

Tolucy Pty Ltd
C/- Calder Flower Architects



Detailed Site Investigation: Proposed Seniors Living, 58 Laitoki Road, Terrey Hills, NSW.

P1504710JR05V01
October 2018

ENVIRONMENTAL



WATER



WASTEWATER



GEOTECHNICAL



CIVIL



PROJECT
MANAGEMENT



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Abbreviations

ABC – Ambient background concentration

AEC – Area of environmental concern

AF – Asbestos fines

ASC NEPM – Assessment of site contamination (National Environmental Protection Measure)

BTEXN – Benzene, toluene, ethylbenzene, xylene, naphthalene

COC – Chain of custody

COPC – Contaminants of potential concern

DEC – NSW Department of Environment and Conservation

DP – Deposited Plan

DQI – Data quality indicators

DQO – Data quality objective

DSI – Detailed site investigation

EIL – Ecological investigation levels

EPA – NSW Environmental Protection Authority

ESL – Ecological screening levels

HM – Heavy metals

HSL – Health screening level

LGA – Local government area

MA – Martens and Associates Pty Ltd

mAHD – Meters Australian height datum

mBGL – Meters below ground level

NATA – National Association of Testing Authorities

NBC – Northern Beaches Council

OCP – Organochloride pesticides

OEH – NSW Office of Environment and Heritage

OPP – Organophosphate pesticides

PACM – Potential asbestos containing material

PAH – Polycyclic aromatic hydrocarbons

PSI – Preliminary site investigation

RPD – Relative percentage difference – difference between two values
divided by the average

SAC – Site acceptance criteria

SAQP – Sampling analytical and quality plan

SOP – Standard operating procedure

TRH – Total recoverable hydrocarbons

1 Introduction

1.1 Overview

This report prepared by Martens and Associates (MA) on behalf of Tolucy Pty Ltd C/- Calder Flower Architects ('the client') documents the findings of a detailed site investigation (DSI) to support a development application (DA) to Northern Beaches Council (NBC) for a proposed seniors living development at 58 Laitoki Road, Terrey Hills, NSW ('the site').

A preliminary site investigation (PSI) was previously completed by MA (MA, 2016) for the site and should be read in conjunction with this report.

1.2 Objectives

The objective of this report is to assess areas of environmental concern (AEC) and associated contaminants of potential concern (COPC) identified in the PSI (MA, 2016) and determine suitability for the proposed seniors living development.

1.3 Proposed Development

The proposed seniors living development will include the following:

- Seven residential blocks, including one block with common areas and reception.
- Internal roads, car parking and services infrastructure.

The proposed layout is provided in Attachment A.

1.4 Scope of Works

The scope of works for this DSI includes:

- Review of PSI (MA, 2016).
- Intrusive soil investigation and soil sampling program where access is available, targeting AEC outlined in the PSI (MA, 2016).
- Laboratory analyses of selected samples for identified COPC and assessment against site acceptance criteria (SAC).

1.5 Reference Guidelines

This assessment is prepared in general accordance with the following guidelines:

- NEPC (1999, amended 2013) National Environmental Protection (Assessment of Site Contamination) Measure. Referred to as ASC NEPM (2013).
- NSW EPA (2017) 3rd Ed. Contaminated Land Management: Guidelines for the NSW Site Auditor Scheme.
- NSW OEH (2011) Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites.

2 Site Background Information

2.1 Site Location and Existing Land Use

Site information is summarised in Table 1.

Table 1: Site background information.

Item	Description / Detail
Site address	58 Laitoki Road, Terrey Hills, NSW.
Lot/DP	Lot 368 DP752017.
Approximate area	1.95 ha (site plan from Calder Flower Architects).
Local Government Area (LGA)	NBC
Current zoning and land use	RU4 Primary Production Small Lots.
Proposed land use	Seniors living development.
Site description	The site contains a single storey clad dwelling, garage, above ground pool, horse arena/stables and sheds. The site is generally cleared of trees with low grass cover.
Surrounding land uses	Mixture of rural, rural residential and low density residential.
Drainage	Drainage is typically via overland flow to the north west, to Neverfail Creek (immediately west of the site's western boundary).
Topography	The site has grades of 5 – 15% towards the north west. Site elevation is between approximately 198 mAHD in the south east and 173 mAHD in the north west.
Expected geology	The Sydney 1:100,000 Geological Series Sheet 9130 (Geological Survey of NSW, 1983) indicates that the site is underlain by Hawkesbury Sandstone comprising medium to coarse grained quartz sandstone, very minor shale and laminite lenses.
Environmental receptors	Neverfail Creek to the west of site which is an upper tributary of Kierans Creek.
Sensitive receptors	Future site residents, visitors, and workers. Site workers during future construction work. Surrounding residential/rural site occupants.

3 Previous Site Investigation

3.1 Preliminary Site Investigation (PSI)

A PSI (MA, 2016) was completed which provided an account of potential contamination status at the site. The summary of key findings is provided in Table 2.

Table 2: Summary of previous site investigations.

Investigation Details	Investigation Task and Finding
Scope of works	○ Review of available site information including NSW EPA records, Council records and historic aerial photography. ○ Site walkover. ○ Identification of AECs and associated COPC. ○ Preparation of a PSI in general accordance with ASC NEPM (2013).
Current and historical site records key findings	○ Review of NBC databases included records for the approval of dwellings, a swimming pool, nursery shed, a cabana and landfilling at the site. ○ NSW EPA records contained no notices for the site or site surrounds. ○ Review of historic aerial photography indicated rural and/or rural residential use since at least 1955. ○ Site walkover identified dwellings and sheds in the central portion of the site, in addition to stables and a horse arena in the western portion of the site. Localised areas of filling was noted in the western portion of the horse stables and to the east of the horse stables.
Conclusions and recommendations	○ A DSI was recommended to address AEC and associated COPC identified as part of the investigation.

4 Conceptual Site Model

4.1 Areas of Environmental Concern

AECs identified in MA (2016) are provided in Table 3.

Table 3: Areas of environmental concern and contaminants of primary concern.

AEC ¹	Potential for Contamination	COPC
A – Dwelling and existing/former sheds	Pesticides and heavy metals may have been used underneath dwellings for pest control. Dwelling construction may include ACM and/or lead based paints. Existing/former sheds may have stored fuel, oils, pesticides and/or been treated with heavy metals and pesticides (pest control). Shed construction may have include ACM and/or lead based paints.	HM, TRH, BTEXN, PAH, OCP/OPP, asbestos
B – Filled areas ²	Fill, of unknown origin, observed to contain anthropogenic material such as brick and tile. Material may contain contaminants such as ACM, hydrocarbons or pesticides.	HM, TRH, BTEXN, PAH, OCP/OPP, asbestos

Notes

¹ Locations identified on AEC map in Attachment B.

² An additional area of localised filling was observed in the eastern portion of the site during DSI investigations, as shown in the AEC map in Attachment B.

4.2 Sensitive Receptors and Exposure Pathways

Table 4 provides a summary of identified sensitive receptors and potential exposure pathways connecting receptors to identified AECs and COPCs outlined in Table 3.

Table 4: Summary of receptors and potential pathways.

Receptor	Pathway
<u>Human Receptors:</u>	
- Future site residents, visitors and workers. - Site workers during future construction works. - Surrounding residential/rural site occupants, workers and gold players.	- Dermal contact. - Oral ingestion of potentially contaminated soil. - Inhalation of potential contaminants.
<u>Environmental Receptors</u>	
- Neverfail Creek (which is an upper tributary of Kierans Creek). - Existing site flora and fauna.	- Migration of contaminated runoff. - Direct contact with site flora and fauna.

5 Sampling, Analytical and Quality Plan (SAQP)

A SAQP was developed to ensure that data collected for this DSI is representative and provides a robust basis for site assessment decisions. Preparation of the SAQP was completed in general accordance with ASC NEPM (2013) methodology and includes:

- Data quality objectives (DQO).
- Sampling methodologies and procedures.
- Field screening methods.
- Sample handling, preservation and storage procedures.
- Analytical QA/QC.

5.1 Data Quality Objectives (DQO)

DQO have been prepared as statements specifying qualitative and quantitative data required to support project decisions. DQO have been prepared in general accordance with NSW EPA (2017) ASC NEPM (2013) guidelines and are presented in Table 5.

Table 5: Data quality objectives for the assessment of soil investigations.

Step 1 Stating the Problem	The proposed seniors living development will include residential land use with access to soil. Therefore, the site must be deemed suitable to accommodate the proposed land use. This DSI is required to assess risk in AEC posed by COPC, to onsite and offsite sensitive receptors.
Step 2 Identifying the Decision(s)	Historical investigations have identified AEC which may be a source of contamination, including existing dwellings and sheds, and potential fill material. To assess the suitability of the site for future residential use, decisions are to be made based on the following questions: ○ Is site soil quality suitable for the intended residential land use? ○ Has previous or current site use impacted the quality of site soil that may pose a risk to humans or the environment health for future land use and construction? ○ Does site soil require remediation or management prior to onsite residential land use?
Step 3 Identification of Inputs to the Decision	The inputs to the assessment of site soil quality will include: ○ Soil sampling at nominated locations across the site. ○ Laboratory analytical results for relevant COPC. ○ Assessment of analytical results against site suitable human health and ecological risk criteria.

Step 4 Study Boundary Definitions	Study boundaries are as follows: ○ Lateral – Lateral boundary of the assessment is defined by the investigation area boundary as indicated in Attachment B. ○ Vertical – Vertical boundary will be governed by the maximum depth reached during subsurface investigations. ○ Temporal – At this stage of investigation, only one round of sampling has been undertaken.
Step 5 Development of Decision Rules	The decision rule for this investigation area is as follows: If the concentration of contaminants in the soil data exceeds the adopted assessment criteria; an assessment of the risk is required. Should the risk be unacceptable, further investigation to remediate and or manage the onsite impacts in relation to the proposed development will be undertaken.
Step 6 Specification of Limits on Decision Errors	Guidance found in ASC NEPM (2013) Schedule B2 regarding 95% upper confidence limit (UCL) states that the 95% UCL of the arithmetic mean provides a 95% confidence level that the true population mean will be less than or equal to this value. Therefore, a decision can be made based on a probability that 95% of the data collected will satisfy the site acceptance criteria. A limit on decision error will be 5% that a conclusive statement may be incorrect. In applying the statistical analysis, the standard deviation of the results should be less than 50% of the relevant investigation or screening level, and no single value should exceed 250% of the relevant investigation or screening level. Additionally, data validation will be completed with laboratory QA/QC analysis, as detailed in Section 5.2.
Step 7 Optimisation of Sampling Design	Proposed sampling locations shall provide even coverage across identified AEC on the site (with consideration to the existing development and access constraints). Sampling shall attempt to ensure that critical locations are assessed, sampled, and analysed for appropriate contaminants of concern. Soil sampling locations were set using a combined judgemental and grid pattern across the site.

5.2 Data Quality Indicators (DQI)

In accordance with NSW EPA (2017), the investigation data set has been compared with Data Quality Indicators (DQI) outlined in Table 6 to ensure that collected data meets the project needs and that DQOs have been met.

Table 6: Data Quality Indicators.

Assessment Measure (DQI)	Comment
Precision – A measure of the variability (or reproducibility) of data.	Precision is assessed by reviewing blind field duplicated sample set through the calculation of relative percent difference (RPD). Data precision is deemed acceptable where contaminant concentrations are less than 10 x EQL, or where RPDs are below 50% (10-30 x EQL) or 30% (>30 x EQL). Exceedance of this range is still considered acceptable where heterogeneous materials are sampled and where results are significantly lower than SAC.
Accuracy – A measure of the closeness of reported data to the “true value”.	Data accuracy is assessed by: ○ Field spikes and blanks. ○ Laboratory control samples.

Assessment Measure (DQI)	Comment
Representativeness – The confidence that data are representative of each media present on the site.	To ensure data representativeness the following field and laboratory procedures are followed: ○ Ensure that the design and implementation of the sampling program has been completed in accordance with MA standard operating procedures (SOP). ○ Blank samples shall be used during field sampling to ensure no cross contamination or laboratory artefacts. ○ Ensure that all laboratory hold times are met and that sample handling and transport is completed in accordance with MA SOP.
Completeness – A measure of the amount of usable data from a data collection activity.	To ensure data set completeness, the following is required: ○ Confirmation that all sampling methodology was completed in general accordance with MA SOP. ○ COC and receipt forms. ○ Results from all laboratory QA/QC samples (lab blanks, trip/spike, lab duplicates). ○ NATA accreditation stamp on all laboratory reports.
Comparability - The confidence that data may be considered to be equivalent for each sampling and analytical event.	Data comparability is maintained by ensuring that: ○ All site sampling events are undertaken following methodologies outlined in MA SOP and published guidelines. ○ NATA accredited laboratory methodologies shall be followed on all laboratory testing.

5.3 Investigation and Sampling Methodology and Quality Assurance / Quality Control

Site investigation and soil sampling methodology (Table 7) was completed to meet the project DQO.

Table 7: Investigation and sampling methodology.

Activity	Detail / Comments
Fieldworks	Surface and subsurface investigations were completed on 12 July, 2018 and involved: - Excavation of 2 boreholes in AECs and collection of 3 representative soil samples for laboratory analysis. - Collection of 9 near-surface soil samples across the site for laboratory analysis. - Collection of 2 fibrous cement sheeting fragment material samples for laboratory analysis. - Collection of QA/QC samples for laboratory analysis. Borehole and sampling locations are provided in Attachment C, and detailed borehole logs provided in Attachment D.
Soil sampling	Soil sampling was completed by the supervising MA environmental engineer using a clean spade (surface samples), or directly from the lead auger (borehole samples) using a nitrile glove covered hand. Each sample was placed into a laboratory-supplied, acid-rinsed 250mL glass jar, labelled with a unique identification number and no headspace to limit volatile loss. A clean pair of disposable gloves was used when handling each sample and samples collected from the centre of soil clods.
QA / QC sampling	Duplicate samples were collected for intra-laboratory analysis. 2 soil duplicate (intra-lab) samples were collected during investigations. A trip blank and trip spike sample was used during sampling.
Sample handling and transportation	Sample collection, storage and transport were conducted according to MA SOP. Collected samples were placed immediately into an ice chilled cooler-box. Samples were dispatched to a NATA-accredited laboratory under chain of custody documentation within holding times.

A review of QA/QC procedure has been completed and is presented in the data validation report (Attachment E). The report concludes that data is suitable for the purposes of the assessment.

5.4 Laboratory Analytical Suite

Laboratory analysis was carried out by Envirolab Pty Ltd a NATA accredited laboratory. Laboratory analysis is summarised in Table 8.

Table 8: Summary of primary soil laboratory analyses.

COPC	Number of Samples Analysed
BTEXN	12
TRH	12
PAH	12
Asbestos in soil	2
PCB	2
Heavy metals ¹	12
OCP/OPP	12

Notes:

¹ Heavy metals – arsenic, cadmium, chromium, copper, lead, mercury, nickel, zinc.

6 Site Assessment Criteria

6.1 Overview

The SAC adopted for this DSI have been derived from ASC NEPM (2013).

Guideline values for individual contaminants analysed for this assessment are presented in laboratory tables in Attachment F.

Table 9 summarises the SAC adopted for this investigation.

Table 9: Summary of SAC.

Media	Adopted Guidelines	Applicability
Soil	ASC NEPM (2013) HILs, EILs, ESLs, HSLs and Management Limits	<u>Health Investigation Levels (HILs)</u> HIL A – residential land use with access to soil <u>Ecological Investigation Levels (EILs)</u> EILs have been developed for urban residential and public open space land use. Site specific EILs were calculated using conservative physiochemical properties (pH of 4 and CEC of 5 cmol/kg) and ambient background concentrations (ABC) for aged contamination in low traffic areas in NSW. <u>Environmental Screening Levels (ESLs)</u> Urban residential and public open spaces <u>Health Screening Levels (HSLs)</u> HSL A – Low density residential land use for sand have been adopted as a conservative measure. <u>Management Limits</u> TRH management levels for residential, parkland and public open space have been adopted based on the proposed future land use. <u>Asbestos</u> Due to the preliminary nature of the investigation, asbestos will be assessed on a detect/non-detect basis.

7 Results

7.1 Field Observations

DSI field investigations were undertaken on 12 July, 2018, in conjunction with a geotechnical investigation at the site. The following observations were made:

- The timber clad dwelling and galvanised metal sheds in the central portion of the site typically in good condition.
- Site vegetation was typically in good condition, with no obvious impacts from contamination.
- Fill material in the western portion of the site, adjacent to the horse stables and trotting track, was observed to be primarily comprised of sands and clayey sands (likely reworked material from site) containing anthropogenic material such as plastic, concrete, tile and brick fragments.
- An additional area of fill was noted in the eastern portion of the site, east of the existing dwelling and sheds. Fill was observed to contain potentially asbestos containing material (PACM).

7.2 Laboratory Analytical Results

The following sections summarise the results of laboratory analysis. Detailed tabulated results showing individual sample concentrations compared to adopted SAC are available in Attachment F. Laboratory analytical documentation is available in Attachment G.

Table 10: Summary of laboratory results.

Analyte	Results Compared to SAC
Heavy Metals	<u>HILs</u>
	All results below SAC.
	<u>EILs</u>
	All results below SAC.

Analyte	Results Compared to SAC
TRH/BTEXN	<u>HILs</u> All results below SAC. <u>EILs</u> All results below SAC. <u>ESLs</u> All results below SAC. <u>HSLs</u> All results below SAC. <u>Management Limits</u> All results below SAC.
OCP/OPP	<u>HILs</u> All results below SAC. <u>EILs</u> All results below SAC.
PAH	<u>HILs</u> All results below SAC. <u>EILs</u> All results below SAC. <u>ESLs</u> All results below SAC. <u>HSLs</u> All results below SAC.
PCB	All results below laboratory detection limits.
Asbestos	<u>Asbestos in soil</u> Crysotile asbestos detected in soil sample 4710/BH101/0.5 . <u>Asbestos in material</u> Crysotile asbestos detected in material samples 4710/PACM01 and 4710/PACM02 .

8 Discussion and Conclusion

8.1 Laboratory Results

Laboratory results (Envirolab report reference 190859) found all chemical concentrations for soil samples to be below the adopted SAC.

Asbestos was identified in one soil sample (**4710/BH101/0.5**) and two material samples (**4710/PACM01 and 4710/PACM02**), collected from the area of localised fill material identified in the eastern portion of the site (sampling locations provided on Attachment C).

8.2 Data Gaps

Due to access restrictions at the time of inspection, sampling beneath existing dwellings, sheds and stables on the site (i.e. AEC A) was not undertaken. We recommend that, following demolition of existing structures, sampling is undertaken in building footprints to address data gaps (this may be done during the remediation stage).

8.3 Conclusion

Asbestos identified in the eastern portion of the site poses a potential risk to current and future human receptors. We recommend a remedial action plan (RAP) be prepared to address areas of identified asbestos contamination, as shown in Attachment C and to guide remediation of the areas.

Additionally, due to access restrictions, data gaps exist in AEC A. It is recommended that, following demolition of structures, data gap closure sampling is undertaken to determine if remediation is required. This may be completed in conjunction with site remediation works.

If soil is to be removed from site, a formal waste classification assessment may be required in accordance with NSW EPA Waste Classification Guidelines (2014).

Subject to the preparation and completion of a RAP and data gap assessment at the site, we consider the site can be made suitable for the proposed seniors living development. Should the proposed development be modified, then reassessment will be required.

9 Limitations

This DSI was undertaken in accordance with current industry standards.

It is important to note that no land contamination study can be considered to be a complete and exhaustive characterisation of a site nor can it be guaranteed that any assessment shall identify and characterise all areas of potential contamination or all past potentially contaminating land-uses. Therefore, this report should not be read as a guarantee that only contamination identified shall be found on the site. Should material be exposed in future which appears to be contaminated, additional testing may be required to determine the implications for the site.

Martens & Associates Pty Ltd has undertaken this assessment for the purposes of assessing potential site contamination. No reliance on this report should be made for any other investigation or proposal. Martens & Associates Pty Ltd accepts no responsibility, and provides no guarantee regarding the characteristics of areas of the site not specifically studied in this investigation.

10 References

Martens and Associates (2018) *Preliminary Site Investigation: Proposed Seniors Living, 58 Laitoki Road, Terrey Hills, NSW* – ref. P1504710JR02V02.

NEPC (1999, amended 2013) *National Environmental Protection (Assessment of Site Contamination) Measure* – Referred to as ASC NEPM (2013).

NSW EPA (2017) 3rd Ed. *Contaminated Land Management: Guidelines for the NSW Site Auditor Scheme*.

NSW EPA (1995) *Sampling Design Guidelines*.

NSW EPA (2014) *Waste Classification Guidelines, Part 1: Classifying Waste*.

NSW OEH (2011) *Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites*.

11 Attachment A – Subdivision Plan



1 SITE PLAN
1:400

DATE	ISSUE	ISSUE ID	Drawn	Check
9/10/18	Issue for Development Application	A	PJ	DM

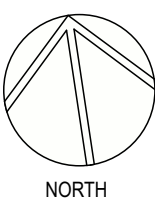
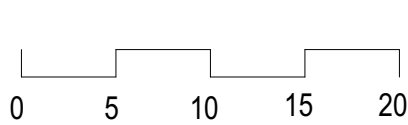
NOTES:

- Do not scale from this drawing. Use figured dimensions only.
- Contact the Calder Flower Architects for clarifications if required.
- Calder Flower Architects are not liable for any loss, damage, claim, cost demand as a result of the use or receipt of drawings issued in DWG format.
- Refer to Landscape Documentation for external works and all tree retention and removal information.

NOT FOR CONSTRUCTION

PROJECT:
TERREY HILLS PROPOSED SENIORS COMMUNITY
58 LAITOKI ROAD TERREY HILLS, NSW 2084

DRAWING TITLE:
SITE PLAN



12 Attachment B – AEC Plan



Key:



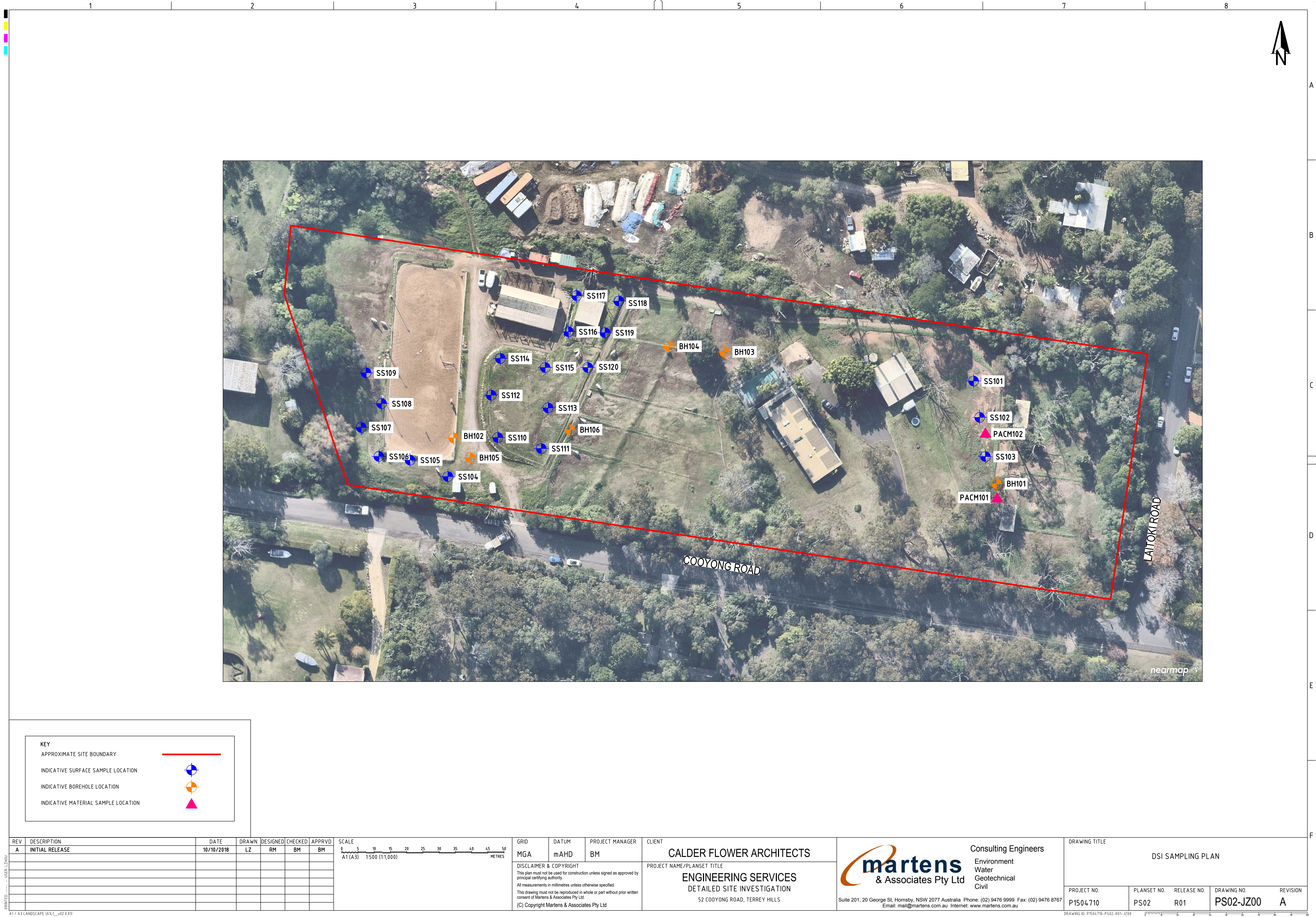
AEC A – Existing/former sheds and dwelling



AEC B – Approximate areas of fill

Martens & Associates Pty Ltd ABN 85 070 240 890		Environment Water Wastewater Geotechnical Civil Management	
Drawn:	BR/RM	AEC Locations 52 Cooyong Road, Terrey Hills, NSW SOURCE: SIX Maps	Drawing No:
Approved:	GT		FIGURE 1
Date:	02/08/2018		Job No: P1504710JR05V01
Scale:	Not to Scale		

13 Attachment C – Sampling Plan



KEY	
APPROXIMATE SITE BOUNDARY	
INDICATIVE SURFACE SAMPLE LOCATION	
INDICATIVE BOREHOLE LOCATION	
INDICATIVE MATERIAL SAMPLE LOCATION	

REV	DESCRIPTION	DATE	DRAWN	DESIGNED	CHECKED	APPRVD
A	INITIAL RELEASE	10/10/2018	LZ	RM	BM	BM

SCALE
0 5 10 15 20 25 30 35 40 45 50
A1 (A3) 1:500 (1:1,000) METRES

GRID	DATUM	PROJECT MANAGER
MGA	mAHD	BM
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CLIENT
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PROJECT NAME/PLANSET TITLE
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DRAWING TITLE				
DSI SAMPLING PLAN				
PROJECT NO.	PLANSET NO.	RELEASE NO.	DRAWING NO.	REVISION
P1504710	PS02	R01	PS02-JZ00	A

14 **Attachment D – Borehole Logs**

[illegible]

CLIENT	Tony Harris c/- Calder Flower Architects	COMMENCED	12/07/2018	COMPLETED	12/07/2018	REF BH102 Sheet 1 OF 1 PROJECT NO. P1504710	
PROJECT	Preliminary Geotechnical Assessment	LOGGED	AM	CHECKED	HN		
SITE	52 Cooyong Rd, Terrey Hills, NSW	GEOLOGY	Hawkesbury Sandstone	VEGETATION	N/A		
EQUIPMENT	2WD ute-mounted hydraulic drill rig	EASTING		RL SURFACE	174.3 m	DATUM	AHD
EXCAVATION DIMENSIONS	ø100 mm x 6.20 m depth	NORTHING		ASPECT	Northwest	SLOPE	<2%

Drilling				Sampling		Field Material Description									
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS / ASCS CLASSIFICATION	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY	STRUCTURE AND ADDITIONAL OBSERVATIONS			
ADV	H	12/07/18	1	0.10 174.20	4710/BH102/0.3/S/1 D 0.30 m			SP SC	FILL: SAND; fine to coarse grained, grey, pale brown; with mixed subangular gravels. FILL: Clayey SAND; fine to medium grained; dark brown, orange-brown, grey; with mixed subangular gravels, concrete and plastic fragments.	D	D	FILL			
				0.90 173.40									4710/BH102/0.8/S/1 D 0.80 m		
AD/T	M			1.30 173.00	4710/BH102/1.1/R/1 D 1.10 m			CL	FILL: SANDSTONE BOULDER; fine to coarse grained, grey, pale grey, white. FILL: Silty Sandy CLAY; low plasticity; brown, dark grey, white.	M ($<<PL$)	VSt		0.90: V-bit refusal on sandstone boulder within fill.		
				4710/BH102/1.4/S/1 D 1.40 m											
ADV	L-M			1.90 172.40	4710/BH102/2.1/S/1 D 2.10 m			SC	Clayey SAND, fine to medium grained, yellow-brown. Pale grey, red-brown, dark green-grey. Pale grey, pale brown.	D / M	D - VD			RESIDUAL SOIL	
				2.50 171.80	4710/BH102/2.6/S/1 D 2.60 m										
				3.00 171.30	4710/BH102/3.1/S/1 D 3.10 m										
				3.60 170.70											
AD/T	H			4	4.50 169.80							SANDSTONE; fine to medium grained, pale grey, white; distinctly weathered; inferred very low to low strength. Pale brown, pale grey.			
AD/T	M	5									6.20: TC-bit refusal on inferred low to medium strength sandstone.				
H		6													
		7						Hole Terminated at 6.20 m							

EXCAVATION LOG TO BE READ IN CONJUNCTION WITH ACCOMPANYING REPORT NOTES AND ABBREVIATIONS

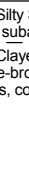
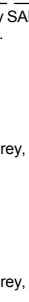


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**Engineering Log -
BOREHOLE**

CLIENT	Tony Harris c/- Calder Flower Architects	COMMENCED	18/07/2018	COMPLETED	18/07/2018	REF BH105 Sheet 1 OF 1 PROJECT NO. P1504710	
PROJECT	Preliminary Geotechnical Assessment	LOGGED	AM	CHECKED	HN		
SITE	52 Cooyong Rd, Terrey Hills, NSW	GEOLOGY	Hawkesbury Sandstone	VEGETATION	Grass		
EQUIPMENT	2WD ute-mounted hydraulic drill rig	EASTING		RL SURFACE	174.1 m	DATUM	AHD
EXCAVATION DIMENSIONS	ø100 mm x 4.50 m depth	NORTHING		ASPECT	West	SLOPE	<2%

Drilling					Sampling		Field Material Description							
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS / ASCS CLASSIFICATION	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY	STRUCTURE AND ADDITIONAL OBSERVATIONS		
AD/T	M			0.15 173.95				SM	FILL: Silty SAND; fine to coarse grained; grey, dark brown; with mixed subangular gravels, trace clay; inferred dense.	D	D	FILL		
			SC	FILL: Clayey SAND; fine to medium grained; dark brown, orange-brown, grey; with mixed subangular to subrounded gravels, concrete and plastic fragments; inferred dense.										
			CL	FILL: Sandy CLAY; low plasticity; brown, dark grey; inferred stiff to very stiff.										
AD/V	L-M	1	1.00 173.10				SC	Clayey SAND; medium grained; yellow brown; inferred medium dense. Pale grey, red-brown. Pale grey, pale brown.	D / M MD M / W	RESIDUAL SOIL				
		2	1.60 172.50											
		2.30 171.80												
		3	3.00 171.10 3.20 170.90											
		4	4.20 169.90											
AD/T	M-H			4.50						SANDSTONE; medium grained; pale grey, white; distinctly weathered; inferred very low to low strength.				WEATHERED ROCK 3.20: V-bit refusal.
										Pale brown, pale grey.				
			5						Hole Terminated at 4.50 m			4.50: TC-bit refusal on inferred low to medium strength sandstone.		
			6											
			7											

EXCAVATION LOG TO BE READ IN CONJUNCTION WITH ACCOMPANYING REPORT NOTES AND ABBREVIATIONS



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**Engineering Log -
BOREHOLE**

CLIENT	Tony Harris c/- Calder Flower Architects				COMMENCED	18/07/2018		COMPLETED	18/07/2018		REF BH106		
PROJECT	Preliminary Geotechnical Assessment				LOGGED	AM		CHECKED	HN		Sheet 1 OF 1		
SITE	52 Cooyong Rd, Terrey Hills, NSW				GEOLOGY	Hawkesbury Sandstone		VEGETATION	Grass		PROJECT NO. P1504710		
EQUIPMENT		2WD ute-mounted hydraulic drill rig				EASTING			RL SURFACE	177.5 m		DATUM AHD	
EXCAVATION DIMENSIONS		ø100 mm x 2.10 m depth				NORTHING			ASPECT	West		SLOPE <5%	
Drilling			Sampling			Field Material Description							
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS / ASCS CLASSIFICATION	SOIL/ROCK MATERIAL DESCRIPTION		MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
ADV	L-M	Not Encountered	1	177.50	4710/BH106/0.1/S/1 D 0.10 m			SP	FILL: SAND; medium grained; grey, brown.	D		FILL	
				0.20				SC	FILL: Clayey SAND; fine to medium grained; black, grey, orange-brown, red; with subrounded to subangular ironstone gravels.	M	L - MD		
				177.30									
				0.60	4710/BH106/0.5/S/1 D 0.50 m			CL	FILL: Sandy CLAY, low plasticity; dark grey, dark brown; with subrounded sandstone boulders and brick fragments.	M (<PL)	St - VSt	RESIDUAL SOIL	
				176.90									
				1.10	4710/BH106/1.0/S/1 D 1.00 m			SP	SAND; medium grained; yellow-brown; with clay.				
				176.40									
				1.40	4710/BH106/1.3/S/1 D 1.30 m			SC	Clayey SAND; medium grained; orange brown.	M	MD		
				176.10									
							2	2.10					

CLIENT	Tony Harris c/- Calder Flower Architects	COMMENCED	18/07/2018	COMPLETED	18/07/2018	REF BH107 Sheet 1 OF 1 PROJECT NO. P1504710	
PROJECT	Preliminary Geotechnical Assessment	LOGGED	AM	CHECKED	HN		
SITE	52 Cooyong Rd, Terrey Hills, NSW	GEOLOGY	Hawkesbury Sandstone	VEGETATION	Grass		
EQUIPMENT	2WD ute-mounted hydraulic drill rig	EASTING		RL SURFACE	186 m	DATUM	AHD
EXCAVATION DIMENSIONS	ø100 mm x 1.50 m depth	NORTHING		ASPECT	West	SLOPE	<5%

Drilling				Sampling		Field Material Description							
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS / ASCS CLASSIFICATION	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY	DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	L-M	Not Encountered	0.10	185.90	4710/BH107/CBR0.3-0.6/1 CBR 0.30 m 4710/BH107/0.5/S/1 D 0.50 m			ML	TOPSOIL: Sandy SILT; low plasticity; dark grey, brown. Sandy CLAY; low plasticity; brown, grey; with subrounded ironstone gravels. Sandy CLAY; low plasticity; red-brown. Sandy CLAY; low to medium plasticity; pale grey, orange-brown.	M			TOPSOIL RESIDUAL SOIL
			0.40	185.60		CL	M (<PL)	F					
			1.20	184.80		CL	M (<PL)	St - VSt					
			1.50			CL - CI	F - St						
							VSt						
			2						Hole Terminated at 1.50 m (Target depth reached)				
			3										
			4										
			5										
			6										
			7										

EXCAVATION LOG TO BE READ IN CONJUNCTION WITH ACCOMPANYING REPORT NOTES AND ABBREVIATIONS



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**Engineering Log -
BOREHOLE**

CLIENT	Tony Harris c/- Calder Flower Architects			COMMENCED	18/07/2018	COMPLETED	18/07/2018	REF BH108				
PROJECT	Preliminary Geotechnical Assessment			LOGGED	AM	CHECKED	HN	Sheet 1 OF 1				
SITE	52 Cooyong Rd, Terrey Hills, NSW			GEOLOGY	Hawkesbury Sandstone	VEGETATION	Grass	PROJECT NO. P1504710				
EQUIPMENT		2WD ute-mounted hydraulic drill rig			EASTING		RL SURFACE	189.9 m	DATUM	AHD		
EXCAVATION DIMENSIONS		Ø100 mm x 4.80 m depth			NORTHING		ASPECT	West	SLOPE	<5%		
Drilling				Sampling		Field Material Description						
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS / ASCS CLASSIFICATION	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/V	L	M-H	Not Encountered	189.90	4710/BH108/0.3-0.6/CBR/T CBR 0.30 m 4710/BH108/0.4/S/1 D 0.40 m			SM	TOPSOIL: Silty SAND; fine grained; brown; trace clay.	D	MD	TOPSOIL
				0.20				CL	Sandy CLAY; low plasticity; red, white, orange-brown; trace subrounded ironstone gravels.	St - VSt	RESIDUAL SOIL	
				189.70				M (<PL)	VSt			
				1.10					H			
				188.80					SP	SAND; medium grained; pale grey, pale yellow, red; trace clay; inferred dense to very dense.	M	D - VD
				1.50				Pale grey, pale red.				
				188.40								
				2.10					4710/BH108/2.0/S/1 D 2.00 m			Pale grey, pale yellow.
				187.80								
				2.40								
AD/T	M-H	H	Not Encountered	187.50	4710/BH108/2.0/S/1 D 2.00 m				SANDSTONE; medium grained; white, pale grey; distinctly weathered; inferred very low to low strength.			WEATHERED ROCK 2.40: V-bit refusal.
				3.00				Red-brown; inferred low strength.				
				186.90								
				3.60					Red-brown, pale grey.			
186.30												
	H		Not Encountered	4.80								
				5					Hole Terminated at 4.80 m			4.80: TC-bit refusal on inferred low to medium strength sandstone.
				6								
				7								
EXCAVATION LOG TO BE READ IN CONJUNCTION WITH ACCOMPANYING REPORT NOTES AND ABBREVIATIONS												
						MARTENS & ASSOCIATES PTY LTD Suite 201, 20 George St. Hornsby, NSW 2077 Australia Phone: (02) 9476 9999 Fax: (02) 9476 8767 mail@martens.com.au WEB: http://www.martens.com.au			Engineering Log - BOREHOLE			

MARTENS 2.00 LIB.GLB Log MARTENS BOREHOLE P1504710BH101.9H102V01.GPJ <<DrawingFile>> 09/08/2018 16:29 8.30.004 D:\git\Lab and In Situ Tool - DGD [Lib: Martens 2.00 2016-11-13 Proj: Martens 2.00 2016-11-13]

15 **Attachment E – Data Validation Report**

DATA VALIDATION REPORT: 52 Cooyong Road, Terrey Hills, NSW
1. Sample Handling

- a. Were sample holding times met?
- b. Were samples in proper custody between the field and reaching the laboratory?
- c. Were the samples properly and adequately preserved?
- d. Were the samples received by the laboratory in good condition?

Yes	No
	(Comments below)
✓	
✓	
✓	
✓	

COMMENTS

Sample handling is:

Satisfactory
**Partially
Satisfactory**
Unsatisfactory

DATA VALIDATION REPORT: 52 Cooyong Road, Terrey Hills, NSW
2. Precision / Accuracy Statement

- a. Was a NATA registered laboratory used?
- b. Did the laboratory perform the requested tests?
- c. Were laboratory methods adopted NATA endorsed?
- d. Were appropriate test procedures followed?
- e. Were reporting limits satisfactory?
- f. Was the NATA Seal on the reports?
- g. Were reports signed by an authorised person?

Yes	No (Comments below)
✓	
✓	
✓	
✓	
✓	
✓	
✓	

COMMENTS

**Precision / Accuracy of the
Laboratory Report:**

✓

Satisfactory
**Partially
Satisfactory**
Unsatisfactory

DATA VALIDATION REPORT: 52 Cooyong Road, Terrey Hills, NSW
3. Field Quality Assurance / Quality Control (QA/QC)

a. Number of Primary Samples analysed
(does not include duplicates)

b. Number of days of sampling

c. Number and Type of QA/QC Samples analysed

Intra-Laboratory Field Duplicates

Inter-Laboratory Field triplicates

Trip Blanks

Field Rinsate

Other (Field Blanks, Spikes, etc.)

Comments

Media	Number
Soil:	12
Water:	-
Material	-
	1
Soil	Water
2	
-	
1	
-	
-	

DATA VALIDATION REPORT: 52 Cooyong Road, Terrey Hills, NSW
Field Duplicates

Adequate Numbers of intra-laboratory field duplicates analysed?

Adequate Numbers of inter-laboratory field duplicates analysed?

Were field duplicate RPDs within Control Limits?

- i. Organics
- ii. Metals / Inorganics
- iii. Nutrients

Yes	No (Comments below)
✓	
✓	-
	N/A
✓	
	N/A

COMMENTS

Samples 4710/DUP01 and 4710/SS117 exceeded RPDs for lead (96%)

and zinc (49%). This is likely due to sampling of heterogenous material. All

sample concentrations are well below the adopted SAC and will not affect

investigation findings.

DATA VALIDATION REPORT: 52 Cooyong Road, Terrey Hills, NSW
Summary of Quality Assurance / Quality Control (QA/QC)

QA/QC Type	Satisfactory	Partially Satisfactory	Unsatisfactory
Sample handling	✓		
Precision / Accuracy of the Laboratory Report	✓		
Field QA / QC	✓		
Laboratory Internal QA / QC	✓		

Data Usability

1. Data directly usable ✓
2. Data usable with the following corrections/modifications
(see comment below)
3. Data not usable.

COMMENTS

Field Duplicates (SOIL)
Filter: SDG in('ENVIRI

SDG		ENVIROLAB 2018-07-13T00:00:00		ENVIROLAB 2018-07-13T00:00:00		ENVIROLAB 2018-07-13T00:00:00		ENVIROLAB 2018-07-13T00:00:00	
Field ID		4710/SS117		4710/DUP01		4710/SS120		4710/DUP02	
Sampled Date/Time		12/07/2018		12/07/2018		12/07/2018		12/07/2018	
				RPD				RPD	
Chem Gr	ChemNam	Units	EQL						
Inorganics	Moisture	%	0.1	15.0	23.0	42	17.0	20.0	16
Lead	Lead	mg/kg	1	20.0	57.0	96	26.0	26.0	0
Metals	Arsenic	mg/kg	4	<4.0	4.0	0	<4.0	<4.0	0
	Cadmium	mg/kg	0.4	<0.4	<0.4	0	<0.4	<0.4	0
	Chromium	mg/kg	1	11.0	16.0	37	18.0	13.0	32
	Copper	mg/kg	1	32.0	25.0	25	10.0	9.0	11
	Mercury	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.1	0
	Nickel	mg/kg	1	8.0	10.0	22	4.0	4.0	0
	Zinc	mg/kg	1	53.0	87.0	49	36.0	41.0	13

*RPDs have only been considered where a concentration is greater than 1 times the EQL.
**High RPDs are in bold (Acceptable RPDs for each EQL multiplier range are: 80 (1-10 x EQL); 50 (10-30 x EQL); 30 (> 30 x EQL))
***Interlab Duplicates are matched on a per compound basis as methods vary between laboratories. Any methods in the row header relate to those used in the primary laboratory

16 **Attachment F – Laboratory Summary Tables**

[illegible]

	Inorganics	Lead	Metals							Polychlorinated Biphenyls							
	Moisture	Lead	Arsenic	Cadmium	Chromium (III+VI)	Copper	Mercury	Nickel	Zinc	Arochlor 1016	Arochlor 1221	Arochlor 1232	Arochlor 1242	Arochlor 1248	Arochlor 1254	Arochlor 1260	PCBs (Sum of total)
	%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL	0.1	1	4	0.4	1	1	0.1	1	1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
NEPM 2013 Table 1A(1) HILs Res A Soil		300	100	20		6000	40	400	7400								1
Site Specific EIL		1100	100			55		35	150								

Field_ID																	
4710/BH101/0.5	8.2	23	<4	<0.4	48	4	<0.1	3	32	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
4710/BH102/0.3	14	29	<4	<0.4	18	11	<0.1	7	44	-	-	-	-	-	-	-	-
4710/BH102/1.4	10	24	<4	<0.4	11	5	<0.1	2	19	-	-	-	-	-	-	-	-
4710/SS101	12	14	6	<0.4	39	4	<0.1	2	26	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
4710/SS105	16	18	<4	<0.4	7	6	<0.1	2	31	-	-	-	-	-	-	-	-
4710/SS106	15	31	<4	<0.4	7	7	<0.1	3	38	-	-	-	-	-	-	-	-
4710/SS109	15	32	<4	<0.4	13	10	<0.1	5	52	-	-	-	-	-	-	-	-
4710/SS112	15	15	<4	<0.4	7	9	<0.1	4	36	-	-	-	-	-	-	-	-
4710/SS114	18	9	<4	<0.4	7	7	<0.1	3	28	-	-	-	-	-	-	-	-
4710/SS115	26	22	<4	<0.4	9	13	<0.1	5	51	-	-	-	-	-	-	-	-
4710/SS117	15	20	<4	<0.4	11	32	<0.1	8	53	-	-	-	-	-	-	-	-
4710/SS120	17	26	<4	<0.4	18	10	<0.1	4	36	-	-	-	-	-	-	-	-

[illegible]

	Halogogenated Benzenes	Organochlorine Pesticides																										Organophosphorus Pesticides																		Pesticides
	Heachlorobenzene mg/kg	4,4-DEE mg/kg		α -BHC mg/kg		Aldrin mg/kg	β -BHC mg/kg	Chlordane (cis) mg/kg		Chlordane (trans) mg/kg		δ -BHC mg/kg		DDE mg/kg	DDT mg/kg	DDT+DDE+DDD mg/kg	Dieldrin mg/kg	Endosulfan I mg/kg	Endosulfan II mg/kg	Endosulfan sulphate mg/kg	Endrin mg/kg	Endrin aldehyde mg/kg	γ -BHC (lindane) mg/kg	Heptachlor mg/kg	Heptachlor epoxide mg/kg	Methoxychlor mg/kg	Azinphos methyl mg/kg	Bromophos-ethyl mg/kg	Chlorpyrifos mg/kg	Chlorpyrifos-methyl mg/kg	Disinon mg/kg	Dichlorvos mg/kg	Dimethoate mg/kg	Ethon mg/kg	Fenitrothion mg/kg	Malathion mg/kg	Romel mg/kg	Parathion mg/kg								
EOL	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1						
NPEM 2013 Table 1A(1) HILS Res A Soil	10															240					10			6		300				160																
Site Specific EIL																180																														
Field ID																																														
4710/BH101/0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
4710/BH102/0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
4710/BH102/1.4	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
4710/SS101	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
4710/SS105	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
4710/SS106	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
4710/SS109	<0.1	<0.1	<																																											

17 **Attachment G – Laboratory Analytical Documentation**

CERTIFICATE OF ANALYSIS 196235

Client Details

Client	Martens & Associates Pty Ltd
Attention	Robert Mehaffey, Gray Taylor
Address	Suite 201, 20 George St, Hornsby, NSW, 2077

Sample Details

Your Reference	<u>P1504710JCOC01V01</u>
Number of Samples	30 soil, 2 material
Date samples received	13/07/2018
Date completed instructions received	13/07/2018

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.
 Samples were analysed as received from the client. Results relate specifically to the samples as received.
 Results are reported on a dry weight basis for solids and on an as received basis for other matrices.
Please refer to the last page of this report for any comments relating to the results.

Report Details

Date results requested by	20/07/2018
Date of Issue	19/07/2018
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Asbestos Approved By

Analysed by Asbestos Approved Identifier: Matt Tang
 Authorised by Asbestos Approved Signatory: Matt Tang

Results Approved By

Dragana Tomas, Senior Chemist
 Giovanni Agosti, Group Technical Manager
 Matthew Tang, Asbestos Analyst
 Nancy Zhang, Assistant Lab Manager
 Steven Luong, Senior Chemist

Authorised By



Jacinta Hurst, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil

Our Reference		196235-1	196235-5	196235-6	196235-9	196235-12
Your Reference	UNITS	4710/SS101	4710/SS105	4710/SS106	4710/SS109	4710/SS112
Date Sampled		12/07/2018	12/07/2018	12/07/2018	12/07/2018	12/07/2018
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	16/07/2018	16/07/2018	16/07/2018	16/07/2018	16/07/2018
Date analysed	-	18/07/2018	18/07/2018	18/07/2018	18/07/2018	18/07/2018
TRH C ₆ - C ₉	mg/kg	<25	<25	<25	<25	<25
TRH C ₆ - C ₁₀	mg/kg	<25	<25	<25	<25	<25
vTPH C ₆ - C ₁₀ less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	99	93	96	97	93

vTRH(C6-C10)/BTEXN in Soil

Our Reference		196235-14	196235-15	196235-17	196235-20	196235-21
Your Reference	UNITS	4710/SS114	4710/SS115	4710/SS117	4710/SS120	4710/BH101/0.5
Date Sampled		12/07/2018	12/07/2018	12/07/2018	12/07/2018	12/07/2018
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	16/07/2018	16/07/2018	16/07/2018	16/07/2018	16/07/2018
Date analysed	-	18/07/2018	18/07/2018	18/07/2018	18/07/2018	18/07/2018
TRH C ₆ - C ₉	mg/kg	<25	<25	<25	<25	<25
TRH C ₆ - C ₁₀	mg/kg	<25	<25	<25	<25	<25
vTPH C ₆ - C ₁₀ less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	92	90	96	91	95

vTRH(C6-C10)/BTEXN in Soil					
Our Reference		196235-23	196235-25	196235-31	196235-32
Your Reference	UNITS	4710/BH102/0.3	4710/BH102/1.4	Trip Spike	Trip Blank
Date Sampled		12/07/2018	12/07/2018	12/07/2018	12/07/2018
Type of sample		soil	soil	soil	soil
Date extracted	-	16/07/2018	16/07/2018	16/07/2018	16/07/2018
Date analysed	-	18/07/2018	18/07/2018	18/07/2018	18/07/2018
TRH C ₆ - C ₉	mg/kg	<25	<25	[NA]	<25
TRH C ₆ - C ₁₀	mg/kg	<25	<25	[NA]	<25
vTPH C ₆ - C ₁₀ less BTEX (F1)	mg/kg	<25	<25	[NA]	<25
Benzene	mg/kg	<0.2	<0.2	97%	<0.2
Toluene	mg/kg	<0.5	<0.5	98%	<0.5
Ethylbenzene	mg/kg	<1	<1	100%	<1
m+p-xylene	mg/kg	<2	<2	100%	<2
o-Xylene	mg/kg	<1	<1	100%	<1
naphthalene	mg/kg	<1	<1	[NA]	<1
Total +ve Xylenes	mg/kg	<1	<1	[NA]	<1
Surrogate aaa-Trifluorotoluene	%	97	93	79	96

svTRH (C10-C40) in Soil

Our Reference		196235-1	196235-5	196235-6	196235-9	196235-12
Your Reference	UNITS	4710/SS101	4710/SS105	4710/SS106	4710/SS109	4710/SS112
Date Sampled		12/07/2018	12/07/2018	12/07/2018	12/07/2018	12/07/2018
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	16/07/2018	16/07/2018	16/07/2018	16/07/2018	16/07/2018
Date analysed	-	17/07/2018	17/07/2018	16/07/2018	17/07/2018	17/07/2018
TRH C ₁₀ - C ₁₄	mg/kg	<50	<50	<50	<50	<50
TRH C ₁₅ - C ₂₈	mg/kg	<100	<100	<100	<100	<100
TRH C ₂₉ - C ₃₆	mg/kg	<100	<100	<100	<100	<100
TRH >C ₁₀ -C ₁₆	mg/kg	<50	<50	<50	<50	<50
TRH >C ₁₀ - C ₁₆ less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C ₁₆ -C ₃₄	mg/kg	<100	<100	<100	<100	<100
TRH >C ₃₄ -C ₄₀	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	107	94	97	97	96

svTRH (C10-C40) in Soil

Our Reference		196235-14	196235-15	196235-17	196235-20	196235-21
Your Reference	UNITS	4710/SS114	4710/SS115	4710/SS117	4710/SS120	4710/BH101/0.5
Date Sampled		12/07/2018	12/07/2018	12/07/2018	12/07/2018	12/07/2018
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	16/07/2018	16/07/2018	16/07/2018	16/07/2018	16/07/2018
Date analysed	-	17/07/2018	17/07/2018	17/07/2018	17/07/2018	17/07/2018
TRH C ₁₀ - C ₁₄	mg/kg	<50	<50	<50	<50	<50
TRH C ₁₅ - C ₂₈	mg/kg	<100	<100	<100	<100	<100
TRH C ₂₉ - C ₃₆	mg/kg	<100	<100	<100	<100	<100
TRH >C ₁₀ -C ₁₆	mg/kg	<50	<50	<50	<50	<50
TRH >C ₁₀ - C ₁₆ less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C ₁₆ -C ₃₄	mg/kg	<100	<100	<100	<100	<100
TRH >C ₃₄ -C ₄₀	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	99	103	98	99	97

svTRH (C10-C40) in Soil			
Our Reference		196235-23	196235-25
Your Reference	UNITS	4710/BH102/0.3	4710/BH102/1.4
Date Sampled		12/07/2018	12/07/2018
Type of sample		soil	soil
Date extracted	-	16/07/2018	16/07/2018
Date analysed	-	17/07/2018	17/07/2018
TRH C ₁₀ - C ₁₄	mg/kg	<50	<50
TRH C ₁₅ - C ₂₈	mg/kg	<100	<100
TRH C ₂₉ - C ₃₆	mg/kg	<100	<100
TRH >C ₁₀ -C ₁₆	mg/kg	<50	<50
TRH >C ₁₀ - C ₁₆ less Naphthalene (F2)	mg/kg	<50	<50
TRH >C ₁₆ -C ₃₄	mg/kg	<100	<100
TRH >C ₃₄ -C ₄₀	mg/kg	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50
Surrogate o-Terphenyl	%	96	95

PAHs in Soil						
Our Reference		196235-1	196235-5	196235-6	196235-9	196235-12
Your Reference	UNITS	4710/SS101	4710/SS105	4710/SS106	4710/SS109	4710/SS112
Date Sampled		12/07/2018	12/07/2018	12/07/2018	12/07/2018	12/07/2018
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	16/07/2018	16/07/2018	16/07/2018	16/07/2018	16/07/2018
Date analysed	-	17/07/2018	17/07/2018	17/07/2018	17/07/2018	17/07/2018
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	0.3	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	0.2	0.7	0.1	<0.1
Pyrene	mg/kg	<0.1	0.2	0.6	0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	0.3	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	0.3	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	0.5	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	0.09	0.2	0.06	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	0.2	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	0.4	3.3	0.3	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate <i>p</i> -Terphenyl-d14	%	99	97	78	97	92

PAHs in Soil						
Our Reference		196235-14	196235-15	196235-17	196235-20	196235-21
Your Reference	UNITS	4710/SS114	4710/SS115	4710/SS117	4710/SS120	4710/BH101/0.5
Date Sampled		12/07/2018	12/07/2018	12/07/2018	12/07/2018	12/07/2018
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	16/07/2018	16/07/2018	16/07/2018	16/07/2018	16/07/2018
Date analysed	-	17/07/2018	17/07/2018	17/07/2018	17/07/2018	17/07/2018
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	0.1	0.2	0.2	<0.1
Pyrene	mg/kg	<0.1	0.1	0.2	0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	0.08	0.1	0.06	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	0.3	1.2	0.4	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	95	99	97	96	95

PAHs in Soil			
Our Reference		196235-23	196235-25
Your Reference	UNITS	4710/BH102/0.3	4710/BH102/1.4
Date Sampled		12/07/2018	12/07/2018
Type of sample		soil	soil
Date extracted	-	16/07/2018	16/07/2018
Date analysed	-	17/07/2018	17/07/2018
Naphthalene	mg/kg	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1
Phenanthrene	mg/kg	0.2	<0.1
Anthracene	mg/kg	<0.1	<0.1
Fluoranthene	mg/kg	0.6	<0.1
Pyrene	mg/kg	0.5	<0.1
Benzo(a)anthracene	mg/kg	0.3	<0.1
Chrysene	mg/kg	0.2	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	0.4	<0.2
Benzo(a)pyrene	mg/kg	0.3	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	0.2	<0.1
Total +ve PAH's	mg/kg	2.7	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	95	94

Organochlorine Pesticides in soil						
Our Reference		196235-1	196235-5	196235-6	196235-9	196235-12
Your Reference	UNITS	4710/SS101	4710/SS105	4710/SS106	4710/SS109	4710/SS112
Date Sampled		12/07/2018	12/07/2018	12/07/2018	12/07/2018	12/07/2018
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	16/07/2018	16/07/2018	16/07/2018	16/07/2018	16/07/2018
Date analysed	-	16/07/2018	16/07/2018	16/07/2018	16/07/2018	16/07/2018
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	125	123	127	132	122

Organochlorine Pesticides in soil						
Our Reference		196235-14	196235-15	196235-17	196235-20	196235-21
Your Reference	UNITS	4710/SS114	4710/SS115	4710/SS117	4710/SS120	4710/BH101/0.5
Date Sampled		12/07/2018	12/07/2018	12/07/2018	12/07/2018	12/07/2018
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	16/07/2018	16/07/2018	16/07/2018	16/07/2018	16/07/2018
Date analysed	-	16/07/2018	16/07/2018	16/07/2018	16/07/2018	16/07/2018
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	118	127	127	125	119

Organochlorine Pesticides in soil			
Our Reference		196235-23	196235-25
Your Reference	UNITS	4710/BH102/0.3	4710/BH102/1.4
Date Sampled		12/07/2018	12/07/2018
Type of sample		soil	soil
Date extracted	-	16/07/2018	16/07/2018
Date analysed	-	16/07/2018	16/07/2018
HCB	mg/kg	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1
Surrogate TCMX	%	120	119

Organophosphorus Pesticides						
Our Reference		196235-1	196235-5	196235-6	196235-9	196235-12
Your Reference	UNITS	4710/SS101	4710/SS105	4710/SS106	4710/SS109	4710/SS112
Date Sampled		12/07/2018	12/07/2018	12/07/2018	12/07/2018	12/07/2018
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	16/07/2018	16/07/2018	16/07/2018	16/07/2018	16/07/2018
Date analysed	-	16/07/2018	16/07/2018	16/07/2018	16/07/2018	16/07/2018
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyrifos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyrifos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	125	123	127	132	122

Organophosphorus Pesticides						
Our Reference		196235-14	196235-15	196235-17	196235-20	196235-21
Your Reference	UNITS	4710/SS114	4710/SS115	4710/SS117	4710/SS120	4710/BH101/0.5
Date Sampled		12/07/2018	12/07/2018	12/07/2018	12/07/2018	12/07/2018
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	16/07/2018	16/07/2018	16/07/2018	16/07/2018	16/07/2018
Date analysed	-	16/07/2018	16/07/2018	16/07/2018	16/07/2018	16/07/2018
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyrifos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyrifos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	118	127	127	125	119

Organophosphorus Pesticides			
Our Reference		196235-23	196235-25
Your Reference	UNITS	4710/BH102/0.3	4710/BH102/1.4
Date Sampled		12/07/2018	12/07/2018
Type of sample		soil	soil
Date extracted	-	16/07/2018	16/07/2018
Date analysed	-	16/07/2018	16/07/2018
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1
Chlorpyrifos	mg/kg	<0.1	<0.1
Chlorpyrifos-methyl	mg/kg	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1
Dichlorvos	mg/kg	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1
Surrogate TCMX	%	120	119

PCBs in Soil			
Our Reference		196235-1	196235-21
Your Reference	UNITS	4710/SS101	4710/BH101/0.5
Date Sampled		12/07/2018	12/07/2018
Type of sample		soil	soil
Date extracted	-	16/07/2018	16/07/2018
Date analysed	-	16/07/2018	16/07/2018
Aroclor 1016	mg/kg	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1
Surrogate TCLMX	%	125	119

Acid Extractable metals in soil

Our Reference		196235-1	196235-5	196235-6	196235-9	196235-12
Your Reference	UNITS	4710/SS101	4710/SS105	4710/SS106	4710/SS109	4710/SS112
Date Sampled		12/07/2018	12/07/2018	12/07/2018	12/07/2018	12/07/2018
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	16/07/2018	16/07/2018	16/07/2018	16/07/2018	16/07/2018
Date analysed	-	16/07/2018	16/07/2018	16/07/2018	16/07/2018	16/07/2018
Arsenic	mg/kg	6	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	39	7	7	13	7
Copper	mg/kg	4	6	7	10	9
Lead	mg/kg	14	18	31	32	15
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	2	2	3	5	4
Zinc	mg/kg	26	31	38	52	36

Acid Extractable metals in soil

Our Reference		196235-14	196235-15	196235-17	196235-20	196235-21
Your Reference	UNITS	4710/SS114	4710/SS115	4710/SS117	4710/SS120	4710/BH101/0.5
Date Sampled		12/07/2018	12/07/2018	12/07/2018	12/07/2018	12/07/2018
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	16/07/2018	16/07/2018	16/07/2018	16/07/2018	16/07/2018
Date analysed	-	16/07/2018	16/07/2018	16/07/2018	16/07/2018	16/07/2018
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	7	9	11	18	48
Copper	mg/kg	7	13	32	10	4
Lead	mg/kg	9	22	20	26	23
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	3	5	8	4	3
Zinc	mg/kg	28	51	53	36	32

Acid Extractable metals in soil					
Our Reference		196235-23	196235-25	196235-27	196235-28
Your Reference	UNITS	4710/BH102/0.3	4710/BH102/1.4	4710/DUP01	4710/DUP02
Date Sampled		12/07/2018	12/07/2018	12/07/2018	12/07/2018
Type of sample		soil	soil	soil	soil
Date prepared	-	16/07/2018	16/07/2018	16/07/2018	16/07/2018
Date analysed	-	16/07/2018	16/07/2018	16/07/2018	16/07/2018
Arsenic	mg/kg	<4	<4	4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	18	11	16	13
Copper	mg/kg	11	5	25	9
Lead	mg/kg	29	24	57	26
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	7	2	10	4
Zinc	mg/kg	44	19	87	41

Moisture						
Our Reference		196235-1	196235-5	196235-6	196235-9	196235-12
Your Reference	UNITS	4710/SS101	4710/SS105	4710/SS106	4710/SS109	4710/SS112
Date Sampled		12/07/2018	12/07/2018	12/07/2018	12/07/2018	12/07/2018
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	16/07/2018	16/07/2018	16/07/2018	16/07/2018	16/07/2018
Date analysed	-	17/07/2018	17/07/2018	17/07/2018	17/07/2018	17/07/2018
Moisture	%	12	16	15	15	15

Moisture						
Our Reference		196235-14	196235-15	196235-17	196235-20	196235-21
Your Reference	UNITS	4710/SS114	4710/SS115	4710/SS117	4710/SS120	4710/BH101/0.5
Date Sampled		12/07/2018	12/07/2018	12/07/2018	12/07/2018	12/07/2018
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	16/07/2018	16/07/2018	16/07/2018	16/07/2018	16/07/2018
Date analysed	-	17/07/2018	17/07/2018	17/07/2018	17/07/2018	17/07/2018
Moisture	%	18	26	15	17	8.2

Moisture					
Our Reference		196235-23	196235-25	196235-27	196235-28
Your Reference	UNITS	4710/BH102/0.3	4710/BH102/1.4	4710/DUP01	4710/DUP02
Date Sampled		12/07/2018	12/07/2018	12/07/2018	12/07/2018
Type of sample		soil	soil	soil	soil
Date prepared	-	16/07/2018	16/07/2018	16/07/2018	16/07/2018
Date analysed	-	17/07/2018	17/07/2018	17/07/2018	17/07/2018
Moisture	%	14	10	23	20

Asbestos ID - soils			
Our Reference		196235-1	196235-21
Your Reference	UNITS	4710/SS101	4710/BH101/0.5
Date Sampled		12/07/2018	12/07/2018
Type of sample		soil	soil
Date analysed	-	19/07/2018	19/07/2018
Sample mass tested	g	Approx. 30g	41.41g
Sample Description	-	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	Chrysotile asbestos detected Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected

Asbestos ID - materials			
Our Reference	UNITS	196235-29	196235-30
Your Reference		4710/PACM01	4710/PACM02
Date Sampled		12/07/2018	12/07/2018
Type of sample		material	material
Date analysed	-	17/07/2018	17/07/2018
Mass / Dimension of Sample	-	75x50x5mm	45x15x5mm
Sample Description	-	Beige compressed fibre cement material	Beige compressed fibre cement material
Asbestos ID in materials	-	Chrysotile asbestos detected	Chrysotile asbestos detected

Method ID	Methodology Summary
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's. Note, the Total +ve reported DDD+DDE+DDT PQL is reflective of the lowest individual PQL and is therefore simply a sum of the positive individually report DDD+DDE+DDT.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD. Note, the Total +ve PCBs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PCBs" is simply a sum of the positive individual PCBs.
Org-008	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.

Method ID	Methodology Summary
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'EQ PQL' values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'EQ zero' values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'EQ half PQL' values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-014	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate		Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	196235-21
Date extracted	-			16/07/2018	1	16/07/2018	16/07/2018		16/07/2018	16/07/2018
Date analysed	-			18/07/2018	1	18/07/2018	18/07/2018		18/07/2018	18/07/2018
TRH C ₆ - C ₉	mg/kg	25	Org-016	<25	1	<25	<25	0	84	80
TRH C ₆ - C ₁₀	mg/kg	25	Org-016	<25	1	<25	<25	0	84	80
Benzene	mg/kg	0.2	Org-016	<0.2	1	<0.2	<0.2	0	81	79
Toluene	mg/kg	0.5	Org-016	<0.5	1	<0.5	<0.5	0	80	78
Ethylbenzene	mg/kg	1	Org-016	<1	1	<1	<1	0	79	75
m+p-xylene	mg/kg	2	Org-016	<2	1	<2	<2	0	89	85
o-Xylene	mg/kg	1	Org-016	<1	1	<1	<1	0	80	76
naphthalene	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-016	102	1	99	100	1	96	95

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate		Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	25	16/07/2018	16/07/2018		[NT]	[NT]
Date analysed	-			[NT]	25	18/07/2018	18/07/2018		[NT]	[NT]
TRH C ₆ - C ₉	mg/kg	25	Org-016	[NT]	25	<25	<25	0	[NT]	[NT]
TRH C ₆ - C ₁₀	mg/kg	25	Org-016	[NT]	25	<25	<25	0	[NT]	[NT]
Benzene	mg/kg	0.2	Org-016	[NT]	25	<0.2	<0.2	0	[NT]	[NT]
Toluene	mg/kg	0.5	Org-016	[NT]	25	<0.5	<0.5	0	[NT]	[NT]
Ethylbenzene	mg/kg	1	Org-016	[NT]	25	<1	<1	0	[NT]	[NT]
m+p-xylene	mg/kg	2	Org-016	[NT]	25	<2	<2	0	[NT]	[NT]
o-Xylene	mg/kg	1	Org-016	[NT]	25	<1	<1	0	[NT]	[NT]
naphthalene	mg/kg	1	Org-014	[NT]	25	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-016	[NT]	25	93	100	7	[NT]	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	196235-21
Date extracted	-			16/07/2018	1	16/07/2018	16/07/2018		16/07/2018	16/07/2018
Date analysed	-			16/07/2018	1	17/07/2018	17/07/2018		16/07/2018	17/07/2018
TRH C ₁₀ - C ₁₄	mg/kg	50	Org-003	<50	1	<50	<50	0	114	120
TRH C ₁₅ - C ₂₈	mg/kg	100	Org-003	<100	1	<100	<100	0	96	105
TRH C ₂₉ - C ₃₆	mg/kg	100	Org-003	<100	1	<100	<100	0	92	85
TRH >C ₁₀ -C ₁₆	mg/kg	50	Org-003	<50	1	<50	<50	0	114	120
TRH >C ₁₆ -C ₃₄	mg/kg	100	Org-003	<100	1	<100	<100	0	96	105
TRH >C ₃₄ -C ₄₀	mg/kg	100	Org-003	<100	1	<100	<100	0	92	85
Surrogate o-Terphenyl	%		Org-003	93	1	107	94	13	100	97

QUALITY CONTROL: svTRH (C10-C40) in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	25	16/07/2018	16/07/2018		[NT]	[NT]
Date analysed	-			[NT]	25	17/07/2018	17/07/2018		[NT]	[NT]
TRH C ₁₀ - C ₁₄	mg/kg	50	Org-003	[NT]	25	<50	<50	0	[NT]	[NT]
TRH C ₁₅ - C ₂₈	mg/kg	100	Org-003	[NT]	25	<100	<100	0	[NT]	[NT]
TRH C ₂₉ - C ₃₆	mg/kg	100	Org-003	[NT]	25	<100	<100	0	[NT]	[NT]
TRH >C ₁₀ -C ₁₆	mg/kg	50	Org-003	[NT]	25	<50	<50	0	[NT]	[NT]
TRH >C ₁₆ -C ₃₄	mg/kg	100	Org-003	[NT]	25	<100	<100	0	[NT]	[NT]
TRH >C ₃₄ -C ₄₀	mg/kg	100	Org-003	[NT]	25	<100	<100	0	[NT]	[NT]
Surrogate o-Terphenyl	%		Org-003	[NT]	25	95	91	4	[NT]	[NT]

QUALITY CONTROL: PAHs in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	196235-21
Date extracted	-			16/07/2018	1	16/07/2018	16/07/2018		16/07/2018	16/07/2018
Date analysed	-			17/07/2018	1	17/07/2018	17/07/2018		17/07/2018	17/07/2018
Naphthalene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	111	98
Acenaphthylene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	116	93
Phenanthrene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	105	96
Anthracene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	108	101
Pyrene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	110	104
Benzo(a)anthracene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	102	95
Benzo(b,j,k)fluoranthene	mg/kg	0.2	Org-012	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-012	<0.05	1	<0.05	<0.05	0	97	84
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-012	103	1	99	94	5	120	121

QUALITY CONTROL: PAHs in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	25	16/07/2018	16/07/2018		[NT]	[NT]
Date analysed	-			[NT]	25	17/07/2018	17/07/2018		[NT]	[NT]
Naphthalene	mg/kg	0.1	Org-012	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Acenaphthylene	mg/kg	0.1	Org-012	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-012	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-012	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Phenanthrene	mg/kg	0.1	Org-012	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Anthracene	mg/kg	0.1	Org-012	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-012	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Pyrene	mg/kg	0.1	Org-012	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-012	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-012	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Benzo(b,j,k)fluoranthene	mg/kg	0.2	Org-012	[NT]	25	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-012	[NT]	25	<0.05	<0.05	0	[NT]	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-012	[NT]	25	94	89	5	[NT]	[NT]

QUALITY CONTROL: Organochlorine Pesticides in soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	196235-21
Date extracted	-			16/07/2018	1	16/07/2018	16/07/2018		16/07/2018	16/07/2018
Date analysed	-			16/07/2018	1	16/07/2018	16/07/2018		16/07/2018	16/07/2018
HCB	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
alpha-BHC	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	89	94
gamma-BHC	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	73	76
Heptachlor	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	88	90
delta-BHC	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	87	92
Heptachlor Epoxide	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	83	90
gamma-Chlordane	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	91	95
Dieldrin	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	94	98
Endrin	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	84	89
pp-DDD	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	90	95
Endosulfan II	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	79	78
Methoxychlor	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-005	118	1	125	116	7	107	103

QUALITY CONTROL: Organochlorine Pesticides in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	25	16/07/2018	16/07/2018		[NT]	[NT]
Date analysed	-			[NT]	25	16/07/2018	16/07/2018		[NT]	[NT]
HCB	mg/kg	0.1	Org-005	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
alpha-BHC	mg/kg	0.1	Org-005	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
gamma-BHC	mg/kg	0.1	Org-005	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-005	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-005	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
delta-BHC	mg/kg	0.1	Org-005	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-005	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Heptachlor Epoxide	mg/kg	0.1	Org-005	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
gamma-Chlordane	mg/kg	0.1	Org-005	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-005	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-005	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-005	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Dieldrin	mg/kg	0.1	Org-005	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Endrin	mg/kg	0.1	Org-005	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-005	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Endosulfan II	mg/kg	0.1	Org-005	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-005	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-005	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-005	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Methoxychlor	mg/kg	0.1	Org-005	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-005	[NT]	25	119	115	3	[NT]	[NT]

QUALITY CONTROL: Organophosphorus Pesticides					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	196235-21
Date extracted	-			16/07/2018	1	16/07/2018	16/07/2018		16/07/2018	16/07/2018
Date analysed	-			16/07/2018	1	16/07/2018	16/07/2018		16/07/2018	16/07/2018
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Bromophos-ethyl	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Chlorpyrifos	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	87	82
Chlorpyrifos-methyl	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Dichlorvos	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	85	88
Dimethoate	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	91	98
Fenitrothion	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	81	79
Malathion	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	83	71
Parathion	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	94	84
Ronnel	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	91	75
Surrogate TCMX	%		Org-008	118	1	125	116	7	126	117

QUALITY CONTROL: Organophosphorus Pesticides					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	25	16/07/2018	16/07/2018		[NT]	[NT]
Date analysed	-			[NT]	25	16/07/2018	16/07/2018		[NT]	[NT]
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-008	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Bromophos-ethyl	mg/kg	0.1	Org-008	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Chlorpyrifos	mg/kg	0.1	Org-008	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Chlorpyrifos-methyl	mg/kg	0.1	Org-008	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-008	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Dichlorvos	mg/kg	0.1	Org-008	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Dimethoate	mg/kg	0.1	Org-008	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-008	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Fenitrothion	mg/kg	0.1	Org-008	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Malathion	mg/kg	0.1	Org-008	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Parathion	mg/kg	0.1	Org-008	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-008	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-008	[NT]	25	119	115	3	[NT]	[NT]

QUALITY CONTROL: PCBs in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	196235-21
Date extracted	-			16/07/2018	1	16/07/2018	16/07/2018		16/07/2018	16/07/2018
Date analysed	-			16/07/2018	1	16/07/2018	16/07/2018		16/07/2018	16/07/2018
Aroclor 1016	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	102	100
Aroclor 1260	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCLMX	%		Org-006	118	1	125	116	7	126	117

QUALITY CONTROL: Acid Extractable metals in soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	196235-21
Date prepared	-			16/07/2018	1	16/07/2018	16/07/2018		16/07/2018	16/07/2018
Date analysed	-			16/07/2018	1	16/07/2018	16/07/2018		16/07/2018	16/07/2018
Arsenic	mg/kg	4	Metals-020	<4	1	6	<4	40	118	57
Cadmium	mg/kg	0.4	Metals-020	<0.4	1	<0.4	<0.4	0	110	91
Chromium	mg/kg	1	Metals-020	<1	1	39	30	26	114	103
Copper	mg/kg	1	Metals-020	<1	1	4	6	40	119	111
Lead	mg/kg	1	Metals-020	<1	1	14	13	7	113	104
Mercury	mg/kg	0.1	Metals-021	<0.1	1	<0.1	<0.1	0	106	100
Nickel	mg/kg	1	Metals-020	<1	1	2	2	0	117	96
Zinc	mg/kg	1	Metals-020	<1	1	26	32	21	110	97

QUALITY CONTROL: Acid Extractable metals in soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	25	16/07/2018	16/07/2018		[NT]	[NT]
Date analysed	-			[NT]	25	16/07/2018	16/07/2018		[NT]	[NT]
Arsenic	mg/kg	4	Metals-020	[NT]	25	<4	<4	0	[NT]	[NT]
Cadmium	mg/kg	0.4	Metals-020	[NT]	25	<0.4	<0.4	0	[NT]	[NT]
Chromium	mg/kg	1	Metals-020	[NT]	25	11	10	10	[NT]	[NT]
Copper	mg/kg	1	Metals-020	[NT]	25	5	6	18	[NT]	[NT]
Lead	mg/kg	1	Metals-020	[NT]	25	24	26	8	[NT]	[NT]
Mercury	mg/kg	0.1	Metals-021	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Nickel	mg/kg	1	Metals-020	[NT]	25	2	1	67	[NT]	[NT]
Zinc	mg/kg	1	Metals-020	[NT]	25	19	25	27	[NT]	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.
Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.	

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Report Comments

Acid Extractable Metals in Soil - Spike recovery for As in sample 21 at 57% which is outside lab acceptance criteria (70-130%), however, the LCS recovery is acceptable at 118%, sample heterogeneity suspected

Asbestos: A portion of the supplied samples were sub-sampled for asbestos analysis according to Envirolab procedures.

We cannot guarantee that these sub-samples are indicative of the entire sample.

Envirolab recommends supplying 40-50g of sample in its own container.

Note: Samples 196235-1 & 21 were sub-sampled from jars provided by the client.

Sample 196235-21; Chrysotile asbestos identified embedded in fragments of fibre cement, it is estimated to be 19.68g/kg in 41.41g of soil (i.e. > reporting limit for the method of 0.1g/kg).
detected.

SOIL ANALYSIS CHAIN OF CUSTODY FORM

Additional Testing												
Name	P1504710 - 52 Cooyong Rd, Terrey Hills - DSI											
Martens Contact Officer	Robert Mehaffey					Contact Email	rmehaffey@martens.com.au					
Sampling and Shipping	Sample Date	12 July 2018		Dispatch Date	13 July 2018		Turnaround Time		standard			
	Our Reference	P1504710JCOC01V01			Shipping Method (X)	Hand			Post		Courier	X
	On Ice (X)	X	No Ice (X)		Other (X)							
Laboratory												
Name	EnviroLab											
Sample Delivery Address	12 Ashley Street, Chatswood											
Delivery Contact	Name	Aileen		Phone	9910 6200		Fax			Email	ahie@envirolabservices.com.au	
Please Send Report By (X)	Post		Fax		Email	X	Reporting Email Address		rmehaffey@martens.com.au; gtaylor@martens.com.au			

	Sample ID	Combo 6a	Combo 5b	8HM	Asbestos in Material	BTEX	TRH	HOLD
1	4710/SS101	X						
2	4710/SS102							X
3	4710/SS103							X
4	4710/SS104							X
5	4710/SS105		X					
6	4710/SS106		X					
7	4710/SS107							X
8	4710/SS108							X
9	4710/SS109		X					
10	4710/SS110							X
11	4710/SS111							X
12	4710/SS112		X					
13	4710/SS113							X
14	4710/SS114		X					
15	4710/SS115		X					
16	4710/SS116							X
17	4710/SS117		X					
18	4710/SS118							X
19	4710/SS119							X

Head Office
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SOIL ANALYSIS CHAIN OF CUSTODY

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Sample ID	Combo 6a	Combo 5b	8HM	Asbestos in Material	BTEX	TRH	HOLD
20 4710/SS120		X					
21 4710/BH101/0.5	X						
22 4710/BH101/1.0							X
23 4710/BH102/0.3		X					
24 4710/BH102/1.1							X
25 4710/BH102/1.4		X					
26 4710/BH102/2.6							X
27 4710/DUP01			X				
28 4710/DUP02			X				
29 4710/PACM01				X			
30 4710/PACM02				X			
31 Trip Spike					X		
32 Trip Blank						X	



Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200

Job No: 196235.

Date Received: 13/5/19.
Time Received: 1245.
Received By: EMI
Temp: Cool/Ambient
Cooling: Ice/icepack
Security: Intact/Broken/None