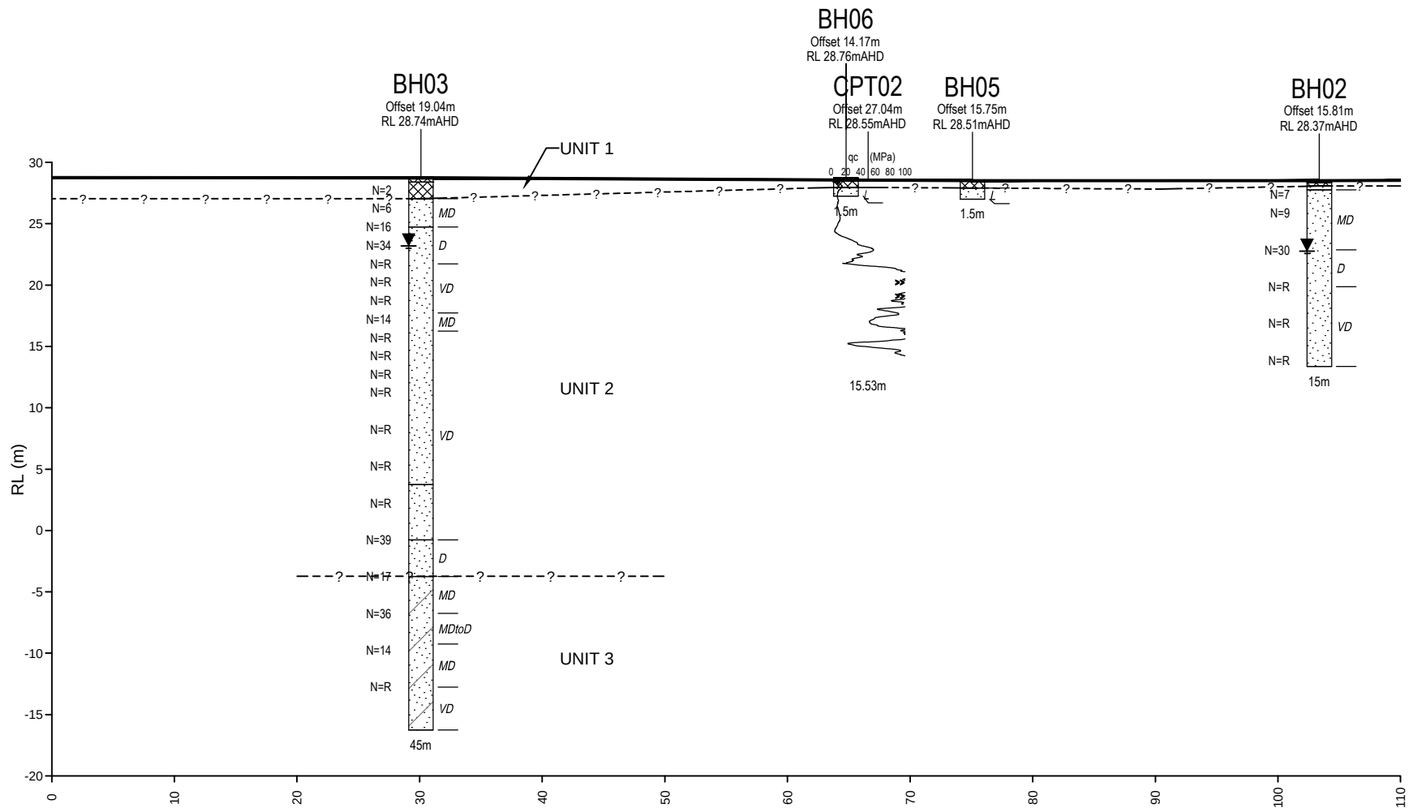
coffey

client: BROOKFIELD MULTIPLEX AUSTRALASIA

project: MATERIAL SCIENCE BUILDING
UNSW, KENSINGTON, NSW

title: SECTION A-A'

project no: GEOTLCOV24080AS-AE | figure no: FIGURE 2 | rev: A



SECTION B-B'

LEGEND

- FILL
- SAND
- CLAYEY SAND
- WATER LEVEL
- N*=17 — STANDARD PENETRATION TEST RESULT
- EXISTING GROUND SURFACE
- – –?– – INFERRED GEOLOGICAL BOUNDARY

revision	no.	description	drawn	approved	date
	A	ORIGINAL ISSUE			

5 0 5 15 25
Horizontal Scale (metres) 1:500

5 0 5 15 25
Vertical Scale (metres) 1:500

drawn	BC / AW
approved	BC
date	13 / 08 / 15
scale	AS SHOWN
original size	A3

coffey

client: BROOKFIELD MULTIPLEX AUSTRALASIA

project: MATERIAL SCIENCE BUILDING
UNSW, KENSINGTON, NSW

title: SECTION B-B'

project no: GEOTLCOV24080AS-AE | figure no: FIGURE 3 | rev: A

Appendix A - Engineering Borehole Logs

coffey

Engineering Log - Borehole

Borehole ID.	**BH01**
sheet:	1 of 4
project no.	**GEOTLCOV24080AS**
client:	**Brookfield Multiplex**
date started:	**22 Jul 2015**
principal:	
date completed:	**22 Jul 2015**
project:	**UNSW Material Science Building**
logged by:	**BF**
location:	**Kensington, NSW**
checked by:	**AC**

position: E: 336146; N: 6245672 (MGA94 Zone 56) surface elevation: 28.15 m (AHD) angle from horizontal: 90°

drill model: Drillcat, Track mounted hole diameter : 100 mm

drilling information | **material substance**

method & support	penetration 1 2 3	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description (SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components)	moisture condition	consistency / relative density	hand penetrometer (kPa) 100 200 300 400	structure and additional observations
AD CASING		Not Observed	E	28				**ROAD SURFACE: ASPHALT**: 0.04 m.	M			**ROAD SURFACE**
			E					**FILL: Gravelly SAND**: fine to coarse grained, grey, fine to coarse grained, sub-rounded to sub-angular gravel, with some silt.				**FILL** PID=0.1ppm
												PID=0.0ppm
			E					**FILL: SAND**: fine to medium grained, grey/brown, trace of fine to medium grained, sub-angular gravel.				
			SPT 2, 2, 3 N*=5	27	1.0		SP	**SAND**: fine to medium grained, grey/brown.		MD		**MARINE DEPOSITS** PID=0.1ppm
				26	2.0							
			SPT 3, 4, 5 N*=9	25	3.0							
W				24	4.0					D		
				23	5.0							
			SPT 5, 7, 12 N*=19	22	6.0							
				21	7.0							

CDF_0_9_04BB.GLB Log COF BOREHOLE: NON CORED GEOTLCOV24080AS.GPJ <<DrawingFile>> 06/08/2015 15:41

method
- AD auger drilling*
- AS auger screwing*
- HA hand auger
- W washbore

* bit shown by suffix
- e.g. AD/T
- B blank bit
- T TC bit
- V V bit

support
- M mud
- C casing
- N nil

penetration
1 2 3 — no resistance ranging to refusal

water
- 10-Oct-12 water level on date shown
- water inflow
- water outflow

samples & field tests
- B bulk disturbed sample
- D disturbed sample
- E environmental sample
- SS split spoon sample
- U## undisturbed sample ##mm diameter
- HP hand penetrometer (kPa)
- N standard penetration test (SPT)
- N* SPT - sample recovered
- Nc SPT with solid cone
- VS vane shear; peak/remouded (kPa)
- R refusal
- HB hammer bouncing

classification symbol & soil description based on Unified Classification System

moisture
- D dry
- M moist
- W wet
- Wp plastic limit
- Wl liquid limit

consistency / relative density

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

coffey

Engineering Log - Borehole

Borehole ID.	**BH01**
sheet:	2 of 4
project no.	**GEOTLCOV24080AS**
client:	**Brookfield Multiplex**
date started:	**22 Jul 2015**
principal:	
date completed:	**22 Jul 2015**
project:	**UNSW Material Science Building**
logged by:	**BF**
location:	**Kensington, NSW**
checked by:	**AC**

position: E: 336146; N: 6245672 (MGA94 Zone 56) surface elevation: 28.15 m (AHD) angle from horizontal: 90°

drill model: Drillcat, Track mounted hole diameter : 100 mm

drilling information | **material substance**

method & support	penetration 1 2 3	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description (SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components)	moisture condition	consistency / relative density	hand penetrometer (kPa) 100 200 300 400	structure and additional observations
W		Not Observed	SPT 20, 35/120mm N*=R	20			SP	**SAND**: fine to medium grained, grey/brown. *(continued)*	M	D		**MARINE DEPOSITS**
				19	9.0					VD		
			SPT 8, 26, 34 N*=60	18	10.0							
				17	11.0							
				16	12.0							
				15	13.0							
			SPT 30, 35/60mm N*=R	14	14.0							
				13	15.0							

CDF_0_9_04BB.GLB Log COF BOREHOLE: NON CORED GEOTLCOV24080AS.GPJ <<DrawingFile>> 06/08/2015 15:41

method
- AD auger drilling*
- AS auger screwing*
- HA hand auger
- W washbore

* bit shown by suffix
e.g. AD/T
- B blank bit
- T TC bit
- V V bit

support
- M mud
- C casing
- N nil

penetration
1 2 3 — no resistance ranging to refusal

water
- 10-Oct-12 water level on date shown
- water inflow
- water outflow

samples & field tests
- B bulk disturbed sample
- D disturbed sample
- E environmental sample
- SS split spoon sample
- U## undisturbed sample ##mm diameter
- HP hand penetrometer (kPa)
- N standard penetration test (SPT)
- N* SPT - sample recovered
- Nc SPT with solid cone
- VS vane shear; peak/remouded (kPa)
- R refusal
- HB hammer bouncing

classification symbol & soil description based on Unified Classification System

moisture
- D dry
- M moist
- W wet
- Wp plastic limit
- Wl liquid limit

consistency / relative density

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

coffey

Engineering Log - Borehole

Borehole ID.	**BH01**
sheet:	3 of 4
project no.	**GEOTLCOV24080AS**
client:	**Brookfield Multiplex**
date started:	**22 Jul 2015**
principal:	
date completed:	**22 Jul 2015**
project:	**UNSW Material Science Building**
logged by:	**BF**
location:	**Kensington, NSW**
checked by:	**AC**

position: E: 336146; N: 6245672 (MGA94 Zone 56) surface elevation: 28.15 m (AHD) angle from horizontal: 90°

drill model: Drillcat, Track mounted hole diameter : 100 mm

drilling information | **material substance**

method & support	penetration 1 2 3	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description (SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components)	moisture condition	consistency / relative density	hand penetrometer (kPa) 100 200 300 400	structure and additional observations
W		Not Observed	SPT 40/100mm N*=R	12			SP	**SAND**: fine to medium grained, grey/brown. *(continued)*	M	VD		**MARINE DEPOSITS**
				11	17.0							
				10	18.0							
			SPT 20, 30, 35/110mm N*=R	9	19.0							
				8	20.0							
				7	21.0							
				6	22.0							
			SPT 25, 35/70mm N*=R	5	23.0							

CDF_0_9_04BB.GLB Log COF BOREHOLE: NON CORED GEOTLCOV24080AS.GPJ <<DrawingFile>> 06/08/2015 15:41

method
- AD auger drilling*
- AS auger screwing*
- HA hand auger
- W washbore

* bit shown by suffix
e.g. AD/T
- B blank bit
- T TC bit
- V V bit

support
- M mud
- C casing
- N nil

penetration
1 2 3 — no resistance ranging to refusal

water
- 10-Oct-12 water level on date shown
- water inflow
- water outflow

samples & field tests
- B bulk disturbed sample
- D disturbed sample
- E environmental sample
- SS split spoon sample
- U## undisturbed sample ##mm diameter
- HP hand penetrometer (kPa)
- N standard penetration test (SPT)
- N* SPT - sample recovered
- Nc SPT with solid cone
- VS vane shear; peak/remouded (kPa)
- R refusal
- HB hammer bouncing

classification symbol & soil description based on Unified Classification System

moisture
- D dry
- M moist
- W wet
- Wp plastic limit
- Wl liquid limit

consistency / relative density

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

coffey

Engineering Log - Borehole

Borehole ID.	**BH01**
sheet:	4 of 4
project no.	**GEOTLCOV24080AS**
client:	**Brookfield Multiplex**
date started:	**22 Jul 2015**
principal:	
date completed:	**22 Jul 2015**
project:	**UNSW Material Science Building**
logged by:	**BF**
location:	**Kensington, NSW**
checked by:	**AC**

position: E: 336146; N: 6245672 (MGA94 Zone 56) surface elevation: 28.15 m (AHD) angle from horizontal: 90°

drill model: Drillcat, Track mounted hole diameter : 100 mm

drilling information | **material substance**

method & support	penetration 1 2 3	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description **SOIL TYPE**: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	hand penetrometer (kPa) 100 200 300 400	structure and additional observations
W		Not Observed		4			SP	**SAND**: fine to medium grained, grey/brown. *(continued)*	M	VD		**MARINE DEPOSITS**
				3	25.0							
				2	26.0							
			SPT 25, 24, 26 N*=50	1	27.0		SP	**SAND**: fine to medium grained, brown, with some medium plasticity clay.				
				0	28.0							
			SPT 24, 35/80mm N*=R	-1	29.0							
				-2	30.0			Borehole BH01 terminated at 30.0 m Target depth				
				-3	31.0							

CDF_0_9_04BB.GLB Log COF BOREHOLE: NON CORED GEOTLCOV24080AS.GPJ <<DrawingFile>> 06/08/2015 15:41

method
- AD auger drilling*
- AS auger screwing*
- HA hand auger
- W washbore

* bit shown by suffix
e.g. AD/T
- B blank bit
- T TC bit
- V V bit

support
- M mud
- C casing
- N nil

penetration
1 2 3 — no resistance ranging to refusal

water
- 10-Oct-12 water level on date shown
- water inflow
- water outflow

samples & field tests
- B bulk disturbed sample
- D disturbed sample
- E environmental sample
- SS split spoon sample
- U## undisturbed sample ##mm diameter
- HP hand penetrometer (kPa)
- N standard penetration test (SPT)
- N* SPT - sample recovered
- Nc SPT with solid cone
- VS vane shear; peak/remouded (kPa)
- R refusal
- HB hammer bouncing

classification symbol & soil description
based on Unified Classification System

moisture
- D dry
- M moist
- W wet
- Wp plastic limit
- Wl liquid limit

consistency / relative density

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

coffey

Engineering Log - Borehole

Borehole ID.	**BH02**
sheet:	1 of 2
project no.	**GEOTLCOV24080AS**
client:	**Brookfield Multiplex**
date started:	**21 Jul 2015**
principal:	
date completed:	**21 Jul 2015**
project:	**UNSW Material Science Building**
logged by:	**BF**
location:	**Kensington, NSW**
checked by:	**AC**

position: E: 336178; N: 6245666 (MGA94 Zone 56) surface elevation: 28.37 m (AHD) angle from horizontal: 90°

drill model: Drillcat, Track mounted hole diameter : 100 mm

drilling information | **material substance**

method & support	penetration 1 2 3	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description (SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components)	moisture condition	consistency / relative density	hand penetrometer (kPa) 100 200 300 400	structure and additional observations
AD CASING			E					**ROAD SURFACE: ASPHALT**	M			**ROAD SURFACE**
			E	28				**FILL: Gravelly SAND**: fine to medium grained, dark grey, fine to coarse grained, sub-rounded to sub-angular gravel, with some silt.				**FILL** PID=0.1ppm
												PID=0.2ppm
			E				SP	**FILL: SAND**: fine to medium grained, grey/brown.		MD		**MARINE DEPOSITS**
			E SPT 3, 3, 4 N*=7	27	1.0			**SAND**: fine to medium grained, grey/brown.				PID=0.0ppm
				26	2.0							
			SPT 3, 4, 5 N*=9		3.0							
		Not Observed		25								
				24	4.0							
W		05/08/15 ▽	SPT 9, 14, 16 N*=30	23	5.0					D		
				22	6.0							
				21	7.0							

CDF_0_9_04BB.GLB Log COF BOREHOLE: NON CORED GEOTLCOV24080AS.GPJ <<DrawingFile>> 06/08/2015 15:41

method
- AD auger drilling*
- AS auger screwing*
- HA hand auger
- W washbore
- * bit shown by suffix
- e.g. AD/T
- B blank bit
- T TC bit
- V V bit

support
- M mud
- C casing
- N nil

penetration
1 2 3 — no resistance ranging to refusal

water
- 10-Oct-12 water level on date shown
- water inflow
- water outflow

samples & field tests
- B bulk disturbed sample
- D disturbed sample
- E environmental sample
- SS split spoon sample
- U## undisturbed sample ##mm diameter
- HP hand penetrometer (kPa)
- N standard penetration test (SPT)
- N* SPT - sample recovered
- Nc SPT with solid cone
- VS vane shear; peak/remouded (kPa)
- R refusal
- HB hammer bouncing

classification symbol & soil description based on Unified Classification System

moisture
- D dry
- M moist
- W wet
- Wp plastic limit
- Wl liquid limit

consistency / relative density

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

coffey

Engineering Log - Borehole

Borehole ID.	**BH02**
sheet:	2 of 2
project no.	**GEOTLCOV24080AS**
client:	**Brookfield Multiplex**
date started:	**21 Jul 2015**
principal:	
date completed:	**21 Jul 2015**
project:	**UNSW Material Science Building**
logged by:	**BF**
location:	**Kensington, NSW**
checked by:	**AC**

position: E: 336178; N: 6245666 (MGA94 Zone 56) surface elevation: 28.37 m (AHD) angle from horizontal: 90°

drill model: Drillcat, Track mounted hole diameter : 100 mm

drilling information | **material substance**

method & support	penetration 1 2 3	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description **SOIL TYPE**: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	hand penetrometer (kPa) 100 200 300 400	structure and additional observations
W		Not Observed	SPT 30, 35/70mm N*=R	20			SP	**SAND**: fine to medium grained, grey/brown. *(continued)*	M	D		**MARINE DEPOSITS**
				19	9.0					VD		
				18	10.0							
			SPT 18, 35, 35/100mm N*=R	17	11.0							
				16	12.0							
				15	13.0							
			SPT 30, 35/60mm N*=R	14	14.0							
				13	15.0			Borehole BH02 terminated at 15.0 m Target depth				

CDF_0_9_04BB.GLB Log COF BOREHOLE: NON CORED GEOTLCOV24080AS.GPJ <<DrawingFile>> 06/08/2015 15:41

method
- AD auger drilling*
- AS auger screwing*
- HA hand auger
- W washbore

* bit shown by suffix
e.g. AD/T
- B blank bit
- T TC bit
- V V bit

support
- M mud
- C casing
- N nil

penetration
1 2 3 — no resistance ranging to refusal

water
- 10-Oct-12 water level on date shown
- water inflow
- water outflow

samples & field tests
- B bulk disturbed sample
- D disturbed sample
- E environmental sample
- SS split spoon sample
- U## undisturbed sample ##mm diameter
- HP hand penetrometer (kPa)
- N standard penetration test (SPT)
- N* SPT - sample recovered
- Nc SPT with solid cone
- VS vane shear; peak/remouded (kPa)
- R refusal
- HB hammer bouncing

classification symbol & soil description
based on Unified Classification System

moisture
- D dry
- M moist
- W wet
- Wp plastic limit
- Wl liquid limit

consistency / relative density

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

coffey

Engineering Log - Borehole

Borehole ID.	**BH03**
sheet:	1 of 6
project no.	**GEOTLCOV24080AS**
client:	**Brookfield Multiplex**
date started:	**13 Jul 2015**
principal:	
date completed:	**16 Jul 2015**
project:	**UNSW Material Science Building**
logged by:	**BF**
location:	**Kensington, NSW**
checked by:	**AC**

position: E: 336185; N: 6245739 (MGA94 Zone 56) surface elevation: 28.74 m (AHD) angle from horizontal: 90°

drill model: Drillcat, Track mounted hole diameter : 100 mm

drilling information | **material substance**

method & support	penetration 1 2 3	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description (SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components)	moisture condition	consistency / relative density	hand penetrometer (kPa) 100 200 300 400	structure and additional observations
AD			E					**ROAD SURFACE: ASPHALT**: 0.05 m.	M			**ROAD SURFACE**
			E					**FILL: Gravelly SAND**: medium to coarse grained, grey, fine to coarse grained, sub-angular to angular gravel.				**FILL** PID=0.3ppm
				28				**FILL: SAND**: medium to coarse grained, grey, trace of fine to medium grained, sub-angular gravel.				PID=0.3ppm
			E SPT 1, 1, 1 N*=2		1.0							PID=0.3ppm
				27			SP	**SAND**: medium to coarse grained, orange-brown/grey.		MD		**MARINE DEPOSITS**
			E SPT 3, 3, 3 N*=6	26	2.0							PID=0.8ppm
				25	3.0							
W		Not Observed 05/08/15	SPT 4, 7, 9 N*=16		4.0		SP	**SAND**: fine to medium grained, grey/brown.		D		
				24	5.0							
			SPT 11, 16, 18 N*=34	23	6.0							
				22								
			SPT 35/100mm N*=R		7.0					VD		
				21								

CDF_0_9_04BB.GLB Log COF BOREHOLE: NON CORED GEOTLCOV24080AS.GPJ <<DrawingFile>> 06/08/2015 15:42

method
- AD auger drilling*
- AS auger screwing*
- HA hand auger
- W washbore

* bit shown by suffix
- e.g. AD/T
- B blank bit
- T TC bit
- V V bit

support
- M mud
- C casing
- N nil

penetration
1 2 3 — no resistance ranging to refusal

water
- 10-Oct-12 water level on date shown
- water inflow
- water outflow

samples & field tests
- B bulk disturbed sample
- D disturbed sample
- E environmental sample
- SS split spoon sample
- U## undisturbed sample ##mm diameter
- HP hand penetrometer (kPa)
- N standard penetration test (SPT)
- N* SPT - sample recovered
- Nc SPT with solid cone
- VS vane shear; peak/remoulded (kPa)
- R refusal
- HB hammer bouncing

classification symbol & soil description based on Unified Classification System

moisture
- D dry
- M moist
- W wet
- Wp plastic limit
- Wl liquid limit

consistency / relative density

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

coffey

Engineering Log - Borehole

Borehole ID.	**BH03**
sheet:	2 of 6
project no.	**GEOTLCOV24080AS**
client:	**Brookfield Multiplex**
date started:	**13 Jul 2015**
principal:	
date completed:	**16 Jul 2015**
project:	**UNSW Material Science Building**
logged by:	**BF**
location:	**Kensington, NSW**
checked by:	**AC**

position: E: 336185; N: 6245739 (MGA94 Zone 56) surface elevation: 28.74 m (AHD) angle from horizontal: 90°

drill model: Drillcat, Track mounted hole diameter : 100 mm

drilling information | **material substance**

method & support	penetration 1 2 3	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description (SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components)	moisture condition	consistency / relative density	hand penetrometer (kPa) 100 200 300 400	structure and additional observations
W		Not Observed	SPT 40/120mm N*=R	20	9.0		SP	**SAND**: fine to medium grained, grey/brown. *(continued)*	M	VD		**MARINE DEPOSITS**
			SPT 40, 40/100mm N*=R	19	10.0							
			SPT 6, 6, 8 N=14	18	11.0					MD		
			SPT 35, 35/100mm N=R	17	12.0					VD		
			SPT 35, 30/70mm N=R	16	13.0							
				15	14.0							
				14	15.0							
				13								

CDF_0_9_04BB.GLB Log COF BOREHOLE: NON CORED GEOTLCOV24080AS.GPJ <<DrawingFile>> 06/08/2015 15:42

method
- AD auger drilling*
- AS auger screwing*
- HA hand auger
- W washbore

* bit shown by suffix
e.g. AD/T
- B blank bit
- T TC bit
- V V bit

support
- M mud
- C casing
- N nil

penetration
1 2 3 — no resistance ranging to refusal

water
- 10-Oct-12 water level on date shown
- water inflow
- water outflow

samples & field tests
- B bulk disturbed sample
- D disturbed sample
- E environmental sample
- SS split spoon sample
- U## undisturbed sample ##mm diameter
- HP hand penetrometer (kPa)
- N standard penetration test (SPT)
- N* SPT - sample recovered
- Nc SPT with solid cone
- VS vane shear; peak/remouded (kPa)
- R refusal
- HB hammer bouncing

classification symbol & soil description based on Unified Classification System

moisture
- D dry
- M moist
- W wet
- Wp plastic limit
- Wl liquid limit

consistency / relative density

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

coffey

Engineering Log - Borehole

Borehole ID.	**BH03**
sheet:	3 of 6
project no.	**GEOTLCOV24080AS**
client:	**Brookfield Multiplex**
date started:	**13 Jul 2015**
principal:	
date completed:	**16 Jul 2015**
project:	**UNSW Material Science Building**
logged by:	**BF**
location:	**Kensington, NSW**
checked by:	**AC**

position: E: 336185; N: 6245739 (MGA94 Zone 56) surface elevation: 28.74 m (AHD) angle from horizontal: 90°

drill model: Drillcat, Track mounted hole diameter : 100 mm

drilling information | **material substance**

method & support	penetration 1 2 3	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description **SOIL TYPE**: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	hand penetrometer (kPa) 100 200 300 400	structure and additional observations
W		Not Observed	SPT 20, 30/70mm N*=R	12	17.0		SP	**SAND**: fine to medium grained, grey/brown. *(continued)*	M	VD		**MARINE DEPOSITS**
			SPT 35, /120mm N*=R	11	18.0							
				10	19.0							
				9	20.0							
			SPT 40/100mm N=R	8	21.0							
				7	22.0							
				6	23.0							
			SPT 35/130mm N*=R	5								

CDF_0_9_04BB.GLB Log COF BOREHOLE: NON CORED GEOTLCOV24080AS.GPJ <<DrawingFile>> 06/08/2015 15:42

method
- AD auger drilling*
- AS auger screwing*
- HA hand auger
- W washbore

* bit shown by suffix
e.g. AD/T
- B blank bit
- T TC bit
- V V bit

support
- M mud
- C casing
- N nil

penetration
1 2 3 — no resistance ranging to refusal

water
- 10-Oct-12 water level on date shown
- water inflow
- water outflow

samples & field tests
- B bulk disturbed sample
- D disturbed sample
- E environmental sample
- SS split spoon sample
- U## undisturbed sample ##mm diameter
- HP hand penetrometer (kPa)
- N standard penetration test (SPT)
- N* SPT - sample recovered
- Nc SPT with solid cone
- VS vane shear; peak/remouded (kPa)
- R refusal
- HB hammer bouncing

classification symbol & soil description
based on Unified Classification System

moisture
- D dry
- M moist
- W wet
- Wp plastic limit
- Wl liquid limit

consistency / relative density

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

coffey

Engineering Log - Borehole

Borehole ID.	**BH03**
sheet:	4 of 6
project no.	**GEOTLCOV24080AS**
client:	**Brookfield Multiplex**
date started:	**13 Jul 2015**
principal:	
date completed:	**16 Jul 2015**
project:	**UNSW Material Science Building**
logged by:	**BF**
location:	**Kensington, NSW**
checked by:	**AC**

position: E: 336185; N: 6245739 (MGA94 Zone 56) surface elevation: 28.74 m (AHD) angle from horizontal: 90°

drill model: Drillcat, Track mounted hole diameter : 100 mm

drilling information | **material substance**

method & support	penetration 1 2 3	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description **SOIL TYPE**: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	hand penetrometer (kPa) 100 200 300 400	structure and additional observations
W		Not Observed		4	25.0		SP	**SAND**: fine to medium grained, grey/brown. *(continued)*	M	VD		**MARINE DEPOSITS**
				3			SP	**SAND**: fine to medium grained, grey/brown, with some clay lenses.				
			SPT 40/120mm N=R	2	26.0							
				1	27.0							
				0	28.0							
			SPT 11, 15, 24 N*=39	-1	29.0		SP	**SAND**: fine to medium grained, orange-brown/grey, with some medium plasticity clay.		D		
				-2	30.0							
				-3	31.0							

CDF_0_9_04BB.GLB Log COF BOREHOLE: NON CORED GEOTLCOV24080AS.GPJ <<DrawingFile>> 06/08/2015 15:42

method
- AD auger drilling*
- AS auger screwing*
- HA hand auger
- W washbore

* bit shown by suffix
e.g. AD/T
- B blank bit
- T TC bit
- V V bit

support
- M mud
- C casing
- N nil

penetration
1 2 3 — no resistance ranging to refusal

water
- 10-Oct-12 water level on date shown
- water inflow
- water outflow

samples & field tests
- B bulk disturbed sample
- D disturbed sample
- E environmental sample
- SS split spoon sample
- U## undisturbed sample ##mm diameter
- HP hand penetrometer (kPa)
- N standard penetration test (SPT)
- N* SPT - sample recovered
- Nc SPT with solid cone
- VS vane shear; peak/remouded (kPa)
- R refusal
- HB hammer bouncing

classification symbol & soil description
based on Unified Classification System

moisture
- D dry
- M moist
- W wet
- Wp plastic limit
- Wl liquid limit

consistency / relative density

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

coffey

Engineering Log - Borehole

Borehole ID.	**BH03**
sheet:	5 of 6
project no.	**GEOTLCOV24080AS**
client:	**Brookfield Multiplex**
date started:	**13 Jul 2015**
principal:	
date completed:	**16 Jul 2015**
project:	**UNSW Material Science Building**
logged by:	**BF**
location:	**Kensington, NSW**
checked by:	**AC**

position: E: 336185; N: 6245739 (MGA94 Zone 56) surface elevation: 28.74 m (AHD) angle from horizontal: 90°

drill model: Drillcat, Track mounted hole diameter : 100 mm

drilling information | **material substance**

method & support	penetration 1 2 3	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description (SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components)	moisture condition	consistency / relative density	hand penetrometer (kPa) 100 200 300 400	structure and additional observations
W		Not Observed					SP	**SAND**: fine to medium grained, orange-brown/grey, with some medium plasticity clay. *(continued)*	M	D		**MARINE DEPOSITS**
			SPT 6, 7, 10 N*=17	-4	33.0		SC	**Clayey SAND**: fine to medium grained, red-brown.		MD		
				-5	34.0							
				-6	35.0							
			SPT 11, 14, 22 N*=36	-7	36.0					MD to D		
				-8	37.0							
				-9	38.0					MD		
			SPT 6, 6, 8 N*=14	-10	39.0							
				-11								

CDF_0_9_04BB.GLB Log COF BOREHOLE: NON CORED GEOTLCOV24080AS.GPJ <<DrawingFile>> 06/08/2015 15:42

method
- AD auger drilling*
- AS auger screwing*
- HA hand auger
- W washbore

* bit shown by suffix
e.g. AD/T
- B blank bit
- T TC bit
- V V bit

support
- M mud
- C casing
- N nil

penetration
1 2 3 — no resistance ranging to refusal

water
- 10-Oct-12 water level on date shown
- water inflow
- water outflow

samples & field tests
- B bulk disturbed sample
- D disturbed sample
- E environmental sample
- SS split spoon sample
- U## undisturbed sample ##mm diameter
- HP hand penetrometer (kPa)
- N standard penetration test (SPT)
- N* SPT - sample recovered
- Nc SPT with solid cone
- VS vane shear; peak/remouded (kPa)
- R refusal
- HB hammer bouncing

classification symbol & soil description based on Unified Classification System

moisture
- D dry
- M moist
- W wet
- Wp plastic limit
- Wl liquid limit

consistency / relative density

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

coffey

Engineering Log - Borehole

Borehole ID.	**BH03**
sheet:	6 of 6
project no.	**GEOTLCOV24080AS**
client:	**Brookfield Multiplex**
date started:	**13 Jul 2015**
principal:	
date completed:	**16 Jul 2015**
project:	**UNSW Material Science Building**
logged by:	**BF**
location:	**Kensington, NSW**
checked by:	**AC**

position: E: 336185; N: 6245739 (MGA94 Zone 56) surface elevation: 28.74 m (AHD) angle from horizontal: 90°

drill model: Drillcat, Track mounted hole diameter : 100 mm

drilling information | **material substance**

method & support	penetration 1 2 3	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description **SOIL TYPE**: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	hand penetrometer (kPa) 100 200 300 400	structure and additional observations
W		Not Observed	SPT 22, 35/120mm N*=R	-12 -13 -14 -15 -16 -17 -18 -19	41.0 42.0 43.0 44.0 45.0 46.0 47.0		SC	**Clayey SAND**: fine to medium grained, red-brown. *(continued)*	M	MD VD		**MARINE DEPOSITS**
								Borehole BH03 terminated at 45.0 m Target depth				

CDF_0_9_04BB.GLB Log COF BOREHOLE: NON CORED GEOTLCOV24080AS.GPJ <<DrawingFile>> 06/08/2015 15:42

method
- AD auger drilling*
- AS auger screwing*
- HA hand auger
- W washbore

* bit shown by suffix
e.g. AD/T
- B blank bit
- T TC bit
- V V bit

support
- M mud
- C casing
- N nil

penetration
1 2 3 — no resistance ranging to refusal

water
- 10-Oct-12 water level on date shown
- water inflow
- water outflow

samples & field tests
- B bulk disturbed sample
- D disturbed sample
- E environmental sample
- SS split spoon sample
- U## undisturbed sample ##mm diameter
- HP hand penetrometer (kPa)
- N standard penetration test (SPT)
- N* SPT - sample recovered
- Nc SPT with solid cone
- VS vane shear; peak/remouded (kPa)
- R refusal
- HB hammer bouncing

classification symbol & soil description
based on Unified Classification System

moisture
- D dry
- M moist
- W wet
- Wp plastic limit
- Wl liquid limit

consistency / relative density

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

coffey

Engineering Log - Borehole

Borehole ID.	**BH04**
sheet:	1 of 4
project no.	**GEOTLCOV24080AS**
client:	**Brookfield Multiplex**
date started:	**17 Jul 2015**
principal:	
date completed:	**20 Jul 2015**
project:	**UNSW Material Science Building**
logged by:	**BF**
location:	**Kensington, NSW**
checked by:	**AC**

position: E: 336149; N: 6245742 (MGA94 Zone 56) surface elevation: 27.95 m (AHD) angle from horizontal: 90°

drill model: Drillcat, Track mounted hole diameter : 100 mm

drilling information | **material substance**

method & support	penetration 1 2 3	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description (SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components)	moisture condition	consistency / relative density	hand penetrometer (kPa) 100 200 300 400	structure and additional observations
AD/T		Not Observed	E					**ROAD SURFACE: CONCRETE**: 0.15 m.				**ROAD SURFACE**
								FILL: Gravelly SAND: fine to coarse grained, orange-brown/grey, fine to coarse grained, sub-angular to angular gravel.	M			**FILL** PID=0.2ppm
			E	27	1.0			**FILL: SAND**: fine to coarse grained, orange-brown/grey, trace of fine grained, sub-rounded gravel.				PID=0.1ppm
			SPT 3, 2, 3 N*=5				SP	**SAND**: fine to medium grained, orange-brown.		MD		**MARINE DEPOSITS**
			E	26	2.0							PID=0.3ppm
W			SPT 3, 4, 4 N*=8	25	3.0							
				24	4.0					VD		
			SPT 10, 19, 32 N*=51	23	5.0							
			SPT 20, 30/110mm N*=R	22	6.0							
			SPT 29, 30/90mm N*=R	21	7.0							
				20								

CDF_0_9_04BB.GLB Log COF BOREHOLE: NON CORED GEOTLCOV24080AS.GPJ <<DrawingFile>> 06/08/2015 15:42

method
- AD auger drilling*
- AS auger screwing*
- HA hand auger
- W washbore

* bit shown by suffix
e.g. AD/T
- B blank bit
- T TC bit
- V V bit

support
- M mud
- C casing
- N nil

penetration
1 2 3 — no resistance ranging to refusal

water
- 10-Oct-12 water level on date shown
- water inflow
- water outflow

samples & field tests
- B bulk disturbed sample
- D disturbed sample
- E environmental sample
- SS split spoon sample
- U## undisturbed sample ##mm diameter
- HP hand penetrometer (kPa)
- N standard penetration test (SPT)
- N* SPT - sample recovered
- Nc SPT with solid cone
- VS vane shear; peak/remouded (kPa)
- R refusal
- HB hammer bouncing

classification symbol & soil description based on Unified Classification System

moisture
- D dry
- M moist
- W wet
- Wp plastic limit
- Wl liquid limit

consistency / relative density

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

coffey

Engineering Log - Borehole

Borehole ID.	**BH04**
sheet:	2 of 4
project no.	**GEOTLCOV24080AS**
client:	**Brookfield Multiplex**
date started:	**17 Jul 2015**
principal:	
date completed:	**20 Jul 2015**
project:	**UNSW Material Science Building**
logged by:	**BF**
location:	**Kensington, NSW**
checked by:	**AC**

position: E: 336149; N: 6245742 (MGA94 Zone 56) surface elevation: 27.95 m (AHD) angle from horizontal: 90°

drill model: Drillcat, Track mounted hole diameter : 100 mm

drilling information | **material substance**

method & support	penetration 1 2 3	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description **SOIL TYPE**: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	hand penetrometer (kPa) 100 200 300 400	structure and additional observations
W		Not Observed	SPT 24, 30/100mm N*=R	19	9.0		SP	**SAND**: fine to medium grained, orange-brown. *(continued)*	M	VD		**MARINE DEPOSITS**
				18	10.0							
				17	11.0							
			SPT 16, 30, 30/80mm N*=R	16	12.0							
				15	13.0							
				14	14.0							
			SPT 20, 30/120mm N*=R	13	15.0							
				12								

CDF_0_9_04BB.GLB Log COF BOREHOLE: NON CORED GEOTLCOV24080AS.GPJ <<DrawingFile>> 06/08/2015 15:42

method
- AD auger drilling*
- AS auger screwing*
- HA hand auger
- W washbore

* bit shown by suffix
e.g. AD/T
- B blank bit
- T TC bit
- V V bit

support
- M mud
- C casing
- N nil

penetration
1 2 3 — no resistance ranging to refusal

water
- 10-Oct-12 water level on date shown
- water inflow
- water outflow

samples & field tests
- B bulk disturbed sample
- D disturbed sample
- E environmental sample
- SS split spoon sample
- U## undisturbed sample ##mm diameter
- HP hand penetrometer (kPa)
- N standard penetration test (SPT)
- N* SPT - sample recovered
- Nc SPT with solid cone
- VS vane shear; peak/remouded (kPa)
- R refusal
- HB hammer bouncing

classification symbol & soil description
based on Unified Classification System

moisture
- D dry
- M moist
- W wet
- Wp plastic limit
- Wl liquid limit

consistency / relative density

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

coffey

Engineering Log - Borehole

Borehole ID.	**BH04**
sheet:	3 of 4
project no.	**GEOTLCOV24080AS**
client:	**Brookfield Multiplex**
date started:	**17 Jul 2015**
principal:	
date completed:	**20 Jul 2015**
project:	**UNSW Material Science Building**
logged by:	**BF**
location:	**Kensington, NSW**
checked by:	**AC**

position: E: 336149; N: 6245742 (MGA94 Zone 56) surface elevation: 27.95 m (AHD) angle from horizontal: 90°

drill model: Drillcat, Track mounted hole diameter : 100 mm

drilling information | **material substance**

method & support	penetration 1 2 3	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description (SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components)	moisture condition	consistency / relative density	hand penetrometer (kPa) 100 200 300 400	structure and additional observations
W		Not Observed	SPT 30, 30/90mm N*=R	11	17.0		SP	**SAND**: fine to medium grained, orange-brown. *(continued)*	M	VD		**MARINE DEPOSITS**
				10	18.0							
				9	19.0							
				8	20.0							
			SPT 15, 30/50mm N*=R	7	21.0							
				6	22.0							
				5	23.0							
			SPT 30, 30/70mm N*=R	4								

CDF_0_9_04BB.GLB Log COF BOREHOLE: NON CORED GEOTLCOV24080AS.GPJ <<DrawingFile>> 06/08/2015 15:42

method
- AD auger drilling*
- AS auger screwing*
- HA hand auger
- W washbore

* bit shown by suffix e.g. AD/T
- B blank bit
- T TC bit
- V V bit

support
- M mud
- C casing
- N nil

penetration

1 2 3 — no resistance ranging to refusal

water

10-Oct-12 water level on date shown
- water inflow
- water outflow

samples & field tests
- B bulk disturbed sample
- D disturbed sample
- E environmental sample
- SS split spoon sample
- U## undisturbed sample ##mm diameter
- HP hand penetrometer (kPa)
- N standard penetration test (SPT)
- N* SPT - sample recovered
- Nc SPT with solid cone
- VS vane shear; peak/remouded (kPa)
- R refusal
- HB hammer bouncing

classification symbol & soil description based on Unified Classification System

moisture
- D dry
- M moist
- W wet
- Wp plastic limit
- Wl liquid limit

consistency / relative density

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

coffey

Engineering Log - Borehole

Borehole ID.	**BH04**
sheet:	4 of 4
project no.	**GEOTLCOV24080AS**
client:	**Brookfield Multiplex**
date started:	**17 Jul 2015**
principal:	
date completed:	**20 Jul 2015**
project:	**UNSW Material Science Building**
logged by:	**BF**
location:	**Kensington, NSW**
checked by:	**AC**

position: E: 336149; N: 6245742 (MGA94 Zone 56) surface elevation: 27.95 m (AHD) angle from horizontal: 90°

drill model: Drillcat, Track mounted hole diameter : 100 mm

drilling information | **material substance**

method & support	penetration 1 2 3	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description (SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components)	moisture condition	consistency / relative density	hand penetrometer (kPa) 100 200 300 400	structure and additional observations
W		Not Observed	SPT 50/130mm N*=R	3 2 1 0 -1 -2 -3 -4	25.0 26.0 27.0 28.0 29.0 30.0 31.0		SP	**SAND**: fine to medium grained, orange-brown. *(continued)*	M	VD		**MARINE DEPOSITS**
			SPT 10, 26, 30/80mm N*=R				SP	**SAND**: fine to medium grained, orange-brown, with some medium plasticity clay.				
								Borehole BH04 terminated at 30.0 m Target depth				

CDF_0_9_04BB.GLB Log COF BOREHOLE: NON CORED GEOTLCOV24080AS.GPJ <<DrawingFile>> 06/08/2015 15:42

method
- AD auger drilling*
- AS auger screwing*
- HA hand auger
- W washbore
- * bit shown by suffix
- e.g. AD/T
- B blank bit
- T TC bit
- V V bit

support
- M mud
- C casing
- N nil

penetration 1 2 3 — no resistance ranging to refusal

water
- 10-Oct-12 water level on date shown
- water inflow
- water outflow

samples & field tests
- B bulk disturbed sample
- D disturbed sample
- E environmental sample
- SS split spoon sample
- U## undisturbed sample ##mm diameter
- HP hand penetrometer (kPa)
- N standard penetration test (SPT)
- N* SPT - sample recovered
- Nc SPT with solid cone
- VS vane shear; peak/remouded (kPa)
- R refusal
- HB hammer bouncing

classification symbol & soil description based on Unified Classification System

moisture
- D dry
- M moist
- W wet
- Wp plastic limit
- Wl liquid limit

consistency / relative density

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

coffey

Engineering Log - Borehole

Borehole ID.	**BH05**
sheet:	1 of 1
project no.	**GEOTLCOV24080AS**
client:	**Brookfield Multiplex**
date started:	**22 Jul 2015**
principal:	
date completed:	**22 Jul 2015**
project:	**UNSW Material Science Building**
logged by:	**BF**
location:	**Kensington, NSW**
checked by:	**AC**

position: E: 336182; N: 6245694 (MGA94 Zone 56) surface elevation: 28.51 m (AHD) angle from horizontal: 90°

drill model: Drillcat, Track mounted hole diameter : 100 mm

drilling information | **material substance**

method & support	penetration 1 2 3	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description (SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components)	moisture condition	consistency / relative density	hand penetrometer (kPa) 100 200 300 400	structure and additional observations
		Not Observed	E E B E	28 1.0			SP	**ROAD SURFACE: ASPHALT**: 0.03 m. **FILL: Gravelly SAND**: fine to medium grained, brown/grey, fine to coarse grained, sub-angular gravel. **SAND**: fine to medium grained, dark brown.	M	L		**ROAD SURFACE** **FILL** PID=0.5ppm PID=0.6ppm **MARINE DEPOSITS** PID=0.8ppm
				27 26 25 24 23 22 21	2.0 3.0 4.0 5.0 6.0 7.0			Borehole BH05 terminated at 1.5 m Target depth				

CDF_0_9_04BB.GLB Log COF BOREHOLE: NON CORED GEOTLCOV24080AS.GPJ <<DrawingFile>> 06/08/2015 15:42

method
- AD auger drilling*
- AS auger screwing*
- HA hand auger
- W washbore

* bit shown by suffix
e.g. AD/T
- B blank bit
- T TC bit
- V V bit

support
- M mud
- C casing
- N nil

penetration
1 2 3 — no resistance ranging to refusal

water
- 10-Oct-12 water level on date shown
- water inflow
- water outflow

samples & field tests
- B bulk disturbed sample
- D disturbed sample
- E environmental sample
- SS split spoon sample
- U## undisturbed sample ##mm diameter
- HP hand penetrometer (kPa)
- N standard penetration test (SPT)
- N* SPT - sample recovered
- Nc SPT with solid cone
- VS vane shear; peak/remoulded (kPa)
- R refusal
- HB hammer bouncing

classification symbol & soil description
based on Unified Classification System

moisture
- D dry
- M moist
- W wet
- Wp plastic limit
- Wl liquid limit

consistency / relative density

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

coffey

Engineering Log - Borehole

Borehole ID.	**BH06**
sheet:	1 of 1
project no.	**GEOTLCOV24080AS**
client:	**Brookfield Multiplex**
date started:	**21 Jul 2015**
principal:	
date completed:	**21 Jul 2015**
project:	**UNSW Material Science Building**
logged by:	**BF**
location:	**Kensington, NSW**
checked by:	**AC**

position: E: 336185; N: 6245704 (MGA94 Zone 56) surface elevation: 28.76 m (AHD) angle from horizontal: 90°

drill model: Drillcat, Track mounted hole diameter : 100 mm

drilling information | **material substance**

method & support	penetration 1 2 3	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description (SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components)	moisture condition	consistency / relative density	hand penetrometer (kPa) 100 200 300 400	structure and additional observations
		Not Observed	B E E B E	28	1.0		SP	**ROAD SURFACE: ASPHALT**: 0.03 m. **FILL: Gravelly SAND**: fine to coarse grained, dark grey, fine to coarse grained, sub-angular gravel. **FILL: SAND**: fine to medium grained, yellow-brown, with some fine to coarse grained, sub-angular to angular gravel. **SAND**: fine to medium grained, pale grey.	M L			**ROAD SURFACE** **FILL** PID=0.3ppm PID=0.3ppm **MARINE DEPOSITS** PID=0.4ppm
				27 26 25 24 23 22 21	2.0 3.0 4.0 5.0 6.0 7.0			Borehole BH06 terminated at 1.5 m Target depth				

CDF_0_9_04BB.GLB Log COF BOREHOLE: NON CORED GEOTLCOV24080AS.GPJ <<DrawingFile>> 06/08/2015 15:43

method
- AD auger drilling*
- AS auger screwing*
- HA hand auger
- W washbore

* bit shown by suffix
e.g. AD/T
- B blank bit
- T TC bit
- V V bit

support
- M mud
- C casing
- N nil

penetration
1 2 3 — no resistance ranging to refusal

water
- 10-Oct-12 water level on date shown
- water inflow
- water outflow

samples & field tests
- B bulk disturbed sample
- D disturbed sample
- E environmental sample
- SS split spoon sample
- U## undisturbed sample ##mm diameter
- HP hand penetrometer (kPa)
- N standard penetration test (SPT)
- N* SPT - sample recovered
- Nc SPT with solid cone
- VS vane shear; peak/remouded (kPa)
- R refusal
- HB hammer bouncing

classification symbol & soil description
based on Unified Classification System

moisture
- D dry
- M moist
- W wet
- Wp plastic limit
- Wl liquid limit

consistency / relative density

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

coffey

Soil Description Explanation Sheet (1 of 2)

DEFINITION:

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

CLASSIFICATION SYMBOL & SOIL NAME

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

PARTICLE SIZE DESCRIPTIVE TERMS

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

MOISTURE CONDITION

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

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

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

CONSISTENCY OF COHESIVE SOILS

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

DENSITY OF GRANULAR SOILS

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

MINOR COMPONENTS

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

SOIL STRUCTURE

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

GEOLOGICAL ORIGIN

WEATHERED IN PLACE SOILS

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

TRANSPORTED SOILS

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

coffey

Soil Description Explanation Sheet (2 of 2)

SOIL CLASSIFICATION INCLUDING IDENTIFICATION AND DESCRIPTION

FIELD IDENTIFICATION PROCEDURES (Excluding particles larger than 60 mm and basing fractions on estimated mass)							USC	PRIMARY NAME
COARSE GRAINED SOILS More than 50% of materials less than 63 mm is larger than 0.075 mm	(A 0.075 mm particle is about the smallest particle visible to the naked eye)	GRAVELS More than half of coarse fraction is larger than 2.36 mm	CLEAN GRAVELS (Little or no fines)	Wide range in grain size and substantial amounts of all intermediate particle sizes.			GW	GRAVEL
				Predominantly one size or a range of sizes with more intermediate sizes missing.			GP	GRAVEL
			GRAVELS WITH FINES (Appreciable amount of fines)	Non-plastic fines (for identification procedures see ML below)			GM	SILTY GRAVEL
				Plastic fines (for identification procedures see CL below)			GC	CLAYEY GRAVEL
		SANDS More than half of coarse fraction is smaller than 2.36 mm	CLEAN SANDS (Little or no fines)	Wide range in grain sizes and substantial amounts of all intermediate sizes			SW	SAND
				Predominantly one size or a range of sizes with some intermediate sizes missing.			SP	SAND
			SANDS WITH FINES (Appreciable amount of fines)	Non-plastic fines (for identification procedures see ML below).			SM	SILTY SAND
				Plastic fines (for identification procedures see CL below).			SC	CLAYEY SAND
FINE GRAINED SOILS More than 50% of material less than 63 mm is smaller than 0.075 mm			IDENTIFICATION PROCEDURES ON FRACTIONS <0.2 mm.					
		SILTS & CLAYS Liquid limit less than 50	**DRY STRENGTH**	**DILATANCY**	**TOUGHNESS**			
			None to Low	Quick to slow	None		ML	SILT
			Medium to High	None	Medium		CL	CLAY
			Low to medium	Slow to very slow	Low		OL	ORGANIC SILT
		SILTS & CLAYS Liquid limit greater than 50	Low to medium	Slow to very slow	Low to medium		MH	SILT
			High	None	High		CH	CLAY
			Medium to High	None	Low to medium		OH	ORGANIC CLAY
HIGHLY ORGANIC SOILS			Readily identified by colour, odour, spongy feel and frequently by fibrous texture.				Pt	PEAT

• Low plasticity – Liquid Limit w_L less than 35%. • Medium plasticity – w_L between 35% and 50%. • High plasticity – w_L greater than 50%.

COMMON DEFECTS IN SOIL

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

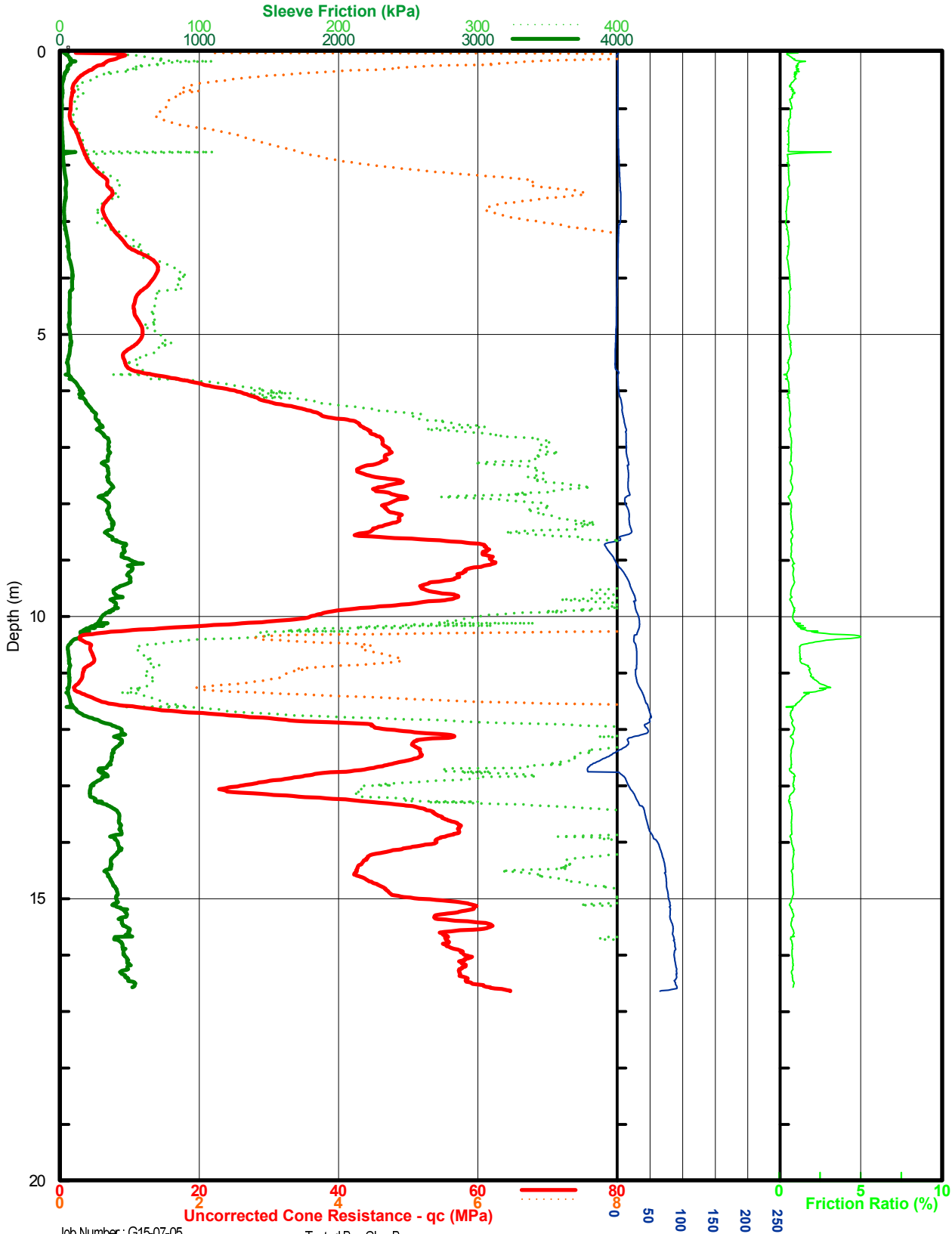
TERM	DEFINITION	DIAGRAM
SOFTENED ZONE	A zone in clayey soil, usually adjacent to a defect in which the soil has a higher moisture content than elsewhere.	
TUBE	Tubular cavity. May occur singly or as one of a large number of separate or inter-connected tubes. Walls often coated with clay or strengthened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

Appendix B - CPT Results

CONE PENETROMETER TEST RESULT

Coffey Geotechnics
UNSW Material Science Building
Kensington NSW

CPTu-01



Job Number : G15-07-05
Test Date : 16/07/2015
DGPS Position : 56 H 0336150, 6245655
DGPS Format : GDA
Rig : Tommy
Cone Number : S15CFIIP.S11101
Predrill Depth : 0.00m
Dissipation Tests @ : N/A
Terminated Due To : Lifted Rig

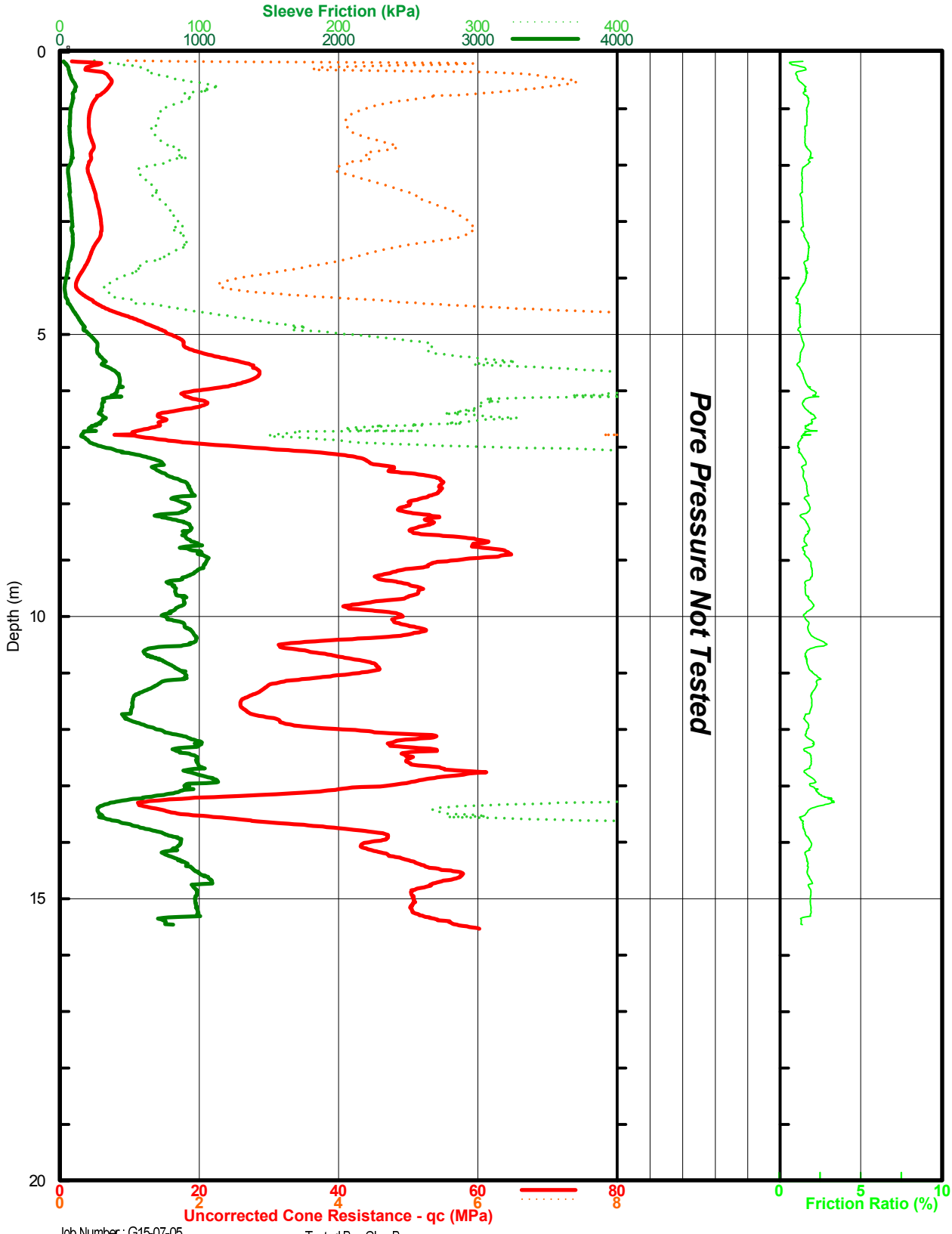
Tested By : Glen Beaven
Test Category : IGS-1S
Checked By : Glen Beaven

Insitu Geotech Services Pty Ltd IGS

CONE PENETROMETER TEST RESULT

Coffey Geotechnics
UNSW Material Science Building
Kensington NSW

CPT-02



Job Number : G15-07-05
Test Date : 16/07/2015
DGPS Position : 56 H 0336185, 6245679
DGPS Format : GDA
Rig : Tommy
Cone Number : S15CFII.C60
Predrill Depth : 0.15m
Dissipation Tests @ : N/A
Terminated Due To : Lifted Rig

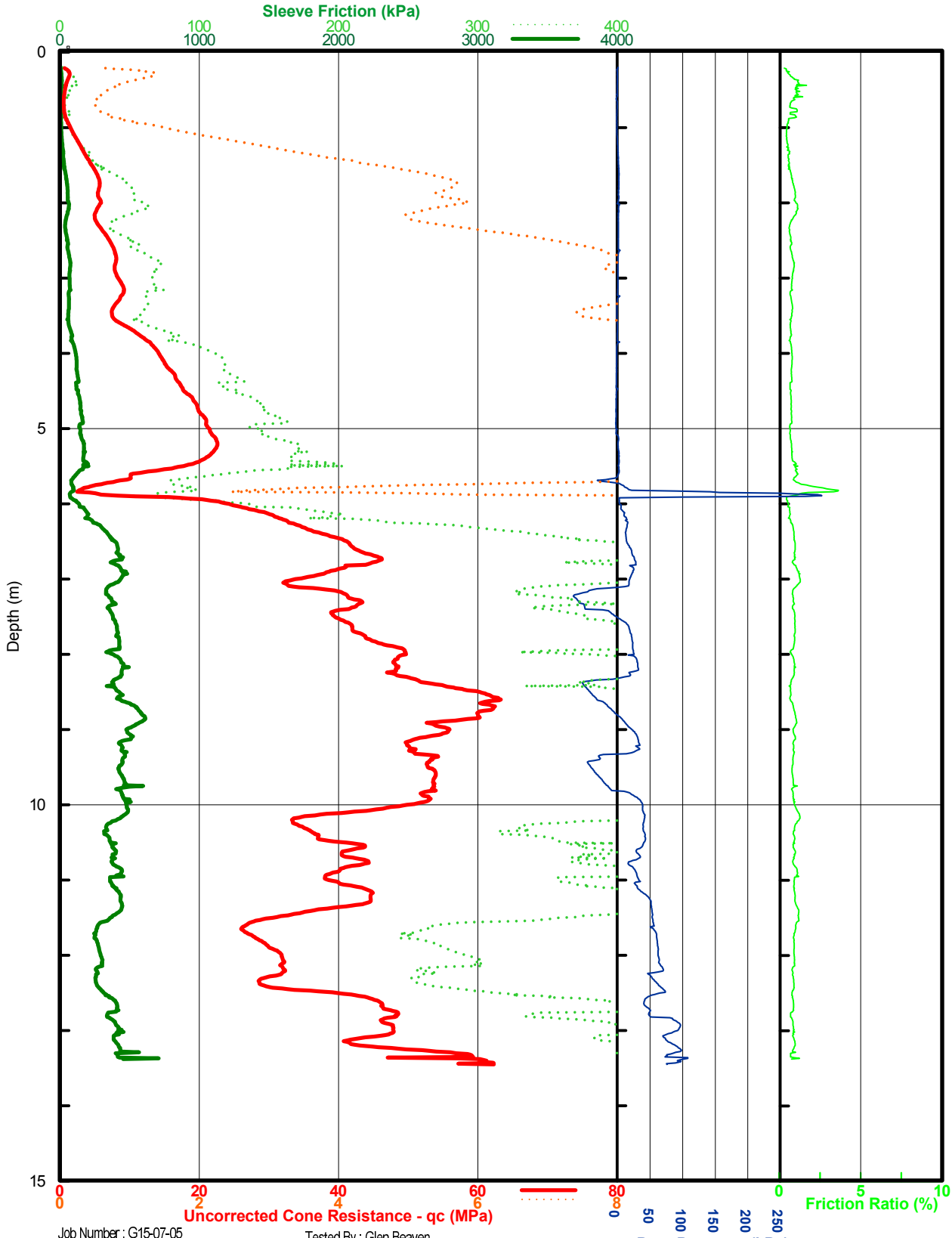
Tested By : Glen Beaven
Test Category : IGS-2S
Checked By : Glen Beaven

Insitu Geotech Services Pty Ltd IGS

CONE PENETROMETER TEST RESULT

Coffey Geotechnics
UNSW Material Science Building
Kensington NSW

CPTu-03



Job Number : G15-07-05
Test Date : 16/07/2015
DGPS Position : 56 H 0336158, 6245762
DGPS Format : GDA
Rig : Tommy
Cone Number : S15CFIIP.S11101
Predrill Depth : 0.20m
Dissipation Tests @ : N/A
Terminated Due To : Lifted Rig

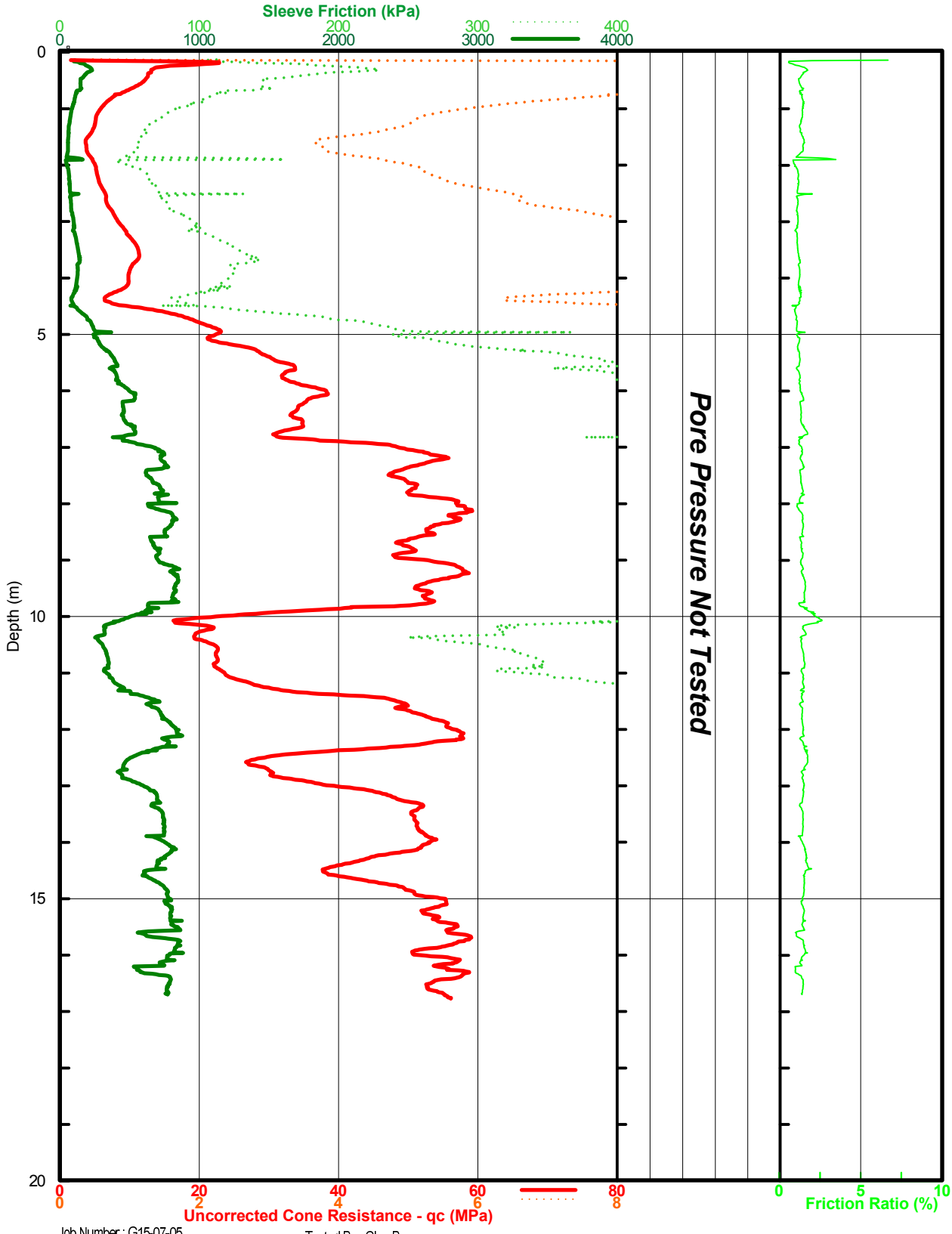
Tested By : Glen Beaven
Test Category : IGS-1S
Checked By : Glen Beaven

Insitu Geotech Services Pty Ltd IGS

CONE PENETROMETER TEST RESULT

Coffey Geotechnics
UNSW Material Science Building
Kensington NSW

CPT-04



Job Number : G15-07-05
Test Date : 16/07/2015
DGPS Position : 56 H 0336139, 6245704
DGPS Format : GDA
Rig : Tommy
Cone Number : S15CFII.C60
Predrill Depth : 0.13m
Dissipation Tests @ : N/A
Terminated Due To : Lifted Rig

Tested By : Glen Beaven
Test Category : IGS-2S
Checked By : Glen Beaven

Insitu Geotech Services Pty Ltd IGS

Appendix C - Laboratory Test Results

This page has been left intentionally blank

eurofins | mgt

Certificate of Analysis

Coffey Geotechnics Pty Ltd Chatswood
Level 18, Tower B, Citadel Tower 799 Pacific Highway
Chatswood
NSW 2067

NATA Accredited
Accreditation Number 1261
Site Number 1254

Accredited for compliance with ISO/IEC 17025.
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Attention: **Priya Dass**

Report **465878-S**
Project name UNSW
Project ID GEOTLCOV24080AS
Received Date Jul 20, 2015

Client Sample ID			**BH3_0.1-0.2**	**BH3_0.5-0.6**	**BH3_2.5**
Sample Matrix			**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**S15-Jl18174**	**S15-Jl18175**	**S15-Jl18177**
Date Sampled			**Jul 13, 2015**	**Jul 13, 2015**	**Jul 13, 2015**
Test/Reference	LOR	Unit			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions					
TRH C6-C9	20	mg/kg	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	< 20	< 20	< 20
TRH C15-C28	50	mg/kg	< 50	< 50	< 50
TRH C29-C36	50	mg/kg	94	< 50	< 50
TRH C10-36 (Total)	50	mg/kg	94	< 50	< 50
BTEX					
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Xylenes - Total	0.3	mg/kg	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	71	71	75
Total Recoverable Hydrocarbons - 2013 NEPM Fractions					
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	< 0.5
TRH C6-C10	20	mg/kg	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	< 20
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	< 50	< 50
Polycyclic Aromatic Hydrocarbons					
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	0.6	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.2	1.2
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Chrysene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Fluorene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5

Client Sample ID			BH3_0.1-0.2	BH3_0.5-0.6	BH3_2.5
Sample Matrix			**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**S15-Jl18174**	**S15-Jl18175**	**S15-Jl18177**
Date Sampled			**Jul 13, 2015**	**Jul 13, 2015**	**Jul 13, 2015**
Test/Reference	LOR	Unit			
Polycyclic Aromatic Hydrocarbons					
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Total PAH*	0.5	mg/kg	< 0.5	< 0.5	< 0.5
2-Fluorobiphenyl (surr.)	1	%	106	110	115
p-Terphenyl-d14 (surr.)	1	%	109	102	110
Organochlorine Pesticides					
Chlordanes - Total	0.1	mg/kg	< 0.1	-	-
4.4'-DDD	0.05	mg/kg	< 0.05	-	-
4.4'-DDE	0.05	mg/kg	< 0.05	-	-
4.4'-DDT	0.05	mg/kg	< 0.05	-	-
a-BHC	0.05	mg/kg	< 0.05	-	-
Aldrin	0.05	mg/kg	< 0.05	-	-
b-BHC	0.05	mg/kg	< 0.05	-	-
d-BHC	0.05	mg/kg	< 0.05	-	-
Dieldrin	0.05	mg/kg	< 0.05	-	-
Endosulfan I	0.05	mg/kg	< 0.05	-	-
Endosulfan II	0.05	mg/kg	< 0.05	-	-
Endosulfan sulphate	0.05	mg/kg	< 0.05	-	-
Endrin	0.05	mg/kg	< 0.05	-	-
Endrin aldehyde	0.05	mg/kg	< 0.05	-	-
Endrin ketone	0.05	mg/kg	< 0.05	-	-
g-BHC (Lindane)	0.05	mg/kg	< 0.05	-	-
Heptachlor	0.05	mg/kg	< 0.05	-	-
Heptachlor epoxide	0.05	mg/kg	< 0.05	-	-
Hexachlorobenzene	0.05	mg/kg	< 0.05	-	-
Methoxychlor	0.2	mg/kg	< 0.2	-	-
Toxaphene	1	mg/kg	< 1	-	-
Dibutylchlorendate (surr.)	1	%	74	-	-
Tetrachloro-m-xylene (surr.)	1	%	78	-	-
Organophosphorus Pesticides (OP)					
Chlorpyrifos	0.5	mg/kg	< 0.5	-	-
Coumaphos	0.5	mg/kg	< 0.5	-	-
Demeton (total)	1	mg/kg	< 1	-	-
Diazinon	0.5	mg/kg	< 0.5	-	-
Dichlorvos	0.5	mg/kg	< 0.5	-	-
Dimethoate	0.5	mg/kg	< 0.5	-	-
Disulfoton	0.5	mg/kg	< 0.5	-	-
Ethoprop	0.5	mg/kg	< 0.5	-	-
Fenitrothion	0.5	mg/kg	< 0.5	-	-
Fensulfothion	0.5	mg/kg	< 0.5	-	-
Fenthion	0.5	mg/kg	< 0.5	-	-
Methyl azinphos	0.5	mg/kg	< 0.5	-	-
Malathion	0.5	mg/kg	< 0.5	-	-
Methyl parathion	0.5	mg/kg	< 0.5	-	-
Mevinphos	0.5	mg/kg	< 0.5	-	-
Monocrotophos	10	mg/kg	< 10	-	-
Parathion	0.5	mg/kg	< 0.5	-	-
Phorate	0.5	mg/kg	< 0.5	-	-

Client Sample ID			BH3_0.1-0.2	BH3_0.5-0.6	BH3_2.5
Sample Matrix			**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**S15-Jl18174**	**S15-Jl18175**	**S15-Jl18177**
Date Sampled			**Jul 13, 2015**	**Jul 13, 2015**	**Jul 13, 2015**
Test/Reference	LOR	Unit			
Organophosphorus Pesticides (OP)					
Profenofos	0.5	mg/kg	< 0.5	-	-
Prothiofos	0.5	mg/kg	< 0.5	-	-
Ronnel	0.5	mg/kg	< 0.5	-	-
Stirophos	0.5	mg/kg	< 0.5	-	-
Trichloronate	0.5	mg/kg	< 0.5	-	-
Triphenylphosphate (surr.)	1	%	83	-	-
Total Recoverable Hydrocarbons - 2013 NEPM Fractions					
TRH >C10-C16	50	mg/kg	< 50	< 50	< 50
TRH >C16-C34	100	mg/kg	< 100	< 100	< 100
TRH >C34-C40	100	mg/kg	< 100	< 100	< 100
Chloride	10	mg/kg	-	< 10	-
Conductivity (1:5 aqueous extract at 25°C)	10	uS/cm	-	30	-
Organic Matter %	0.01	% w/w	-	4.8	-
pH (1:5 Aqueous extract)	0.1	pH Units	-	8.1	-
Sulphate (as SO4)	10	mg/kg	-	37	-
% Moisture	0.1	%	4.8	6.9	6.0
Ion Exchange Properties					
Cation Exchange Capacity	0.05	meq/100g	-	5.1	-
Heavy Metals					
Arsenic	2	mg/kg	< 2	< 2	< 2
Cadmium	0.4	mg/kg	< 0.4	0.6	< 0.4
Chromium	5	mg/kg	8.8	< 5	< 5
Copper	5	mg/kg	43	12	< 5
Lead	5	mg/kg	< 5	19	< 5
Mercury	0.05	mg/kg	< 0.05	< 0.05	< 0.05
Nickel	5	mg/kg	47	8.9	< 5
Zinc	5	mg/kg	40	41	< 5

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results (regarding both quality and NATA accreditation).

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Eurofins | mgt Suite B4			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Sydney	Jul 27, 2015	14 Day
- Method: TRH C6-C36 - LTM-ORG-2010			
BTEX	Sydney	Jul 27, 2015	14 Day
- Method: TRH C6-C40 - LTM-ORG-2010			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Jul 27, 2015	14 Day
- Method: TRH C6-C40 - LTM-ORG-2010			
Polycyclic Aromatic Hydrocarbons	Sydney	Jul 27, 2015	14 Day
- Method: E007 Polyaromatic Hydrocarbons (PAH)			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Jul 27, 2015	14 Day
- Method: TRH C6-C40 - LTM-ORG-2010			
Eurofins | mgt Suite B14			
Organochlorine Pesticides	Sydney	Jul 27, 2015	14 Day
- Method: E013 Organochlorine Pesticides (OC)			
Organophosphorus Pesticides (OP)	Sydney	Jul 27, 2015	14 Day
- Method: E014 Organophosphorus Pesticides (OP)			
Eurofins | mgt Suite B18			
Chloride	Sydney	Jul 27, 2015	28 Day
- Method: E033 /E045 /E047 Chloride			
pH (1:5 Aqueous extract)	Sydney	Jul 21, 2015	7 Day
- Method: LTM-GEN-7090 pH in soil by ISE			
Sulphate (as SO4)	Sydney	Jul 27, 2015	28 Day
- Method: E045 Sulphate			
Conductivity (1:5 aqueous extract at 25°C)	Melbourne	Jul 22, 2015	7 Day
- Method: LM-LTM-INO-4030			
Ion Exchange Properties	Melbourne	Jul 22, 2015	
Organic Matter %	Melbourne	Jul 22, 2015	5 Day
- Method: APHA 2540E Fixed and Volatile Solids Ignited at 550C			
Metals M8	Sydney	Jul 27, 2015	28 Day
- Method: LTM-MET-3040_R0 TOTAL AND DISSOLVED METALS AND MERCURY IN WATERS BY ICP-MS			
% Moisture	Sydney	Jul 21, 2015	14 Day
- Method: LTM-GEN-7080 Moisture			

eurofins | mgt

ABN – 50 005 085 521 e.mail : EnviroSales@eurofins.com.au web : www.eurofins.com.au

Melbourne
3-5 Kingston Town Close
Oakleigh VIC 3166
Phone : +61 3 8564 5000
NATA # 1261
Site # 1254 & 14271

Sydney
Unit F3, Building F
16 Mars Road
Lane Cove West NSW 2066
Phone : +61 2 9900 8400
NATA # 1261 Site # 18217

Brisbane
1/21 Smallwood Place
Murarrie QLD 4172
Phone : +61 7 3902 4600
NATA # 1261 Site # 20794

Company Name: Coffey Geotechnics Pty Ltd Chatswood
Address: Level 18, Tower B, Citadel Tower 799 Pacific Highway
Chatswood
NSW 2067

Project Name: UNSW
Project ID: GEOTLCOV24080AS

Order No.:
Report #: 465878
Phone: +61 2 9406 1000
Fax: +61 2 9406 1002

Received: Jul 20, 2015 4:34 PM
Due: Jul 27, 2015
Priority: 5 Day
Contact Name: Priya Dass

Eurofins | mgt Client Manager: Charl Du Preez

Sample Detail					Asbestos Absence /Presence	HOLD	Organic Matter %	Metals M8	Eurofins | mgt Suite B18	Eurofins | mgt Suite B14	Moisture Set	Cation Exchange Capacity	Eurofins | mgt Suite B4
Laboratory where analysis is conducted													
Melbourne Laboratory - NATA Site # 1254 & 14271							X					X	
Sydney Laboratory - NATA Site # 18217					X	X		X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794													
External Laboratory													
Sample ID	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**									
BH3_0.1-0.2	Jul 13, 2015		Soil	S15-Jl18174	X			X		X	X		X
BH3_0.5-0.6	Jul 13, 2015		Soil	S15-Jl18175			X	X	X		X	X	X
BH3_1.0	Jul 13, 2015		Soil	S15-Jl18176		X							
BH3_2.5	Jul 13, 2015		Soil	S15-Jl18177				X			X		X
BH3_(2.5)	Jul 13, 2015		Soil	S15-Jl18178		X							
BH3_5.5-5.9	Jul 13, 2015		Soil	S15-Jl18179		X							

Eurofins | mgt Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil results are reported on a dry basis, unless otherwise stated.
3. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
4. Results are uncorrected for matrix spikes or surrogate recoveries.
5. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
6. Samples were analysed on an 'as received' basis. 7. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the Sample Receipt Advice.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

****NOTE:** pH duplicates are reported as a range NOT as RPD

UNITS

mg/kg: milligrams per Kilogram

ug/l: micrograms per litre

ppb: Parts per billion

org/100ml: Organisms per 100 millilitres

MPN/100mL: Most Probable Number of organisms per 100 millilitres

mg/l: milligrams per litre

ppm: Parts per million

%: Percentage

NTU: Nephelometric Turbidity Units

TERMS

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery
CRM	Certified Reference Material - reported as percent recovery
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands. In the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
Batch Duplicate	A second piece of analysis from a sample outside of the clients batch of samples but run within the laboratory batch of analysis.
Batch SPIKE	Spike recovery reported on a sample from outside of the clients batch of samples but run within the laboratory batch of analysis.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
ASLP	Australian Standard Leaching Procedure (AS4439.3)
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within
TEQ	Toxic Equivalency Quotient

QC - ACCEPTANCE CRITERIA

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries : Recoveries must lie between 50-150% - Phenols 20-130%.

QC DATA GENERAL COMMENTS

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxophene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxophene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Arochlor 1260 in Matrix Spikes and LCS's.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPD's are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	mg/kg	< 20			20	Pass	
TRH C10-C14	mg/kg	< 20			20	Pass	
TRH C15-C28	mg/kg	< 50			50	Pass	
TRH C29-C36	mg/kg	< 50			50	Pass	
Method Blank							
BTEX							
Benzene	mg/kg	< 0.1			0.1	Pass	
Toluene	mg/kg	< 0.1			0.1	Pass	
Ethylbenzene	mg/kg	< 0.1			0.1	Pass	
m&p-Xylenes	mg/kg	< 0.2			0.2	Pass	
o-Xylene	mg/kg	< 0.1			0.1	Pass	
Xylenes - Total	mg/kg	< 0.3			0.3	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	mg/kg	< 0.5			0.5	Pass	
TRH C6-C10	mg/kg	< 20			20	Pass	
TRH C6-C10 less BTEX (F1)	mg/kg	< 20			20	Pass	
Method Blank							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	mg/kg	< 0.5			0.5	Pass	
Acenaphthylene	mg/kg	< 0.5			0.5	Pass	
Anthracene	mg/kg	< 0.5			0.5	Pass	
Benz(a)anthracene	mg/kg	< 0.5			0.5	Pass	
Benzo(a)pyrene	mg/kg	< 0.5			0.5	Pass	
Benzo(b&j)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Benzo(g.h.i)perylene	mg/kg	< 0.5			0.5	Pass	
Benzo(k)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Chrysene	mg/kg	< 0.5			0.5	Pass	
Dibenz(a.h)anthracene	mg/kg	< 0.5			0.5	Pass	
Fluoranthene	mg/kg	< 0.5			0.5	Pass	
Fluorene	mg/kg	< 0.5			0.5	Pass	
Indeno(1.2.3-cd)pyrene	mg/kg	< 0.5			0.5	Pass	
Naphthalene	mg/kg	< 0.5			0.5	Pass	
Phenanthrene	mg/kg	< 0.5			0.5	Pass	
Pyrene	mg/kg	< 0.5			0.5	Pass	
Method Blank							
Organochlorine Pesticides							
Chlordanes - Total	mg/kg	< 0.1			0.1	Pass	
4.4'-DDD	mg/kg	< 0.05			0.05	Pass	
4.4'-DDE	mg/kg	< 0.05			0.05	Pass	
4.4'-DDT	mg/kg	< 0.05			0.05	Pass	
a-BHC	mg/kg	< 0.05			0.05	Pass	
Aldrin	mg/kg	< 0.05			0.05	Pass	
b-BHC	mg/kg	< 0.05			0.05	Pass	
d-BHC	mg/kg	< 0.05			0.05	Pass	
Dieldrin	mg/kg	< 0.05			0.05	Pass	
Endosulfan I	mg/kg	< 0.05			0.05	Pass	
Endosulfan II	mg/kg	< 0.05			0.05	Pass	
Endosulfan sulphate	mg/kg	< 0.05			0.05	Pass	
Endrin	mg/kg	< 0.05			0.05	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Endrin aldehyde	mg/kg	< 0.05			0.05	Pass	
Endrin ketone	mg/kg	< 0.05			0.05	Pass	
g-BHC (Lindane)	mg/kg	< 0.05			0.05	Pass	
Heptachlor	mg/kg	< 0.05			0.05	Pass	
Heptachlor epoxide	mg/kg	< 0.05			0.05	Pass	
Hexachlorobenzene	mg/kg	< 0.05			0.05	Pass	
Methoxychlor	mg/kg	< 0.2			0.2	Pass	
Toxaphene	mg/kg	< 1			1	Pass	
Method Blank							
Organophosphorus Pesticides (OP)							
Chlorpyrifos	mg/kg	< 0.5			0.5	Pass	
Coumaphos	mg/kg	< 0.5			0.5	Pass	
Demeton (total)	mg/kg	< 1			1	Pass	
Diazinon	mg/kg	< 0.5			0.5	Pass	
Dichlorvos	mg/kg	< 0.5			0.5	Pass	
Dimethoate	mg/kg	< 0.5			0.5	Pass	
Disulfoton	mg/kg	< 0.5			0.5	Pass	
Ethoprop	mg/kg	< 0.5			0.5	Pass	
Fenitrothion	mg/kg	< 0.5			0.5	Pass	
Fensulfothion	mg/kg	< 0.5			0.5	Pass	
Fenthion	mg/kg	< 0.5			0.5	Pass	
Methyl azinphos	mg/kg	< 0.5			0.5	Pass	
Malathion	mg/kg	< 0.5			0.5	Pass	
Methyl parathion	mg/kg	< 0.5			0.5	Pass	
Mevinphos	mg/kg	< 0.5			0.5	Pass	
Monocrotophos	mg/kg	< 10			10	Pass	
Parathion	mg/kg	< 0.5			0.5	Pass	
Phorate	mg/kg	< 0.5			0.5	Pass	
Profenofos	mg/kg	< 0.5			0.5	Pass	
Prothiofos	mg/kg	< 0.5			0.5	Pass	
Ronnel	mg/kg	< 0.5			0.5	Pass	
Stirophos	mg/kg	< 0.5			0.5	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
TRH >C10-C16	mg/kg	< 50			50	Pass	
TRH >C16-C34	mg/kg	< 100			100	Pass	
TRH >C34-C40	mg/kg	< 100			100	Pass	
Method Blank							
Chloride	mg/kg	< 10			10	Pass	
Conductivity (1:5 aqueous extract at 25°C)	uS/cm	< 10			10	Pass	
Sulphate (as SO4)	mg/kg	< 10			10	Pass	
Method Blank							
Ion Exchange Properties							
Cation Exchange Capacity	meq/100g	< 0.05			0.05	Pass	
Method Blank							
Heavy Metals							
Arsenic	mg/kg	< 2			2	Pass	
Cadmium	mg/kg	< 0.4			0.4	Pass	
Chromium	mg/kg	< 5			5	Pass	
Copper	mg/kg	< 5			5	Pass	
Lead	mg/kg	< 5			5	Pass	
Mercury	mg/kg	< 0.05			0.05	Pass	
Nickel	mg/kg	< 5			5	Pass	
Zinc	mg/kg	< 5			5	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
LCS - % Recovery							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	%	94			70-130	Pass	
TRH C10-C14	%	72			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	91			70-130	Pass	
Toluene	%	91			70-130	Pass	
Ethylbenzene	%	90			70-130	Pass	
m&p-Xylenes	%	94			70-130	Pass	
o-Xylene	%	94			70-130	Pass	
Xylenes - Total	%	94			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	%	108			70-130	Pass	
TRH C6-C10	%	87			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	%	96			70-130	Pass	
Acenaphthylene	%	95			70-130	Pass	
Anthracene	%	99			70-130	Pass	
Benz(a)anthracene	%	94			70-130	Pass	
Benzo(a)pyrene	%	92			70-130	Pass	
Benzo(b&j)fluoranthene	%	103			70-130	Pass	
Benzo(g.h.i)perylene	%	87			70-130	Pass	
Benzo(k)fluoranthene	%	100			70-130	Pass	
Chrysene	%	95			70-130	Pass	
Dibenz(a.h)anthracene	%	88			70-130	Pass	
Fluoranthene	%	96			70-130	Pass	
Fluorene	%	95			70-130	Pass	
Indeno(1.2.3-cd)pyrene	%	89			70-130	Pass	
Naphthalene	%	95			70-130	Pass	
Phenanthrene	%	91			70-130	Pass	
Pyrene	%	100			70-130	Pass	
LCS - % Recovery							
Organochlorine Pesticides							
Chlordanes - Total	%	97			70-130	Pass	
4.4'-DDD	%	106			70-130	Pass	
4.4'-DDE	%	102			70-130	Pass	
4.4'-DDT	%	96			70-130	Pass	
a-BHC	%	101			70-130	Pass	
Aldrin	%	100			70-130	Pass	
b-BHC	%	103			70-130	Pass	
d-BHC	%	103			70-130	Pass	
Dieldrin	%	96			70-130	Pass	
Endosulfan I	%	97			70-130	Pass	
Endosulfan II	%	95			70-130	Pass	
Endosulfan sulphate	%	90			70-130	Pass	
Endrin	%	97			70-130	Pass	
Endrin aldehyde	%	92			70-130	Pass	
Endrin ketone	%	94			70-130	Pass	
g-BHC (Lindane)	%	104			70-130	Pass	
Heptachlor	%	98			70-130	Pass	
Heptachlor epoxide	%	97			70-130	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Methoxychlor	%	90			70-130	Pass	
LCS - % Recovery							
Organophosphorus Pesticides (OP)							
Chlorpyrifos	%	94			70-130	Pass	
Dimethoate	%	100			70-130	Pass	
Disulfoton	%	101			70-130	Pass	
Methyl azinphos	%	75			70-130	Pass	
Methyl parathion	%	96			70-130	Pass	
Parathion	%	101			70-130	Pass	
Phorate	%	100			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
TRH >C10-C16	%	80			70-130	Pass	
LCS - % Recovery							
Chloride	%	103			70-130	Pass	
Sulphate (as SO4)	%	114			70-130	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic	%	118			70-130	Pass	
Cadmium	%	120			70-130	Pass	
Chromium	%	118			70-130	Pass	
Copper	%	122			70-130	Pass	
Lead	%	114			70-130	Pass	
Mercury	%	96			70-130	Pass	
Nickel	%	117			70-130	Pass	
Zinc	%	105			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1					
TRH C6-C9	S15-Jl17541	NCP	%	70			70-130	Pass	
TRH C10-C14	S15-Jl18174	CP	%	100			70-130	Pass	
Spike - % Recovery									
BTEX				Result 1					
Benzene	S15-Jl17541	NCP	%	80			70-130	Pass	
Toluene	S15-Jl17541	NCP	%	79			70-130	Pass	
Ethylbenzene	S15-Jl17541	NCP	%	78			70-130	Pass	
m&p-Xylenes	S15-Jl17541	NCP	%	82			70-130	Pass	
o-Xylene	S15-Jl17541	NCP	%	81			70-130	Pass	
Xylenes - Total	S15-Jl17541	NCP	%	82			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
Naphthalene	S15-Jl20692	NCP	%	100			70-130	Pass	
TRH C6-C10	S15-Jl17541	NCP	%	75			70-130	Pass	
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons				Result 1					
Acenaphthene	S15-Jl18174	CP	%	88			70-130	Pass	
Acenaphthylene	S15-Jl18174	CP	%	86			70-130	Pass	
Anthracene	S15-Jl18174	CP	%	91			70-130	Pass	
Benz(a)anthracene	S15-Jl18174	CP	%	101			70-130	Pass	
Benzo(a)pyrene	S15-Jl18174	CP	%	89			70-130	Pass	
Benzo(b&j)fluoranthene	S15-Jl18174	CP	%	86			70-130	Pass	
Benzo(g.h.i)perylene	S15-Jl18174	CP	%	70			70-130	Pass	
Benzo(k)fluoranthene	S15-Jl18174	CP	%	92			70-130	Pass	
Chrysene	S15-Jl18174	CP	%	93			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Dibenz(a.h)anthracene	S15-Jl18174	CP	%	76			70-130	Pass	
Fluoranthene	S15-Jl18174	CP	%	94			70-130	Pass	
Fluorene	S15-Jl18174	CP	%	85			70-130	Pass	
Indeno(1.2.3-cd)pyrene	S15-Jl18174	CP	%	74			70-130	Pass	
Naphthalene	S15-Jl18174	CP	%	86			70-130	Pass	
Phenanthrene	S15-Jl18174	CP	%	87			70-130	Pass	
Pyrene	S15-Jl18174	CP	%	96			70-130	Pass	
Spike - % Recovery									
Organochlorine Pesticides				Result 1					
Chlordanes - Total	S15-Jl20953	NCP	%	89			70-130	Pass	
4.4'-DDD	S15-Jl20953	NCP	%	129			70-130	Pass	
4.4'-DDE	S15-Jl20953	NCP	%	94			70-130	Pass	
4.4'-DDT	S15-Jl20953	NCP	%	85			70-130	Pass	
a-BHC	S15-Jl20953	NCP	%	92			70-130	Pass	
Aldrin	S15-Jl20953	NCP	%	92			70-130	Pass	
b-BHC	S15-Jl20953	NCP	%	90			70-130	Pass	
d-BHC	S15-Jl20953	NCP	%	92			70-130	Pass	
Dieldrin	S15-Jl20953	NCP	%	107			70-130	Pass	
Endosulfan I	S15-Jl20953	NCP	%	87			70-130	Pass	
Endosulfan II	S15-Jl20953	NCP	%	116			70-130	Pass	
Endosulfan sulphate	S15-Jl20953	NCP	%	97			70-130	Pass	
Endrin	S15-Jl20953	NCP	%	108			70-130	Pass	
Endrin aldehyde	S15-Jl20953	NCP	%	106			70-130	Pass	
Endrin ketone	S15-Jl20953	NCP	%	112			70-130	Pass	
g-BHC (Lindane)	S15-Jl20953	NCP	%	94			70-130	Pass	
Heptachlor	S15-Jl20953	NCP	%	87			70-130	Pass	
Heptachlor epoxide	S15-Jl20953	NCP	%	89			70-130	Pass	
Methoxychlor	S15-Jl20953	NCP	%	127			70-130	Pass	
Spike - % Recovery									
Organophosphorus Pesticides (OP)				Result 1					
Chlorpyrifos	S15-Jl18651	NCP	%	97			70-130	Pass	
Dimethoate	S15-Jl18651	NCP	%	101			70-130	Pass	
Disulfoton	S15-Jl18651	NCP	%	113			70-130	Pass	
Methyl azinphos	S15-Jl18651	NCP	%	72			70-130	Pass	
Methyl parathion	S15-Jl18651	NCP	%	90			70-130	Pass	
Parathion	S15-Jl18651	NCP	%	103			70-130	Pass	
Phorate	S15-Jl18651	NCP	%	100			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
TRH >C10-C16	S15-Jl18174	CP	%	126			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	S15-Jl16955	NCP	%	99			70-130	Pass	
Cadmium	S15-Jl16955	NCP	%	105			70-130	Pass	
Chromium	S15-Jl16955	NCP	%	93			70-130	Pass	
Copper	S15-Jl16955	NCP	%	101			70-130	Pass	
Lead	S15-Jl17047	NCP	%	96			70-130	Pass	
Mercury	S15-Jl16955	NCP	%	78			70-130	Pass	
Nickel	S15-Jl16955	NCP	%	98			70-130	Pass	
Zinc	S15-Jl20926	NCP	%	96			70-130	Pass	
Spike - % Recovery									
				Result 1					
Chloride	S15-Jl21491	NCP	%	103			70-130	Pass	
Sulphate (as SO4)	S15-Jl21491	NCP	%	95			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C6-C9	S15-Jl17539	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C10-C14	S15-Jl18769	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C15-C28	S15-Jl18769	NCP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH C29-C36	S15-Jl18769	NCP	mg/kg	< 50	< 50	<1	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	S15-Jl17539	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Toluene	S15-Jl17539	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Ethylbenzene	S15-Jl17539	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
m&p-Xylenes	S15-Jl17539	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
o-Xylene	S15-Jl17539	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Xylenes - Total	S15-Jl17539	NCP	mg/kg	< 0.3	< 0.3	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
Naphthalene	S15-Jl17539	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
TRH C6-C10	S15-Jl17539	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C6-C10 less BTEX (F1)	S15-Jl17539	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	S15-Jl18772	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Acenaphthylene	S15-Jl18772	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Anthracene	S15-Jl18772	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benz(a)anthracene	S15-Jl18772	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(a)pyrene	S15-Jl18772	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(b&j)fluoranthene	S15-Jl18772	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(g.h.i)perylene	S15-Jl18772	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(k)fluoranthene	S15-Jl18772	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Chrysene	S15-Jl18772	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dibenz(a.h)anthracene	S15-Jl18772	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluoranthene	S15-Jl18772	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluorene	S15-Jl18772	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	S15-Jl18772	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Naphthalene	S15-Jl18772	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Phenanthrene	S15-Jl18772	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Pyrene	S15-Jl18772	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
Organochlorine Pesticides				Result 1	Result 2	RPD			
Chlordanes - Total	S15-Jl20952	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
4.4'-DDD	S15-Jl20952	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
4.4'-DDE	S15-Jl20952	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
4.4'-DDT	S15-Jl20952	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
a-BHC	S15-Jl20952	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Aldrin	S15-Jl20952	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
b-BHC	S15-Jl20952	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
d-BHC	S15-Jl20952	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Dieldrin	S15-Jl20952	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan I	S15-Jl20952	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan II	S15-Jl20952	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan sulphate	S15-Jl20952	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin	S15-Jl20952	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin aldehyde	S15-Jl20952	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin ketone	S15-Jl20952	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	

Duplicate									
Organochlorine Pesticides				Result 1	Result 2	RPD			
g-BHC (Lindane)	S15-Jl20952	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Heptachlor	S15-Jl20952	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Heptachlor epoxide	S15-Jl20952	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Hexachlorobenzene	S15-Jl20952	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Methoxychlor	S15-Jl20952	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Toxaphene	S15-Jl20952	NCP	mg/kg	< 1	< 1	<1	30%	Pass	
Duplicate									
Organophosphorus Pesticides (OP)				Result 1	Result 2	RPD			
Chlorpyrifos	S15-Jl18174	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Coumaphos	S15-Jl18645	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Demeton (total)	S15-Jl18645	NCP	mg/kg	< 1	< 1	<1	30%	Pass	
Diazinon	S15-Jl18174	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dichlorvos	S15-Jl18174	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dimethoate	S15-Jl18645	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Disulfoton	S15-Jl18174	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Ethoprop	S15-Jl18174	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fenitrothion	S15-Jl18174	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fensulfothion	S15-Jl18174	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fenthion	S15-Jl18174	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Methyl azinphos	S15-Jl18174	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Malathion	S15-Jl18645	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Methyl parathion	S15-Jl18174	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Mevinphos	S15-Jl18174	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Monocrotophos	S15-Jl18645	NCP	mg/kg	< 10	< 10	<1	30%	Pass	
Parathion	S15-Jl18645	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Phorate	S15-Jl18174	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Profenofos	S15-Jl18645	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Prothiofos	S15-Jl18645	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Ronnel	S15-Jl18174	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Stirophos	S15-Jl18645	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
TRH >C10-C16	S15-Jl18769	NCP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH >C16-C34	S15-Jl18769	NCP	mg/kg	< 100	< 100	<1	30%	Pass	
TRH >C34-C40	S15-Jl18769	NCP	mg/kg	< 100	< 100	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S15-My20808	NCP	%	19	18	4.0	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	S15-Jl16947	NCP	mg/kg	2.9	3.1	7.0	30%	Pass	
Cadmium	S15-Jl16947	NCP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	S15-Jl16947	NCP	mg/kg	24	24	1.0	30%	Pass	
Copper	S15-Jl16947	NCP	mg/kg	23	20	18	30%	Pass	
Lead	S15-Jl16947	NCP	mg/kg	52	48	8.0	30%	Pass	
Mercury	S15-Jl16947	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Nickel	S15-Jl16947	NCP	mg/kg	13	9.7	28	30%	Pass	
Zinc	S15-Jl16947	NCP	mg/kg	120	100	20	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Chloride	S15-Jl18175	CP	mg/kg	< 10	< 10	<1	30%	Pass	
Conductivity (1:5 aqueous extract at 25°C)	M15-Jl17713	NCP	uS/cm	36	30	19	30%	Pass	
pH (1:5 Aqueous extract)	S15-Jl18175	CP	pH Units	8.1	8.1	pass	30%	Pass	
Sulphate (as SO4)	S15-Jl18175	CP	mg/kg	37	38	3.0	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs

Authorised By

Charl Du Preez	Analytical Services Manager
Bob Symons	Senior Analyst-Asbestos (NSW)
Bob Symons	Senior Analyst-Inorganic (NSW)
Emily Rosenberg	Senior Analyst-Metal (VIC)
Huong Le	Senior Analyst-Inorganic (VIC)
Ivan Taylor	Senior Analyst-Metal (NSW)
Ryan Hamilton	Senior Analyst-Organic (NSW)
Ryan Hamilton	Senior Analyst-Volatile (NSW)

Glenn Jackson

National Laboratory Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Uncertainty data is available on request

eurofins | mgt

Certificate of Analysis

Coffey Geotechnics Pty Ltd Chatswood
Level 18, Tower B, Citadel Tower 799 Pacific Highway
Chatswood
NSW 2067

NATA Accredited
Accreditation Number 1261
Site Number 1254

Accredited for compliance with ISO/IEC 17025.
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Attention: **Matthew Locke**

Report **466918-S**
Project name MSB UNSW
Project ID GEOTLCOV24080AS
Received Date Jul 30, 2015

Client Sample ID			**BH04 7.0-7.5**	**BH01 8.5-8.95**	**BH02 0.1-0.2**	**BH02 5.5-5.95**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**S15-Jl25721**	**S15-Jl25723**	**S15-Jl25725**	**S15-Jl25726**
Date Sampled			**Jul 17, 2015**	**Jul 22, 2015**	**Jul 21, 2015**	**Jul 21, 2015**
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	< 20	< 20	< 20	< 20
TRH C15-C28	50	mg/kg	< 50	< 50	< 50	< 50
TRH C29-C36	50	mg/kg	< 50	< 50	< 50	< 50
TRH C10-36 (Total)	50	mg/kg	< 50	< 50	< 50	< 50
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes - Total	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	104	74	73	85
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
TRH C6-C10	20	mg/kg	< 20	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	< 20	< 20
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	< 50	< 50	< 50
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	0.6	0.6	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.2	1.2	1.2
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Chrysene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluorene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5

Client Sample ID			BH04 7.0-7.5	BH01 8.5-8.95	BH02 0.1-0.2	BH02 5.5-5.95
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins | mgt Sample No.			S15-Jl25721	S15-Jl25723	S15-Jl25725	S15-Jl25726
Date Sampled			Jul 17, 2015	Jul 22, 2015	Jul 21, 2015	Jul 21, 2015
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Total PAH*	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
2-Fluorobiphenyl (surr.)	1	%	106	119	115	108
p-Terphenyl-d14 (surr.)	1	%	110	121	117	105
Organochlorine Pesticides						
Chlordanes - Total	0.1	mg/kg	-	-	< 0.1	-
4.4'-DDD	0.05	mg/kg	-	-	< 0.05	-
4.4'-DDE	0.05	mg/kg	-	-	< 0.05	-
4.4'-DDT	0.05	mg/kg	-	-	< 0.05	-
a-BHC	0.05	mg/kg	-	-	< 0.05	-
Aldrin	0.05	mg/kg	-	-	< 0.05	-
b-BHC	0.05	mg/kg	-	-	< 0.05	-
d-BHC	0.05	mg/kg	-	-	< 0.05	-
Dieldrin	0.05	mg/kg	-	-	< 0.05	-
Endosulfan I	0.05	mg/kg	-	-	< 0.05	-
Endosulfan II	0.05	mg/kg	-	-	< 0.05	-
Endosulfan sulphate	0.05	mg/kg	-	-	< 0.05	-
Endrin	0.05	mg/kg	-	-	< 0.05	-
Endrin aldehyde	0.05	mg/kg	-	-	< 0.05	-
Endrin ketone	0.05	mg/kg	-	-	< 0.05	-
g-BHC (Lindane)	0.05	mg/kg	-	-	< 0.05	-
Heptachlor	0.05	mg/kg	-	-	< 0.05	-
Heptachlor epoxide	0.05	mg/kg	-	-	< 0.05	-
Hexachlorobenzene	0.05	mg/kg	-	-	< 0.05	-
Methoxychlor	0.2	mg/kg	-	-	< 0.2	-
Toxaphene	1	mg/kg	-	-	< 1	-
Dibutylchlorendate (surr.)	1	%	-	-	81	-
Tetrachloro-m-xylene (surr.)	1	%	-	-	86	-
Organophosphorus Pesticides (OP)						
Chlorpyrifos	0.5	mg/kg	-	-	< 0.5	-
Coumaphos	0.5	mg/kg	-	-	< 0.5	-
Demeton (total)	1	mg/kg	-	-	< 1	-
Diazinon	0.5	mg/kg	-	-	< 0.5	-
Dichlorvos	0.5	mg/kg	-	-	< 0.5	-
Dimethoate	0.5	mg/kg	-	-	< 0.5	-
Disulfoton	0.5	mg/kg	-	-	< 0.5	-
Ethoprop	0.5	mg/kg	-	-	< 0.5	-
Fenitrothion	0.5	mg/kg	-	-	< 0.5	-
Fensulfothion	0.5	mg/kg	-	-	< 0.5	-
Fenthion	0.5	mg/kg	-	-	< 0.5	-
Methyl azinphos	0.5	mg/kg	-	-	< 0.5	-
Malathion	0.5	mg/kg	-	-	< 0.5	-
Methyl parathion	0.5	mg/kg	-	-	< 0.5	-
Mevinphos	0.5	mg/kg	-	-	< 0.5	-
Monocrotophos	10	mg/kg	-	-	< 10	-
Parathion	0.5	mg/kg	-	-	< 0.5	-
Phorate	0.5	mg/kg	-	-	< 0.5	-

Client Sample ID			BH04 7.0-7.5	BH01 8.5-8.95	BH02 0.1-0.2	BH02 5.5-5.95
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins | mgt Sample No.			S15-Jl25721	S15-Jl25723	S15-Jl25725	S15-Jl25726
Date Sampled			Jul 17, 2015	Jul 22, 2015	Jul 21, 2015	Jul 21, 2015
Test/Reference	LOR	Unit				
Organophosphorus Pesticides (OP)						
Profenofos	0.5	mg/kg	-	-	< 0.5	-
Prothiofos	0.5	mg/kg	-	-	< 0.5	-
Ronnel	0.5	mg/kg	-	-	< 0.5	-
Stirophos	0.5	mg/kg	-	-	< 0.5	-
Trichloronate	0.5	mg/kg	-	-	< 0.5	-
Triphenylphosphate (surr.)	1	%	-	-	69	-
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
TRH >C10-C16	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C16-C34	100	mg/kg	< 100	< 100	< 100	< 100
TRH >C34-C40	100	mg/kg	< 100	< 100	< 100	< 100
Chloride	10	mg/kg	-	< 10	-	11
Conductivity (1:5 aqueous extract at 25°C)	10	uS/cm	-	10	-	16
Organic Matter %	0.01	% w/w	-	0.20	-	0.30
pH (1:5 Aqueous extract)	0.1	pH Units	-	7.0	-	6.8
Sulphate (as SO4)	10	mg/kg	-	< 10	-	< 10
% Moisture	0.1	%	16	14	5.6	16
Ion Exchange Properties						
Cation Exchange Capacity	0.05	meq/100g	-	6.2	-	8.4
Heavy Metals						
Arsenic	2	mg/kg	< 2	< 2	< 2	< 2
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	< 5	< 5	27	< 5
Copper	5	mg/kg	< 5	< 5	74	< 5
Lead	5	mg/kg	< 5	< 5	< 5	< 5
Mercury	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Nickel	5	mg/kg	< 5	< 5	160	< 5
Zinc	5	mg/kg	< 5	15	70	< 5

Client Sample ID			BH01 0.1-0.2	BH02 0.5-0.6	BH04 0.2-0.3	BH06 0.1-0.2
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins | mgt Sample No.			S15-Jl25729	S15-Jl25732	S15-Jl25734	S15-Jl25735
Date Sampled			Jul 22, 2015	Jul 21, 2015	Jul 17, 2015	Jul 21, 2015
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	< 20	< 20	< 20	41
TRH C15-C28	50	mg/kg	< 50	< 50	< 50	< 50
TRH C29-C36	50	mg/kg	< 50	< 50	< 50	< 50
TRH C10-36 (Total)	50	mg/kg	< 50	< 50	< 50	< 50
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes - Total	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	88	105	129	91

Client Sample ID			BH01 0.1-0.2	BH02 0.5-0.6	BH04 0.2-0.3	BH06 0.1-0.2
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**S15-Jl25729**	**S15-Jl25732**	**S15-Jl25734**	**S15-Jl25735**
Date Sampled			**Jul 22, 2015**	**Jul 21, 2015**	**Jul 17, 2015**	**Jul 21, 2015**
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
TRH C6-C10	20	mg/kg	< 20	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	< 20	< 20
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	< 50	< 50	< 50
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	0.6	0.6	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.2	1.2	1.2
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Chrysene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluorene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Total PAH*	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
2-Fluorobiphenyl (surr.)	1	%	104	115	114	113
p-Terphenyl-d14 (surr.)	1	%	102	118	116	115
Organochlorine Pesticides						
Chlordanes - Total	0.1	mg/kg	< 0.1	-	-	-
4.4'-DDD	0.05	mg/kg	< 0.05	-	-	-
4.4'-DDE	0.05	mg/kg	< 0.05	-	-	-
4.4'-DDT	0.05	mg/kg	< 0.05	-	-	-
a-BHC	0.05	mg/kg	< 0.05	-	-	-
Aldrin	0.05	mg/kg	< 0.05	-	-	-
b-BHC	0.05	mg/kg	< 0.05	-	-	-
d-BHC	0.05	mg/kg	< 0.05	-	-	-
Dieldrin	0.05	mg/kg	< 0.05	-	-	-
Endosulfan I	0.05	mg/kg	< 0.05	-	-	-
Endosulfan II	0.05	mg/kg	< 0.05	-	-	-
Endosulfan sulphate	0.05	mg/kg	< 0.05	-	-	-
Endrin	0.05	mg/kg	< 0.05	-	-	-
Endrin aldehyde	0.05	mg/kg	< 0.05	-	-	-
Endrin ketone	0.05	mg/kg	< 0.05	-	-	-
g-BHC (Lindane)	0.05	mg/kg	< 0.05	-	-	-
Heptachlor	0.05	mg/kg	< 0.05	-	-	-
Heptachlor epoxide	0.05	mg/kg	< 0.05	-	-	-
Hexachlorobenzene	0.05	mg/kg	< 0.05	-	-	-
Methoxychlor	0.2	mg/kg	< 0.2	-	-	-
Toxaphene	1	mg/kg	< 1	-	-	-

Client Sample ID			BH01 0.1-0.2	BH02 0.5-0.6	BH04 0.2-0.3	BH06 0.1-0.2
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**S15-Jl25729**	**S15-Jl25732**	**S15-Jl25734**	**S15-Jl25735**
Date Sampled			**Jul 22, 2015**	**Jul 21, 2015**	**Jul 17, 2015**	**Jul 21, 2015**
Test/Reference	LOR	Unit				
Organochlorine Pesticides						
Dibutylchlorendate (surr.)	1	%	70	-	-	-
Tetrachloro-m-xylene (surr.)	1	%	88	-	-	-
Organophosphorus Pesticides (OP)						
Chlorpyrifos	0.5	mg/kg	< 0.5	-	-	-
Coumaphos	0.5	mg/kg	< 0.5	-	-	-
Demeton (total)	1	mg/kg	< 1	-	-	-
Diazinon	0.5	mg/kg	< 0.5	-	-	-
Dichlorvos	0.5	mg/kg	< 0.5	-	-	-
Dimethoate	0.5	mg/kg	< 0.5	-	-	-
Disulfoton	0.5	mg/kg	< 0.5	-	-	-
Ethoprop	0.5	mg/kg	< 0.5	-	-	-
Fenitrothion	0.5	mg/kg	< 0.5	-	-	-
Fensulfothion	0.5	mg/kg	< 0.5	-	-	-
Fenthion	0.5	mg/kg	< 0.5	-	-	-
Methyl azinphos	0.5	mg/kg	< 0.5	-	-	-
Malathion	0.5	mg/kg	< 0.5	-	-	-
Methyl parathion	0.5	mg/kg	< 0.5	-	-	-
Mevinphos	0.5	mg/kg	< 0.5	-	-	-
Monocrotophos	10	mg/kg	< 10	-	-	-
Parathion	0.5	mg/kg	< 0.5	-	-	-
Phorate	0.5	mg/kg	< 0.5	-	-	-
Profenofos	0.5	mg/kg	< 0.5	-	-	-
Prothiofos	0.5	mg/kg	< 0.5	-	-	-
Ronnel	0.5	mg/kg	< 0.5	-	-	-
Stirophos	0.5	mg/kg	< 0.5	-	-	-
Trichloronate	0.5	mg/kg	< 0.5	-	-	-
Triphenylphosphate (surr.)	1	%	68	-	-	-
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
TRH >C10-C16	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C16-C34	100	mg/kg	< 100	< 100	< 100	< 100
TRH >C34-C40	100	mg/kg	< 100	< 100	< 100	< 100
% Moisture	0.1	%	6.0	7.2	23	14
Heavy Metals						
Aluminium	10	mg/kg	36000	2600	1500	-
Antimony	10	mg/kg	< 10	< 10	< 10	-
Arsenic	2	mg/kg	< 2	< 2	< 2	< 2
Barium	10	mg/kg	96	17	< 10	-
Beryllium	2	mg/kg	< 2	< 2	< 2	-
Bismuth	10	mg/kg	< 10	< 10	< 10	-
Boron	10	mg/kg	< 10	< 10	< 10	-
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	45	11	< 5	11
Cobalt	5	mg/kg	56	< 5	< 5	-
Copper	5	mg/kg	69	< 5	21	43
Iron	5	mg/kg	68000	3900	1800	-
Lead	5	mg/kg	< 5	5.0	12	7.7
Manganese	5	mg/kg	1100	73	24	-
Mercury	0.05	mg/kg	< 0.05	< 0.05	0.25	0.15

Client Sample ID Sample Matrix Eurofins | mgt Sample No. Date Sampled Test/Reference	LOR	Unit	BH01 0.1-0.2 Soil S15-Jl25729 Jul 22, 2015	BH02 0.5-0.6 Soil S15-Jl25732 Jul 21, 2015	BH04 0.2-0.3 Soil S15-Jl25734 Jul 17, 2015	BH06 0.1-0.2 Soil S15-Jl25735 Jul 21, 2015
Heavy Metals						
Molybdenum	5	mg/kg	< 5	< 5	< 5	-
Nickel	5	mg/kg	210	5.4	< 5	48
Selenium	2	mg/kg	< 2	< 2	< 2	-
Silver	5	mg/kg	< 5	< 5	< 5	-
Thallium	10	mg/kg	< 10	< 10	< 10	-
Tin	10	mg/kg	< 10	< 10	< 10	-
Titanium	10	mg/kg	2600	51	93	-
Uranium	1	mg/kg	< 1	< 1	< 1	-
Vanadium	10	mg/kg	84	< 10	< 10	-
Zinc	5	mg/kg	87	7.8	21	36
Alkali Metals						
Calcium	1	mg/kg	16000	750	1300	-
Magnesium	1	mg/kg	57000	830	230	-
Potassium	1	mg/kg	2000	110	490	-
Sodium	1	mg/kg	12000	460	690	-
Extended Metals Suite						
Phosphorus	10	mg/kg	1300	59	74	-
Silicon	100	mg/kg	1000	210	120	-
Sulphur	100	mg/kg	620	190	< 100	-

Client Sample ID Sample Matrix Eurofins | mgt Sample No. Date Sampled Test/Reference	LOR	Unit	BH04 1.0 Soil S15-Jl25736 Jul 17, 2015	BH01 0.5-0.6 Soil S15-Jl25737 Jul 22, 2015	BH05 0.5-0.6 Soil S15-Jl25739 Jul 21, 2015	BH05 0.1-0.2 Soil S15-Jl25740 Jul 21, 2015
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	< 20	< 20	< 20	< 20
TRH C15-C28	50	mg/kg	< 50	< 50	130	< 50
TRH C29-C36	50	mg/kg	< 50	< 50	140	< 50
TRH C10-36 (Total)	50	mg/kg	< 50	< 50	270	< 50
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes - Total	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	94	78	109	96
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
TRH C6-C10	20	mg/kg	< 20	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	< 20	< 20
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	< 50	< 50	< 50

Client Sample ID Sample Matrix Eurofins | mgt Sample No. Date Sampled Test/Reference	LOR	Unit	BH04 1.0 Soil S15-Jl25736 Jul 17, 2015	BH01 0.5-0.6 Soil S15-Jl25737 Jul 22, 2015	BH05 0.5-0.6 Soil S15-Jl25739 Jul 21, 2015	BH05 0.1-0.2 Soil S15-Jl25740 Jul 21, 2015
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	< 0.5	8.1	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	0.6	8.1	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.2	8.1	1.2
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	1.3	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5	2.2	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5	6.6	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5	5.2	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	< 0.5	4.2	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	< 0.5	2.7	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5	4.8	< 0.5
Chrysene	0.5	mg/kg	< 0.5	< 0.5	4.4	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	1.0	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5	< 0.5	15	< 0.5
Fluorene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	2.4	< 0.5
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5	10	< 0.5
Pyrene	0.5	mg/kg	< 0.5	< 0.5	12	< 0.5
Total PAH*	0.5	mg/kg	< 0.5	< 0.5	72	< 0.5
2-Fluorobiphenyl (surr.)	1	%	102	116	118	116
p-Terphenyl-d14 (surr.)	1	%	105	116	117	119
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
TRH >C10-C16	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C16-C34	100	mg/kg	< 100	< 100	260	< 100
TRH >C34-C40	100	mg/kg	< 100	< 100	580	< 100
% Moisture	0.1	%	8.3	7.7	7.8	11
Heavy Metals						
Aluminium	10	mg/kg	3900	5800	-	-
Antimony	10	mg/kg	< 10	< 10	-	-
Arsenic	2	mg/kg	2.7	< 2	2.8	2.6
Barium	10	mg/kg	< 10	45	-	-
Beryllium	2	mg/kg	< 2	< 2	-	-
Bismuth	10	mg/kg	< 10	< 10	-	-
Boron	10	mg/kg	< 10	< 10	-	-
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	< 5	11	5.1	17
Cobalt	5	mg/kg	< 5	7.5	-	-
Copper	5	mg/kg	< 5	25	35	42
Iron	5	mg/kg	3700	14000	-	-
Lead	5	mg/kg	< 5	54	150	7.8
Manganese	5	mg/kg	< 5	180	-	-
Mercury	0.05	mg/kg	< 0.05	0.55	1.2	2.3
Molybdenum	5	mg/kg	< 5	< 5	-	-
Nickel	5	mg/kg	< 5	22	< 5	70
Selenium	2	mg/kg	< 2	< 2	-	-
Silver	5	mg/kg	< 5	< 5	-	-
Thallium	10	mg/kg	< 10	< 10	-	-

Client Sample ID			BH04 1.0	BH01 0.5-0.6	BH05 0.5-0.6	BH05 0.1-0.2
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**S15-Jl25736**	**S15-Jl25737**	**S15-Jl25739**	**S15-Jl25740**
Date Sampled			**Jul 17, 2015**	**Jul 22, 2015**	**Jul 21, 2015**	**Jul 21, 2015**
Test/Reference	LOR	Unit				
Heavy Metals						
Tin	10	mg/kg	< 10	< 10	-	-
Titanium	10	mg/kg	41	650	-	-
Uranium	1	mg/kg	< 1	< 1	-	-
Vanadium	10	mg/kg	12	26	-	-
Zinc	5	mg/kg	76	40	100	51
Alkali Metals						
Calcium	1	mg/kg	190	3700	-	-
Magnesium	1	mg/kg	73	4300	-	-
Potassium	1	mg/kg	62	270	-	-
Sodium	1	mg/kg	35	980	-	-
Extended Metals Suite						
Phosphorus	10	mg/kg	16	290	-	-
Silicon	100	mg/kg	180	390	-	-
Sulphur	100	mg/kg	< 100	160	-	-

Client Sample ID			BH05 1.0	BH06 0.5-0.6
Sample Matrix			**Soil**	**Soil**
Eurofins | mgt Sample No.			**S15-Jl25741**	**S15-Jl25742**
Date Sampled			**Jul 21, 2015**	**Jul 21, 2015**
Test/Reference	LOR	Unit		
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				
TRH C6-C9	20	mg/kg	< 20	< 20
TRH C10-C14	20	mg/kg	< 20	< 20
TRH C15-C28	50	mg/kg	< 50	< 50
TRH C29-C36	50	mg/kg	< 50	< 50
TRH C10-36 (Total)	50	mg/kg	< 50	< 50
BTEX				
Benzene	0.1	mg/kg	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1
Xylenes - Total	0.3	mg/kg	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	77	124
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5
TRH C6-C10	20	mg/kg	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	< 50
Polycyclic Aromatic Hydrocarbons				
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.2
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5

Client Sample ID			BH05 1.0	BH06 0.5-0.6
Sample Matrix			Soil	Soil
Eurofins | mgt Sample No.			S15-Jl25741	S15-Jl25742
Date Sampled			Jul 21, 2015	Jul 21, 2015
Test/Reference	LOR	Unit		
Polycyclic Aromatic Hydrocarbons				
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5
Chrysene	0.5	mg/kg	< 0.5	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5	< 0.5
Fluorene	0.5	mg/kg	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5
Naphthalene	0.5	mg/kg	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5
Pyrene	0.5	mg/kg	< 0.5	< 0.5
Total PAH*	0.5	mg/kg	< 0.5	< 0.5
2-Fluorobiphenyl (surr.)	1	%	92	128
p-Terphenyl-d14 (surr.)	1	%	98	97
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				
TRH >C10-C16	50	mg/kg	< 50	< 50
TRH >C16-C34	100	mg/kg	< 100	< 100
TRH >C34-C40	100	mg/kg	< 100	< 100
% Moisture	0.1	%	1.2	7.0
Heavy Metals				
Arsenic	2	mg/kg	< 2	2.4
Cadmium	0.4	mg/kg	< 0.4	< 0.4
Chromium	5	mg/kg	< 5	< 5
Copper	5	mg/kg	8.7	< 5
Lead	5	mg/kg	28	7.8
Mercury	0.05	mg/kg	0.20	0.23
Nickel	5	mg/kg	< 5	< 5
Zinc	5	mg/kg	14	17

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results (regarding both quality and NATA accreditation).

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Eurofins | mgt Suite B4			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Sydney	Jul 31, 2015	14 Day
- Method: TRH C6-C36 - LTM-ORG-2010			
BTEX	Sydney	Jul 30, 2015	14 Day
- Method: TRH C6-C40 - LTM-ORG-2010			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Jul 30, 2015	14 Day
- Method: TRH C6-C40 - LTM-ORG-2010			
Polycyclic Aromatic Hydrocarbons	Sydney	Jul 31, 2015	14 Day
- Method: E007 Polyaromatic Hydrocarbons (PAH)			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Jul 31, 2015	14 Day
- Method: TRH C6-C40 - LTM-ORG-2010			
Eurofins | mgt Suite B14			
Organochlorine Pesticides	Sydney	Jul 31, 2015	14 Day
- Method: E013 Organochlorine Pesticides (OC)			
Organophosphorus Pesticides (OP)	Sydney	Jul 31, 2015	14 Day
- Method: E014 Organophosphorus Pesticides (OP)			
Eurofins | mgt Suite B18			
Chloride	Sydney	Jul 31, 2015	28 Day
- Method: E033 /E045 /E047 Chloride			
pH (1:5 Aqueous extract)	Sydney	Jul 31, 2015	7 Day
- Method: LTM-GEN-7090 pH in soil by ISE			
Sulphate (as SO4)	Sydney	Jul 31, 2015	28 Day
- Method: E045 Sulphate			
Conductivity (1:5 aqueous extract at 25°C)	Melbourne	Aug 03, 2015	7 Day
- Method: LM-LTM-INO-4030			
Ion Exchange Properties	Melbourne	Aug 03, 2015	
Organic Matter %	Melbourne	Aug 05, 2015	5 Day
- Method: APHA 2540E Fixed and Volatile Solids Ignited at 550C			
Extended Metals Suite	Sydney	Jul 30, 2015	28 Day
- Method: E022 Acid Extractable metals in Soils & E026 Mercury & E022/E030 Cations			
Metals M8	Sydney	Jul 30, 2015	28 Day
- Method: LTM-MET-3040_R0 TOTAL AND DISSOLVED METALS AND MERCURY IN WATERS BY ICP-MS			
% Moisture	Sydney	Jul 30, 2015	14 Day
- Method: LTM-GEN-7080 Moisture			

eurofins | mgt

ABN – 50 005 085 521 e.mail : EnviroSales@eurofins.com.au web : www.eurofins.com.au

Melbourne
3-5 Kingston Town Close
Oakleigh VIC 3166
Phone : +61 3 8564 5000
NATA # 1261
Site # 1254 & 14271

Sydney
Unit F3, Building F
16 Mars Road
Lane Cove West NSW 2066
Phone : +61 2 9900 8400
NATA # 1261 Site # 18217

Brisbane
1/21 Smallwood Place
Murarrie QLD 4172
Phone : +61 7 3902 4600
NATA # 1261 Site # 20794

Company Name: Coffey Geotechnics Pty Ltd Chatswood
Address: Level 18, Tower B, Citadel Tower 799 Pacific Highway
Chatswood
NSW 2067

Project Name: MSB UNSW
Project ID: GEOTLCOV24080AS

Order No.:
Report #: 466918
Phone: +61 2 9406 1000
Fax: +61 2 9406 1002

Received: Jul 30, 2015 11:32 AM
Due: Aug 6, 2015
Priority: 5 Day
Contact Name: Matthew Locke

Eurofins | mgt Client Manager: Charl Du Preez

Sample Detail					Asbestos Absence /Presence	HOLD	Organic Matter %	Metals M8	Eurofins | mgt Suite B18	Extended Metals Suite	Eurofins | mgt Suite B14	Moisture Set	Cation Exchange Capacity	Eurofins | mgt Suite B4
Laboratory where analysis is conducted														
Melbourne Laboratory - NATA Site # 1254 & 14271							X						X	
Sydney Laboratory - NATA Site # 18217					X	X		X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794														
External Laboratory														
Sample ID	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**										
BH04 7.0-7.5	Jul 17, 2015		Soil	S15-Jl25721				X				X		X
BH04 2.5-2.95	Jul 17, 2015		Soil	S15-Jl25722		X								
BH01 8.5-8.95	Jul 22, 2015		Soil	S15-Jl25723			X	X	X			X	X	X
BH01 1.0-1.45	Jul 22, 2015		Soil	S15-Jl25724		X								
BH02 0.1-0.2	Jul 21, 2015		Soil	S15-Jl25725	X			X			X	X		X
BH02 5.5-5.95	Jul 21, 2015		Soil	S15-Jl25726			X	X	X			X	X	X
BH02 2.5-2.95	Jul 21, 2015		Soil	S15-Jl25727		X								
BH01 2.5-2.95	Jul 22, 2015		Soil	S15-Jl25728		X								
BH01 0.1-0.2	Jul 22, 2015		Soil	S15-Jl25729	X					X	X	X		X

eurofins | mgt

ABN – 50 005 085 521 e.mail : EnviroSales@eurofins.com.au web : www.eurofins.com.au

Melbourne
3-5 Kingston Town Close
Oakleigh VIC 3166
Phone : +61 3 8564 5000
NATA # 1261
Site # 1254 & 14271

Sydney
Unit F3, Building F
16 Mars Road
Lane Cove West NSW 2066
Phone : +61 2 9900 8400
NATA # 1261 Site # 18217

Brisbane
1/21 Smallwood Place
Murarrie QLD 4172
Phone : +61 7 3902 4600
NATA # 1261 Site # 20794

Company Name: Coffey Geotechnics Pty Ltd Chatswood
Address: Level 18, Tower B, Citadel Tower 799 Pacific Highway
Chatswood
NSW 2067

Project Name: MSB UNSW
Project ID: GEOTLCOV24080AS

Order No.:
Report #: 466918
Phone: +61 2 9406 1000
Fax: +61 2 9406 1002

Received: Jul 30, 2015 11:32 AM
Due: Aug 6, 2015
Priority: 5 Day
Contact Name: Matthew Locke

Eurofins | mgt Client Manager: Charl Du Preez

Sample Detail					Asbestos Absence /Presence	HOLD	Organic Matter %	Metals M8	Eurofins | mgt Suite B18	Extended Metals Suite	Eurofins | mgt Suite B14	Moisture Set	Cation Exchange Capacity	Eurofins | mgt Suite B4
Laboratory where analysis is conducted														
Melbourne Laboratory - NATA Site # 1254 & 14271							X						X	
Sydney Laboratory - NATA Site # 18217					X	X		X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794														
External Laboratory														
BH01 1.0	Jul 22, 2015		Soil	S15-Jl25730		X								
BH02 1.0	Jul 21, 2015		Soil	S15-Jl25731		X								
BH02 0.5-0.6	Jul 21, 2015		Soil	S15-Jl25732						X		X		X
BH04 1.5-1.6	Jul 17, 2015		Soil	S15-Jl25733		X								
BH04 0.2-0.3	Jul 17, 2015		Soil	S15-Jl25734	X					X		X		X
BH06 0.1-0.2	Jul 21, 2015		Soil	S15-Jl25735				X				X		X
BH04 1.0	Jul 17, 2015		Soil	S15-Jl25736						X		X		X
BH01 0.5-0.6	Jul 22, 2015		Soil	S15-Jl25737						X		X		X
BH06 1.0	Jul 21, 2015		Soil	S15-Jl25738		X								
BH05 0.5-0.6	Jul 21, 2015		Soil	S15-Jl25739				X				X		X

eurofins | mgt

ABN – 50 005 085 521 e.mail : EnviroSales@eurofins.com.au web : www.eurofins.com.au

Melbourne
3-5 Kingston Town Close
Oakleigh VIC 3166
Phone : +61 3 8564 5000
NATA # 1261
Site # 1254 & 14271

Sydney
Unit F3, Building F
16 Mars Road
Lane Cove West NSW 2066
Phone : +61 2 9900 8400
NATA # 1261 Site # 18217

Brisbane
1/21 Smallwood Place
Murarrie QLD 4172
Phone : +61 7 3902 4600
NATA # 1261 Site # 20794

Company Name: Coffey Geotechnics Pty Ltd Chatswood
Address: Level 18, Tower B, Citadel Tower 799 Pacific Highway
Chatswood
NSW 2067

Project Name: MSB UNSW
Project ID: GEOTLCOV24080AS

Order No.:
Report #: 466918
Phone: +61 2 9406 1000
Fax: +61 2 9406 1002

Received: Jul 30, 2015 11:32 AM
Due: Aug 6, 2015
Priority: 5 Day
Contact Name: Matthew Locke

Eurofins | mgt Client Manager: Charl Du Preez

Sample Detail					Asbestos Absence /Presence	HOLD	Organic Matter %	Metals M8	Eurofins | mgt Suite B18	Extended Metals Suite	Eurofins | mgt Suite B14	Moisture Set	Cation Exchange Capacity	Eurofins | mgt Suite B4
Laboratory where analysis is conducted														
Melbourne Laboratory - NATA Site # 1254 & 14271							X						X	
Sydney Laboratory - NATA Site # 18217					X	X		X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794														
External Laboratory														
BH05 0.1-0.2	Jul 21, 2015		Soil	S15-Jl25740				X				X		X
BH05 1.0	Jul 21, 2015		Soil	S15-Jl25741				X				X		X
BH06 0.5-0.6	Jul 21, 2015		Soil	S15-Jl25742				X				X		X
BH1 0.1-0.2 DUPLICATE	Jul 17, 2015		Soil	S15-Jl25838		X								

Eurofins | mgt Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil results are reported on a dry basis, unless otherwise stated.
3. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
4. Results are uncorrected for matrix spikes or surrogate recoveries.
5. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
6. Samples were analysed on an 'as received' basis. 7. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the Sample Receipt Advice.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

****NOTE:** pH duplicates are reported as a range NOT as RPD

UNITS

mg/kg: milligrams per Kilogram

ug/l: micrograms per litre

ppb: Parts per billion

org/100ml: Organisms per 100 millilitres

MPN/100mL: Most Probable Number of organisms per 100 millilitres

mg/l: milligrams per litre

ppm: Parts per million

%: Percentage

NTU: Nephelometric Turbidity Units

TERMS

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery
CRM	Certified Reference Material - reported as percent recovery
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands. In the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
Batch Duplicate	A second piece of analysis from a sample outside of the clients batch of samples but run within the laboratory batch of analysis.
Batch SPIKE	Spike recovery reported on a sample from outside of the clients batch of samples but run within the laboratory batch of analysis.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
ASLP	Australian Standard Leaching Procedure (AS4439.3)
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within
TEQ	Toxic Equivalency Quotient

QC - ACCEPTANCE CRITERIA

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries : Recoveries must lie between 50-150% - Phenols 20-130%.

QC DATA GENERAL COMMENTS

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxophene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxophene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Arochlor 1260 in Matrix Spikes and LCS's.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPD's are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	mg/kg	< 20			20	Pass	
TRH C10-C14	mg/kg	< 20			20	Pass	
TRH C15-C28	mg/kg	< 50			50	Pass	
TRH C29-C36	mg/kg	< 50			50	Pass	
Method Blank							
BTEX							
Benzene	mg/kg	< 0.1			0.1	Pass	
Toluene	mg/kg	< 0.1			0.1	Pass	
Ethylbenzene	mg/kg	< 0.1			0.1	Pass	
m&p-Xylenes	mg/kg	< 0.2			0.2	Pass	
o-Xylene	mg/kg	< 0.1			0.1	Pass	
Xylenes - Total	mg/kg	< 0.3			0.3	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	mg/kg	< 0.5			0.5	Pass	
TRH C6-C10	mg/kg	< 20			20	Pass	
TRH C6-C10 less BTEX (F1)	mg/kg	< 20			20	Pass	
Method Blank							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	mg/kg	< 0.5			0.5	Pass	
Acenaphthylene	mg/kg	< 0.5			0.5	Pass	
Anthracene	mg/kg	< 0.5			0.5	Pass	
Benz(a)anthracene	mg/kg	< 0.5			0.5	Pass	
Benzo(a)pyrene	mg/kg	< 0.5			0.5	Pass	
Benzo(b&j)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Benzo(g.h.i)perylene	mg/kg	< 0.5			0.5	Pass	
Benzo(k)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Chrysene	mg/kg	< 0.5			0.5	Pass	
Dibenz(a.h)anthracene	mg/kg	< 0.5			0.5	Pass	
Fluoranthene	mg/kg	< 0.5			0.5	Pass	
Fluorene	mg/kg	< 0.5			0.5	Pass	
Indeno(1.2.3-cd)pyrene	mg/kg	< 0.5			0.5	Pass	
Naphthalene	mg/kg	< 0.5			0.5	Pass	
Phenanthrene	mg/kg	< 0.5			0.5	Pass	
Pyrene	mg/kg	< 0.5			0.5	Pass	
Method Blank							
Organochlorine Pesticides							
Chlordanes - Total	mg/kg	< 0.1			0.1	Pass	
4.4'-DDD	mg/kg	< 0.05			0.05	Pass	
4.4'-DDE	mg/kg	< 0.05			0.05	Pass	
4.4'-DDT	mg/kg	< 0.05			0.05	Pass	
a-BHC	mg/kg	< 0.05			0.05	Pass	
Aldrin	mg/kg	< 0.05			0.05	Pass	
b-BHC	mg/kg	< 0.05			0.05	Pass	
d-BHC	mg/kg	< 0.05			0.05	Pass	
Dieldrin	mg/kg	< 0.05			0.05	Pass	
Endosulfan I	mg/kg	< 0.05			0.05	Pass	
Endosulfan II	mg/kg	< 0.05			0.05	Pass	
Endosulfan sulphate	mg/kg	< 0.05			0.05	Pass	
Endrin	mg/kg	< 0.05			0.05	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Endrin aldehyde	mg/kg	< 0.05			0.05	Pass	
Endrin ketone	mg/kg	< 0.05			0.05	Pass	
g-BHC (Lindane)	mg/kg	< 0.05			0.05	Pass	
Heptachlor	mg/kg	< 0.05			0.05	Pass	
Heptachlor epoxide	mg/kg	< 0.05			0.05	Pass	
Hexachlorobenzene	mg/kg	< 0.05			0.05	Pass	
Methoxychlor	mg/kg	< 0.2			0.2	Pass	
Toxaphene	mg/kg	< 1			1	Pass	
Method Blank							
Organophosphorus Pesticides (OP)							
Chlorpyrifos	mg/kg	< 0.5			0.5	Pass	
Coumaphos	mg/kg	< 0.5			0.5	Pass	
Demeton (total)	mg/kg	< 1			1	Pass	
Diazinon	mg/kg	< 0.5			0.5	Pass	
Dichlorvos	mg/kg	< 0.5			0.5	Pass	
Dimethoate	mg/kg	< 0.5			0.5	Pass	
Disulfoton	mg/kg	< 0.5			0.5	Pass	
Ethoprop	mg/kg	< 0.5			0.5	Pass	
Fenitrothion	mg/kg	< 0.5			0.5	Pass	
Fensulfothion	mg/kg	< 0.5			0.5	Pass	
Fenthion	mg/kg	< 0.5			0.5	Pass	
Methyl azinphos	mg/kg	< 0.5			0.5	Pass	
Malathion	mg/kg	< 0.5			0.5	Pass	
Methyl parathion	mg/kg	< 0.5			0.5	Pass	
Mevinphos	mg/kg	< 0.5			0.5	Pass	
Monocrotophos	mg/kg	< 10			10	Pass	
Parathion	mg/kg	< 0.5			0.5	Pass	
Phorate	mg/kg	< 0.5			0.5	Pass	
Profenofos	mg/kg	< 0.5			0.5	Pass	
Prothiofos	mg/kg	< 0.5			0.5	Pass	
Ronnel	mg/kg	< 0.5			0.5	Pass	
Stirophos	mg/kg	< 0.5			0.5	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
TRH >C10-C16	mg/kg	< 50			50	Pass	
TRH >C16-C34	mg/kg	< 100			100	Pass	
TRH >C34-C40	mg/kg	< 100			100	Pass	
Method Blank							
Chloride	mg/kg	< 10			10	Pass	
Conductivity (1:5 aqueous extract at 25°C)	uS/cm	< 10			10	Pass	
Sulphate (as SO4)	mg/kg	< 10			10	Pass	
Method Blank							
Ion Exchange Properties							
Cation Exchange Capacity	meq/100g	< 0.05			0.05	Pass	
Method Blank							
Heavy Metals							
Aluminium	mg/kg	< 10			10	Pass	
Antimony	mg/kg	< 10			10	Pass	
Arsenic	mg/kg	< 2			2	Pass	
Barium	mg/kg	< 10			10	Pass	
Beryllium	mg/kg	< 2			2	Pass	
Bismuth	mg/kg	< 10			10	Pass	
Boron	mg/kg	< 10			10	Pass	
Cadmium	mg/kg	< 0.4			0.4	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Chromium	mg/kg	< 5			5	Pass	
Cobalt	mg/kg	< 5			5	Pass	
Copper	mg/kg	< 5			5	Pass	
Iron	mg/kg	< 5			5	Pass	
Lead	mg/kg	< 5			5	Pass	
Manganese	mg/kg	< 5			5	Pass	
Mercury	mg/kg	< 0.05			0.05	Pass	
Molybdenum	mg/kg	< 5			5	Pass	
Nickel	mg/kg	< 5			5	Pass	
Selenium	mg/kg	< 2			2	Pass	
Silver	mg/kg	< 5			5	Pass	
Thallium	mg/kg	< 10			10	Pass	
Tin	mg/kg	< 10			10	Pass	
Titanium	mg/kg	< 10			10	Pass	
Uranium	mg/kg	< 1			1	Pass	
Vanadium	mg/kg	< 10			10	Pass	
Zinc	mg/kg	< 5			5	Pass	
Method Blank							
Alkali Metals							
Calcium	mg/kg	< 1			1	Pass	
Magnesium	mg/kg	< 1			1	Pass	
Potassium	mg/kg	< 1			1	Pass	
Sodium	mg/kg	< 1			1	Pass	
Method Blank							
Extended Metals Suite							
Phosphorus	mg/kg	< 10			10	Pass	
Silicon	mg/kg	< 100			100	Pass	
Sulphur	mg/kg	< 100			100	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	%	127			70-130	Pass	
TRH C10-C14	%	95			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	84			70-130	Pass	
Toluene	%	114			70-130	Pass	
Ethylbenzene	%	112			70-130	Pass	
m&p-Xylenes	%	114			70-130	Pass	
o-Xylene	%	117			70-130	Pass	
Xylenes - Total	%	115			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	%	110			70-130	Pass	
TRH C6-C10	%	116			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	%	86			70-130	Pass	
Acenaphthylene	%	87			70-130	Pass	
Anthracene	%	94			70-130	Pass	
Benz(a)anthracene	%	87			70-130	Pass	
Benzo(a)pyrene	%	81			70-130	Pass	
Benzo(b&j)fluoranthene	%	87			70-130	Pass	
Benzo(g.h.i)perylene	%	105			70-130	Pass	
Benzo(k)fluoranthene	%	91			70-130	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Chrysene	%	102			70-130	Pass	
Dibenz(a.h)anthracene	%	127			70-130	Pass	
Fluoranthene	%	91			70-130	Pass	
Fluorene	%	103			70-130	Pass	
Indeno(1.2.3-cd)pyrene	%	110			70-130	Pass	
Naphthalene	%	84			70-130	Pass	
Phenanthrene	%	99			70-130	Pass	
Pyrene	%	94			70-130	Pass	
LCS - % Recovery							
Organochlorine Pesticides							
Chlordanes - Total	%	107			70-130	Pass	
4.4'-DDD	%	112			70-130	Pass	
4.4'-DDE	%	109			70-130	Pass	
4.4'-DDT	%	102			70-130	Pass	
a-BHC	%	105			70-130	Pass	
Aldrin	%	109			70-130	Pass	
b-BHC	%	106			70-130	Pass	
d-BHC	%	111			70-130	Pass	
Dieldrin	%	105			70-130	Pass	
Endosulfan I	%	107			70-130	Pass	
Endosulfan II	%	106			70-130	Pass	
Endosulfan sulphate	%	105			70-130	Pass	
Endrin	%	96			70-130	Pass	
Endrin aldehyde	%	104			70-130	Pass	
Endrin ketone	%	105			70-130	Pass	
g-BHC (Lindane)	%	107			70-130	Pass	
Heptachlor	%	101			70-130	Pass	
Heptachlor epoxide	%	104			70-130	Pass	
Methoxychlor	%	104			70-130	Pass	
LCS - % Recovery							
Organophosphorus Pesticides (OP)							
Chlorpyrifos	%	103			70-130	Pass	
Dimethoate	%	108			70-130	Pass	
Disulfoton	%	103			70-130	Pass	
Methyl azinphos	%	74			70-130	Pass	
Methyl parathion	%	101			70-130	Pass	
Parathion	%	97			70-130	Pass	
Phorate	%	83			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
TRH >C10-C16	%	96			70-130	Pass	
LCS - % Recovery							
Chloride	%	99			70-130	Pass	
Sulphate (as SO4)	%	100			70-130	Pass	
LCS - % Recovery							
Heavy Metals							
Aluminium	%	97			70-130	Pass	
Antimony	%	107			70-130	Pass	
Arsenic	%	92			70-130	Pass	
Barium	%	119			70-130	Pass	
Beryllium	%	121			70-130	Pass	
Bismuth	%	120			70-130	Pass	
Boron	%	123			70-130	Pass	
Cadmium	%	89			70-130	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Chromium	%	91			70-130	Pass	
Cobalt	%	114			70-130	Pass	
Copper	%	88			70-130	Pass	
Iron	%	92			70-130	Pass	
Lead	%	84			70-130	Pass	
Manganese	%	116			70-130	Pass	
Mercury	%	83			70-130	Pass	
Molybdenum	%	127			70-130	Pass	
Nickel	%	88			70-130	Pass	
Selenium	%	114			70-130	Pass	
Silver	%	120			70-130	Pass	
Thallium	%	120			70-130	Pass	
Tin	%	120			70-130	Pass	
Titanium	%	100			70-130	Pass	
Uranium	%	123			70-130	Pass	
Vanadium	%	117			70-130	Pass	
Zinc	%	90			70-130	Pass	
LCS - % Recovery							
Alkali Metals							
Calcium	%	110			70-130	Pass	
Magnesium	%	109			70-130	Pass	
Potassium	%	113			70-130	Pass	
Sodium	%	105			70-130	Pass	
LCS - % Recovery							
Extended Metals Suite							
Phosphorus	%	116			70-130	Pass	
Silicon	%	111			70-130	Pass	
Sulphur	%	100			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1					
TRH C6-C9	S15-Jl25172	NCP	%	90			70-130	Pass	
TRH C10-C14	S15-Jl25931	NCP	%	87			70-130	Pass	
Spike - % Recovery									
BTEX				Result 1					
Benzene	S15-Jl25172	NCP	%	89			70-130	Pass	
Toluene	S15-Jl25172	NCP	%	87			70-130	Pass	
Ethylbenzene	S15-Jl25172	NCP	%	95			70-130	Pass	
m&p-Xylenes	S15-Jl25172	NCP	%	98			70-130	Pass	
o-Xylene	S15-Jl25172	NCP	%	102			70-130	Pass	
Xylenes - Total	S15-Jl25172	NCP	%	99			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
Naphthalene	S15-Jl25172	NCP	%	128			70-130	Pass	
TRH C6-C10	S15-Jl25172	NCP	%	81			70-130	Pass	
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons				Result 1					
Acenaphthene	S15-Jl25721	CP	%	99			70-130	Pass	
Acenaphthylene	S15-Jl25721	CP	%	97			70-130	Pass	
Anthracene	S15-Jl25721	CP	%	99			70-130	Pass	
Benz(a)anthracene	S15-Jl25721	CP	%	104			70-130	Pass	
Benzo(a)pyrene	S15-Jl25721	CP	%	104			70-130	Pass	
Benzo(b&j)fluoranthene	S15-Jl25721	CP	%	109			70-130	Pass	
Benzo(g.h.i)perylene	S15-Jl25721	CP	%	84			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Benzo(k)fluoranthene	S15-Jl25721	CP	%	97			70-130	Pass	
Chrysene	S15-Jl25721	CP	%	101			70-130	Pass	
Dibenz(a.h)anthracene	S15-Jl25721	CP	%	87			70-130	Pass	
Fluoranthene	S15-Jl25721	CP	%	100			70-130	Pass	
Fluorene	S15-Jl25721	CP	%	98			70-130	Pass	
Indeno(1.2.3-cd)pyrene	S15-Jl25721	CP	%	88			70-130	Pass	
Naphthalene	S15-Jl25721	CP	%	99			70-130	Pass	
Phenanthrene	S15-Jl25721	CP	%	91			70-130	Pass	
Pyrene	S15-Jl25721	CP	%	101			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
TRH >C10-C16	S15-Jl25931	NCP	%	92			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Copper	S15-Jl25890	NCP	%	101			70-130	Pass	
Spike - % Recovery									
Organochlorine Pesticides				Result 1					
Chlordanes - Total	S15-Jl27111	NCP	%	99			70-130	Pass	
4.4'-DDD	S15-Jl27111	NCP	%	109			70-130	Pass	
4.4'-DDE	S15-Jl27111	NCP	%	101			70-130	Pass	
4.4'-DDT	S15-Jl27111	NCP	%	100			70-130	Pass	
a-BHC	S15-Jl27111	NCP	%	98			70-130	Pass	
Aldrin	S15-Jl27111	NCP	%	100			70-130	Pass	
b-BHC	S15-Jl27111	NCP	%	96			70-130	Pass	
d-BHC	S15-Jl27111	NCP	%	108			70-130	Pass	
Dieldrin	S15-Jl27111	NCP	%	99			70-130	Pass	
Endosulfan I	S15-Jl27111	NCP	%	100			70-130	Pass	
Endosulfan II	S15-Jl27111	NCP	%	100			70-130	Pass	
Endosulfan sulphate	S15-Jl27111	NCP	%	104			70-130	Pass	
Endrin	S15-Jl27111	NCP	%	97			70-130	Pass	
Endrin aldehyde	S15-Jl27111	NCP	%	93			70-130	Pass	
Endrin ketone	S15-Jl27111	NCP	%	102			70-130	Pass	
g-BHC (Lindane)	S15-Jl27111	NCP	%	102			70-130	Pass	
Heptachlor	S15-Jl27111	NCP	%	98			70-130	Pass	
Heptachlor epoxide	S15-Jl27111	NCP	%	98			70-130	Pass	
Methoxychlor	S15-Jl27111	NCP	%	92			70-130	Pass	
Spike - % Recovery									
Organophosphorus Pesticides (OP)				Result 1					
Chlorpyrifos	S15-Jl27112	NCP	%	95			70-130	Pass	
Dimethoate	S15-Jl27112	NCP	%	101			70-130	Pass	
Disulfoton	S15-Jl27112	NCP	%	126			70-130	Pass	
Methyl azinphos	S15-Jl27112	NCP	%	92			70-130	Pass	
Methyl parathion	S15-Jl27112	NCP	%	94			70-130	Pass	
Parathion	S15-Jl27112	NCP	%	95			70-130	Pass	
Phorate	S15-Jl27112	NCP	%	103			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Manganese	S15-Jl25890	NCP	%	107			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Antimony	S15-Jl25735	CP	%	86			70-130	Pass	
Arsenic	S15-Jl25735	CP	%	102			70-130	Pass	
Barium	S15-Jl25735	CP	%	87			70-130	Pass	
Beryllium	S15-Jl25735	CP	%	95			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Bismuth	S15-Jl25735	CP	%	88			70-130	Pass	
Boron	S15-Jl25735	CP	%	104			70-130	Pass	
Cadmium	S15-Jl25735	CP	%	104			70-130	Pass	
Chromium	S15-Jl25735	CP	%	105			70-130	Pass	
Cobalt	S15-Jl25735	CP	%	87			70-130	Pass	
Lead	S15-Jl25735	CP	%	108			70-130	Pass	
Mercury	S15-Jl25735	CP	%	113			70-130	Pass	
Molybdenum	S15-Jl25735	CP	%	70			70-130	Pass	
Nickel	S15-Jl25735	CP	%	74			70-130	Pass	
Selenium	S15-Jl25735	CP	%	99			70-130	Pass	
Silver	S15-Jl25735	CP	%	89			70-130	Pass	
Thallium	S15-Jl25735	CP	%	88			70-130	Pass	
Uranium	S15-Jl25735	CP	%	114			70-130	Pass	
Vanadium	S15-Jl25735	CP	%	98			70-130	Pass	
Zinc	S15-Jl25735	CP	%	70			70-130	Pass	
Spike - % Recovery									
Alkali Metals				Result 1					
Calcium	S15-Jl25735	CP	%	78			70-130	Pass	
Potassium	S15-Jl25735	CP	%	114			70-130	Pass	
Spike - % Recovery									
Extended Metals Suite				Result 1					
Phosphorus	S15-Jl25735	CP	%	118			70-130	Pass	
Sulphur	S15-Jl25735	CP	%	96			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
				Result 1	Result 2	RPD			
Chloride	S15-Jl24046	NCP	mg/kg	200	200	<1	30%	Pass	
Conductivity (1:5 aqueous extract at 25°C)	M15-Jl25631	NCP	uS/cm	16	13	21	30%	Pass	
Sulphate (as SO4)	S15-Jl24046	NCP	mg/kg	120	120	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C10-C14	S15-Jl25725	CP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C15-C28	S15-Jl25725	CP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH C29-C36	S15-Jl25725	CP	mg/kg	< 50	< 50	<1	30%	Pass	
Duplicate									
Organochlorine Pesticides				Result 1	Result 2	RPD			
Chlordanes - Total	B15-Jl26040	NCP	mg/kg	**	< 0.1	<1	30%	Pass	
4.4'-DDD	B15-Jl26040	NCP	mg/kg	**	< 0.05	<1	30%	Pass	
4.4'-DDE	B15-Jl26040	NCP	mg/kg	**	< 0.05	<1	30%	Pass	
4.4'-DDT	B15-Jl26040	NCP	mg/kg	**	< 0.05	<1	30%	Pass	
a-BHC	B15-Jl26040	NCP	mg/kg	**	< 0.05	<1	30%	Pass	
Aldrin	B15-Jl26040	NCP	mg/kg	**	< 0.05	<1	30%	Pass	
b-BHC	B15-Jl26040	NCP	mg/kg	**	< 0.05	<1	30%	Pass	
d-BHC	B15-Jl26040	NCP	mg/kg	**	< 0.05	<1	30%	Pass	
Dieldrin	B15-Jl26040	NCP	mg/kg	**	< 0.05	<1	30%	Pass	
Endosulfan I	B15-Jl26040	NCP	mg/kg	**	< 0.05	<1	30%	Pass	
Endosulfan II	B15-Jl26040	NCP	mg/kg	**	< 0.05	<1	30%	Pass	
Endosulfan sulphate	B15-Jl26040	NCP	mg/kg	**	< 0.05	<1	30%	Pass	
Endrin	B15-Jl26040	NCP	mg/kg	**	< 0.05	<1	30%	Pass	
Endrin aldehyde	B15-Jl26040	NCP	mg/kg	**	< 0.05	<1	30%	Pass	
Endrin ketone	B15-Jl26040	NCP	mg/kg	**	< 0.05	<1	30%	Pass	
g-BHC (Lindane)	B15-Jl26040	NCP	mg/kg	**	< 0.05	<1	30%	Pass	
Heptachlor	B15-Jl26040	NCP	mg/kg	**	< 0.05	<1	30%	Pass	

Duplicate									
Organochlorine Pesticides				Result 1	Result 2	RPD			
Heptachlor epoxide	B15-Jl26040	NCP	mg/kg	**	< 0.05	<1	30%	Pass	
Hexachlorobenzene	B15-Jl26040	NCP	mg/kg	**	< 0.05	<1	30%	Pass	
Methoxychlor	B15-Jl26040	NCP	mg/kg	**	< 0.2	<1	30%	Pass	
Toxaphene	B15-Jl26040	NCP	mg/kg	**	< 1	<1	30%	Pass	
Duplicate									
Organophosphorus Pesticides (OP)				Result 1	Result 2	RPD			
Chlorpyrifos	S15-Jl26280	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Coumaphos	S15-Jl26280	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Demeton (total)	S15-Jl26280	NCP	mg/kg	< 1	< 1	<1	30%	Pass	
Diazinon	S15-Jl26280	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dichlorvos	S15-Jl26280	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dimethoate	S15-Jl26280	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Disulfoton	S15-Jl26280	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Ethoprop	S15-Jl26280	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fenitrothion	S15-Jl26280	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fensulfothion	S15-Jl26280	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fenthion	S15-Jl26280	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Methyl azinphos	S15-Jl26280	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Malathion	S15-Jl26280	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Methyl parathion	S15-Jl26280	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Mevinphos	S15-Jl26280	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Monocrotophos	S15-Jl26280	NCP	mg/kg	< 10	< 10	<1	30%	Pass	
Parathion	S15-Jl26280	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Phorate	S15-Jl26280	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Profenofos	S15-Jl26280	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Prothiofos	S15-Jl26280	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Ronnel	S15-Jl26280	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Stirophos	S15-Jl26280	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
TRH >C10-C16	S15-Jl25725	CP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH >C16-C34	S15-Jl25725	CP	mg/kg	< 100	< 100	<1	30%	Pass	
TRH >C34-C40	S15-Jl25725	CP	mg/kg	< 100	< 100	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
pH (1:5 Aqueous extract)	S15-Jl25726	CP	pH Units	6.8	6.9	pass	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S15-Jl25734	CP	%	23	22	6.0	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Aluminium	S15-Jl25734	CP	mg/kg	1500	1400	11	30%	Pass	
Antimony	S15-Jl25734	CP	mg/kg	< 10	< 10	<1	30%	Pass	
Arsenic	S15-Jl25734	CP	mg/kg	< 2	< 2	<1	30%	Pass	
Barium	S15-Jl25734	CP	mg/kg	< 10	29	97	30%	Fail	Q15
Beryllium	S15-Jl25734	CP	mg/kg	< 2	< 2	<1	30%	Pass	
Bismuth	S15-Jl25734	CP	mg/kg	< 10	< 10	<1	30%	Pass	
Boron	S15-Jl25734	CP	mg/kg	< 10	< 10	<1	30%	Pass	
Cadmium	S15-Jl25734	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	S15-Jl25734	CP	mg/kg	< 5	< 5	<1	30%	Pass	
Cobalt	S15-Jl25734	CP	mg/kg	< 5	< 5	<1	30%	Pass	
Copper	S15-Jl25734	CP	mg/kg	21	21	1.0	30%	Pass	
Iron	S15-Jl25734	CP	mg/kg	1800	1500	16	30%	Pass	
Lead	S15-Jl25734	CP	mg/kg	12	14	16	30%	Pass	

Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Manganese	S15-Jl25734	CP	mg/kg	24	23	5.0	30%	Pass	
Mercury	S15-Jl25734	CP	mg/kg	0.25	0.31	21	30%	Pass	
Molybdenum	S15-Jl25734	CP	mg/kg	< 5	< 5	<1	30%	Pass	
Nickel	S15-Jl25734	CP	mg/kg	< 5	< 5	<1	30%	Pass	
Selenium	S15-Jl25734	CP	mg/kg	< 2	< 2	<1	30%	Pass	
Silver	S15-Jl25734	CP	mg/kg	< 5	< 5	<1	30%	Pass	
Thallium	S15-Jl25734	CP	mg/kg	< 10	< 10	<1	30%	Pass	
Tin	S15-Jl25734	CP	mg/kg	< 10	< 10	<1	30%	Pass	
Uranium	S15-Jl25734	CP	mg/kg	< 1	< 1	<1	30%	Pass	
Vanadium	S15-Jl25734	CP	mg/kg	< 10	< 10	<1	30%	Pass	
Zinc	S15-Jl25734	CP	mg/kg	21	35	49	30%	Fail	Q15
Duplicate									
Extended Metals Suite				Result 1	Result 2	RPD			
Phosphorus	S15-Jl25734	CP	mg/kg	74	70	5.0	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C6-C9	S15-Jl25735	CP	mg/kg	< 20	< 20	<1	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	S15-Jl25735	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Toluene	S15-Jl25735	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Ethylbenzene	S15-Jl25735	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
m&p-Xylenes	S15-Jl25735	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
o-Xylene	S15-Jl25735	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Xylenes - Total	S15-Jl25735	CP	mg/kg	< 0.3	< 0.3	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
Naphthalene	S15-Jl25735	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
TRH C6-C10	S15-Jl25735	CP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C6-C10 less BTEX (F1)	S15-Jl25735	CP	mg/kg	< 20	< 20	<1	30%	Pass	
Duplicate									
Alkali Metals				Result 1	Result 2	RPD			
Calcium	S15-Jl26988	NCP	mg/kg	4300	4100	5.0	30%	Pass	
Potassium	S15-Jl26988	NCP	mg/kg	1700	1800	8.0	30%	Pass	
Duplicate									
Extended Metals Suite				Result 1	Result 2	RPD			
Sulphur	S15-Jl26988	NCP	mg/kg	5500	6700	19	30%	Pass	
Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	S15-Jl25737	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Acenaphthylene	S15-Jl25737	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Anthracene	S15-Jl25737	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benz(a)anthracene	S15-Jl25737	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(a)pyrene	S15-Jl25737	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(b&j)fluoranthene	S15-Jl25737	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(g.h.i)perylene	S15-Jl25737	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(k)fluoranthene	S15-Jl25737	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Chrysene	S15-Jl25737	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dibenz(a.h)anthracene	S15-Jl25737	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluoranthene	S15-Jl25737	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluorene	S15-Jl25737	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	S15-Jl25737	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Naphthalene	S15-Jl25737	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Phenanthrene	S15-Jl25737	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Pyrene	S15-Jl25737	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	

Duplicate									
Alkali Metals				Result 1	Result 2	RPD			
Magnesium	S15-Jl26988	NCP	mg/kg	2700	3000	11	30%	Pass	
Sodium	S15-Jl26988	NCP	mg/kg	190	230	19	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs
Q15	The RPD reported passes Eurofins | mgt's Acceptance Criteria as stipulated in SOP 05. Refer to Glossary Page of this report for further details

Authorised By

Charl Du Preez	Analytical Services Manager
Bob Symons	Senior Analyst-Asbestos (NSW)
Bob Symons	Senior Analyst-Inorganic (NSW)
Emily Rosenberg	Senior Analyst-Metal (VIC)
Huong Le	Senior Analyst-Inorganic (VIC)
Ivan Taylor	Senior Analyst-Metal (NSW)
Ryan Hamilton	Senior Analyst-Organic (NSW)
Ryan Hamilton	Senior Analyst-Volatile (NSW)

Glenn Jackson

National Laboratory Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Uncertainty data is available on request

Artarmon, Sydney Laboratory

Coffey Testing Pty Ltd
ABN 92 114 364 046
47 - 49 Carlotta Street
Artarmon SYDNEY NSW 2064

Phone: +61 2 9437 0137

Material Test Report

Report No: ARTA15S-00428-1
Issue No: 1

Client: Coffey Geotechnics Pty Ltd (Chatswood)
PO Box 5275
West Chatswood NSW 1515

Principal:
Project No.: INFOARTA01378AA
Project Name: GEOTLCOV24080AS - MATERIAL SCIENCE BUILDING, UNSW
Lot No.: TRN:

Accredited for compliance with ISO/IEC 17025.

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Approved Signatory: Garry Collins
(Specialised Testing Manager)
NATA Accredited Laboratory Number:431
Date of Issue: 12/08/2015

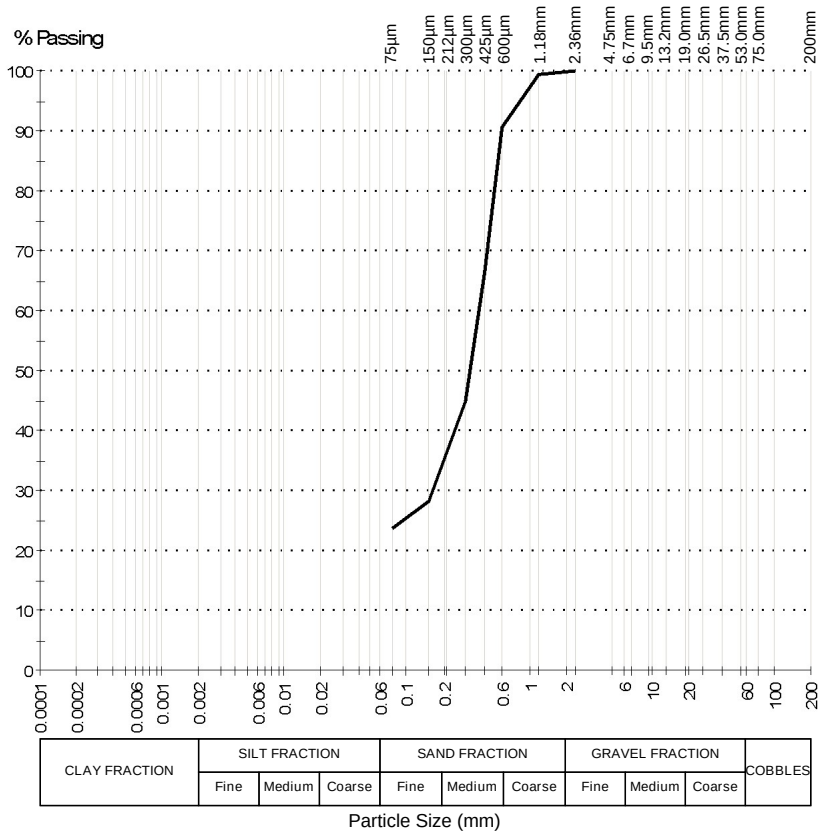
Sample Details

Sample ID:	ARTA15S-00428
Client Sample:	BH03
Date Sampled:	23/07/2015
Source:	Ex Job Site
Material:	Subgrade
Specification:	No Specification
Sampling Method:	Submitted by client
Project Location:	Kensington, NSW
Sample Location:	BH03 (35.50 to 35.95m)

Other Test Results

Description	Method	Result	Limits

Particle Size Distribution



Method: AS 1289.3.6.1
Drying by: Oven
Date Tested: 5/08/2015
Note: Sample Washed

Sieve Size	% Passing	Limits
2.36mm	100	
1.18mm	99	
600µm	90	
425µm	66	
300µm	45	
150µm	28	
75µm	24	

Comments

N/A

Artarmon, Sydney Laboratory

Coffey Testing Pty Ltd
ABN 92 114 364 046
47 - 49 Carlotta Street
Artarmon SYDNEY NSW 2064

Phone: +61 2 9437 0137

Report No: ARTA15S-00429-1
Issue No: 1

Material Test Report

Client:	Coffey Geotechnics Pty Ltd (Chatswood) PO Box 5275 West Chatswood NSW 1515
Principal:	
Project No.:	INFOARTA01378AA
Project Name:	GEOTLCOV24080AS - MATERIAL SCIENCE BUILDING, UNSW
Lot No.:	TRN:

Accredited for compliance with ISO/IEC 17025.

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Approved Signatory: Garry Collins
(Specialised Testing Manager)
NATA Accredited Laboratory Number:431
Date of Issue: 12/08/2015

Sample Details

Sample ID:	ARTA15S-00429
Client Sample:	BH03
Date Sampled:	23/07/2015
Source:	Ex Job Site
Material:	Subgrade
Specification:	No Specification
Sampling Method:	Submitted by client
Project Location:	Kensington, NSW
Sample Location:	BH03 (38.50 to 38.95m)

Test Results

Description	Method	Result	Limits
Sample History	AS 1289.1.1	Air-dried	
Preparation	AS 1289.1.1	Dry Sieved	
Linear Shrinkage (%)	AS 1289.3.4.1	7.0	
Mould Length (mm)		250.1	
Crumbling		No	
Curling		No	
Cracking		Yes	
Liquid Limit (%)	AS 1289.3.1.2	33	
Method		One Point	
Plastic Limit (%)	AS 1289.3.2.1	16	
Plasticity Index (%)	AS 1289.3.3.1	17	
Date Tested		5/08/2015	

Comments

N/A