

Matthews Contracting



Stage 1 and 2 Environmental Site
Assessment:
11 Addison Road, Ingleside, NSW.

ENVIRONMENTAL



WATER



WASTEWATER



GEOTECHNICAL



CIVIL



PROJECT
MANAGEMENT



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1 Introduction

1.1 Overview

This report prepared by Martens and Associates (MA), on behalf of Matthews Contracting ('the Client'), documents a Stage 1 and 2 Environmental Site Assessment (ESA) completed for 11 Addison Road, Ingleside, NSW ('the site').

1.2 Objectives

Investigation objectives included:

- Identification of historic and current contaminating site activities.
- Evaluation of potential areas of environmental concern (AEC) and associated chemicals of primary concern (COPC).
- Execute a programme of soil sampling and laboratory analysis to determine site contamination based on identified potential AEC and COPC.
- Determine suitability for continued use of the site for storage of building materials and construction plant.
- Provide recommendations for further works (if necessary).

1.3 Scope of Works

Scope of works included:

- Site history review using available records.
- Aerial photo interpretation.
- Site walkover to review current land use, potential contaminating activities and neighbouring land uses.
- Confirmation of potential AEC and COPC.
- Intrusive soil investigation and laboratory analysis.
- Preparation of an ESA report in general accordance with the relevant sections of NSW OEH (2011) and NSW DEC (2006).

1.4 Reference Guidelines

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

- CRC Care (2011) Health screening levels for petroleum hydrocarbons in soil and groundwater Part 1: Technical development document.
- NEPC (1999, amended) National Environmental Protection (Assessment of Site Contamination) Measure (NEPM).
- NSW DEC (2006) Contaminated Sites: Guidelines for the NSW Site Auditor Scheme.
- NSW EPA (1995) Sampling Design Guidelines.
- NSW OEH (2011) Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites, 2nd edition.

1.5 Proposed Development

The site is proposed to be utilised for the continued storage of building materials and construction plant and as an office for the contracting business. This represents no change to the existing site use. However, as part of the continued use proposal, MA understands some alterations are proposed including demolition then replacement of a staff lunch room/shed and reconfiguration of the site's stormwater management system. It is also likely that the site's onsite wastewater management system shall be reconfigured based on recommendations provided by MA (2014).

1.6 Abbreviations

ACM – Asbestos containing material

AEC – Area of environmental concern

AST – Above ground storage tank

BGL – Below ground level

BTEX – Benzene, toluene, ethyl benzene, xylene

COPC – Chemical of primary concern

CRC CARE – Cooperative Research Centre for Contamination Assessment and Remediation of the Environment

DECCW – NSW Department of Environment, Climate Change and Water

DP – Deposited Plan
EPA – NSW Environmental Protection Authority
ESA – Environmental site assessment
ESL – Ecological screening levels
GSW – General solid waste
HIL- Health investigation levels
HSL- Heal screening levels
LGA – Local government area
LOR – Limit of reporting
MA – Martens and Associates
NATA – National Association of Testing Authorities
NEPC- National Environmental Protection Council
OCP – Organochloride pesticides
OEH – NSW Office of Environment and Heritage
OPP – Organophosphate pesticides
PAH – Polycyclic aromatic hydrocarbons
PCB – Polychlorinated biphenyl
RAP – Remedial action plan
RPD – Relative percentage difference – difference between two values divided by the average
SOP – Standard operating procedure
TRH – Total recoverable hydrocarbons

2 Location and Setting

Site information is summarised in Table 1.

Table 1: Site background information.

Site address	11 Addison Road, Ingleside, NSW
Site area	Approximately 18,630 m ²
Local Government Area (LGA)	Pittwater Council
Lot and DP (Title Information)	Lot 1831 DP 812302
Zoning	1(a) – Non-Urban
Current land use	Site used by earthworks contracting firm to store and maintain vehicles, machinery and materials.
Proposed land use	No change from the current land use.
Surrounding land uses	Boarded by Addison Road to the east, rural residential allotments to the south, west and north.
Geology and soil landscapes	The Sydney 1:100,000 Geological Sheet 9130 (1983) describes geology underlying the site as Hawkesbury Sandstone.
Sensitive receptors	Residences to the south, west and north. Nearest environmental receptors is Wirreanda Creek 600 m west of the site.

Site location is shown in Figure 1 in Attachment A.

3 Stage 1 ESA

3.1 Bore Search

A review of the NSW Department of Natural Resources groundwater bore database revealed that there are six bores with available water level data located within approximately 300 m of the subject site and one bore located on the site. Results are summarised in Table 2 with bores shown in Figure 2.

Table 2: DNR groundwater details for seven bores within 300 m of the site.

Groundwater Bore Identification	Approx. Distance from Site (m)	Depth To Ground Water (mBGL)	Intended Use	Water Bearing Zone Substrate
GW051799	180	11	Domestic	Sandstone
GW051861	130	18, 38	Domestic	Sandstone
GW014464	180	6, 30	Irrigation	Sandstone
GW057745	200	25, 145	Irrigation	Sandstone
GW060293	240	29	Irrigation	Sandstone
GW064440	280	84	Domestic Stock	Sandstone
GW103160	On Site	15, 105	Domestic Stock	Sandstone

3.2 Site Walkover

A site inspection was undertaken by a Martens & Associates environmental engineer on February 5, 2014. Site walkover observations included:

- Above ground storage tank (AST) within concrete block bund and associated refuelling area. Tank is 20 KL and used for storage of diesel.
- Concrete pad used for storage of machinery and excavation equipment.
- Storage area for building waste such as metal and wiring on bare earth.
- Mechanical garage workshop and forecourt area used to service earth moving machinery.

- Truck wash down area consisting of a concrete slab surrounded by bare earth.
- Stockpile area consisting of spoil (Client advised it was VENMN however no certification provided) from various building sites Mathews Contracting had worked on.
- Miscellaneous storage area of building materials such as metal, wood, plastics and old excavation equipment.
- Truck turning/parking/offloading area.
- General area of site used for office, car park and general storage of mechanical equipment.

Photos are provided in Figures 3 – 7 in Attachment A.

3.3 Historical Site Records Review

Information derived from review of historical site records is presented in Table 3.

Table 3: Site history information.

Information Source		Available Information
NSW OEH Records		No notices for the site or areas surrounding the site are currently listed under the Contaminated Land Management Act (1997) or the Environmentally Hazardous Chemicals Act (1985).
Pittwater Council Records ¹	Application Number/Date	Description
	DA B0700/2000	Construction of an attached dual occupancy and swimming pool – Withdrawn
	CC 0661/2002	Construction of an attached dual occupancy and swimming pool – Certificate Issued
	BC 0148/2004	As built variations to approved plan as per Drawings A.05-C, A.01-F, A.03-C, A.02-B – Certificate Issued
	DA N0700/00/S96/3/2011	Construction of an attached dual occupancy and swimming pool. Modifications are listed in the Statement of Environmental Effects which is available on Councils website – Modification Approved
	DA N0440/2011	Occupation of existing site for the purpose of an industry associated directly to an extractive industry, to store and maintain vehicles, machinery and materials – Withdrawn/Cancelled
	DA N0263/2013	Occupation of existing site for the purpose of an industry associated directly to an extractive industry, to store and maintain vehicles, machinery and materials – Withdrawn/Cancelled

Note:

¹ See Attachment B for detailed records.

3.4 Aerial Photograph Interpretation

Results of aerial photograph interpretation are summarised in Table 4 with aerial photographs provided in Figures 8 – 13 in Attachment A.

Table 4: Observations from selected aerial photographs.

Year	Site	Surrounding Land Use	Reference
1930	Natural bushland	Natural bushland surrounding the site. Agricultural farms to the north east. Mona Vale Road to the south.	Sydney Survey Run: 1 - 12, Photo: Unknown Scale: Unknown
1947	Natural bushland	Little change from 1930.	Broken Bay Run: 39, Photo: Unknown Scale: 1:12,200
1965	Natural bushland Site partially cleared in south west corner Formation of Addison Rd	Increased clearing to the north, east and west for rural residential. Bahai Temple to the east. Dwelling constructed adjacent to southern boundary	Cumberland Run 13 E, Photo: Unknown Scale: Unknown
1982	Natural bushland Site partially cleared in south west corner No change from 1965	Increased clearing to the north, east and west for rural residential. Construction of dam and dwelling on lot adjacent to western boundary	Sydney Run 14, Photo: 2560 M ASL Scale: 1:16000
2002	Majority of site cleared in the east and west Construction of a dam, fuel tank, workshop, dwelling and sheds at the rear (west) of the site	Dwelling constructed to the south in eastern portion of the site Increased rural residential development to the north, east and west. Addison Road is sealed.	Sydney Run: 5, Photo: Unknown Scale: 1:25,000
Present	Dam has been filled Construction of current dwelling in eastern portion of the site and sheds near north west boundary	Little change from 2002.	Six maps

3.5 Site History Summary

Properties surrounding the site were largely native bushland until at least 1947. After 1965, increased clearing occurred in the area for rural residential purposes. The site's use has been limited to rural residential with sheds and unsealed yards used to run a commercial earthworks/civil contracting business. Sometime after 2002, the current dwelling was constructed.

3.6 Discussion with Land Owner

Discussions were held with Steve Mathews (site owner) during the site walkover. Mr Mathews provided the following information.

- Lower portion of the site used for storage of earth moving machinery and associated equipment, materials and plant for the last 20 years.
- Area used for storage of plant, stockpiles and truck turning area has been levelled and filled with material from the site. Area had approximately 300 mm of bitumen and road base placed on surface to act as a 'seal' and hardstand pavement. This layer had worn through in several areas where truck movements were high.
- Stockpile area used to be an old dam which was filled with material from the site during construction of the lower storage area.
- There has been no instances of fuel spillages from the AST.

3.7 Areas of Environmental Concern/Chemicals of Primary Concern

Our assessment of site AECs is made on the basis of: available site history (anecdotal and DA records); aerial photograph interpretation; and site inspection. Based on past uses of AECs, chemicals of primary concern (COPC) have been identified as outlined in Table 5 and shown in Figure 1.

Table 5: AECs and COPCs (extract from MA, 2014a).

AEC	Location	Potential Contaminating Activity	COPC ¹	Likelihood for contamination
A	Refuelling area	Potential contamination from fuel spillage	TRH, PAH, HM, BTEX	High
B	Bunded area for fuel tank	Potential contamination from fuel spillage	TRH, PAH, HM, BTEX	High
C	Concrete pad used for storage of excavation equipment	Oil, fuel and hydraulic oil from machinery and drilling heads	TRH, PAH, HM, BTEX	High
D	Building waste storage area	Builders waste, wiring/metal and storage containers	TRH, PAH, HM, BTEX	Medium - High
E	Mechanical workshop	Leaking oil and fluid from excavation equipment and storage containers	TRH, PAH, HM, BTEX	High
F	Mechanical workshop forecourt	Leaking oil and fluid from servicing excavation equipment and plant	TRH, PAH, HM, BTEX	High
G	Truck wash down area	Oil, fluid and pesticides washed off trucks/excavation equipment	TRH, PAH, HM, BTEX, OPP/OCP	Medium – High
H	Stockpile area	Stockpiles consisting of VENM from various building sites (no certification)	TRH, PAH, HM, BTEX, OPP/OCP, asbestos	Medium
I	Miscellaneous storage area of building materials	Storage of materials such as rusting metal, wood, plastics and containers	TRH, PAH, HM, BTEX, OPP/OCP	Low – Medium

AEC	Location	Potential Contaminating Activity	COPC ¹	Likelihood for contamination
J	Truck turning/parking/offloading area	Fill from unknown sources. Leaking oil, fuel and fluid from vehicles and excavation equipment	TRH, HM, PAH, BTEX, asbestos	Low – Medium
K	General area of site used as office, car park and storage of mechanical equipment	Leaking oil, fuel and fluid from vehicles and excavation equipment	TRH, HM, PAH, BTEX	Low – Medium

3.8 Conclusion

A review of site history and walkover inspection indicates the site has the following potential contamination sources:

- Mechanical workshop and associated forecourt area.
- Truck wash down area.
- Above ground fuel tank and associated refuelling area.
- Concrete pad used for storage of machinery and drilling heads.
- Stockpile area consisting of spoil from various building sites (no certification of VENM status).
- Miscellaneous storage area of building materials such as metal, wood, plastics and old excavation equipment.
- Truck turning/parking/offloading area.
- General area of site used for office, car park and general storage of mechanical equipment.

In light of above, a Stage 2 ESA was undertaken to assess potential soil contamination associated with identified AEC and COPC.

4 Stage 2 Environmental Site Assessment

4.1 Field and Laboratory Investigations

4.1.1 Field Programme

Identified AEC and COPC were utilised to develop a field investigation programme to detail prevailing site contamination condition. Intrusive investigation (Table 6) was undertaken with sampling locations selected to provide adequate site coverage to assess extents and locations of AECs. Sampling was completed in general accordance with the sampling design guidelines outlined in NSW EPA (1995).

4.1.2 Sampling Investigations

Intrusive investigations were undertaken on February 20, 2014 and are summarised in Table 6.

Table 6: Soil sampling methods.

Type	Number of Locations	Equipment	Description
Hydraulic auger borehole	12	95 mm diameter solid flight hydraulic auger	Boreholes drilled to depths between 0.7 – 2.5 mBGL. A total of 57 primary soil samples were taken. Samples were taken off the lead auger tip.
Test pit	10	Spade	300 mm x 300 mm test pits excavated to depths between 0.3 – 0.6 mBGL. A total of 39 primary soil samples were taken.

Subsurface investigation locations are shown in Figure 14 – Attachment A with borehole/test pit logs provided in Attachment C.

4.1.3 Sampling Quality Assurance/Control

Soil sampling quality assurance/control processes (Table 7) were undertaken to meet data quality objectives.

Table 7: Soil sampling quality assurance/control processes.

Activity	Detail / Comments
Soil logging	Test pits/boreholes were logged by an environmental engineer in accordance with Martens and Associates SOP.
Soil sampling	Soil sampling was completed by an environmental engineer. Soil samples were placed into a laboratory-supplied, acid-rinsed 250mL glass jar, labelled with a unique identification number and where possible afforded no headspace to limit volatile loss.
Soil screening	A portion of some test pit and borehole samples were placed into 'zip-lock' plastic bags to assess presence of VOC compounds via photo-ionisation detector (PID), calibrated with 100 ppm isobutylene calibration gas. VOC concentrations obtained from PID, in combination with other field observations, were utilised to select samples to be analysed. PID concentrations are detailed on borehole logs in Attachment C.
QA / QC sampling	Two duplicate soil samples were taken and submitted to the laboratory for intra-laboratory analysis. One (1) trip blank (TB) and one (1) trip spike (TS) sample were placed with soil samples in cooler boxes and tested by the analytical laboratory to assess potential cross contamination between samples (TB) and the loss of volatile contamination from samples (TS) during transportation. The QA / QC Data Validation Report is presented in Attachment E and a Relative Percentage Difference (RPD) assessment in Attachment F.
Sample handling and transportation	Sample collection, storage and transport were conducted according to Martens and Associates SOP. Collected samples were placed into an ice chilled cooler-box. Samples were dispatched to a NATA-accredited laboratory under chain of custody documentation within holding times.
Decontamination of sampling equipment	Augers and spades were decontaminated between sampling locations by pressurised water spray with a solution of Decon-90™, a phosphate-free detergent, followed by rinsing with potable water.

4.1.4 Laboratory Analytical Suite

Primary soil samples were selected for a suite of laboratory analyses (Table 8) to address site AECs and potential COPC identified in the Stage 1 ESA and/or visual and olfactory evidence of contamination. Discrete samples were analysed by Envirolab Pty Ltd a NATA accredited laboratory. A laboratory report is provided in Attachment D.

Table 8: Summary of primary soil laboratory analyses.

COPC	Number of Samples Analysed
BTEX	21
TRH	22
PAH	22
Heavy metals ¹	21
OCP	3
PCB	3
Benzo(a)pyrene TCLP	10
Asbestos (soil)	4

Notes:

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

5 Quality Control and Quality Assurance Assessment

A review of QA/QC procedure has been completed and is present in the Data Validation Report presented in Attachment E. The report concludes that data is suitable for the purposes of the assessment. A relative percentage difference (RPD) summary is in Attachment F.

6 Assessment Criteria

6.1 Overview

Soil investigation and screening levels have been adopted to evaluate potential risk to human health and the ecosystem from site contamination. Investigation levels were selected based on:

1. The site being utilised for continued use for storage of building materials and construction plant.
2. A sealed site (concrete or flexible pavement) or hybrid layer plus 300 mm of bitumen and road base or ripped sandstone. We note that the site is not currently fully sealed with minimal and degraded seal in areas of high traffic movement.

6.2 Soil Assessment Criteria

Investigation levels for soil were established based on the following references:

- o NSW DEC (2006) Contaminated Sites: Guidelines for the NSW Site Auditor Scheme.
- o CRC Care (2011) Health screening levels for petroleum hydrocarbons in soil and groundwater Part 1: Technical development document.
- o NEPC (1999, amended 2013) National Environmental Protection (Assessment of Site Contamination) Measure (NEPM).

6.2.1 Health Investigation Levels

Human health based soil investigation levels (HIL) for commercial/industrial land use provided in Column D of Table 1A(1) in the NEPM (1999, amended 2013) have been adopted as the soil investigation levels.

NEPC (1999, amended) has provided a health screening level for bonded ACM as 0.01% weight for weight (w/w). An additional health screening level is that no visible asbestos be present for surface soil. MA has adopted an asbestos investigation level of "non-detect" for this site.

Adopted HILS are summarised in Table 9.

Table 9: Adopted health investigation levels for soil (HIL) and laboratory detection levels (LOR).

Contaminant of Concern	Adopted HIL (mg/kg)	LOR (mg/kg)
Benzo(a)pyrene TEQ	40	0.5
Total PAH	4000	<2.55
Arsenic (total)	3000	4
Cadmium	900	0.5
Chromium (VI)	3600	1
Copper	240,000	1
Lead	1,500	1
Mercury	730	0.1
Nickel	6,000	1
Zinc	400,000	1
Aldrin + Dieldrin	45	0.2
Chlordane	530	0.1
DDT+DDD+DDE	3,600	0.3
Heptachlor	50	0.1
Asbestos	0.01% w/w = bonded asbestos 0.001% w/w = friable asbestos None visible at surface	0.01% w/w

6.2.2 Health Screening Levels for Petroleum Hydrocarbon Compounds

Health screening levels (HSL) have been developed to address risk to human health, identified predominantly as inhalation of vapours from contaminant sources and direct contact with TPH affected soils.

HSLs for commercial/industrial land use in sand soils as outlined in Table 1A(3) in the NEPM (1999, amended 2013) have been adopted for assessment of vapour intrusion risk (Table 10). This selection is made to address the sand and clay fill materials identified. Direct contact HSL for commercial/industrial land use as outlined in Table A4 of CRC Care (2011) apply where material is at the surface or might be exposed by site works (Table 11).

Table 10: Commercial/industrial soil HSLs for vapour intrusion in sand (mg/kg).

	0m – <1m	1m – <2m	2m – <4m	4m+	Soil Saturation Concentration (C _{sat}) ¹
Toluene	NL	NL	NL	NL	560
Ethylbenzene	NL	NL	NL	NL	64
Xylenes	230	NL	NL	NL	300
Naphthalene	NL	NL	NL	NL	9
Benzene	3	3	3	3	360
F1 (C₆ – C₁₀)	260	370	630	NL	950
F2 (C₁₀ – C₁₆)	NL	NL	NL	NL	560

Notes:

¹ The soil saturation concentration (C_{sat}) is defined as the soil concentration at which the porewater phase cannot dissolve any more of an individual chemical. The soil vapour that is in equilibrium with the porewater will be at its maximum. If the derived soil HSL exceeds C_{sat}, a soil vapour source concentration for a petroleum mixture could not exceed a level that would result in the maximum vapour risk for the given scenario. For these scenarios, no HSL is presented and the HSL is shown as 'not limiting' or NL (NEPM, 1999 amended 2013).

Table 11: Direct contact TPH HSL and laboratory LOR.

Contaminant of Concern	Soil Criteria (mg/kg)	LOR (mg/kg)
TPH (C ₆ -C ₁₀)	26,000	25
TPH(C ₁₀ -C ₁₆)	20,000	50
TPH (C ₁₆ -C ₃₄)	27,000	250
TPH (C ₃₄ – C ₄₀)	38,000	500
Benzene	430	0.2
Toluene	99,000	0.5
Ethyl benzene	27,000	1
Naphthalene	11,000	1
Xylene (total)	81,000	3

6.2.3 Ecological Screening Levels for Petroleum Hydrocarbon Compounds

Ecological Screening Levels (ESL) have been developed to address potential environmental risk due to hydrocarbon compound contamination.

ESL apply principally to contamination contained in the top 2 m of soil with screening levels derived for fine and coarse grained soils. ESLs for coarse grained soils with commercial and industrial land use (Table 12) have been selected for this assessment as outlined in Table 1B(6) of the NEPM (1999, amended 2013).

Contamination at levels above ESL occurring at depths greater than 2 mbgl is not considered an environmental risk unless site works reduce cover to less than 2 m through excavation works.

Table 12: ESL screening levels - TPH and BTEX ESL and LOR.

Contaminant of Concern	Soil Criteria (mg/kg)	LOR (mg/kg)
F1 (C ₆ -C ₁₀)	215	25
F2 (C ₁₀ -C ₁₆)	170	50
F3 (C ₁₆ -C ₃₄)	1700	250
F4 (C ₃₄ -C ₄₀)	3300	500
Benzene	75	0.2
Toluene	135	0.5
Ethyl benzene	165	1
Xylene (total)	180	3
Benzo(a)pyrene	0.7	0.05

7 Results

7.1 Health Investigation Levels

The HIL criteria of 40 mg/kg for Benzo(a)pyrene TEQ was exceeded at BH122 at depths of 0.05 m (81 mg/kg) and 0.2 m (50 mg/kg).

7.2 Health Screening Levels for Petroleum Hydrocarbons

Health screening levels for petroleum hydrocarbons were not exceeded by any analysed samples.

7.3 Ecological Screening Levels for Petroleum Hydrocarbons

ESL criteria were exceeded for benzo(a)pyrene and TRH (C₁₆-C₃₄) at locations/depths as outlined in Table 13.

Table 13: Samples which exceeded ESL criteria.

Contaminant	Criteria (mg/kg)	BH or TP /Depth (mBGL)	Result (mg/kg)
Benzo(a)pyrene	0.7	105/0.2	2.80
		112/0.05	1.30
		116/0.05	1.30
		116/0.2	0.73
		117/0.1	3.00
		117/0.5	3.70
		120/0.5	1.10
		122/0.05	59.00
		122/0.2	36.00
		123/0.05	6.20
F3 (C ₁₆ -C ₃₄)	1,700	112/0.05	5,600
		122/0.05	3,100
		122/0.2	2,000

7.4 Benzo(a)pyrene TCLP

With the exception of sample TP122/0.2, benzo(a)pyrene TCLP was conducted on all samples which exceeded the benzo(a)pyrene ESL, and sample BH120/0.05. All analysed samples were below laboratory detection limits (<0.001 mg/kg) except sample BH122/0.05 which had pyrene and fluoranthene at or marginally above detection levels (0.001 mg/kg and 0.002 mg/kg respectively).

8 Conclusion and Recommendations

HILs for benzo(a)pyrene TEQ were exceeded by two samples with ESL criteria exceeded by 10 samples for benzo(a)pyrene and three samples for TRH (C₁₆-C₃₄).

In light of the above, and given the assessment criteria assumed a sealed site (the site is currently not fully sealed), a Remediation Action Plan (RAP) is to be prepared to detail site sealing and future management practices.

Assessment contained in this report is not applicable unless the site is sealed in nominated areas.

Site sealing is considered an appropriate remediation method given this will prevent human and ecological contact with contaminated soils, and given benzo(a)pyrene leachate from samples tested for TCLP occurred at low concentrations (maximum 0.001 mg/kg).

Following successful execution of the RAP and subsequent validation, the site would be fit for continued use.

9 Limitations

This Stage 1 and 2 contamination assessment 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

CRC Care (2011), *Health screening levels for petroleum hydrocarbons in soil and groundwater Part 1: Technical development document.*

Department of Mineral Resources (1983) *Sydney 1:100,000 Geological Sheet 9130.*

Martens and Associates (2014) Onsite Wastewater Assessment: 11 Addison Road, Ingleside, NSW, report reference P1404106JR03V01.

NEPC (1999, amended) *National Environmental Protection (Assessment of Site Contamination) Measure (NEPM).*

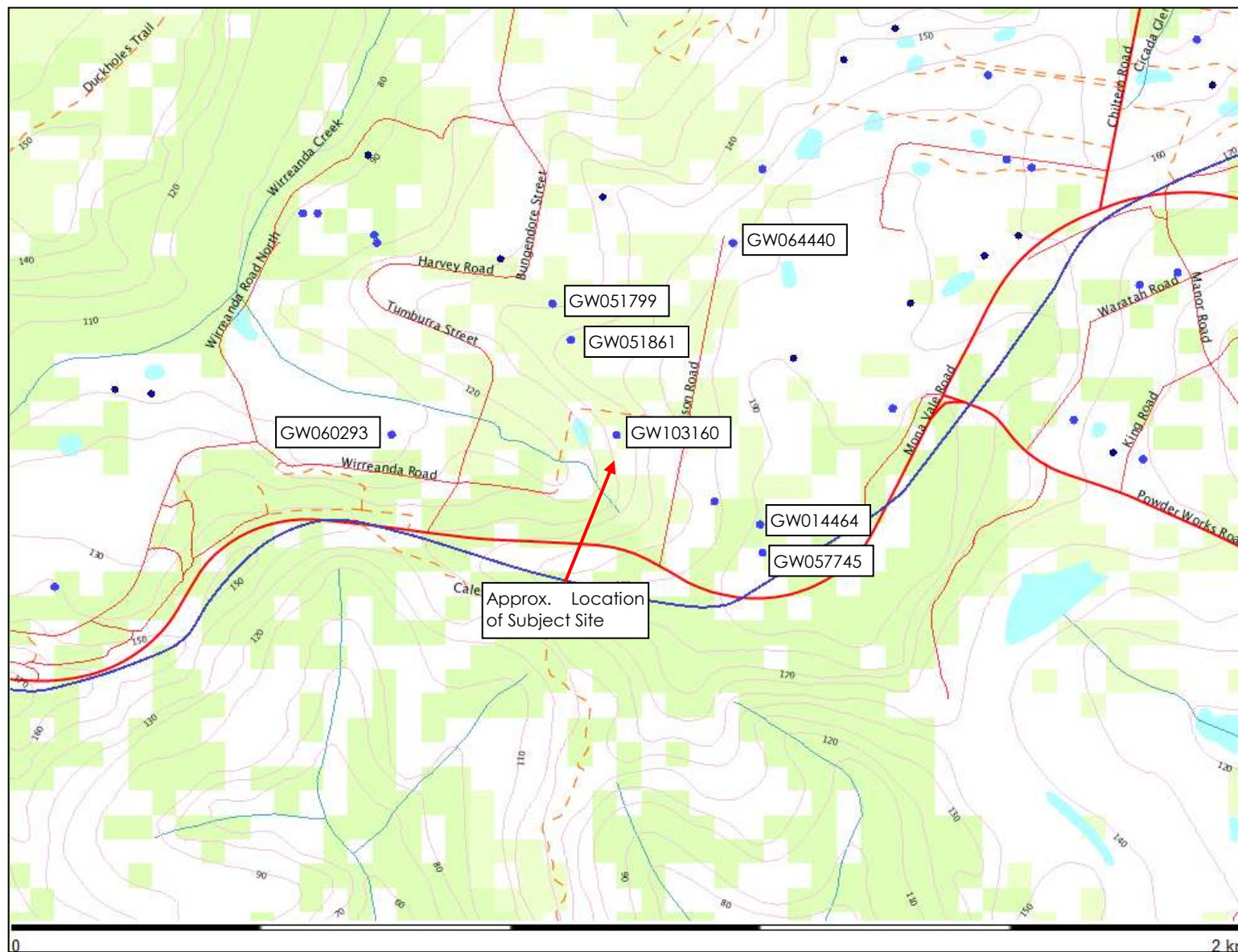
NSW DEC (2006) *Contaminated Sites: Guidelines for the NSW Site Auditor Scheme.*

NSW OEH (2011) *2nd Ed Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites.*

11 Attachment A – Site Survey and Figures



Martens & Associates Pty Ltd ABN 85 070 240 890		Environment Water Wastewater Geotechnical Civil Management	
Drawn:	GMT	Site Plan & Areas of Environmental Concern	Drawing No:
Approved:	GT		Figure 1
Date:	10/02/2014		
Scale:	Not to Scale		Job No: P1404106



Martens & Associates Pty Ltd ABN 85 070 240 890		Environment Water Wastewater Geotechnical Civil Management	
Drawn:	GMT	Local Groundwater Bores (from NSW DNR database)	Drawing No:
Approved:	GT		Figure 2
Date:	10/02/2014		
Scale:	Not to Scale		Job No: P1404106



Martens & Associates Pty Ltd ABN 85 070 240 890		Environment Water Wastewater Geotechnical Civil Management	
Drawn:	GMT	Above ground fuel storage tank	Drawing No:
Approved:	GT		Figure 3
Date:	10/02/2014		
Scale:	Not to Scale		Job No: P1404106



Martens & Associates Pty Ltd ABN 85 070 240 890		Environment Water Wastewater Geotechnical Civil Management	
Drawn:	GMT	Drill heads and excavation equipment	Drawing No:
Approved:	GT		Figure 4
Date:	10/02/2014		
Scale:	Not to Scale		Job No: P1404106



Martens & Associates Pty Ltd ABN 85 070 240 890		Environment Water Wastewater Geotechnical Civil Management	
Drawn:	GMT	General rubbish stockpile	Drawing No:
Approved:	GT		Figure 5
Date:	10/02/2014		
Scale:	Not to Scale		Job No: P1404106



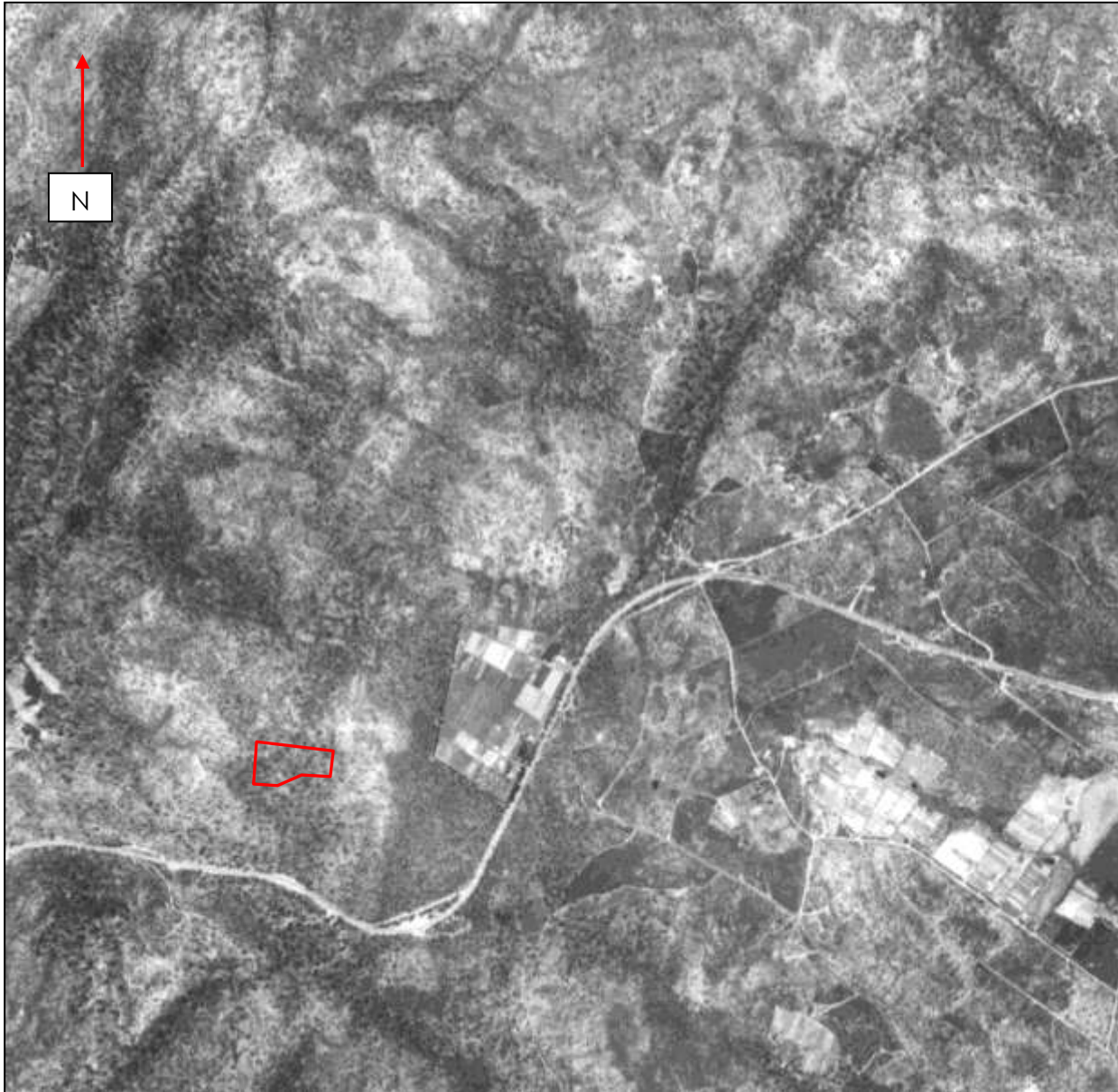
Martens & Associates Pty Ltd ABN 85 070 240 890		Environment Water Wastewater Geotechnical Civil Management	
Drawn:	GMT	Potable water storage tank	Drawing No:
Approved:	GT		Figure 6
Date:	10/02/2014		
Scale:	Not to Scale		Job No: P1404106



Martens & Associates Pty Ltd ABN 85 070 240 890		Environment Water Wastewater Geotechnical Civil Management	
Drawn:	GMT	Workshop forecourt area used for excavator maintenance	Drawing No:
Approved:	GT		Figure 7
Date:	10/02/2014		
Scale:	Not to Scale		Job No: P1404106



Martens & Associates Pty Ltd ABN 85 070 240 890		Environment Water Wastewater Geotechnical Civil Management	
Drawn:	GMT	Historical Aerial – 1930 Source: NSW Department Lands	Drawing No:
Approved:	GT		Figure 8
Date:	10/02/2014		
Scale:	Not to Scale		Job No: P1404106



Martens & Associates Pty Ltd ABN 85 070 240 890		Environment Water Wastewater Geotechnical Civil Management	
Drawn:	GMT	Historical Aerial – 1947 Source: NSW Department Lands	Drawing No:
Approved:	GT		Figure 9
Date:	10/02/2014		
Scale:	Not to Scale		Job No: P1404106



Martens & Associates Pty Ltd ABN 85 070 240 890		Environment Water Wastewater Geotechnical Civil Management	
Drawn:	GMT	Historical Aerial – 1965 Source: NSW Department Lands	Drawing No:
Approved:	GT		Figure 10
Date:	10/02/2014		
Scale:	Not to Scale		Job No: P1404106



Martens & Associates Pty Ltd ABN 85 070 240 890		Environment Water Wastewater Geotechnical Civil Management	
Drawn:	GMT	Historical Aerial – 1982 Source: NSW Department Lands	Drawing No:
Approved:	GT		Figure 11
Date:	10/02/2014		
Scale:	Not to Scale		Job No: P1404106



Martens & Associates Pty Ltd ABN 85 070 240 890

Environment | Water | Wastewater | Geotechnical | Civil | Management

Drawn:	GMT
Approved:	GT
Date:	10/02/2014
Scale:	Not to Scale

Historical Aerial – 2002
Source: NSW Department Lands

Drawing No:
Figure 12

Job No: P1404106



Martens & Associates Pty Ltd ABN 85 070 240 890		Environment Water Wastewater Geotechnical Civil Management	
Drawn:	GMT	Historical Aerial – Present Source: Six Maps	Drawing No:
Approved:	GT		Figure 13
Date:	10/02/2014		
Scale:	Not to Scale		Job No: P1404106



Martens & Associates Pty Ltd ABN 85 070 240 890		Environment Water Wastewater Geotechnical Civil Management	
Drawn:	BR	BOREHOLE AND TEST PIT LOCATIONS	Drawing No:
Approved:	GT		Figure 14
Date:	14.03.2014		
Scale:	Not to Scale		Job No: P1404106

12 Attachment B - Historical Search Documents

PITTWATER COUNCIL DEVELOPMENT APPLICATION FORM

2nd Floor, Unit 11, No 5 Vuko Place, Warriewood
PO Box 882, MONA VALE NSW 1660
DX 9018, MONA VALE
Facsimile: (02) 9970 7150
Telephone: (02) 9970 1111
ABN No. 61340837871
Email: pittwater_council@pittwater.nsw.gov.au
Website: www.pittwaterlga.com.au



Office Use Only:

FILE AND PART NO: _____

PROPERTY NO: _____

OFFICER: _____

DA NO: _____

CC NO: _____

PRE-LODGEEMENT

- Pre-lodgement discussion with staff is recommended.
- Discuss your proposal with your neighbours prior to design or lodgement.
- Carefully read the checklist and guide in this form and ensure that all required information and documentation is provided with your application.

LODGEEMENT

- All information required by the check-list must be submitted with this application.
- Incomplete applications or illegible information will not be accepted by Council.
- All fees are to be paid at the time of lodgement.
- If written agreement from neighbours is not provided the application will be notified and 'stop the clock' will commence

THIS APPLICATION IS FOR: (please tick)

- ☐ DEVELOPMENT CONSENT (Complying ☐ Integrated ☐ Designated ☐ See Page 3)
- ☒ MODIFICATION OF CONSENT Approval No 700/00 Approval Date 19/11/01
- ☐ CONCURRENT DEVELOPMENT APPLICATION AND CONSTRUCTION CERTIFICATE
- Note: Prior to release of the Construction Certificate, the licensed builder's details or owner builder's permit no. must be provided

LOCATION OF THE PROPOSAL: (please print)

House No 11 Street/Road ADDISON Suburb INGLESIDE
Postcode 2101 Lot 1831 Section _____ Deposited Plan 812 302
Present use of land or building RESIDENTIAL

DESCRIPTION OF PROPOSAL / DETAILS OF THE MODIFICATION SOUGHT: (please print)

MINOR CHANGES SEE LETTER ATTACHED

OWNER: (please print) This section must be signed by ALL owners

I/we consent to the lodgement of this application and permit Council authorised personnel to enter the site for the purpose of inspections.

Owner/s MR K. & MRS B MATTHEWS MR S & MRS I. MATTHEWS

Address 11 ADDISON RD INGLESIDE

Postcode 2101

Signature(s) _____

- If the property has recently been purchased, written confirmation from the Purchaser's Solicitor must be provided.
- If contracts have been exchanged for purchase of the land, the current owner is to sign the form.
- If signed on behalf of a Company, the seal must be stamped over the signature.
- If the land is below mean high water mark, the written consent of the Crown is required.
- If the written consent is not signed by all owners of the property, this application will not be accepted.

WHAT IS THE ESTIMATED COST OF THE PROPOSAL

STAMPED

2200.00 MODIFICATION
17 MAR 2004

Note: The estimated cost is the value of the works. It is the cost which would be incurred if a contractor carried out the works. This estimate must be supported by an appropriate contract or independent estimate prepared by a suitably qualified person where a variation from Council's estimate of costs is sought. (See Attached Sheet)

DEVELOPMENT APPLICATION

Made under section 75A of the Environmental Planning and Assessment Act 1979

Village Park, 1 Park Street, MONA VALE PO Box 882, MONA VALE NSW 1660 DX 9018, MONA VALE Telephone (02) 9976 1111 ABN No. 61340837871 Email: pittwater_council@pittwater.nsw.gov.au Website: www.pittwater.nsw.gov.au		PITTWATER COUNCIL	Office Use Only DA No <u>NO 700/00/596/3</u> Date Received <u>14/11/11</u>
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PRE LODGEMENT • Pre-lodgement discussion with staff is recommended • Discuss your proposal with your neighbours prior to design or lodgement • Carefully read the checklist and guide in this form and ensure that all required information and documentation is provided with your application	LODGEMENT • All information required by the check-list must be submitted with this application • Incomplete applications or illegible information will not be accepted by Council • All fees are to be paid at the time of lodgement • Please make an appointment to lodge your application. You may be delayed for an unspecified time if no appointment is made	PUBLIC INSPECTION • All documents lodged with this development application including this form will be available for public access at Council's offices and on Council's website
--	---	---

LOCATION OF THE PROPOSAL Address: <u>11 ADDISON ROAD, INGLESIDE (Lot 1831 DP 812302)</u>	☐
PLEASE ENSURE DETAILS OF ALL LAND PARCELS ARE STATED ABOVE	

PROPOSAL Section 95 Modification of Consent ☐ S95(1) Modifications involving minor errors, misdescription or miscalculation ☐ S95(1A) Modifications involving minimal environmental impact ☒ S95(2) Modifications intended to have some other effect as specified in the statement ☐ S96AA Modifications by consent authorities of consents granted by the Court	☐
PLEASE PROVIDE DETAILED DESCRIPTION OF PROPOSAL • ADDITION OF A COVERED VERANDAH • CONVERSION OF AN EXISTING STORE ROOM TO A WC • RELOCATION OF A BAL • RE-CONFIGURATION OF EXTERNAL STAIRS	
Does the proposal involve development below mean high water? (if YES the written consent of the Crown is required) YES ☐ NO ☒	

WHAT IS THE ESTIMATED COST OF THE PROPOSAL \$ <u>17,229</u> Please print out and complete the Estimated Cost of Construction Calculation Sheet and attach to this application Note: The estimated cost is the value of the works. It is the cost which would be incurred if a contractor carried out the works. This estimate must be supported by an actual quote, contract price or independent estimate prepared by a suitably qualified person where a valuation from Council's estimate of costs is sought.	☐
--	--------------------------

STATE ENVIRONMENTAL PLANNING POLICY No 1 DEVELOPMENT STANDARDS Is a SEPP 1 objection required to vary a development standard? YES ☐ NO ☒ Note: If YES, a detailed objection identifying the development standard to be varied and the grounds for your objection needs to accompany the development application. For more assistance see the NSW Government Planning and Infrastructure website (www.planning.nsw.gov.au) under Development/Varying Development Standards.	☐
--	--------------------------

15 NOV 2011

DEVELOPMENT APPLICATION

Made under section 78A of the Environmental Planning and Assessment Act 1979

Village Park 1 Park Street MONA VALE PO Box 882 MONA VALE NSW 1660 CX 8018 MONA VALE Telephone (02) 8970 1111 ABN No 81340837871 Email pittwater_council@pittwater.nsw.gov.au Website www.pittwater.nsw.gov.au		PITTWATER COUNCIL	Office Use Only DA No <u>NO 440/11</u> Date Received <u>30/11/11</u>
--	---	------------------------------	--

PRE LODGEMENT • Pre lodgement discussion with staff is recommended • Discuss your proposal with your neighbours prior to design or lodgement • Carefully read the checklist and guide in this form and ensure that all required information and documentation is provided with your application	LODGEMENT • All information required by the checklist must be submitted with this application • Incomplete applications or illegible information will not be accepted by Council • All fees are to be paid at the time of lodgement • Please make an appointment to lodge your application. You may be delayed for an unspecified time if no appointment is made	PUBLIC INSPECTION • All documents lodged with this development application including this form will be available for public access at Council's offices and on Council's website
--	--	---

LOCATION OF THE PROPOSAL Address <u>11 ADDISON ROAD INGLESIDE (Lot 1831 DP 812302)</u> PLEASE ENSURE DETAILS OF ALL LAND PARCELS ARE STATED ABOVE	☐
--	--------------------------

PROPOSAL Other Development/Land Use PLEASE PROVIDE DETAILED DESCRIPTION OF PROPOSAL Occupation of existing site for the purpose of an industry directly associated with Extractive Industries at 11 Addison Road, Ingleside	☐
Does the proposal involve development below mean high water? (If YES the written consent of the Crown is required) YES ☐ NO ☒	

WHAT IS THE ESTIMATED COST OF THE PROPOSAL \$ <u>N/A</u> Please print out and complete the Estimated Cost of Construction Calculation Sheet and attach to this application Note: The estimated cost is the value of the works. It is the cost which would be incurred if a contractor carried out the works. This estimate must be supported by an actual quote contract price or independent estimate prepared by a suitably qualified person where a variation from Council's estimate of costs is sought	☐
---	--------------------------

STATE ENVIRONMENTAL PLANNING POLICY No 1 DEVELOPMENT STANDARDS Is a SEPP 1 objection required to vary a development standard? YES ☐ NO ☒ Note: If YES a detailed objection identifying the development standard to be varied and the grounds for your objection needs to accompany the development application For more assistance see the NSW Government Planning and Infrastructure website (www.planning.nsw.gov.au) under Development/Varying Development Standards	☐
---	--------------------------

2011 2011

DEVELOPMENT APPLICATION

Made under section 78A of the Environmental Planning and Assessment Act 1979

Office Use Only

Village Park, 1 Park Street, MONA VALE
PO Box 882, MONA VALE NSW 1660
DX 9018, MONA VALE
Telephone: (02) 9970 1111
ABN No. 61340837871
Email: pittwater_council@pittwater.nsw.gov.au
Website: www.pittwater.nsw.gov.au



PITTWATER
COUNCIL

DA No.: N0263/B

Date Received: 13/9/13

PRE-LODGE MENT

- Pre-lodgement discussion with staff is recommended.
- Discuss your proposal with your neighbours prior to design or lodgement.
- Carefully read the checklist and guide in this form and ensure that all required information and documentation is provided with your application.

LODGE MENT

- All information required by the check-list must be submitted with this application.
- Incomplete applications or illegible information will not be accepted by Council.
- All fees are to be paid at the time of lodgement.
- Please make an appointment to lodge your application. You may be delayed for an unspecified time if no appointment is made.

PUBLIC INSPECTION

- All documents lodged with this development application, including this form, will be available for public access at Council's offices and on Council's website.

LOCATION OF THE PROPOSAL

Address: 11 ADDISON ROAD, INGLESIDE (Lot 1831 DP 812302)

PLEASE ENSURE DETAILS OF ALL LAND PARCELS ARE STATED ABOVE

PROPOSAL

Other Development/Land Use

PLEASE PROVIDE DETAILED DESCRIPTION OF PROPOSAL

EXTRACTIVE INDUSTRY

Does the proposal involve development below mean high water? (If YES the written consent of the Crown is required.)

YES ☐

NO ☒

WHAT IS THE ESTIMATED COST OF THE PROPOSAL: \$ _____

Please print out and complete the "Estimated Cost of Works - Calculation Sheet" and attach to this application.

Note: The estimated cost is the value of the works. It is the cost which would be incurred if a contractor carried out the works. This estimate must be supported by an actual quote contract price or independent estimate prepared by a suitably qualified person where a variation from Council's estimate of costs is sought.

STATE ENVIRONMENTAL PLANNING POLICY No 1 - DEVELOPMENT STANDARDS

Is a SEPP 1 objection required to vary a development standard?

YES ☐

NO ☒

Note: If YES, a detailed objection identifying the development standard to be varied and the grounds for your objection needs to accompany the development application.

For more assistance see the NSW Government Planning and Infrastructure website (www.planning.nsw.gov.au) under Development/Varying Development Standards.

SCANNED

16 SEP 2013

PITTWATER COUNCIL

13 Attachment C – Borehole and Test Pit Logs

CLIENT		Kevin Matthews Contracting		COMMENCED		20.02.14		COMPLETED		20.02.14		REF		BH101	
PROJECT		Contamination Assessment		LOGGED		BR		CHECKED		GT		Sheet		1 of 1	
SITE		11 Addison Road Ingleside, NSW.		GEOLOGY		Sandstone		VEGETATION		Grass		PROJECT NO.		P1404106	
EQUIPMENT				Truck Mounted Hydraulic Auger				EASTING		NA		RL SURFACE		NA	
EXCAVATION DIMENSIONS				95mmØ X 2.4m depth				NORTHING		NA		ASPECT		West	
												SLOPE		1-2%	

EXCAVATION DATA						MATERIAL DATA				SAMPLING & TESTING			
METHOD	SUPPORT	WATER	MOISTURE	DEPTH (M)	PENETRATION RESISTANCE	GRAPHIC LOG	CLASSIFICATION	DESCRIPTION OF STRATA Soil type, texture, structure, mottling, colour, plasticity, rocks, oxidation, particle characteristics, organics, secondary and minor components, fill, contamination, odour.	CONSISTENCY	DENSITY INDEX	TYPE	DEPTH (M)	RESULTS AND ADDITIONAL OBSERVATIONS
V	Nil	N	D	0.15			S	SAND - Brown, fine to medium grained.			A	0.05	4106/101/ 0.05 - LIKELY FILL
											B	0.15	4106/101/ 0.15
V	Nil	N	D				S	SAND - Brown, fine to medium grained, mixed with high proportion of sandstone floaters, minimal clay content.			A	0.5	4106/101/ 0.5 - LIKELY FILL
V	Nil	N	D	0.75			S	SAND - Brown, fine to medium grained, minor clays.			A	1.0	4106/101/ 1.0 - POSSIBLY FILL
V	Nil	N	D	1.0			S	SAND - Brown, fine to medium grained, mixed with high proportion of sandstone floaters, minimal clay content.					- POSSIBLY FILL
V	Nil	N	D	1.8			S	SAND - Grey, wet, medium grained, minor clays.			A	2.0	4106/101/ 2.0 - POSSIBLY FILL
V	Nil	Y	W	2.0			S	V bit refusal at 2.4m on either sandstone floater or sandstone bedrock.					GROUNDWATER LEVEL ESTIMATED BASED ON MOISTURE - BOREHOLE MEASURED 0.5 HR AFTER HOLE DRILLED AND NO GROUNDWATER DETECTED.
				2.4									- V bit refusal at 2.4m.
				3.0									
				4.0									
				4.5									

EQUIPMENT / METHOD		SUPPORT		WATER		MOISTURE		PENETRATION		CONSISTENCY		DENSITY		SAMPLING & TESTING		CLASSIFICATION SYMBOLS AND SOIL DESCRIPTION	
N	Natural exposure	SH	Shoring	N	None observed	D	Dry	L	Low	VS	Very Soft	VL	Very Loose	A	Auger sample	pp	Pocket penetrometer
X	Existing excavation	SC	Shotcrete	X	Not measured	M	Moist	M	Moderate	S	Soft	L	Loose	B	Bulk sample	S	Standard penetration test
BH	Backhoe bucket	RB	Rock Bolts	▽	Water level	W	Wet	H	High	F	Firm	MD	Medium Dense	U	Undisturbed sample	VS	Vane shear
HA	Hand auger	Nil	No support	△	Water outflow	Wp	Plastic limit	R	Refusal	St	Stiff	D	Dense	D	Disturbed sample	DCP	Dynamic cone penetrometer
HS	Hand Spade			▽	Water inflow	WI	Liquid limit			VSt	Very Stiff	VD	Very Dense	M	Moisture content	FD	Field density
CC	Concrete Corer									H	Hard			Ux	Tube sample (x mm)	WS	Water sample
V	V-Bit									F	Friable						
TC	Tungsten Carbide Bit																
PT	Push tube																

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MARTENS & ASSOCIATES PTY LTD
6/37 Leighton Place
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

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

CLIENT		Kevin Matthews Contracting		COMMENCED		20.02.14		COMPLETED		20.02.14		REF		BH102	
PROJECT		Contamination Assessment		LOGGED		BR		CHECKED		GT		Sheet		1 of 1	
SITE		11 Addison Road Ingleside, NSW.		GEOLOGY		Sandstone		VEGETATION		Grass		PROJECT NO.		P1404106	
EQUIPMENT				Truck Mounted Hydraulic Auger				EASTING		NA		RL SURFACE		NA	
EXCAVATION DIMENSIONS				95mmØ X 1.7m depth				NORTHING		NA		ASPECT		West	
SLOPE												1-2%			

EXCAVATION DATA				MATERIAL DATA				SAMPLING & TESTING					
METHOD	SUPPORT	WATER	MOISTURE	DEPTH (M)	PENETRATION RESISTANCE	GRAPHIC LOG	CLASSIFICATION	DESCRIPTION OF STRATA	CONSISTENCY	DENSITY INDEX	TYPE	DEPTH (M)	RESULTS AND ADDITIONAL OBSERVATIONS
V	Nil	N	D	0.25			S	SAND - Dark brown, fine to medium grained.			A	0.2	Water test resulted in very minor organic stain.
V	Nil	N	D	0.3			-	SANDSTONE FLOATER.			B	0.2	- FILL
V	Nil	N	D	0.75			CLS	CLAYEY SAND - Brown.			A	0.5	4106/102/ 0.2
V	Nil	N	D	1.0			SC	SANDY CLAY - Dark brown, with red/orange mottles.			B	0.6	4106/102/ 0.2
V	Nil	N	D	1.05			SC	SANDY CLAY - Dark brown, with red/orange mottles.			A	1.0	- POSSIBLY FILL
V	Nil	Y	W	1.7			S	SAND - Grey, wet, medium grained, minor clays.			A	1.5	4106/102/ 1.0
				2.0				V bit refusal at 1.7m on either sandstone floater or sandstone bedrock.					- POSSIBLY FILL
				3.0									GROUNDWATER LEVEL ESTIMATED BASED ON MOISTURE - BOREHOLE MEASURED 0.5 HR AFTER HOLE DRILLED AND NO GROUNDWATER DETECTED.
				4.0									
				4.5									

EQUIPMENT / METHOD		SUPPORT		WATER		MOISTURE		PENETRATION		CONSISTENCY		DENSITY		SAMPLING & TESTING		CLASSIFICATION SYMBOLS AND SOIL DESCRIPTION	
N	Natural exposure	SH	Shoring	N	None observed	D	Dry	L	Low	VS	Very Soft	VL	Very Loose	A	Auger sample	pp	Pocket penetrometer
X	Existing excavation	SC	Shotcrete	X	Not measured	M	Moist	M	Moderate	S	Soft	L	Loose	B	Bulk sample	S	Standard penetration test
BH	Backhoe bucket	RB	Rock Bolts	W	Water level	W	Wet	H	High	F	Firm	MD	Medium Dense	U	Undisturbed sample	VS	Vane shear
HA	Hand auger	Nil	No support	Wp	Plastic limit	Wp	Plastic limit	R	Refusal	St	Stiff	D	Dense	D	Disturbed sample	DCP	Dynamic cone penetrometer
HS	Hand Spade			WI	Liquid limit	WI	Liquid limit			VSt	Very Stiff	VD	Very Dense	M	Moisture content	FD	Field density
CC	Concrete Corer									H	Hard			Ux	Tube sample (x mm)	WS	Water sample
V	V-Bit									F	Friable						
TC	Tungsten Carbide Bit																
PT	Push tube																

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MARTENS & ASSOCIATES PTY LTD

6/37 Leighton Place

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

CLIENT		Kevin Matthews		COMMENCED		20.02.14		COMPLETED		20.02.14		REF		BH103	
PROJECT		Contamination Assessment		LOGGED		BR		CHECKED		GT		Sheet		1 of 1	
SITE		11 Addison Road Ingleside, NSW.		GEOLOGY		Sandstone		VEGETATION		NA		PROJECT NO.		P1404106	
EQUIPMENT				Truck Mounted Hydraulic Auger				EASTING		NA		RL SURFACE		NA	
EXCAVATION DIMENSIONS				95mmØ X 1.8m depth				NORTHING		NA		ASPECT		West	
SLOPE				1-2%											

EXCAVATION DATA				MATERIAL DATA				SAMPLING & TESTING					
METHOD	SUPPORT	WATER	MOISTURE	DEPTH (M)	PENETRATION RESISTANCE	GRAPHIC LOG	CLASSIFICATION	DESCRIPTION OF STRATA	CONSISTENCY	DENSITY INDEX	TYPE	DEPTH (M)	RESULTS AND ADDITIONAL OBSERVATIONS
V	Nil	N	M	0.25			SP	SAND - Dark brown, fine to medium grained.			A	0.05	4106/103/ 0.05 - FILL
V	Nil	N	M	1.0			SC	CLAYEY SAND AND CRUSHED SANDSTONE - Light brown, tends to dark brown sand with minor clay after approx. 0.7m.			A	0.5	4106/103/ 0.5 - FILL
V	Nil	N	M	1.1							A	1.0	4106/103/ 1.0
V	Nil	N	M	1.8			-	CRUSHED SANDSTONE - Variable colors.			A	1.5	4106/103/ 1.5 - V bit refusal at 1.8m.
				2.0				V bit refusal at 1.8m on either sandstone floater or sandstone bedrock.					
				3.0									
				4.0									
				4.5									

EQUIPMENT / METHOD		SUPPORT		WATER		MOISTURE		PENETRATION		CONSISTENCY		DENSITY		SAMPLING & TESTING		CLASSIFICATION SYMBOLS AND SOIL DESCRIPTION	
N	Natural exposure	SH	Shoring	N	None observed	D	Dry	L	Low	VS	Very Soft	VL	Very Loose	A	Auger sample	pp	Pocket penetrometer
X	Existing excavation	SC	Shotcrete	X	Not measured	M	Moist	M	Moderate	S	Soft	L	Loose	B	Bulk sample	S	Standard penetration test
BH	Backhoe bucket	RB	Rock Bolts		Water level	W	Wet	H	High	F	Firm	MD	Medium Dense	U	Undisturbed sample	VS	Vane shear
HA	Hand auger	Nil	No support		Water outflow	Wp	Plastic limit	R	Refusal	St	Stiff	D	Dense	D	Disturbed sample	DCP	Dynamic cone penetrometer
HS	Hand Spade				Water inflow	WI	Liquid limit			VSt	Very Stiff	VD	Very Dense	M	Moisture content	FD	Field density
CC	Concrete Corer									H	Hard			Ux	Tube sample (x mm)	WS	Water sample
V	V-Bit									F	Friable						
TC	Tungsten Carbide Bit																
PT	Push tube																

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**Engineering Log -
Borehole**

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

CLIENT	Kevin Matthews	COMMENCED	20.02.14	COMPLETED	20.02.14	REF TP104							
PROJECT	Contamination Assessment	LOGGED	AB	CHECKED	GT	Sheet 1 of 1							
SITE	11 Addison Road Ingleside, NSW.	GEOLOGY	Sandstone	VEGETATION	NA	PROJECT NO. P1404106							
EQUIPMENT	Hand Spade	EASTING	NA	RL SURFACE	NA								
EXCAVATION DIMENSIONS	300mm x 300mm x 0.6m depth	NORTHING	NA	ASPECT	West	SLOPE	<5%						
EXCAVATION DATA		MATERIAL DATA				SAMPLING & TESTING							
METHOD	SUPPORT	WATER	MOISTURE	DEPTH (M)	PENETRATION RESISTANCE	GRAPHIC LOG	CLASSIFICATION	DESCRIPTION OF STRATA	CONSISTENCY	DENSITY INDEX	TYPE	DEPTH (M)	RESULTS AND ADDITIONAL OBSERVATIONS
HS	Nil	N	M				SC	CLAYEY SAND - Brown, yellow red.			E	0.05	4106/104/ 0.05
											E	0.2	- FILL
											E	0.3	4106/104/ 0.2
											E	0.4	4106/104/ 0.3
											E	0.5	4106/104/ 0.4
													4106/104/ 0.5
				0.6				Terminated at 0.6m on clayey sand.					
				1.0									
				2.0									
				3.0									
				4.0									
				4.5									
EQUIPMENT / METHOD		SUPPORT	WATER	MOISTURE	PENETRATION	CONSISTENCY	DENSITY	SAMPLING & TESTING		CLASSIFICATION SYMBOLS AND SOIL DESCRIPTION			
N Natural exposure		SH Shoring	N None observed	D Dry	L Low	VS Very Soft	VL Very Loose	A Auger sample		pp Pocket penetrometer			
X Existing excavation		SC Shotcrete	X Not measured	M Moist	M Moderate	S Soft	L Loose	B Bulk sample		S Standard penetration test			
BH Backhoe bucket		RB Rock Bolts	Water level	W Wet	H High	F Firm	MD Medium Dense	U Undisturbed sample		VS Vane shear			
HA Hand auger		Nil No support	Water outflow	Wp Plastic limit	R Refusal	St Stiff	D Dense	D Disturbed sample		DCP Dynamic cone penetrometer			
HS Hand Spade			Water inflow	WI Liquid limit		VSt Very Stiff	VD Very Dense	M Moisture content		FD Field density			
CC Concrete Corer						H Hard		Ux Tube sample (x mm)		WS Water sample			
V V-Bit						F Friable							
TC Tungsten Carbide Bit													
PT Push tube													
EXCAVATION LOG TO BE READ IN CONJUNCTION WITH ACCOMPANYING REPORT NOTES AND ABBREVIATIONS													
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CLIENT	Kevin Matthews	COMMENCED	20.02.14	COMPLETED	20.02.14	REF TP105							
PROJECT	Contamination Assessment	LOGGED	AB	CHECKED	GT	Sheet 1 of 1							
SITE	11 Addison Road Ingleside, NSW.	GEOLOGY	Sandstone	VEGETATION	NA	PROJECT NO. P1404106							
EQUIPMENT	Hand Spade	EASTING	NA	RL SURFACE	NA								
EXCAVATION DIMENSIONS	300mm x 300mm x 0.6m depth	NORTHING	NA	ASPECT	West	SLOPE	<5%						
EXCAVATION DATA		MATERIAL DATA				SAMPLING & TESTING							
METHOD	SUPPORT	WATER	MOISTURE	DEPTH (M)	PENETRATION RESISTANCE	GRAPHIC LOG	CLASSIFICATION	DESCRIPTION OF STRATA	CONSISTENCY	DENSITY INDEX	TYPE	DEPTH (M)	RESULTS AND ADDITIONAL OBSERVATIONS
HS	Nil	N	M				SP	SAND WITH GRAVELS - Light brown, medium to course grained.			E	0.05	4106/105/ 0.05
											E	0.2	- FILL
											E	0.3	4106/105/ 0.2
											E	0.4	- ORGANICS
											E	0.5	4106/105/ 0.3
											E	0.6	4106/105/ 0.4
											E	0.5	4106/105/ 0.5
				0.6				Terminated at 0.6m on sand.					
				1.0									
				2.0									
				3.0									
				4.0									
				4.5									
EQUIPMENT / METHOD		SUPPORT	WATER	MOISTURE	PENETRATION	CONSISTENCY	DENSITY	SAMPLING & TESTING		CLASSIFICATION SYMBOLS AND SOIL DESCRIPTION			
N Natural exposure		SH Shoring	N None observed	D Dry	L Low	VS Very Soft	VL Very Loose	A Auger sample		pp Pocket penetrometer			
X Existing excavation		SC Shotcrete	X Not measured	M Moist	M Moderate	S Soft	L Loose	B Bulk sample		S Standard penetration test			
BH Backhoe bucket		RB Rock Bolts	Water level	W Wet	H High	F Firm	MD Medium Dense	U Undisturbed sample		VS Vane shear			
HA Hand auger		Nil No support	Water outflow	Wp Plastic limit	R Refusal	St Stiff	D Dense	D Disturbed sample		DCP Dynamic cone penetrometer			
HS Hand Spade			Water inflow	WI Liquid limit		VSt Very Stiff	VD Very Dense	M Moisture content		FD Field density			
CC Concrete Corer						H Hard		Ux Tube sample (x mm)		WS Water sample			
V V-Bit						F Friable							
TC Tungsten Carbide Bit													
PT Push tube													
EXCAVATION LOG TO BE READ IN CONJUNCTION WITH ACCOMPANYING REPORT NOTES AND ABBREVIATIONS													
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CLIENT		Kevin Matthews		COMMENCED	20.02.14	COMPLETED	20.02.14	REF TP106	
PROJECT		Contamination Assessment		LOGGED	AB	CHECKED	GT	Sheet 1 of 1	
SITE		11 Addison Road Ingleside, NSW.		GEOLOGY	Sandstone	VEGETATION	NA	PROJECT NO. P1404106	
EQUIPMENT		Hand Spade		EASTING	NA	RL SURFACE	NA		
EXCAVATION DIMENSIONS		300mm x 300mm x 0.6m depth		NORTHING	NA	ASPECT	West	SLOPE	1-2%

EXCAVATION DATA				MATERIAL DATA				SAMPLING & TESTING					
METHOD	SUPPORT	WATER	MOISTURE	DEPTH (M)	PENETRATION RESISTANCE	GRAPHIC LOG	CLASSIFICATION	DESCRIPTION OF STRATA	CONSISTENCY	DENSITY INDEX	TYPE	DEPTH (M)	RESULTS AND ADDITIONAL OBSERVATIONS
HS	Nil	N	M	0.05			SC	CLAYEY SAND WITH GRAVELS - Light brown, medium to coarse grained.			E	0.05	4106/106/ 0.05 - FILL
				0.2					E			0.2	4106/106/ 0.2
				0.3					E			0.3	4106/106/ 0.3
				0.4					E			0.4	4106/106/ 0.4
				0.5					E			0.5	4106/106/ 0.5
				0.6				Terminated at 0.6m on clayey sand.					
				1.0									
				2.0									
				3.0									
				4.0									
				4.5									

EQUIPMENT / METHOD
N Natural exposure
X Existing excavation
BH Backhoe bucket
HA Hand auger
HS Hand Spade
CC Concrete Corer
V V-Bit
TC Tungsten Carbide Bit
PT Push tube

SUPPORT
SH Shoring
SC Shotcrete
RB Rock Bolts
Nil No support

WATER
N None observed
X Not measured
Water level
Water outflow
Water inflow

MOISTURE
D Dry
M Moist
Wp Plastic limit
Wl Liquid limit

PENETRATION
L Low
M Moderate
H High
R Refusal

CONSISTENCY
VS Very Soft
S Soft
F Firm
St Stiff
VSt Very Stiff
H Hard
F Friable

DENSITY
VL Very Loose
L Loose
MD Medium Dense
D Dense
VD Very Dense

SAMPLING & TESTING
A Auger sample
B Bulk sample
U Undisturbed sample
D Disturbed sample
M Moisture content
Ux Tube sample (x mm)

pp Pocket penetrometer
S Standard penetration test
VS Vane shear
DCP Dynamic cone penetrometer
FD Field density
WS Water sample

CLASSIFICATION SYMBOLS AND SOIL DESCRIPTION
Y USCS
N Agricultural

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

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Engineering Log -

Excavation

CLIENT	Kevin Matthews	COMMENCED	20.02.14	COMPLETED	20.02.14	REF TP107							
PROJECT	Contamination Assessment	LOGGED	AB	CHECKED	GT	Sheet 1 of 1							
SITE	11 Addison Road Ingleside, NSW.	GEOLOGY	Sandstone	VEGETATION	NA	PROJECT NO. P1404106							
EQUIPMENT	Hand Spade	EASTING	NA	RL SURFACE	NA								
EXCAVATION DIMENSIONS	300mm x 300mm x 0.6m depth	NORTHING	NA	ASPECT	West	SLOPE	<5%						
EXCAVATION DATA		MATERIAL DATA				SAMPLING & TESTING							
METHOD	SUPPORT	WATER	MOISTURE	DEPTH (M)	PENETRATION RESISTANCE	GRAPHIC LOG	CLASSIFICATION	DESCRIPTION OF STRATA	CONSISTENCY	DENSITY INDEX	TYPE	DEPTH (M)	RESULTS AND ADDITIONAL OBSERVATIONS
HS	Nil	N	M				SC	CLAYEY SAND WITH GRAVELS - Light brown, medium to course grained.			E	0.05	4106/107/ 0.05 - FILL
											E	0.2	4106/107/ 0.2
											E	0.3	4106/107/ 0.3
											E	0.4	4106/107/ 0.4
											E	0.5	4106/107/ 0.5
				0.6				Terminated at 0.6m on clayey sand.					
				1.0									
				2.0									
				3.0									
				4.0									
				4.5									
EQUIPMENT / METHOD		SUPPORT	WATER	MOISTURE	PENETRATION	CONSISTENCY	DENSITY	SAMPLING & TESTING		CLASSIFICATION SYMBOLS AND SOIL DESCRIPTION			
N Natural exposure		SH Shoring	N None observed	D Dry	L Low	VS Very Soft	VL Very Loose	A Auger sample		pp Pocket penetrometer			
X Existing excavation		SC Shotcrete	X Not measured	M Moist	M Moderate	S Soft	L Loose	B Bulk sample		S Standard penetration test			
BH Backhoe bucket		RB Rock Bolts	Water level	W Wet	H High	F Firm	MD Medium Dense	U Undisturbed sample		VS Vane shear			
HA Hand auger		Nil No support	Water outflow	Wp Plastic limit	R Refusal	St Stiff	D Dense	D Disturbed sample		DCP Dynamic cone penetrometer			
HS Hand Spade			Water inflow	WI Liquid limit		VSt Very Stiff	VD Very Dense	M Moisture content		FD Field density			
CC Concrete Corer						H Hard		Ux Tube sample (x mm)		WS Water sample			
V V-Bit						F Friable							
TC Tungsten Carbide Bit													
PT Push tube													
EXCAVATION LOG TO BE READ IN CONJUNCTION WITH ACCOMPANYING REPORT NOTES AND ABBREVIATIONS													
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CLIENT	Kevin Matthews			COMMENCED	20.02.14		COMPLETED	20.02.14		REF TP108									
PROJECT	Contamination Assessment			LOGGED	AB		CHECKED	GT		Sheet 1 of 1									
SITE	11 Addison Road Ingleside, NSW.			GEOLOGY	Sandstone		VEGETATION	NA		PROJECT NO. P1404106									
EQUIPMENT		Hand Spade			EASTING	NA		RL SURFACE	NA										
EXCAVATION DIMENSIONS		300mm x 300mm x 0.3m depth			NORTHING	NA		ASPECT	West		SLOPE 1-2%								
EXCAVATION DATA				MATERIAL DATA				SAMPLING & TESTING											
METHOD	SUPPORT	WATER	MOISTURE	DEPTH (M)	PENETRATION RESISTANCE	GRAPHIC LOG	CLASSIFICATION	DESCRIPTION OF STRATA Soil type, texture, structure, mottling, colour, plasticity, rocks, oxidation, particle characteristics, organics, secondary and minor components, fill, contamination, odour.		CONSISTENCY	DENSITY INDEX	TYPE	DEPTH (M)	RESULTS AND ADDITIONAL OBSERVATIONS					
HS	Nil	N	M	0.3			SC	GRAVELLY SAND - Light brown, medium to coarse grained.				E	0.05	4106/108/ 0.05 - FILL					
				0.2								E	0.2	4106/108/ 0.2 + DUP 2A					
				0.3				Refusal at 0.3m on sandstone floater.											
				1.0															
				2.0															
				3.0															
				4.0															
				4.5															
EQUIPMENT / METHOD				SUPPORT		WATER		MOISTURE		PENETRATION		CONSISTENCY		DENSITY		SAMPLING & TESTING		CLASSIFICATION SYMBOLS AND SOIL DESCRIPTION	
N Natural exposure				SH Shoring		N None observed		D Dry		L Low		VS Very Soft		VL Very Loose		A Auger sample		pp Pocket penetrometer	
X Existing excavation				SC Shotcrete		X Not measured		M Moist		M Moderate		S Soft		L Loose		B Bulk sample		S Standard penetration test	
BH Backhoe bucket				RB Rock Bolts		Water level		W Wet		H High		F Firm		MD Medium Dense		U Undisturbed sample		VS Vane shear	
HA Hand auger				Nil No support		Water outflow		Wp Plastic limit		R Refusal		St Stiff		D Dense		D Disturbed sample		DCP Dynamic cone penetrometer	
HS Hand Spade						Water inflow		WI Liquid limit				VSt Very Stiff		VD Very Dense		M Moisture content		FD Field density	
CC Concrete Corer												H Hard				Ux Tube sample (x mm)		WS Water sample	
V V-Bit												F Friable							
TC Tungsten Carbide Bit																			
PT Push tube																			
EXCAVATION LOG TO BE READ IN CONJUNCTION WITH ACCOMPANYING REPORT NOTES AND ABBREVIATIONS																			
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CLIENT		Kevin Matthews			COMMENCED		20.02.14		COMPLETED		20.02.14		REF		BH109				
PROJECT		Contamination Assessment			LOGGED		BR		CHECKED		GT		Sheet 1 of 1						
SITE		11 Addison Road Ingleside, NSW.			GEOLOGY		Sandstone		VEGETATION		NA		PROJECT NO. P1404106						
EQUIPMENT				Truck Mounted Hydraulic Auger			EASTING		NA		RL SURFACE		NA						
EXCAVATION DIMENSIONS				95mmØ X 2.5m depth			NORTHING		NA		ASPECT		East		SLOPE 1-2%				
EXCAVATION DATA				MATERIAL DATA								SAMPLING & TESTING							
METHOD	SUPPORT	WATER	MOISTURE	DEPTH (M)	PENETRATION RESISTANCE	GRAPHIC LOG	CLASSIFICATION	DESCRIPTION OF STRATA Soil type, texture, structure, mottling, colour, plasticity, rocks, oxidation, particle characteristics, organics, secondary and minor components, fill, contamination, odour.		CONSISTENCY	DENSITY INDEX	TYPE	DEPTH (M)	RESULTS AND ADDITIONAL OBSERVATIONS					
V	Nil	N	M	0.3			-	BITUMEN WITH UNDERLAYING ROAD BASE.				A	0.2	- FILL 4106/109/ 0.2					
V	Nil	N	M	0.7			SC	CLAYEY SAND - Dark brown.				A	0.5	- FILL 4106/109/ 0.5					
V	Nil	N	D	0.8			-	SANDSTONE FLOATER.						- FILL					
V	Nil	N	M	1.0			CL	SILTY CLAY - Light grey and red mottled.				A	1.0	- FILL 4106/109/ 1.0					
V	Nil	N	M	1.8			CL	SANDY CLAY AND CLAYEY SAND AND CRUSHED SANDSTONE - Variable colours.				A	1.5	- FILL 4106/109/ 1.5					
V	Nil	N	M	2.0			CL	SANDY CLAY AND CLAYEY SAND - Dark brown.				A	2.0	- FILL 4106/109/ 2.0					
V	Nil	N	M	2.5			CL	SANDY CLAY - Dark brown.				A	2.5	- FILL 4106/109/ 2.5					
				3.0				Borehole terminated at 2.5m on sandy clay (fill).											
				4.0															
				4.5															
EQUIPMENT / METHOD				SUPPORT		WATER		MOISTURE		PENETRATION		CONSISTENCY		DENSITY		SAMPLING & TESTING		CLASSIFICATION SYMBOLS AND SOIL DESCRIPTION	
N Natural exposure				SH Shoring		N None observed		D Dry		L Low		VS Very Soft		VL Very Loose		A Auger sample		pp Pocket penetrometer	
X Existing excavation				SC Shotcrete		X Not measured		M Moist		M Moderate		S Soft		L Loose		B Bulk sample		S Standard penetration test	
BH Backhoe bucket				RB Rock Bolts		Water level		W Wet		H High		F Firm		MD Medium Dense		U Undisturbed sample		VS Vane shear	
HA Hand auger				Nil No support		Water outflow		Wp Plastic limit		R Refusal		St Stiff		D Dense		D Disturbed sample		DCP Dynamic cone penetrometer	
HS Hand Spade						Water inflow		WI Liquid limit				VSt Very Stiff		VD Very Dense		M Moisture content		FD Field density	
CC Concrete Corer												H Hard				Ux Tube sample (x mm)		WS Water sample	
V V-Bit												F Friable							
TC Tungsten Carbide Bit																			
PT Push tube																			
EXCAVATION LOG TO BE READ IN CONJUNCTION WITH ACCOMPANYING REPORT NOTES AND ABBREVIATIONS																			
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CLIENT		Kevin Matthews		COMMENCED		20.02.14		COMPLETED		20.02.14		REF		BH110	
PROJECT		Contamination Assessment		LOGGED		BR		CHECKED		GT		Sheet		1 of 1	
SITE		11 Addison Road Ingleside, NSW.		GEOLOGY		Sandstone		VEGETATION		NA		PROJECT NO.		P1404106	
EQUIPMENT				Truck Mounted Hydraulic Auger				EASTING		NA		RL SURFACE		NA	
EXCAVATION DIMENSIONS				95mmØ X 1.0m depth				NORTHING		NA		ASPECT		East	
SLOPE				1-2%											

EXCAVATION DATA						MATERIAL DATA				SAMPLING & TESTING			
METHOD	SUPPORT	WATER	MOISTURE	DEPTH (M)	PENETRATION RESISTANCE	GRAPHIC LOG	CLASSIFICATION	DESCRIPTION OF STRATA	CONSISTENCY	DENSITY INDEX	TYPE	DEPTH (M)	RESULTS AND ADDITIONAL OBSERVATIONS
V	Nil	N	M	0.3			XX	BITUMEN WITH UNDERLAYING ROAD BASE.			A	0.2	- FILL 4106/110/ 0.2
V	Nil	N	D	0.6			-	SANDSTONE FLOATER.			A	0.5	- FILL 4106/110/ 0.5
V	Nil	N	M	1.0			-	CLAYEY SAND AND CRUSHED SANDSTONE.			A	1.0	- FILL 4106/110/ 1.0
				2.0				Borehole terminated at 1.0m on clayey sand and crushed sandstone (fill).					
				3.0									
				4.0									
				4.5									

EQUIPMENT / METHOD
N Natural exposure
X Existing excavation
BH Backhoe bucket
HA Hand auger
HS Hand Spade
CC Concrete Corer
V V-Bit
TC Tungsten Carbide Bit
PT Push tube

SUPPORT
SH Shoring
SC Shotcrete
RB Rock Bolts
Nil No support

WATER
N None observed
X Not measured
 Water level
 Water outflow
 Water inflow

MOISTURE
D Dry
M Moist
W Wet
Wp Plastic limit
Wl Liquid limit

PENETRATION
L Low
M Moderate
H High
R Refusal

CONSISTENCY
VS Very Soft
S Soft
F Firm
St Stiff
VSt Very Stiff
H Hard
F Friable

DENSITY
VL Very Loose
L Loose
MD Medium Dense
D Dense
VD Very Dense

SAMPLING & TESTING
A Auger sample
B Bulk sample
U Undisturbed sample
D Disturbed sample
M Moisture content
Ux Tube sample (x mm)

pp Pocket penetrometer
S Standard penetration test
VS Vane shear
DCP Dynamic cone penetrometer
FD Field density
WS Water sample

CLASSIFICATION SYMBOLS AND SOIL DESCRIPTION

Y	USCS
N	Agricultural

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

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Engineering Log -

Borehole

CLIENT		Kevin Matthews		COMMENCED		20.02.14		COMPLETED		20.02.14		REF		BH112	
PROJECT		Contamination Assessment		LOGGED		AB		CHECKED		GT		Sheet		1 of 1	
SITE		11 Addison Road Ingleside, NSW.		GEOLOGY		Sandstone		VEGETATION		NA		PROJECT NO.		P1404106	
EQUIPMENT				Truck Mounted Hydraulic Auger				EASTING		NA		RL SURFACE		NA	
EXCAVATION DIMENSIONS				95mmØ X 1.0m depth				NORTHING		NA		ASPECT		East	
SLOPE				1-2%											

EXCAVATION DATA				MATERIAL DATA				SAMPLING & TESTING					
METHOD	SUPPORT	WATER	MOISTURE	DEPTH (M)	PENETRATION RESISTANCE	GRAPHIC LOG	CLASSIFICATION	DESCRIPTION OF STRATA	CONSISTENCY	DENSITY INDEX	TYPE	DEPTH (M)	RESULTS AND ADDITIONAL OBSERVATIONS
V	Nil	N	M	0.3			SP	SAND WITH GRAVELS - Dark grey, medium to coarse grained.			E	0.05	4106/112/ 0.05
				0.2							A	0.2	4106/112/ 0.2
V	Nil	N	M	0.4			SC	CLAYEY SAND - Grey/brown, medium to coarse grained.					- FILL
V	Nil	N	M	1.0			SP	SAND WITH CLAY - Grey/brown, medium to coarse grained.			A	0.5	4106/112/ 0.5
											A	1.0	4106/112/ 1.0
Borehole terminated at 1.0m on sand with clay (fill).													
2.0													
3.0													
4.0													
4.5													

EQUIPMENT / METHOD

N Natural exposure

X Existing excavation

BH Backhoe bucket

HA Hand auger

HS Hand Spade

CC Concrete Corer

V V-Bit

TC Tungsten Carbide Bit

PT Push tube

SUPPORT

SH Shoring

SC Shotcrete

RB Rock Bolts

Nil No support

WATER

N None observed

X Not measured

Water level

Water outflow

Water inflow

MOISTURE

D Dry

M Moist

W Wet

Wp Plastic limit

WI Liquid limit

PENETRATION

L Low

M Moderate

H High

R Refusal

CONSISTENCY

VS Very Soft

S Soft

F Firm

St Stiff

VSt Very Stiff

H Hard

F Friable

DENSITY

VL Very Loose

L Loose

MD Medium Dense

D Dense

VD Very Dense

SAMPLING & TESTING

A Auger sample

B Bulk sample

U Undisturbed sample

D Disturbed sample

M Moisture content

Ux Tube sample (x mm)

CLASSIFICATION SYMBOLS AND SOIL DESCRIPTION

USCS

Agricultural

pp Pocket penetrometer

S Standard penetration test

VS Vane shear

DCP Dynamic cone penetrometer

FD Field density

WS Water sample

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

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Engineering Log -

Borehole

Quality Sheet No. 4

CLIENT	Kevin Matthews	COMMENCED	20.02.14	COMPLETED	20.02.14	REF BH113							
PROJECT	Contamination Assessment	LOGGED	BR	CHECKED	GT	Sheet 1 of 1							
SITE	11 Addison Road Ingleside, NSW.	GEOLOGY	Sandstone	VEGETATION	NA	PROJECT NO. P1404106							
EQUIPMENT	Truck Mounted Hydraulic Auger	EASTING	NA	RL SURFACE	NA								
EXCAVATION DIMENSIONS	95mmØ X 0.7m depth	NORTHING	NA	ASPECT	East	SLOPE	1-2%						
EXCAVATION DATA		MATERIAL DATA				SAMPLING & TESTING							
METHOD	SUPPORT	WATER	MOISTURE	DEPTH (M)	PENETRATION RESISTANCE	GRAPHIC LOG	CLASSIFICATION	DESCRIPTION OF STRATA Soil type, texture, structure, mottling, colour, plasticity, rocks, oxidation, particle characteristics, organics, secondary and minor components, fill, contamination, odour.	CONSISTENCY	DENSITY INDEX	TYPE	DEPTH (M)	RESULTS AND ADDITIONAL OBSERVATIONS
V	Nil	N	D	0.1			XX	BITUMEN WITH UNDERLAYING ROAD BASE GRAVEL.			A	0.05	4106/113/ 0.05 - FILL
V	Nil	N	D					CRUSHED SANDSTONE - Fine to medium grained, minimal clay, light grey.			A	0.5	4106/113/ 0.5
				0.7				V bit refusal at 0.7m on sandstone floater or sandstone bedrock.			A	0.7	4106/113/ 0.7 - V bit refusal at 0.7m.
				1.0									
				2.0									
				3.0									
				4.0									
				4.5									
EQUIPMENT / METHOD		SUPPORT	WATER	MOISTURE	PENETRATION	CONSISTENCY	DENSITY	SAMPLING & TESTING		CLASSIFICATION SYMBOLS AND SOIL DESCRIPTION			
N Natural exposure		SH Shoring	N None observed	D Dry	L Low	VS Very Soft	VL Very Loose	A Auger sample		pp Pocket penetrometer			
X Existing excavation		SC Shotcrete	X Not measured	M Moist	M Moderate	S Soft	L Loose	B Bulk sample		S Standard penetration test			
BH Backhoe bucket		RB Rock Bolts	Water level	W Wet	H High	F Firm	MD Medium Dense	U Undisturbed sample		VS Vane shear			
HA Hand auger		Nil No support	Water outflow	Wp Plastic limit	R Refusal	St Stiff	D Dense	D Disturbed sample		DCP Dynamic cone penetrometer			
HS Hand Spade			Water inflow	WI Liquid limit		VSt Very Stiff	VD Very Dense	M Moisture content		FD Field density			
CC Concrete Corer						H Hard		Ux Tube sample (x mm)		WS Water sample			
V V-Bit						F Friable							
TC Tungsten Carbide Bit													
PT Push tube													
EXCAVATION LOG TO BE READ IN CONJUNCTION WITH ACCOMPANYING REPORT NOTES AND ABBREVIATIONS													
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CLIENT	Kevin Matthews			COMMENCED	20.02.14		COMPLETED	20.02.14		REF TP114				
PROJECT	Contamination Assessment			LOGGED	AB		CHECKED	GT		Sheet 1 of 1				
SITE	11 Addison Road Ingleside, NSW.			GEOLOGY	Sandstone		VEGETATION	NA		PROJECT NO. P1404106				
EQUIPMENT		Hand Spade			EASTING	NA		RL SURFACE	NA					
EXCAVATION DIMENSIONS		300mm X 300mm X 0.4m depth			NORTHING	NA		ASPECT	West		SLOPE 5-10%			
EXCAVATION DATA				MATERIAL DATA				SAMPLING & TESTING						
METHOD	SUPPORT	WATER	MOISTURE	DEPTH (M)	PENETRATION RESISTANCE	GRAPHIC LOG	CLASSIFICATION	DESCRIPTION OF STRATA Soil type, texture, structure, mottling, colour, plasticity, rocks, oxidation, particle characteristics, organics, secondary and minor components, fill, contamination, odour.		CONSISTENCY	DENSITY INDEX	TYPE	DEPTH (M)	RESULTS AND ADDITIONAL OBSERVATIONS
HS	Nil	N	M	0.1			SP	GRAVELLY SAND - Light brown/orange with clay, medium to coarse grained.				E	0.05	4106/114/ 0.05 - FILL - Rusted nail.
HS	Nil	N	M	0.2			SC	CLAYEY SAND - Light brown yellow/dark brown, medium grained.				E	0.2	4106/114/ 0.2 - FILL - Gravels (1-20mm, 5-10%).
				0.3								E	0.3	4106/114/ 0.3
				0.4				Test pit terminated at 0.4m in clayey sand.						
				1.0										
				2.0										
				3.0										
				4.0										
				4.5										
EQUIPMENT / METHOD		SUPPORT	WATER	MOISTURE	PENETRATION	CONSISTENCY	DENSITY	SAMPLING & TESTING		CLASSIFICATION SYMBOLS AND SOIL DESCRIPTION				
N Natural exposure		SH Shoring	N None observed	D Dry	L Low	VS Very Soft	VL Very Loose	A Auger sample		pp Pocket penetrometer				
X Existing excavation		SC Shotcrete	X Not measured	M Moist	M Moderate	S Soft	L Loose	B Bulk sample		S Standard penetration test				
BH Backhoe bucket		RB Rock Bolts	Water level	W Wet	H High	F Firm	MD Medium Dense	U Undisturbed sample		VS Vane shear				
HA Hand auger		Nil No support	Water outflow	Wp Plastic limit	R Refusal	St Stiff	D Dense	D Disturbed sample		DCP Dynamic cone penetrometer				
HS Hand Spade			Water inflow	WI Liquid limit		VSt Very Stiff	VD Very Dense	M Moisture content		FD Field density				
CC Concrete Corer						H Hard		Ux Tube sample (x mm)		WS Water sample				
V V-Bit						F Friable								
TC Tungsten Carbide Bit														
PT Push tube														
EXCAVATION LOG TO BE READ IN CONJUNCTION WITH ACCOMPANYING REPORT NOTES AND ABBREVIATIONS														
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CLIENT		Kevin Matthews		COMMENCED		20.02.14		COMPLETED		20.02.14		REF		BH116	
PROJECT		Contamination Assessment		LOGGED		BR		CHECKED		GT		Sheet		1 of 1	
SITE		11 Addison Road Ingleside, NSW.		GEOLOGY		Sandstone		VEGETATION		NA		PROJECT NO.		P1404106	
EQUIPMENT				Truck Mounted Hydraulic Auger				EASTING		NA		RL SURFACE		NA	
EXCAVATION DIMENSIONS				95mmØ X 2.5m depth				NORTHING		NA		ASPECT		East	
SLOPE				1-2%											

EXCAVATION DATA				MATERIAL DATA				SAMPLING & TESTING					
METHOD	SUPPORT	WATER	MOISTURE	DEPTH (M)	PENETRATION RESISTANCE	GRAPHIC LOG	CLASSIFICATION	DESCRIPTION OF STRATA	CONSISTENCY	DENSITY INDEX	TYPE	DEPTH (M)	RESULTS AND ADDITIONAL OBSERVATIONS
V	Nil	N	M	0.2			XX	BITUMEN AND BROWN CLAYEY SAND/ROAD BASE.			A PID	0.05 0.05	4106/116/ 0.05 2.0 ppm - FILL
V	Nil	N	M	0.2			XX	FILL - Clayey sand, sandy clay and sand, dark brown.			A PID	0.2 0.2	4106/116/ 0.2 2.0 ppm - FILL
V	Nil	N	M	1.0							A	1.0	4106/116/ 1.0
V	Nil	N	M	1.25									
V	Nil	N	M	2.0			SP	SAND - Light brown tending to grey with tree roots, then light brown.			A	1.5	4106/116/ 1.5
V	Nil	N	M	2.5							A	2.0	4106/116/ 2.0
V	Nil	N	M	2.5							A	2.5	4106/116/ 2.5
				3.0				Refusal at 2.5m in sand.					
				4.0									
				4.5									

EQUIPMENT / METHOD		SUPPORT		WATER		MOISTURE		PENETRATION		CONSISTENCY		DENSITY		SAMPLING & TESTING		CLASSIFICATION SYMBOLS AND SOIL DESCRIPTION	
N	Natural exposure	SH	Shoring	N	None observed	D	Dry	L	Low	VS	Very Soft	VL	Very Loose	A	Auger sample	pp	Pocket penetrometer
X	Existing excavation	SC	Shotcrete	X	Not measured	M	Moist	M	Moderate	S	Soft	L	Loose	B	Bulk sample	S	Standard penetration test
BH	Backhoe bucket	RB	Rock Bolts		Water level	W	Wet	H	High	F	Firm	MD	Medium Dense	U	Undisturbed sample	VS	Vane shear
HA	Hand auger	Nil	No support		Water outflow	Wp	Plastic limit	R	Refusal	St	Stiff	D	Dense	D	Disturbed sample	DCP	Dynamic cone penetrometer
HS	Hand Spade				Water inflow	WI	Liquid limit			VSt	Very Stiff	VD	Very Dense	M	Moisture content	FD	Field density
CC	Concrete Corer									H	Hard			Ux	Tube sample (x mm)	WS	Water sample
V	V-Bit									F	Friable						
TC	Tungsten Carbide Bit																
PT	Push tube																

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Engineering Log - Borehole

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

CLIENT		Kevin Matthews		COMMENCED		20.02.14		COMPLETED		20.02.14		REF		BH117	
PROJECT		Contamination Assessment		LOGGED		BR		CHECKED		GT		Sheet		1 of 1	
SITE		11 Addison Road Ingleside, NSW.		GEOLOGY		Sandstone		VEGETATION		NA		PROJECT NO.		P1404106	
EQUIPMENT				Truck Mounted Hydraulic Auger				EASTING		NA		RL SURFACE		NA	
EXCAVATION DIMENSIONS				95mmØ X 1.5m depth				NORTHING		NA		ASPECT		North East	
												SLOPE		1-2%	

EXCAVATION DATA						MATERIAL DATA				SAMPLING & TESTING			
METHOD	SUPPORT	WATER	MOISTURE	DEPTH (M)	PENETRATION RESISTANCE	GRAPHIC LOG	CLASSIFICATION	DESCRIPTION OF STRATA	CONSISTENCY	DENSITY INDEX	TYPE	DEPTH (M)	RESULTS AND ADDITIONAL OBSERVATIONS
V	Nil	N	D	0.05			XX	BITUMEN			A	0.2	- FILL
V	Nil	N	M				XX	FILL - Crushed sandstone, sand, clayey sand, tends to light brown sandy clay.			A PID	0.5 0.5	4106/117/ 0.2 0.2 ppm
V	Nil	N	M	1.0			SP	SAND - Light brown, tends to yellow brown somewhere between 1.0m and 1.5m.			A PID	1.0 1.0	4106/117/ 1.0 0.2 ppm
				1.5				Borehole terminated at 1.5m on sand.			A PID	1.5 1.5	4106/117/ 1.5 0.1 ppm
				2.0									
				3.0									
				4.0									
				4.5									

EQUIPMENT / METHOD
N Natural exposure
X Existing excavation
BH Backhoe bucket
HA Hand auger
HS Hand Spade
CC Concrete Corer
V V-Bit
TC Tungsten Carbide Bit
PT Push tube

SUPPORT
SH Shoring
SC Shotcrete
RB Rock Bolts
Nil No support

WATER
N None observed
X Not measured
Water level
Water outflow
Water inflow

MOISTURE
D Dry
M Moist
W Wet
Wp Plastic limit
Wl Liquid limit

PENETRATION
L Low
M Moderate
H High
R Refusal

CONSISTENCY
VS Very Soft
S Soft
F Firm
St Stiff
VSt Very Stiff
H Hard
F Friable

DENSITY
VL Very Loose
L Loose
MD Medium Dense
D Dense
VD Very Dense

SAMPLING & TESTING
A Auger sample
B Bulk sample
U Undisturbed sample
D Disturbed sample
M Moisture content
Ux Tube sample (x mm)

pp Pocket penetrometer
S Standard penetration test
VS Vane shear
DCP Dynamic cone penetrometer
FD Field density
WS Water sample

CLASSIFICATION SYMBOLS AND SOIL DESCRIPTION
Y USCS
N Agricultural

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Engineering Log - Borehole

CLIENT	Kevin Matthews			COMMENCED	20.02.14		COMPLETED	20.02.14		REF TP118				
PROJECT	Contamination Assessment			LOGGED	AB		CHECKED	GT		Sheet 1 of 1				
SITE	11 Addison Road Ingleside, NSW.			GEOLOGY	Sandstone		VEGETATION	NA		PROJECT NO. P1404106				
EQUIPMENT		Hand Spade			EASTING	NA		RL SURFACE	NA					
EXCAVATION DIMENSIONS		300mm X 300mm X 0.3m depth			NORTHING	NA		ASPECT	West		SLOPE 5-10%			
EXCAVATION DATA				MATERIAL DATA				SAMPLING & TESTING						
METHOD	SUPPORT	WATER	MOISTURE	DEPTH (M)	PENETRATION RESISTANCE	GRAPHIC LOG	CLASSIFICATION	DESCRIPTION OF STRATA Soil type, texture, structure, mottling, colour, plasticity, rocks, oxidation, particle characteristics, organics, secondary and minor components, fill, contamination, odour.		CONSISTENCY	DENSITY INDEX	TYPE	DEPTH (M)	RESULTS AND ADDITIONAL OBSERVATIONS
HS	Nil	N	M	0.3			SP	GRAVELLY SAND - Black/dark brown, medium to coarse grained, with clay.				E	0.05	4106/118/ 0.05 + DUP 1A - FILL
				0.2								E	0.2	4106/118/ 0.2
				0.3				Refusal at 0.3m on sandstone.						
				1.0										
				2.0										
				3.0										
				4.0										
				4.5										
EQUIPMENT / METHOD		SUPPORT	WATER	MOISTURE	PENETRATION	CONSISTENCY	DENSITY	SAMPLING & TESTING		CLASSIFICATION SYMBOLS AND SOIL DESCRIPTION				
N Natural exposure		SH Shoring	N None observed	D Dry	L Low	VS Very Soft	VL Very Loose	A Auger sample		pp Pocket penetrometer				
X Existing excavation		SC Shotcrete	X Not measured	M Moist	M Moderate	S Soft	L Loose	B Bulk sample		S Standard penetration test				
BH Backhoe bucket		RB Rock Bolts	Water level	W Wet	H High	F Firm	MD Medium Dense	U Undisturbed sample		VS Vane shear				
HA Hand auger		Nil No support	Water outflow	Wp Plastic limit	R Refusal	St Stiff	D Dense	D Disturbed sample		DCP Dynamic cone penetrometer				
HS Hand Spade			Water inflow	WI Liquid limit		VSt Very Stiff	VD Very Dense	M Moisture content		FD Field density				
V V-Bit						H Hard		Ux Tube sample (x mm)		WS Water sample				
TC Tungsten Carbide Bit						F Friable								
PT Push tube														
EXCAVATION LOG TO BE READ IN CONJUNCTION WITH ACCOMPANYING REPORT NOTES AND ABBREVIATIONS														
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CLIENT	Kevin Matthews			COMMENCED	20.02.14		COMPLETED	20.02.14		REF TP119				
PROJECT	Contamination Assessment			LOGGED	AB		CHECKED	GT		Sheet 1 of 1				
SITE	11 Addison Road Ingleside, NSW.			GEOLOGY	Sandstone		VEGETATION	NA		PROJECT NO. P1404106				
EQUIPMENT		Hand Spade			EASTING	NA		RL SURFACE	NA					
EXCAVATION DIMENSIONS		300mm X 300mm X 0.4m depth			NORTHING	NA		ASPECT	West		SLOPE 5%			
EXCAVATION DATA				MATERIAL DATA				SAMPLING & TESTING						
METHOD	SUPPORT	WATER	MOISTURE	DEPTH (M)	PENETRATION RESISTANCE	GRAPHIC LOG	CLASSIFICATION	DESCRIPTION OF STRATA Soil type, texture, structure, mottling, colour, plasticity, rocks, oxidation, particle characteristics, organics, secondary and minor components, fill, contamination, odour.		CONSISTENCY	DENSITY INDEX	TYPE	DEPTH (M)	RESULTS AND ADDITIONAL OBSERVATIONS
HS	Nil	N	M	0.1			SP	GRAVELLY SAND - Black/dark brown, medium to coarse grained, with clay.				E	0.05	4106/119/ 0.05 - FILL
HS	Nil	N	M				CL	CLAY WITH TRACE SANDS - Medium to high plasticity.				E	0.2	4106/119/ 0.2
				0.4				Refusal at 0.4m on sandstone.				E	0.3	4106/119/ 0.3
				1.0										
				2.0										
				3.0										
				4.0										
				4.5										
EQUIPMENT / METHOD		SUPPORT	WATER	MOISTURE	PENETRATION	CONSISTENCY	DENSITY	SAMPLING & TESTING		CLASSIFICATION SYMBOLS AND SOIL DESCRIPTION				
N Natural exposure		SH Shoring	N None observed	D Dry	L Low	VS Very Soft	VL Very Loose	A Auger sample		pp Pocket penetrometer				
X Existing excavation		SC Shotcrete	X Not measured	M Moist	M Moderate	S Soft	L Loose	B Bulk sample		S Standard penetration test				
BH Backhoe bucket		RB Rock Bolts	Water level	W Wet	H High	F Firm	MD Medium Dense	U Undisturbed sample		VS Vane shear				
HA Hand auger		Nil No support	Water outflow	Wp Plastic limit	R Refusal	St Stiff	D Dense	D Disturbed sample		DCP Dynamic cone penetrometer				
HS Hand Spade			Water inflow	WI Liquid limit		VSt Very Stiff	VD Very Dense	M Moisture content		FD Field density				
CC Concrete Corer						H Hard		Ux Tube sample (x mm)		WS Water sample				
V V-Bit						F Friable								
TC Tungsten Carbide Bit														
PT Push tube														
EXCAVATION LOG TO BE READ IN CONJUNCTION WITH ACCOMPANYING REPORT NOTES AND ABBREVIATIONS														
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CLIENT	Kevin Matthews			COMMENCED	20.02.14		COMPLETED	20.02.14		REF BH120							
PROJECT	Contamination Assessment			LOGGED	BR		CHECKED	GT		Sheet 1 of 1							
SITE	11 Addison Road Ingleside, NSW.			GEOLOGY	Sandstone		VEGETATION	NA		PROJECT NO. P1404106							
EQUIPMENT		Truck Mounted Hydraulic Auger			EASTING	NA		RL SURFACE	NA								
EXCAVATION DIMENSIONS		95mmØ X 2.5m depth			NORTHING	NA		ASPECT	North		SLOPE 1-2%						
EXCAVATION DATA				MATERIAL DATA				SAMPLING & TESTING									
METHOD	SUPPORT	WATER	MOISTURE	DEPTH (M)	PENETRATION RESISTANCE	GRAPHIC LOG	CLASSIFICATION	DESCRIPTION OF STRATA Soil type, texture, structure, mottling, colour, plasticity, rocks, oxidation, particle characteristics, organics, secondary and minor components, fill, contamination, odour.		CONSISTENCY	DENSITY INDEX	TYPE	DEPTH (M)	RESULTS AND ADDITIONAL OBSERVATIONS			
V	Nil	N	D	0.6			SW	SAND - Light grey, gravels (5-15mm, 10%).				A	0.05	4106/120/ 0.05 - FILL			
												A	0.5	4106/120/ 0.5 + DUP B2			
V	Nil	N	D	1.0			SP	SAND - Light grey, fine to medium grained, uniform.				A PID	1.0	4106/120/ 1.0 0.6 ppm			
												A PID	1.5	4106/120/ 1.5 0.3 ppm			
V	Nil	N	M	2.0			SP	SAND - Light brown, minor clay, tending to clayey sand with depth.				A PID	2.0	4106/120/ 2.0 0.5 ppm			
												A	2.5	4106/120/ 2.5			
				3.0				Borehole terminated at 2.5m in sand.									
				4.0													
				4.5													
EQUIPMENT / METHOD		SUPPORT		WATER		MOISTURE		PENETRATION		CONSISTENCY		DENSITY		SAMPLING & TESTING		CLASSIFICATION SYMBOLS AND SOIL DESCRIPTION	
N Natural exposure		SH Shoring		N None observed		D Dry		L Low		VS Very Soft		VL Very Loose		A Auger sample		pp Pocket penetrometer	
X Existing excavation		SC Shotcrete		X Not measured		M Moist		M Moderate		S Soft		L Loose		B Bulk sample		S Standard penetration test	
BH Backhoe bucket		RB Rock Bolts		▽ Water level		W Wet		H High		F Firm		MD Medium Dense		U Undisturbed sample		VS Vane shear	
HA Hand auger		Nil No support		△ Water outflow		Wp Plastic limit		R Refusal		St Stiff		D Dense		D Disturbed sample		DCP Dynamic cone penetrometer	
HS Hand Spade				▽ Water inflow		WL Liquid limit				VSt Very Stiff		VD Very Dense		M Moisture content		FD Field density	
CC Concrete Corer										H Hard				Ux Tube sample (x mm)		WS Water sample	
V V-Bit										F Friable							
TC Tungsten Carbide Bit																	
PT Push tube																	
EXCAVATION LOG TO BE READ IN CONJUNCTION WITH ACCOMPANYING REPORT NOTES AND ABBREVIATIONS																	
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CLIENT		Kevin Matthews		COMMENCED		20.02.14		COMPLETED		20.02.14		REF		BH121	
PROJECT		Contamination Assessment		LOGGED		BR		CHECKED		GT		Sheet		1 of 1	
SITE		11 Addison Road Ingleside, NSW.		GEOLOGY		Sandstone		VEGETATION		NA		PROJECT NO.		P1404106	
EQUIPMENT				Truck Mounted Hydraulic Auger				EASTING		NA		RL SURFACE		NA	
EXCAVATION DIMENSIONS				95mmØ X 2.5m depth				NORTHING		NA		ASPECT		North West	
SLOPE				5%											
EXCAVATION DATA						MATERIAL DATA						SAMPLING & TESTING			
METHOD	SUPPORT	WATER	MOISTURE	DEPTH (M)	PENETRATION RESISTANCE	GRAPHIC LOG	CLASSIFICATION	DESCRIPTION OF STRATA Soil type, texture, structure, mottling, colour, plasticity, rocks, oxidation, particle characteristics, organics, secondary and minor components, fill, contamination, odour.		CONSISTENCY	DENSITY INDEX	TYPE	DEPTH (M)	RESULTS AND ADDITIONAL OBSERVATIONS	
V	Nil	N	D	0.7			XX	BITUMEN WITH UNDERLAYING CRUSHED SANDSTONE - Variable colours.				PID A	0.0 0.05	0.1 ppm 4106/121/ 0.05 - FILL	
												A	0.5	4106/121/ 0.5	
V	Nil	N	M	1.0			SC	CLAYEY SAND - Light brown.				A PID	1.0 1.0	- FILL 4106/121/ 1.0 7.5 ppm	
												A PID	1.5 1.5	4106/121/ 1.5 0.9 ppm	
V	Nil	N	M	2.0			CL	SANDY CLAY - Light brown, sand is medium grained.				A	2.0	4106/121/ 2.0	
												A	2.5	4106/121/ 2.5	
				3.0				Borehole terminated at 2.5m on sandy clay.							
				4.0											
				4.5											
EQUIPMENT / METHOD		SUPPORT		WATER		MOISTURE		PENETRATION		CONSISTENCY		DENSITY		SAMPLING & TESTING	
N Natural exposure		SH Shoring		N None observed		D Dry		L Low		VS Very Soft		VL Very Loose		A Auger sample	
X Existing excavation		SC Shotcrete		X Not measured		M Moist		M Moderate		S Soft		L Loose		B Bulk sample	
BH Backhoe bucket		RB Rock Bolts		Water level		W Wet		H High		F Firm		MD Medium Dense		U Undisturbed sample	
HA Hand auger		Nil No support		Water outflow		Wp Plastic limit		R Refusal		St Stiff		D Dense		D Disturbed sample	
HS Hand Spade				Water inflow		WL Liquid limit				VSt Very Stiff		VD Very Dense		M Moisture content	
CC Concrete Corer										H Hard				FD Field density	
V V-Bit										F Friable				Ux Tube sample (x mm)	
TC Tungsten Carbide Bit														WS Water sample	
PT Push tube															
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CLIENT	Kevin Matthews	COMMENCED	20.02.14	COMPLETED	20.02.14	REF BH122							
PROJECT	Contamination Assessment	LOGGED	AB	CHECKED	GT	Sheet 1 of 1							
SITE	11 Addison Road Ingleside, NSW.	GEOLOGY	Sandstone	VEGETATION	NA	PROJECT NO. P1404106							
EQUIPMENT	Hand Auger	EASTING	NA	RL SURFACE	NA								
EXCAVATION DIMENSIONS	70mmØ X 0.5m depth	NORTHING	NA	ASPECT	West	SLOPE	5%						
EXCAVATION DATA		MATERIAL DATA				SAMPLING & TESTING							
METHOD	SUPPORT	WATER	MOISTURE	DEPTH (M)	PENETRATION RESISTANCE	GRAPHIC LOG	CLASSIFICATION	DESCRIPTION OF STRATA	CONSISTENCY	DENSITY INDEX	TYPE	DEPTH (M)	RESULTS AND ADDITIONAL OBSERVATIONS
HA	Nil	N	M	0.05			SP	GRAVELLY SAND - Black/dark brown, medium to coarse grained, with clay.			E	0.05	4106/122/ 0.05 - FILL
				0.2							E	0.2	4106/122/ 0.2
				0.3							E	0.3	4106/122/ 0.3
				0.4							E	0.4	4106/122/ 0.4
				0.5				Refusal at 0.5m on sandstone floater.					
				1.0									
				2.0									
				3.0									
				4.0									
				4.5									
EQUIPMENT / METHOD		SUPPORT	WATER	MOISTURE	PENETRATION	CONSISTENCY	DENSITY	SAMPLING & TESTING		CLASSIFICATION SYMBOLS AND SOIL DESCRIPTION			
N Natural exposure		SH Shoring	N None observed	D Dry	L Low	VS Very Soft	VL Very Loose	A Auger sample		pp Pocket penetrometer			
X Existing excavation		SC Shotcrete	X Not measured	M Moist	M Moderate	S Soft	L Loose	B Bulk sample		S Standard penetration test			
BH Backhoe bucket		RB Rock Bolts	Water level	W Wet	H High	F Firm	MD Medium Dense	U Undisturbed sample		VS Vane shear			
HA Hand auger		Nil No support	Water outflow	Wp Plastic limit	R Refusal	St Stiff	D Dense	D Disturbed sample		DCP Dynamic cone penetrometer			
HS Hand Spade			Water inflow	WI Liquid limit		VSt Very Stiff	VD Very Dense	M Moisture content		FD Field density			
CC Concrete Corer						H Hard		Ux Tube sample (x mm)		WS Water sample			
V V-Bit						F Friable							
TC Tungsten Carbide Bit													
PT Push tube													
EXCAVATION LOG TO BE READ IN CONJUNCTION WITH ACCOMPANYING REPORT NOTES AND ABBREVIATIONS													
 Martens MARTENS & ASSOCIATES PTY LTD 6/37 Leighton Place 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													

CLIENT	Kevin Matthews	COMMENCED	20.02.14	COMPLETED	20.02.14	REF TP123							
PROJECT	Contamination Assessment	LOGGED	AB	CHECKED	GT	Sheet 1 of 1							
SITE	11 Addison Road Ingleside, NSW.	GEOLOGY	Sandstone	VEGETATION	NA	PROJECT NO. P1404106							
EQUIPMENT	Hand Spade	EASTING	NA	RL SURFACE	NA								
EXCAVATION DIMENSIONS	300mm X 300mm X 0.5m depth	NORTHING	NA	ASPECT	North West	SLOPE	5%						
EXCAVATION DATA		MATERIAL DATA				SAMPLING & TESTING							
METHOD	SUPPORT	WATER	MOISTURE	DEPTH (M)	PENETRATION RESISTANCE	GRAPHIC LOG	CLASSIFICATION	DESCRIPTION OF STRATA	CONSISTENCY	DENSITY INDEX	TYPE	DEPTH (M)	RESULTS AND ADDITIONAL OBSERVATIONS
HS	Nil	N	M	0.05			SP	GRAVELLY SAND - Black/dark brown, medium to coarse grained, with clay.			E	0.05	4106/123/ 0.05 - FILL
				0.2							E	0.2	4106/123/ 0.2
				0.3							E	0.3	4106/123/ 0.3
				0.4							E	0.4	4106/123/ 0.4
				0.5				Refusal at 0.5m on fill.					
				1.0									
				2.0									
				3.0									
				4.0									
				4.5									
EQUIPMENT / METHOD		SUPPORT	WATER	MOISTURE	PENETRATION	CONSISTENCY	DENSITY	SAMPLING & TESTING		CLASSIFICATION SYMBOLS AND SOIL DESCRIPTION			
N Natural exposure		SH Shoring	N None observed	D Dry	L Low	VS Very Soft	VL Very Loose	A Auger sample		pp Pocket penetrometer			
X Existing excavation		SC Shotcrete	X Not measured	M Moist	M Moderate	S Soft	L Loose	B Bulk sample		S Standard penetration test			
BH Backhoe bucket		RB Rock Bolts	Water level	W Wet	H High	F Firm	MD Medium Dense	U Undisturbed sample		VS Vane shear			
HA Hand auger		Nil No support	Water outflow	Wp Plastic limit	R Refusal	St Stiff	D Dense	D Disturbed sample		DCP Dynamic cone penetrometer			
HS Hand Spade			Water inflow	WI Liquid limit		VSt Very Stiff	VD Very Dense	M Moisture content		FD Field density			
CC Concrete Corer						H Hard		Ux Tube sample (x mm)		WS Water sample			
V V-Bit						F Friable							
TC Tungsten Carbide Bit													
PT Push tube													
EXCAVATION LOG TO BE READ IN CONJUNCTION WITH ACCOMPANYING REPORT NOTES AND ABBREVIATIONS													
 MARTENS & ASSOCIATES PTY LTD 6/37 Leighton Place Hornsby, NSW 2077 Australia Phone: (02) 9476 9999 Fax: (02) 9476 8767 mail@martens.com.au WEB: http://www.martens.com.au Engineering Log - Excavation													

14 Attachment D – COCs and Laboratory Reports

Project									
Name		Contamination Assessment: 11 Addison Rd, Ingleside							
Martens Contact Officer		Ben Rose		Contact Email		brose@martens.com.au			
Sampling and Shipping		Sample Date	20.02.2014		Dispatch Date	21.02.2014		Turnaround Time	Standard
		Our Reference	P1404106JCOC01V01		Shipping Method (X)		Hand	Post	Courier
		On Ice (X)	☒	No Ice (X)	☐	Other (X)	☐	☐	☒
Laboratory									
Name		Envirolab Services P/L							
Sample Delivery Address		12 Ashley St, Chatswood							
Delivery Contact		Name	Aileen Hie		Phone	02 9910 6200		Fax	
Please Send Report By (X)		Post	☐	Fax	☐	Email	☒	Reporting Email Address	brose@martens.com.au and CC gtaylor@martens.com.au
		Name			Phone			Fax	
		Post			Email			Reporting Email Address	ahie@envirolabservices.com.au

Sample ID	Combo 5	Combo 3	8HM	BTEX	BTEX and TRH	Hold
4106/105/0.2		X				
4106/107/0.2		X				
4106/109/0.5	X					
4106/109/1.0		X				
4106/109/1.5		X				
4106/110/1.0		X				
4106/112/0.05		X				
4106/112/0.5		X				
4106/115/0.4		X				
4106/115/1.0		X				
4106/115/2.0		X				
4106/116/0.05	X					
4106/116/0.2		X				
4106/117/0.1		X				
4106/117/0.5		X				

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

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

Job No: 105486

Date Received: 21-2-14
Time Received: 16:00
Received by: D.F.
Temp: Local Ambient
Cooling: Ice/Refrigerator
Security: intact Broken/None

Head Office
Unit 6 / 37 Leighton Place
Hornsby NSW 2077, Australia
Ph 02 9476 9999 Fax 02 9476 8767

> mail@martens.com.au
> www.martens.com.au
MARTENS & ASSOCIATES P/L
ABN 85 070 240 890 ACN 070 240 890

SOIL ANALYSIS CHAIN OF CUSTODY

Page of

Sample ID	Combo 5	Combo 3	8HM	BTEX	BTEX and TRH	Hold
4106/119/0.05	X					
4106/120/0.5		X				
4106/120/1.0		X				
4106/121/1.0		X				
4106/122/0.05		X				
4106/123/0.05		X				
4106/DUPB1			X			
4106/DUPB2			X			
Spike				X		
Blank					X	
4106/109/2.0						X
4106/109/2.5						X
4106/110/0.2						X
4106/110/0.5						X
4106/112/1.0						X
4106/115/1.5						X
4106/115/2.5						X
4106/116/0.5						X
4106/116/1.0						X
4106/116/1.5						X
4106/116/2.0						X
4106/120/1.5						X
4106/120/2.0						X
4106/121/0.5						X
4106/121/1.5						X
4106/121/2.0						X
4106/121/2.5						X

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CERTIFICATE OF ANALYSIS

105486

Client:

Martens & Associates Pty Ltd
6/37 Leighton Place
Hornsby
NSW 2077

Attention: Ben Rose

Sample log in details:

Your Reference:	<u>P1404106JCOC01V01, Ingleside</u>
No. of samples:	42 soils
Date samples received / completed instructions received	21/02/14 / 21/02/14

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: / Issue Date:	28/02/14 / 28/02/14
Date of Preliminary Report:	None Issued

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Accredited for compliance with ISO/IEC 17025. **Tests not covered by NATA are denoted with *.**

Results Approved By:



Jacinta Hurst
Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	105486-1	105486-2	105486-3	105486-4	105486-5
Your Reference	-----	4106/105	4106/107	4106/109	4106/109	4106/109
Depth	-----	0.2	0.2	0.5	1.0	1.5
Date Sampled		20/02/2014	20/02/2014	20/02/2014	20/02/2014	20/02/2014
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	24/02/2014	24/02/2014	24/02/2014	24/02/2014	24/02/2014
Date analysed	-	26/02/2014	26/02/2014	26/02/2014	26/02/2014	26/02/2014
TRHC ₆ - C ₉	mg/kg	<25	<25	<25	<25	<25
TRHC ₆ - C ₁₀	mg/kg	<25	<25	<25	<25	<25
vTPHC 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
Surrogate aaa-Trifluorotoluene	%	100	86	90	99	87

vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	105486-6	105486-7	105486-8	105486-9	105486-10
Your Reference	-----	4106/110	4106/112	4106/112	4106/115	4106/115
Depth	-----	1.0	0.05	0.5	0.4	1.0
Date Sampled		20/02/2014	20/02/2014	20/02/2014	20/02/2014	20/02/2014
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	24/02/2014	24/02/2014	24/02/2014	24/02/2014	24/02/2014
Date analysed	-	26/02/2014	26/02/2014	26/02/2014	26/02/2014	26/02/2014
TRHC ₆ - C ₉	mg/kg	<25	<25	<25	<25	<25
TRHC ₆ - C ₁₀	mg/kg	<25	<25	<25	<25	<25
vTPHC 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
Surrogate aaa-Trifluorotoluene	%	81	98	92	99	105

vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	105486-11	105486-12	105486-13	105486-14	105486-15
Your Reference	-----	4106/115	4106/116	4106/116	4106/117	4106/117
Depth	-----	2.0	0.05	0.2	0.1	0.5
Date Sampled		20/02/2014	20/02/2014	20/02/2014	20/02/2014	20/02/2014
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	24/02/2014	24/02/2014	24/02/2014	24/02/2014	24/02/2014
Date analysed	-	26/02/2014	26/02/2014	26/02/2014	26/02/2014	26/02/2014
TRHC ₆ - C ₉	mg/kg	<25	<25	<25	<25	<25
TRHC ₆ - C ₁₀	mg/kg	<25	<25	<25	<25	<25
vTPHC 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
Surrogate aaa-Trifluorotoluene	%	87	89	88	90	88

vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	105486-16	105486-17	105486-18	105486-19	105486-20
Your Reference	-----	4106/119	4106/120	4106/120	4106/121	4106/122
Depth	-----	0.05	0.5	1.0	1.0	0.05
Date Sampled		20/02/2014	20/02/2014	20/02/2014	20/02/2014	20/02/2014
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	24/02/2014	24/02/2014	24/02/2014	24/02/2014	24/02/2014
Date analysed	-	26/02/2014	26/02/2014	26/02/2014	26/02/2014	26/02/2014
TRHC ₆ - C ₉	mg/kg	<25	<25	<25	<25	<25
TRHC ₆ - C ₁₀	mg/kg	<25	<25	<25	<25	<25
vTPHC 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
Surrogate aaa-Trifluorotoluene	%	89	92	60	82	89

vTRH(C6-C10)/BTEXN in Soil				
Our Reference:	UNITS	105486-21	105486-24	105486-25
Your Reference	-----	4106/123	4106/Spike	4106/Blank
Depth	-----	0.05	-	-
Date Sampled		20/02/2014	20/02/2014	20/02/2014
Type of sample		soil	soil	soil
Date extracted	-	24/02/2014	24/02/2014	24/02/2014
Date analysed	-	26/02/2014	26/02/2014	26/02/2014
TRHC ₆ - C ₉	mg/kg	<25	[NA]	<25
TRHC ₆ - C ₁₀	mg/kg	<25	[NA]	<25
vTPHC ₆ - C ₁₀ less BTEX (F1)	mg/kg	<25	[NA]	<25
Benzene	mg/kg	<0.2	100%	<0.2
Toluene	mg/kg	<0.5	106%	<0.5
Ethylbenzene	mg/kg	<1	96%	<1
m+p-xylene	mg/kg	<2	95%	<2
o-Xylene	mg/kg	<1	94%	<1
naphthalene	mg/kg	<1	[NA]	<1
Surrogate aaa-Trifluorotoluene	%	88	108	87

svTRH (C10-C40) in Soil						
Our Reference:	UNITS	105486-1	105486-2	105486-3	105486-4	105486-5
Your Reference	-----	4106/105	4106/107	4106/109	4106/109	4106/109
Depth	-----	0.2	0.2	0.5	1.0	1.5
Date Sampled		20/02/2014	20/02/2014	20/02/2014	20/02/2014	20/02/2014
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	24/02/2014	24/02/2014	24/02/2014	24/02/2014	24/02/2014
Date analysed	-	24/02/2014	24/02/2014	24/02/2014	24/02/2014	24/02/2014
TRHC ₁₀ - C ₁₄	mg/kg	<50	<50	<50	<50	<50
TRHC ₁₅ - C ₂₈	mg/kg	<100	<100	<100	<100	<100
TRHC 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
Surrogate o-Terphenyl	%	93	92	92	92	92

svTRH (C10-C40) in Soil						
Our Reference:	UNITS	105486-6	105486-7	105486-8	105486-9	105486-10
Your Reference	-----	4106/110	4106/112	4106/112	4106/115	4106/115
Depth	-----	1.0	0.05	0.5	0.4	1.0
Date Sampled		20/02/2014	20/02/2014	20/02/2014	20/02/2014	20/02/2014
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	24/02/2014	24/02/2014	24/02/2014	24/02/2014	24/02/2014
Date analysed	-	24/02/2014	24/02/2014	24/02/2014	24/02/2014	24/02/2014
TRHC ₁₀ - C ₁₄	mg/kg	<50	<50	<50	<50	<50
TRHC ₁₅ - C ₂₈	mg/kg	<100	2,800	<100	<100	<100
TRHC ₂₉ - C ₃₆	mg/kg	<100	3,300	<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	5,600	<100	100	<100
TRH>C ₃₄ -C ₄₀	mg/kg	<100	1,300	<100	<100	<100
Surrogate o-Terphenyl	%	93	119	91	89	91

svTRH (C10-C40) in Soil						
Our Reference:	UNITS	105486-11	105486-12	105486-13	105486-14	105486-15
Your Reference	-----	4106/115	4106/116	4106/116	4106/117	4106/117
Depth	-----	2.0	0.05	0.2	0.1	0.5
Date Sampled		20/02/2014	20/02/2014	20/02/2014	20/02/2014	20/02/2014
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	24/02/2014	24/02/2014	24/02/2014	24/02/2014	24/02/2014
Date analysed	-	24/02/2014	24/02/2014	24/02/2014	24/02/2014	24/02/2014
TRHC ₁₀ - C ₁₄	mg/kg	<50	<50	<50	<50	<50
TRHC ₁₅ - C ₂₈	mg/kg	<100	120	<100	<100	130
TRHC ₂₉ - C ₃₆	mg/kg	<100	500	240	180	290
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	440	210	200	350
TRH>C ₃₄ -C ₄₀	mg/kg	<100	630	170	<100	180
Surrogate o-Terphenyl	%	90	92	89	88	90

svTRH (C10-C40) in Soil						
Our Reference:	UNITS	105486-16	105486-17	105486-18	105486-19	105486-20
Your Reference	-----	4106/119	4106/120	4106/120	4106/121	4106/122
Depth	-----	0.05	0.5	1.0	1.0	0.05
Date Sampled		20/02/2014	20/02/2014	20/02/2014	20/02/2014	20/02/2014
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	24/02/2014	24/02/2014	24/02/2014	24/02/2014	24/02/2014
Date analysed	-	24/02/2014	24/02/2014	24/02/2014	24/02/2014	24/02/2014
TRHC ₁₀ - C ₁₄	mg/kg	<50	<50	<50	<50	<50
TRHC ₁₅ - C ₂₈	mg/kg	<100	<100	<100	<100	1,700
TRHC ₂₉ - C ₃₆	mg/kg	<100	140	<100	<100	2,000
TRH>C ₁₀ -C ₁₆	mg/kg	<50	<50	<50	<50	53
TRH>C ₁₀ - C ₁₆ less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	53
TRH>C ₁₆ -C ₃₄	mg/kg	<100	120	<100	<100	3,100
TRH>C ₃₄ -C ₄₀	mg/kg	<100	150	<100	<100	1,500
Surrogate o-Terphenyl	%	91	87	90	88	112

svTRH (C10-C40) in Soil		
Our Reference:	UNITS	105486-21
Your Reference	-----	4106/123
Depth	-----	0.05
Date Sampled		20/02/2014
Type of sample		soil
Date extracted	-	24/02/2014
Date analysed	-	24/02/2014
TRHC ₁₀ - C ₁₄	mg/kg	<50
TRHC ₁₅ - C ₂₈	mg/kg	340
TRHC ₂₉ - C ₃₆	mg/kg	850
TRH>C ₁₀ -C ₁₆	mg/kg	<50
TRH>C ₁₀ - C ₁₆ less Naphthalene (F2)	mg/kg	<50
TRH>C ₁₆ -C ₃₄	mg/kg	920
TRH>C ₃₄ -C ₄₀	mg/kg	980
Surrogate o-Terphenyl	%	93

PAHs in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ----- -----	105486-1 4106/105 0.2 20/02/2014 soil	105486-2 4106/107 0.2 20/02/2014 soil	105486-3 4106/109 0.5 20/02/2014 soil	105486-4 4106/109 1.0 20/02/2014 soil	105486-5 4106/109 1.5 20/02/2014 soil
Date extracted	-	24/02/2014	24/02/2014	24/02/2014	24/02/2014	24/02/2014
Date analysed	-	25/02/2014	25/02/2014	25/02/2014	25/02/2014	25/02/2014
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.5	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	0.3	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	5.2	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	1.0	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	6.9	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	6.3	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	2.7	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	2.5	<0.1	<0.1	<0.1	<0.1
Benzo(b+k)fluoranthene	mg/kg	4.4	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	2.8	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	1.7	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	0.3	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	1.7	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene TEQ NEPM B1	mg/kg	4.0	<0.5	<0.5	<0.5	<0.5
Total +ve PAH's	mg/kg	36	NIL (+)VE	NIL (+)VE	NIL (+)VE	NIL (+)VE
Surrogate p-Terphenyl-d14	%	106	98	97	97	95

PAHs in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ----- -----	105486-6 4106/110 1.0 20/02/2014 soil	105486-7 4106/112 0.05 20/02/2014 soil	105486-8 4106/112 0.5 20/02/2014 soil	105486-9 4106/115 0.4 20/02/2014 soil	105486-10 4106/115 1.0 20/02/2014 soil
Date extracted	-	24/02/2014	24/02/2014	24/02/2014	24/02/2014	24/02/2014
Date analysed	-	25/02/2014	25/02/2014	25/02/2014	25/02/2014	25/02/2014
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	0.2	<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	0.9	<0.1	0.2	0.1
Anthracene	mg/kg	<0.1	0.2	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.3	2.2	0.3	0.8	0.5
Pyrene	mg/kg	0.2	2.0	0.3	0.8	0.6
Benzo(a)anthracene	mg/kg	<0.1	1	0.1	0.4	0.3
Chrysene	mg/kg	0.1	0.9	0.1	0.4	0.3
Benzo(b+k)fluoranthene	mg/kg	0.2	1.9	0.3	0.9	0.6
Benzo(a)pyrene	mg/kg	0.14	1.3	0.18	0.60	0.39
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	0.8	0.1	0.4	0.2
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	0.9	0.1	0.4	0.2
Benzo(a)pyrene TEQ NEPM B1	mg/kg	<0.5	2	<0.5	1	1
Total +ve PAH's	mg/kg	1.3	12	1.5	4.9	3.3
Surrogate p-Terphenyl-d14	%	97	98	100	100	104

PAHs in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ----- -----	105486-11 4106/115 2.0 20/02/2014 soil	105486-12 4106/116 0.05 20/02/2014 soil	105486-13 4106/116 0.2 20/02/2014 soil	105486-14 4106/117 0.1 20/02/2014 soil	105486-15 4106/117 0.5 20/02/2014 soil
Date extracted	-	24/02/2014	24/02/2014	24/02/2014	24/02/2014	24/02/2014
Date analysed	-	25/02/2014	25/02/2014	25/02/2014	25/02/2014	25/02/2014
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	0.7	0.3	0.3	0.5
Anthracene	mg/kg	<0.1	0.2	<0.1	<0.1	0.2
Fluoranthene	mg/kg	0.1	2.4	1.1	3.5	4.2
Pyrene	mg/kg	0.1	2.2	1.1	3.4	4.8
Benzo(a)anthracene	mg/kg	<0.1	1.0	0.6	1.8	2.3
Chrysene	mg/kg	<0.1	0.9	0.5	1.8	2.2
Benzo(b+k)fluoranthene	mg/kg	<0.2	2.2	1.1	5.4	5.8
Benzo(a)pyrene	mg/kg	0.07	1.3	0.73	3.0	3.7
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	1.0	0.4	2.5	2.9
Dibenzo(a,h)anthracene	mg/kg	<0.1	0.1	<0.1	0.3	0.4
Benzo(g,h,i)perylene	mg/kg	<0.1	1.1	0.5	2.5	2.9
Benzo(a)pyrene TEQ NEPM B1	mg/kg	<0.5	2	1	4.0	5.0
Total +ve PAH's	mg/kg	0.28	13	6.4	24	30
Surrogate p-Terphenyl-d14	%	100	107	103	102	102

PAHs in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ----- -----	105486-16 4106/119 0.05 20/02/2014 soil	105486-17 4106/120 0.5 20/02/2014 soil	105486-18 4106/120 1.0 20/02/2014 soil	105486-19 4106/121 1.0 20/02/2014 soil	105486-20 4106/122 0.05 20/02/2014 soil
Date extracted	-	24/02/2014	24/02/2014	24/02/2014	24/02/2014	24/02/2014
Date analysed	-	25/02/2014	25/02/2014	25/02/2014	25/02/2014	25/02/2014
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	0.9
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	2.8
Acenaphthene	mg/kg	<0.1	0.2	<0.1	<0.1	4.5
Fluorene	mg/kg	<0.1	0.1	<0.1	<0.1	5.9
Phenanthrene	mg/kg	<0.1	2.4	0.8	0.4	64
Anthracene	mg/kg	<0.1	0.5	0.1	<0.1	15
Fluoranthene	mg/kg	0.1	3.7	1.4	0.9	110
Pyrene	mg/kg	0.1	3.0	1.1	0.9	96
Benzo(a)anthracene	mg/kg	<0.1	1.3	0.5	0.4	49
Chrysene	mg/kg	<0.1	1.1	0.4	0.4	40
Benzo(b+k)fluoranthene	mg/kg	<0.2	2.0	0.8	0.8	86
Benzo(a)pyrene	mg/kg	0.11	1.1	0.44	0.49	59
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	0.7	0.3	0.3	32
Dibenzo(a,h)anthracene	mg/kg	<0.1	0.1	<0.1	<0.1	4.5
Benzo(g,h,i)perylene	mg/kg	0.1	0.6	0.3	0.3	30
Benzo(a)pyrene TEQ NEPM B1	mg/kg	<0.5	2	1	1	81
Total +ve PAH's	mg/kg	0.58	17	6.1	4.8	600
Surrogate p-Terphenyl-d14	%	103	103	97	106	102

PAHs in Soil		
Our Reference:	UNITS	105486-21
Your Reference	-----	4106/123
Depth	-----	0.05
Date Sampled		20/02/2014
Type of sample		soil
Date extracted	-	24/02/2014
Date analysed	-	25/02/2014
Naphthalene	mg/kg	<0.1
Acenaphthylene	mg/kg	0.3
Acenaphthene	mg/kg	<0.1
Fluorene	mg/kg	<0.1
Phenanthrene	mg/kg	3.1
Anthracene	mg/kg	0.7
Fluoranthene	mg/kg	10
Pyrene	mg/kg	9.8
Benzo(a)anthracene	mg/kg	5.3
Chrysene	mg/kg	4.4
Benzo(b+k)fluoranthene	mg/kg	9.8
Benzo(a)pyrene	mg/kg	6.2
Indeno(1,2,3-c,d)pyrene	mg/kg	3.4
Dibenzo(a,h)anthracene	mg/kg	0.5
Benzo(g,h,i)perylene	mg/kg	3.4
Benzo(a)pyrene TEQ NEPM B1	mg/kg	9.0
Total +ve PAH's	mg/kg	57
Surrogate p-Terphenyl-d14	%	103

Organochlorine Pesticides in soil				
Our Reference:	UNITS	105486-3	105486-12	105486-16
Your Reference	-----	4106/109	4106/116	4106/119
Depth	-----	0.5	0.05	0.05
Date Sampled		20/02/2014	20/02/2014	20/02/2014
Type of sample		soil	soil	soil
Date extracted	-	24/02/2014	24/02/2014	24/02/2014
Date analysed	-	25/02/2014	25/02/2014	25/02/2014
HCB	mg/kg	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1
Surrogate TCMX	%	98	93	96

PCBs in Soil				
Our Reference:	UNITS	105486-3	105486-12	105486-16
Your Reference	-----	4106/109	4106/116	4106/119
Depth	-----	0.5	0.05	0.05
Date Sampled		20/02/2014	20/02/2014	20/02/2014
Type of sample		soil	soil	soil
Date extracted	-	24/02/2014	24/02/2014	24/02/2014
Date analysed	-	25/02/2014	25/02/2014	25/02/2014
Arochlor 1016	mg/kg	<0.1	<0.1	<0.1
Arochlor 1221	mg/kg	<0.1	<0.1	<0.1
Arochlor 1232	mg/kg	<0.1	<0.1	<0.1
Arochlor 1242	mg/kg	<0.1	<0.1	<0.1
Arochlor 1248	mg/kg	<0.1	<0.1	<0.1
Arochlor 1254	mg/kg	<0.1	<0.1	<0.1
Arochlor 1260	mg/kg	<0.1	<0.1	<0.1
Surrogate TCLMX	%	98	93	96

Acid Extractable metals in soil						
Our Reference:	UNITS	105486-1	105486-2	105486-3	105486-4	105486-5
Your Reference	-----	4106/105	4106/107	4106/109	4106/109	4106/109
Depth	-----	0.2	0.2	0.5	1.0	1.5
Date Sampled		20/02/2014	20/02/2014	20/02/2014	20/02/2014	20/02/2014
Type of sample		soil	soil	soil	soil	soil
Date digested	-	24/02/2014	24/02/2014	24/02/2014	24/02/2014	24/02/2014
Date analysed	-	24/02/2014	24/02/2014	24/02/2014	24/02/2014	24/02/2014
Arsenic	mg/kg	6	<4	4	7	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	0.4	<0.4
Chromium	mg/kg	6	10	13	14	14
Copper	mg/kg	7	3	22	23	4
Lead	mg/kg	35	11	23	20	14
Mercury	mg/kg	0.2	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	2	<1	5	2	1
Zinc	mg/kg	92	20	130	19	24

Acid Extractable metals in soil						
Our Reference:	UNITS	105486-6	105486-7	105486-8	105486-9	105486-10
Your Reference	-----	4106/110	4106/112	4106/112	4106/115	4106/115
Depth	-----	1.0	0.05	0.5	0.4	1.0
Date Sampled		20/02/2014	20/02/2014	20/02/2014	20/02/2014	20/02/2014
Type of sample		soil	soil	soil	soil	soil
Date digested	-	24/02/2014	24/02/2014	24/02/2014	24/02/2014	24/02/2014
Date analysed	-	24/02/2014	24/02/2014	24/02/2014	24/02/2014	24/02/2014
Arsenic	mg/kg	<4	<4	<4	<4	7
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	11	15	16	31	14
Copper	mg/kg	6	17	17	18	22
Lead	mg/kg	12	23	12	28	35
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	3	12	2	11	4
Zinc	mg/kg	21	72	21	40	51

Acid Extractable metals in soil						
Our Reference:	UNITS	105486-11	105486-12	105486-13	105486-14	105486-15
Your Reference	-----	4106/115	4106/116	4106/116	4106/117	4106/117
Depth	-----	2.0	0.05	0.2	0.1	0.5
Date Sampled		20/02/2014	20/02/2014	20/02/2014	20/02/2014	20/02/2014
Type of sample		soil	soil	soil	soil	soil
Date digested	-	24/02/2014	24/02/2014	24/02/2014	24/02/2014	24/02/2014
Date analysed	-	24/02/2014	24/02/2014	24/02/2014	24/02/2014	24/02/2014
Arsenic	mg/kg	<4	<4	6	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	15	19	22	26	18
Copper	mg/kg	6	30	12	4	5
Lead	mg/kg	22	17	54	9	15
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	3	22	3	3	4
Zinc	mg/kg	27	32	53	12	18

Acid Extractable metals in soil						
Our Reference:	UNITS	105486-16	105486-17	105486-18	105486-19	105486-20
Your Reference	-----	4106/119	4106/120	4106/120	4106/121	4106/122
Depth	-----	0.05	0.5	1.0	1.0	0.05
Date Sampled		20/02/2014	20/02/2014	20/02/2014	20/02/2014	20/02/2014
Type of sample		soil	soil	soil	soil	soil
Date digested	-	24/02/2014	24/02/2014	24/02/2014	24/02/2014	24/02/2014
Date analysed	-	24/02/2014	24/02/2014	24/02/2014	24/02/2014	24/02/2014
Arsenic	mg/kg	<4	<4	<4	10	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	10	3	2	27	9
Copper	mg/kg	8	2	<1	8	19
Lead	mg/kg	6	2	2	17	17
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	9	1	<1	3	11
Zinc	mg/kg	17	4	2	20	60

Acid Extractable metals in soil				
Our Reference:	UNITS	105486-21	105486-22	105486-23
Your Reference	-----	4106/123	4106/DUPB1	4106/DUPB2
Depth	-----	0.05	-	-
Date Sampled		20/02/2014	20/02/2014	20/02/2014
Type of sample		soil	soil	soil
Date digested	-	24/02/2014	24/02/2014	24/02/2014
Date analysed	-	24/02/2014	24/02/2014	24/02/2014
Arsenic	mg/kg	<4	5	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4
Chromium	mg/kg	11	21	4
Copper	mg/kg	29	18	3
Lead	mg/kg	26	63	3
Mercury	mg/kg	<0.1	0.2	<0.1
Nickel	mg/kg	24	6	2
Zinc	mg/kg	40	94	5

Moisture						
Our Reference:	UNITS	105486-1	105486-2	105486-3	105486-4	105486-5
Your Reference	-----	4106/105	4106/107	4106/109	4106/109	4106/109
Depth	-----	0.2	0.2	0.5	1.0	1.5
Date Sampled		20/02/2014	20/02/2014	20/02/2014	20/02/2014	20/02/2014
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	24/02/2014	24/02/2014	24/02/2014	24/02/2014	24/02/2014
Date analysed	-	25/02/2014	25/02/2014	25/02/2014	25/02/2014	25/02/2014
Moisture	%	7.9	14	19	19	15

Moisture						
Our Reference:	UNITS	105486-6	105486-7	105486-8	105486-9	105486-10
Your Reference	-----	4106/110	4106/112	4106/112	4106/115	4106/115
Depth	-----	1.0	0.05	0.5	0.4	1.0
Date Sampled		20/02/2014	20/02/2014	20/02/2014	20/02/2014	20/02/2014
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	24/02/2014	24/02/2014	24/02/2014	24/02/2014	24/02/2014
Date analysed	-	25/02/2014	25/02/2014	25/02/2014	25/02/2014	25/02/2014
Moisture	%	18	15	16	13	22

Moisture						
Our Reference:	UNITS	105486-11	105486-12	105486-13	105486-14	105486-15
Your Reference	-----	4106/115	4106/116	4106/116	4106/117	4106/117
Depth	-----	2.0	0.05	0.2	0.1	0.5
Date Sampled		20/02/2014	20/02/2014	20/02/2014	20/02/2014	20/02/2014
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	24/02/2014	24/02/2014	24/02/2014	24/02/2014	24/02/2014
Date analysed	-	25/02/2014	25/02/2014	25/02/2014	25/02/2014	25/02/2014
Moisture	%	19	6.8	14	5.7	10

Moisture						
Our Reference:	UNITS	105486-16	105486-17	105486-18	105486-19	105486-20
Your Reference	-----	4106/119	4106/120	4106/120	4106/121	4106/122
Depth	-----	0.05	0.5	1.0	1.0	0.05
Date Sampled		20/02/2014	20/02/2014	20/02/2014	20/02/2014	20/02/2014
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	24/02/2014	24/02/2014	24/02/2014	24/02/2014	24/02/2014
Date analysed	-	25/02/2014	25/02/2014	25/02/2014	25/02/2014	25/02/2014
Moisture	%	20	11	3.9	15	8.6

Moisture				
Our Reference:	UNITS	105486-21	105486-22	105486-23
Your Reference	-----	4106/123	4106/DUPB1	4106/DUPB2
Depth	-----	0.05	-	-
Date Sampled		20/02/2014	20/02/2014	20/02/2014
Type of sample		soil	soil	soil
Date prepared	-	24/02/2014	24/02/2014	24/02/2014
Date analysed	-	25/02/2014	25/02/2014	25/02/2014
Moisture	%	7.1	24	6.9

Method ID	Methodology Summary
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)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-014	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
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. Note Naphthalene is determined from the VOC analysis.
Org-012 subset	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.
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.
Metals-021 CV-AAS	Determination of Mercury by Cold Vapour AAS.
Inorg-008	Moisture content determined by heating at 105+/-5 deg C for a minimum of 12 hours.

QUALITY CONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
vTRH(C6-C10)/BTEXN in Soil						Base II Duplicate II %RPD		
Date extracted	-			24/02/2014	105486-1	24/02/2014 24/02/2014	LCS-11	24/02/2014
Date analysed	-			26/02/2014	105486-1	26/02/2014 26/02/2014	LCS-11	26/02/2014
TRHC ₆ - C ₉	mg/kg	25	Org-016	<25	105486-1	<25 <25	LCS-11	103%
TRHC ₆ - C ₁₀	mg/kg	25	Org-016	<25	105486-1	<25 <25	LCS-11	103%
Benzene	mg/kg	0.2	Org-016	<0.2	105486-1	<0.2 <0.2	LCS-11	100%
Toluene	mg/kg	0.5	Org-016	<0.5	105486-1	<0.5 <0.5	LCS-11	98%
Ethylbenzene	mg/kg	1	Org-016	<1	105486-1	<1 <1	LCS-11	104%
m+p-xylene	mg/kg	2	Org-016	<2	105486-1	<2 <2	LCS-11	105%
o-Xylene	mg/kg	1	Org-016	<1	105486-1	<1 <1	LCS-11	103%
naphthalene	mg/kg	1	Org-014	<1	105486-1	<1 <1	[NR]	[NR]
Surrogate aaa-Trifluorotoluene	%		Org-016	105	105486-1	100 97 RPD: 3	LCS-11	87%
QUALITY CONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
svTRH (C10-C40) in Soil						Base II Duplicate II %RPD		
Date extracted	-			24/02/2014	105486-1	24/02/2014 24/02/2014	LCS-11	24/02/2014
Date analysed	-			24/02/2014	105486-1	24/02/2014 24/02/2014	LCS-11	24/02/2014
TRHC ₁₀ - C ₁₄	mg/kg	50	Org-003	<50	105486-1	<50 <50	LCS-11	108%
TRHC ₁₅ - C ₂₈	mg/kg	100	Org-003	<100	105486-1	<100 110	LCS-11	112%
TRHC ₂₈ - C ₃₆	mg/kg	100	Org-003	<100	105486-1	<100 100	LCS-11	95%
TRH>C ₁₀ -C ₁₆	mg/kg	50	Org-003	<50	105486-1	<50 <50	LCS-11	108%
TRH>C ₁₆ -C ₃₄	mg/kg	100	Org-003	<100	105486-1	<100 190	LCS-11	112%
TRH>C ₃₄ -C ₄₀	mg/kg	100	Org-003	<100	105486-1	<100 <100	LCS-11	95%
Surrogate o-Terphenyl	%		Org-003	90	105486-1	93 95 RPD: 2	LCS-11	115%
QUALITY CONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
PAHs in Soil						Base II Duplicate II %RPD		
Date extracted	-			24/02/2014	105486-1	24/02/2014 24/02/2014	LCS-11	24/02/2014
Date analysed	-			25/02/2014	105486-1	25/02/2014 25/02/2014	LCS-11	25/02/2014
Naphthalene	mg/kg	0.1	Org-012 subset	<0.1	105486-1	<0.1 <0.1	LCS-11	109%
Acenaphthylene	mg/kg	0.1	Org-012 subset	<0.1	105486-1	0.5 0.2 RPD: 86	[NR]	[NR]
Acenaphthene	mg/kg	0.1	Org-012 subset	<0.1	105486-1	<0.1 0.2	[NR]	[NR]
Fluorene	mg/kg	0.1	Org-012 subset	<0.1	105486-1	0.3 0.3 RPD: 0	LCS-11	115%
Phenanthrene	mg/kg	0.1	Org-012 subset	<0.1	105486-1	5.2 5.0 RPD: 4	LCS-11	108%
Anthracene	mg/kg	0.1	Org-012 subset	<0.1	105486-1	1.0 0.8 RPD: 22	[NR]	[NR]
Fluoranthene	mg/kg	0.1	Org-012 subset	<0.1	105486-1	6.9 9.0 RPD: 26	LCS-11	108%

QUALITY CONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
PAHs in Soil						Base II Duplicate II %RPD		
Pyrene	mg/kg	0.1	Org-012 subset	<0.1	105486-1	6.3 7.7 RPD: 20	LCS-11	113%
Benzo(a)anthracene	mg/kg	0.1	Org-012 subset	<0.1	105486-1	2.7 3.3 RPD: 20	[NR]	[NR]
Chrysene	mg/kg	0.1	Org-012 subset	<0.1	105486-1	2.5 3.3 RPD: 28	LCS-11	102%
Benzo(b+k)fluoranthene	mg/kg	0.2	Org-012 subset	<0.2	105486-1	4.4 5.7 RPD: 26	[NR]	[NR]
Benzo(a)pyrene	mg/kg	0.05	Org-012 subset	<0.05	105486-1	2.8 3.5 RPD: 22	LCS-11	108%
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012 subset	<0.1	105486-1	1.7 2.0 RPD: 16	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012 subset	<0.1	105486-1	0.3 0.4 RPD: 29	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012 subset	<0.1	105486-1	1.7 1.7 RPD: 0	[NR]	[NR]
Surrogate p-Terphenyl-d14	%		Org-012 subset	101	105486-1	106 106 RPD: 0	LCS-11	131%
QUALITY CONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
Organochlorine Pesticides in soil						Base II Duplicate II %RPD		
Date extracted	-			24/02/2014	[NT]	[NT]	LCS-5	24/02/2014
Date analysed	-			25/02/2014	[NT]	[NT]	LCS-5	25/02/2014
HCB	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
alpha-BHC	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-5	123%
gamma-BHC	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
beta-BHC	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-5	87%
Heptachlor	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-5	95%
delta-BHC	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
Aldrin	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-5	96%
Heptachlor Epoxide	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-5	115%
gamma-Chlordane	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
alpha-chlordane	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
Endosulfan I	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
pp-DDE	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-5	88%
Dieldrin	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-5	85%
Endrin	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-5	87%
pp-DDD	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-5	103%
Endosulfan II	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
pp-DDT	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
Endrin Aldehyde	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
Endosulfan Sulphate	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-5	101%
Methoxychlor	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
Surrogate TCMX	%		Org-005	87	[NT]	[NT]	LCS-5	88%

QUALITYCONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
PCBs in Soil						Base II Duplicate II %RPD		
Date extracted	-			24/02/2014	[NT]	[NT]	LCS-5	24/02/2014
Date analysed	-			25/02/2014	[NT]	[NT]	LCS-5	25/02/2014
Arochlor 1016	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NR]	[NR]
Arochlor 1221	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NR]	[NR]
Arochlor 1232	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NR]	[NR]
Arochlor 1242	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NR]	[NR]
Arochlor 1248	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NR]	[NR]
Arochlor 1254	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	LCS-5	100%
Arochlor 1260	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NR]	[NR]
Surrogate TCLMX	%		Org-006	87	[NT]	[NT]	LCS-5	84%
QUALITYCONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
Acid Extractable metals in soil						Base II Duplicate II %RPD		
Date digested	-			24/02/2014	105486-1	24/02/2014 24/02/2014	LCS-1	24/02/2014
Date analysed	-			24/02/2014	105486-1	24/02/2014 24/02/2014	LCS-1	24/02/2014
Arsenic	mg/kg	4	Metals-020 ICP-AES	<4	105486-1	6 8 RPD: 29	LCS-1	92%
Cadmium	mg/kg	0.4	Metals-020 ICP-AES	<0.4	105486-1	<0.4 <0.4	LCS-1	99%
Chromium	mg/kg	1	Metals-020 ICP-AES	<1	105486-1	6 8 RPD: 29	LCS-1	96%
Copper	mg/kg	1	Metals-020 ICP-AES	<1	105486-1	7 7 RPD: 0	LCS-1	95%
Lead	mg/kg	1	Metals-020 ICP-AES	<1	105486-1	35 23 RPD: 41	LCS-1	95%
Mercury	mg/kg	0.1	Metals-021 CV-AAS	<0.1	105486-1	0.2 0.1 RPD: 67	LCS-1	101%
Nickel	mg/kg	1	Metals-020 ICP-AES	<1	105486-1	2 2 RPD: 0	LCS-1	97%
Zinc	mg/kg	1	Metals-020 ICP-AES	<1	105486-1	92 110 RPD: 18	LCS-1	96%

QUALITYCONTROL Moisture	UNITS	PQL	METHOD	Blank
Date prepared	-			[NT]
Date analysed	-			[NT]
Moisture	%	0.1	Inorg-008	[NT]

QUALITYCONTROL vTRH(C6-C10)/BTEXNin Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	105486-11	24/02/2014 24/02/2014	105486-2	24/02/2014
Date analysed	-	105486-11	26/02/2014 26/02/2014	105486-2	26/02/2014
TRHC ₆ - C ₉	mg/kg	105486-11	<25 <25	105486-2	106%
TRHC ₆ - C ₁₀	mg/kg	105486-11	<25 <25	105486-2	106%
Benzene	mg/kg	105486-11	<0.2 <0.2	105486-2	100%
Toluene	mg/kg	105486-11	<0.5 <0.5	105486-2	114%
Ethylbenzene	mg/kg	105486-11	<1 <1	105486-2	107%
m+p-xylene	mg/kg	105486-11	<2 <2	105486-2	106%
o-Xylene	mg/kg	105486-11	<1 <1	105486-2	105%
naphthalene	mg/kg	105486-11	<1 <1	[NR]	[NR]
Surrogate aaa- Trifluorotoluene	%	105486-11	87 95 RPD: 9	105486-2	92%
QUALITYCONTROL svTRH (C10-C40) in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	105486-11	24/02/2014 24/02/2014	105486-2	24/02/2014
Date analysed	-	105486-11	24/02/2014 24/02/2014	105486-2	24/02/2014
TRHC ₁₀ - C ₁₄	mg/kg	105486-11	<50 <50	105486-2	99%
TRHC ₁₅ - C ₂₈	mg/kg	105486-11	<100 <100	105486-2	114%
TRHC ₂₉ - C ₃₆	mg/kg	105486-11	<100 <100	105486-2	98%
TRH>C ₁₀ -C ₁₆	mg/kg	105486-11	<50 <50	105486-2	99%
TRH>C ₁₆ -C ₃₄	mg/kg	105486-11	<100 <100	105486-2	114%
TRH>C ₃₄ -C ₄₀	mg/kg	105486-11	<100 <100	105486-2	98%
Surrogate o-Terphenyl	%	105486-11	90 88 RPD: 2	105486-2	105%
QUALITYCONTROL PAHs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	105486-11	24/02/2014 24/02/2014	105486-2	24/02/2014
Date analysed	-	105486-11	25/02/2014 25/02/2014	105486-2	25/02/2014
Naphthalene	mg/kg	105486-11	<0.1 <0.1	105486-2	99%
Acenaphthylene	mg/kg	105486-11	<0.1 <0.1	[NR]	[NR]
Acenaphthene	mg/kg	105486-11	<0.1 <0.1	[NR]	[NR]
Fluorene	mg/kg	105486-11	<0.1 <0.1	105486-2	105%
Phenanthrene	mg/kg	105486-11	<0.1 <0.1	105486-2	99%
Anthracene	mg/kg	105486-11	<0.1 <0.1	[NR]	[NR]
Fluoranthene	mg/kg	105486-11	0.1 <0.1	105486-2	99%
Pyrene	mg/kg	105486-11	0.1 0.1 RPD: 0	105486-2	102%
Benzo(a)anthracene	mg/kg	105486-11	<0.1 <0.1	[NR]	[NR]
Chrysene	mg/kg	105486-11	<0.1 <0.1	105486-2	92%

Client Reference: P1404106JCOC01V01, Ingleside

QUALITY CONTROL PAHs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Benzo(b+k)fluoranthene	mg/kg	105486-11	<0.2 <0.2	[NR]	[NR]
Benzo(a)pyrene	mg/kg	105486-11	0.07 0.07 RPD: 0	105486-2	95%
Indeno(1,2,3-c,d)pyrene	mg/kg	105486-11	<0.1 <0.1	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	105486-11	<0.1 <0.1	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	105486-11	<0.1 <0.1	[NR]	[NR]
Surrogate p-Terphenyl-d14	%	105486-11	100 92 RPD: 8	105486-2	102%
QUALITY CONTROL Acid Extractable metals in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date digested	-	105486-11	24/02/2014 24/02/2014	105486-2	24/02/2014
Date analysed	-	105486-11	24/02/2014 24/02/2014	105486-2	24/02/2014
Arsenic	mg/kg	105486-11	<4 <4	105486-2	92%
Cadmium	mg/kg	105486-11	<0.4 <0.4	105486-2	94%
Chromium	mg/kg	105486-11	15 16 RPD: 6	105486-2	97%
Copper	mg/kg	105486-11	6 7 RPD: 15	105486-2	108%
Lead	mg/kg	105486-11	22 26 RPD: 17	105486-2	102%
Mercury	mg/kg	105486-11	<0.1 <0.1	105486-2	105%
Nickel	mg/kg	105486-11	3 3 RPD: 0	105486-2	92%
Zinc	mg/kg	105486-11	27 30 RPD: 11	105486-2	91%
QUALITY CONTROL vTRH(C6-C10)/BTEXN in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD		
Date extracted	-	105486-21	24/02/2014 24/02/2014		
Date analysed	-	105486-21	26/02/2014 26/02/2014		
TRHC ₆ - C ₉	mg/kg	105486-21	<25 <25		
TRHC ₆ - C ₁₀	mg/kg	105486-21	<25 <25		
Benzene	mg/kg	105486-21	<0.2 <0.2		
Toluene	mg/kg	105486-21	<0.5 <0.5		
Ethylbenzene	mg/kg	105486-21	<1 <1		
m+p-xylene	mg/kg	105486-21	<2 <2		
o-Xylene	mg/kg	105486-21	<1 <1		
naphthalene	mg/kg	105486-21	<1 <1		
Surrogate aaa-Trifluorotoluene	%	105486-21	88 104 RPD: 17		

QUALITY CONTROL svTRH (C10-C40) in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD
Date extracted	-	105486-21	24/02/2014 24/02/2014
Date analysed	-	105486-21	24/02/2014 24/02/2014
TRHC ₁₀ - C ₁₄	mg/kg	105486-21	<50 <50
TRHC ₁₅ - C ₂₈	mg/kg	105486-21	340 260 RPD: 27
TRHC ₂₉ - C ₃₆	mg/kg	105486-21	850 850 RPD: 0
TRH>C ₁₀ -C ₁₆	mg/kg	105486-21	<50 <50
TRH>C ₁₆ -C ₃₄	mg/kg	105486-21	920 820 RPD: 11
TRH>C ₃₄ -C ₄₀	mg/kg	105486-21	980 1100 RPD: 12
Surrogate o-Terphenyl	%	105486-21	93 93 RPD: 0
QUALITY CONTROL PAHs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD
Date extracted	-	105486-21	24/02/2014 24/02/2014
Date analysed	-	105486-21	25/02/2014 25/02/2014
Naphthalene	mg/kg	105486-21	<0.1 <0.1
Acenaphthylene	mg/kg	105486-21	0.3 0.3 RPD: 0
Acenaphthene	mg/kg	105486-21	<0.1 <0.1
Fluorene	mg/kg	105486-21	<0.1 0.2
Phenanthrene	mg/kg	105486-21	3.1 3.8 RPD: 20
Anthracene	mg/kg	105486-21	0.7 0.6 RPD: 15
Fluoranthene	mg/kg	105486-21	10 9.4 RPD: 6
Pyrene	mg/kg	105486-21	9.8 9.0 RPD: 9
Benzo(a)anthracene	mg/kg	105486-21	5.3 3.9 RPD: 30
Chrysene	mg/kg	105486-21	4.4 3.3 RPD: 29
Benzo(b+k)fluoranthene	mg/kg	105486-21	9.8 7.2 RPD: 31
Benzo(a)pyrene	mg/kg	105486-21	6.2 4.6 RPD: 30
Indeno(1,2,3-c,d)pyrene	mg/kg	105486-21	3.4 2.4 RPD: 34
Dibenzo(a,h)anthracene	mg/kg	105486-21	0.5 0.4 RPD: 22
Benzo(g,h,i)perylene	mg/kg	105486-21	3.4 2.4 RPD: 34
Surrogate p-Terphenyl-d14	%	105486-21	103 106 RPD: 3

QUALITY CONTROL Acid Extractable metals in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD
Date digested	-	105486-21	24/02/2014 24/02/2014
Date analysed	-	105486-21	24/02/2014 24/02/2014
Arsenic	mg/kg	105486-21	<4 <4
Cadmium	mg/kg	105486-21	<0.4 <0.4
Chromium	mg/kg	105486-21	11 11 RPD: 0
Copper	mg/kg	105486-21	29 30 RPD: 3
Lead	mg/kg	105486-21	26 19 RPD: 31
Mercury	mg/kg	105486-21	<0.1 <0.1
Nickel	mg/kg	105486-21	24 20 RPD: 18
Zinc	mg/kg	105486-21	40 35 RPD: 13

Report Comments:

Asbestos ID was analysed by Approved Identifier: Not applicable for this job
 Asbestos ID was authorised by Approved Signatory: Not applicable for this job

INS: Insufficient sample for this test	PQL: Practical Quantitation Limit	NT: Not tested
NA: Test not required	RPD: Relative Percent Difference	NA: Test not required
<: Less than	>: Greater than	LCS: Laboratory Control Sample

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.

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 and 10-140% for SVOC 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.

Project										
Name		Contamination Assessment: 11 Addison Rd, Ingleside								
Martens Contact Officer		Ben Rose		Contact Email		brose@martens.com.au				
Sampling and Shipping		Sample Date	20.02.2014		Dispatch Date	04.03.2014		Turnaround Time		
		Our Reference	P1404106JOC02V01				Standard			
		On Ice (X)	X	No Ice (X)		Other (X)		Shipping Method (X)	Hand	Post
Laboratory										
Name		Envirolab Services P/L								
Sample Delivery Address		12 Ashley St, Chatswood								
Delivery Contact		Name	Aileen Hie		Phone	02 9910 6200		Fax		
Please Send Report By (X)		Post		Fax		Email	X	Reporting Email Address	brose@martens.com.au and CC gtaylor@martens.com.au	
								Email	ahie@envirolabservices.com.au	

Note - please await confirmation prior to testing. We are hoping to get this from Client today (04.03.2014).

Sample ID	Benzo(a) pyrene TCIP	PAH	TRH	Sample location
4106/105/0.2	X			Envirolab - certificate of analysis 105486
4106/112/0.05	X			Envirolab - certificate of analysis 105486
4106/116/0.05	X			Envirolab - certificate of analysis 105486
4106/116/0.2	X			Envirolab - certificate of analysis 105486
4106/117/0.1	X			Envirolab - certificate of analysis 105486
4106/117/0.5	X			Envirolab - certificate of analysis 105486
4106/120/0.5	X			Envirolab - certificate of analysis 105486
4106/122/0.05	X			Envirolab - certificate of analysis 105486
4106/123/0.05	X			Envirolab - certificate of analysis 105486
4106/122/0.2		X	X	Sent to envirolab with this COC
4106/120/0.05	X			Sent to envirolab with this COC

105486 A
sent to A
due 1/3

you guys
already have this
sample

CERTIFICATE OF ANALYSIS

105486-A

Client:

Martens & Associates Pty Ltd
6/37 Leighton Place
Hornsby
NSW 2077

Attention: Ben Rose

Sample log in details:

Your Reference:	<u>P1404106JCOC01V01, Ingleside</u>
No. of samples:	Additional testing on soils
Date samples received / completed instructions received	21/02/14 / 04/03/14

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: / Issue Date:	11/03/14 / 7/03/14
Date of Preliminary Report:	None Issued

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Accredited for compliance with ISO/IEC 17025. **Tests not covered by NATA are denoted with *.**

Results Approved By:



Jacinta Hurst
Laboratory Manager

PAHs in TCLP (USEPA 1311)						
Our Reference:	UNITS	105486-A-12	105486-A-13	105486-A-14	105486-A-15	105486-A-17
Your Reference	-----	4106/116	4106/116	4106/117	4106/117	4106/120
Depth	-----	0.05	0.2	0.1	0.5	0.5
Date Sampled		20/02/2014	20/02/2014	20/02/2014	20/02/2014	20/02/2014
Type of sample		soil	soil	soil	soil	soil
pH of soil for fluid# determ.	pH units	9.3	9.5	7.9	7.8	7.9
pH of soil for fluid # determ. (acid)	pH units	1.7	1.8	1.7	1.7	1.7
Extraction fluid used	-	1	1	1	1	1
pH of final Leachate	pH units	5.0	5.0	5.0	5.0	5.0
Date extracted	-	06/03/2014	06/03/2014	06/03/2014	06/03/2014	06/03/2014
Date analysed	-	06/03/2014	06/03/2014	06/03/2014	06/03/2014	06/03/2014
Naphthalene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Acenaphthylene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Acenaphthene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Fluorene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Phenanthrene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Anthracene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Fluoranthene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Pyrene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Benzo(a)anthracene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Chrysene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Benzo(b+k)fluoranthene in TCLP	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002
Benzo(a)pyrene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Indeno(1,2,3-c,d)pyrene - TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Dibenzo(a,h)anthracene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Benzo(g,h,i)perylene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Total +ve PAH's	mg/L	NIL (+)VE	NIL (+)VE	NIL (+)VE	NIL (+)VE	NIL (+)VE
Surrogate p-Terphenyl-d14	%	107	100	126	85	92

PAHs in TCLP (USEPA 1311)			
Our Reference:	UNITS	105486-A-20	105486-A-21
Your Reference	-----	4106/122	4106/123
Depth	-----	0.05	0.05
Date Sampled		20/02/2014	20/02/2014
Type of sample		soil	soil
pH of soil for fluid# determ.	pH units	7.8	9.0
pH of soil for fluid # determ. (acid)	pH units	1.7	1.7
Extraction fluid used	-	1	1
pH of final Leachate	pH units	5.0	5.0
Date extracted	-	06/03/2014	06/03/2014
Date analysed	-	06/03/2014	06/03/2014
Naphthalene in TCLP	mg/L	<0.001	<0.001
Acenaphthylene in TCLP	mg/L	<0.001	<0.001
Acenaphthene in TCLP	mg/L	<0.001	<0.001
Fluorene in TCLP	mg/L	<0.001	<0.001
Phenanthrene in TCLP	mg/L	<0.001	<0.001
Anthracene in TCLP	mg/L	<0.001	<0.001
Fluoranthene in TCLP	mg/L	0.002	<0.001
Pyrene in TCLP	mg/L	0.001	<0.001
Benzo(a)anthracene in TCLP	mg/L	<0.001	<0.001
Chrysene in TCLP	mg/L	<0.001	<0.001
Benzo(b+k)fluoranthene in TCLP	mg/L	<0.002	<0.002
Benzo(a)pyrene in TCLP	mg/L	<0.001	<0.001
Indeno(1,2,3-c,d)pyrene - TCLP	mg/L	<0.001	<0.001
Dibenzo(a,h)anthracene in TCLP	mg/L	<0.001	<0.001
Benzo(g,h,i)perylene in TCLP	mg/L	<0.001	<0.001
Total +ve PAH's	mg/L	0.0030	NIL (+)VE
Surrogate p-Terphenyl-d14	%	101	101

Method ID	Methodology Summary
Inorg-004	Toxicity Characteristic Leaching Procedure (TCLP) using AS 4439 and USEPA 1311 and in house method INORG-004.
EXTRACT.7	Toxicity Characteristic Leaching Procedure (TCLP).
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA 22nd ED, 4500-H+.
Org-012 subset	Leachates are extracted with Dichloromethane and analysed by GC-MS.
Org-012 subset	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.
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS.

QUALITY CONTROL PAHs in TCLP (USEPA 1311)	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			06/03/2014	[NT]	[NT]	LCS-W3	06/03/2014
Date analysed	-			06/03/2014	[NT]	[NT]	LCS-W3	06/03/2014
Naphthalene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	LCS-W3	82%
Acenaphthylene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Acenaphthene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Fluorene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	LCS-W3	88%
Phenanthrene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	LCS-W3	89%
Anthracene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Fluoranthene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	LCS-W3	84%
Pyrene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	LCS-W3	88%
Benzo(a)anthracene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Chrysene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	LCS-W3	83%
Benzo(b+k)fluoranthene in TCLP	mg/L	0.002	Org-012 subset	<0.002	[NT]	[NT]	[NR]	[NR]
Benzo(a)pyrene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	LCS-W3	93%
Indeno(1,2,3-c,d)pyrene -TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Dibenzo(a,h)anthracene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Benzo(g,h,i)perylene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Surrogate p-Terphenyl-d14	%		Org-012	98	[NT]	[NT]	LCS-W3	97%

Report Comments:

sample 1 and 7: TCLP not conducted as per phone conversation.

Asbestos ID was analysed by Approved Identifier:	Not applicable for this job
Asbestos ID was authorised by Approved Signatory:	Not applicable for this job

INS: Insufficient sample for this test	PQL: Practical Quantitation Limit	NT: Not tested
NA: Test not required	RPD: Relative Percent Difference	NA: Test not required
<: Less than	>: Greater than	LCS: Laboratory Control Sample

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.

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 and 10-140% for SVOC 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.

CERTIFICATE OF ANALYSIS

105486-B

Client:

Martens & Associates Pty Ltd
6/37 Leighton Place
Hornsby
NSW 2077

Attention: Ben Rose

Sample log in details:

Your Reference:	<u>P1404106JCOC01V01, Ingleside</u>
No. of samples:	Additional testing on soils
Date samples received / completed instructions received	21/02/14 / 04/03/14

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: / Issue Date:	13/03/14 / 13/03/14
Date of Preliminary Report:	None Issued

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Accredited for compliance with ISO/IEC 17025. **Tests not covered by NATA are denoted with *.**

Results Approved By:



Jacinta Hurst
Laboratory Manager

PAHs in TCLP (USEPA 1311)			
Our Reference:	UNITS	105486-B-1	105486-B-7
Your Reference	-----	4106/105	4106/112
Depth	-----	0.2	0.05
Date Sampled		20/02/2014	20/02/2014
Type of sample		soil	soil
pH of soil for fluid# determ.	pH units	9.3	9.6
pH of soil for fluid # determ. (acid)	pH units	1.8	1.7
Extraction fluid used	-	1	1
pH of final Leachate	pH units	6.3	5.2
Date extracted	-	13/03/2014	13/03/2014
Date analysed	-	13/03/2014	13/03/2014
Naphthalene in TCLP	mg/L	<0.001	<0.001
Acenaphthylene in TCLP	mg/L	<0.001	<0.001
Acenaphthene in TCLP	mg/L	<0.001	<0.001
Fluorene in TCLP	mg/L	<0.001	<0.001
Phenanthrene in TCLP	mg/L	<0.001	<0.001
Anthracene in TCLP	mg/L	<0.001	<0.001
Fluoranthene in TCLP	mg/L	<0.001	<0.001
Pyrene in TCLP	mg/L	<0.001	<0.001
Benzo(a)anthracene in TCLP	mg/L	<0.001	<0.001
Chrysene in TCLP	mg/L	<0.001	<0.001
Benzo(b+k)fluoranthene in TCLP	mg/L	<0.002	<0.002
Benzo(a)pyrene in TCLP	mg/L	<0.001	<0.001
Indeno(1,2,3-c,d)pyrene - TCLP	mg/L	<0.001	<0.001
Dibenzo(a,h)anthracene in TCLP	mg/L	<0.001	<0.001
Benzo(g,h,i)perylene in TCLP	mg/L	<0.001	<0.001
Total +ve PAH's	mg/L	NIL (+)VE	NIL (+)VE
Surrogate p-Terphenyl-d14	%	120	102

Method ID	Methodology Summary
Inorg-004	Toxicity Characteristic Leaching Procedure (TCLP) using AS 4439 and USEPA 1311 and in house method INORG-004.
EXTRACT.7	Toxicity Characteristic Leaching Procedure (TCLP).
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA 22nd ED, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Org-012 subset	Leachates are extracted with Dichloromethane and analysed by GC-MS.
Org-012 subset	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.
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS.

QUALITY CONTROL PAHsinTCLP (USEPA 1311)	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			13/03/2014	[NT]	[NT]	LCS-W1	13/03/2014
Date analysed	-			13/03/2014	[NT]	[NT]	LCS-W1	13/03/2014
Naphthalene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	LCS-W1	105%
Acenaphthylene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Acenaphthene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Fluorene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	LCS-W1	118%
Phenanthrene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	LCS-W1	114%
Anthracene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Fluoranthene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	LCS-W1	111%
Pyrene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	LCS-W1	116%
Benzo(a)anthracene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Chrysene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	LCS-W1	98%
Benzo(b+k)fluoranthene in TCLP	mg/L	0.002	Org-012 subset	<0.002	[NT]	[NT]	[NR]	[NR]
Benzo(a)pyrene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	LCS-W1	118%
Indeno(1,2,3-c,d)pyrene -TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Dibenzo(a,h)anthracene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Benzo(g,h,i)perylene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Surrogate <i>p</i> -Terphenyl-d14	%		Org-012	85	[NT]	[NT]	LCS-W1	119%

Report Comments:

Asbestos ID was analysed by Approved Identifier: Not applicable for this job
 Asbestos ID was authorised by Approved Signatory: Not applicable for this job

INS: Insufficient sample for this test	PQL: Practical Quantitation Limit	NT: Not tested
NA: Test not required	RPD: Relative Percent Difference	NA: Test not required
<: Less than	>: Greater than	LCS: Laboratory Control Sample

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.

Laboratory Acceptance Criteria

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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 and 10-140% for SVOC 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.

Simon Song

From: Nancy Zhang
Sent: Monday, 17 March 2014 12:47 PM
To: Simon Song
Cc: Aileen Hie
Subject: FW: Results for registration '105486 - P1404106JCOC01V01, Ingleside'

Regards,

Nancy Zhang | Organics Section Supervisor | Envirolab Services Pty Ltd

Great Chemistry.Great Service

12 Ashley Street Chatswood NSW 2067
T 612 9910 6200 F 612 9910 6201
<mailto:nzhang@envirolab.com.au> | <http://www.envirolab.com.au>

-----Original Message-----

From: Gray Taylor [<mailto:GTaylor@martens.com.au>]
Sent: Friday, 14 March 2014 10:02 PM
To: Nancy Zhang; Ben Rose
Cc: Jacinta Hurst
Subject: RE: Results for registration '105486 - P1404106JCOC01V01, Ingleside'

Nancy

Please sample the following samples for asbestos in soil

1. 119/0.05 -16
2. 109/0.5 -3
3. 116/0.05 -12
4. 107/0.2 -2

105486 BC
me 19/3
2 days T/A

Please do 2 day turn around

Any questions please call me.

Martens & Associates Pty Ltd

Gray Taylor
Senior Engineer/Project Manager
BE Engineering

Martens & Associates Pty Ltd
Unit 6/37 Leighton Place
Hornsby, NSW 2077
P + 61 2 9476 9999

F + 61 2 9476 8767

M 0422 685 594

www.martens.com.au

This message is intended for the addressee named and may contain confidential / privileged information. If you are not the intended recipient, please delete it and notify the sender. Views expressed in this message are those of the individual sender, and are not necessarily the views of Martens & Associates Pty Ltd. You should scan any attached files for viruses.

-----Original Message-----

From: Nancy Zhang [<mailto:NZhang@envirolab.com.au>]

Sent: Friday, 28 February 2014 4:46 PM

To: Ben Rose; secretary

Subject: Results for registration '105486 - P1404106JCOC01V01, Ingleside'

Please refer to attached for:

a copy of the Certificate of Analysis

a copy of the Invoice

a copy of the COC

an excel file containing the results

Please note that a hard copy will not be posted.

Enquiries should be made directly to:

Jacinta Hurst on jhurst@envirolabservices.com.au or David Springer on dspringer@envirolabservices.com.au
or

Tania Notaras on tnotaras@envirolabservices.com.au

Regards

Envirolab Services

12 Ashley St Chatswood NSW 2067

ph 02 9910 6200 fax 02 9910 6201

www.envirolabservices.com.au

Regards,

Nancy Zhang | Organics Section Supervisor | Envirolab Services Pty Ltd

Great Chemistry.Great Service

12 Ashley Street Chatswood NSW 2067

T 612 9910 6200 F 612 9910 6201

nzhang@envirolab.com.au | www.envirolab.com.au

CERTIFICATE OF ANALYSIS

105486-C

Client:

Martens & Associates Pty Ltd
6/37 Leighton Place
Hornsby
NSW 2077

Attention: Ben Rose

Sample log in details:

Your Reference:	<u>P1404106JCOC01V01, Ingleside</u>
No. of samples:	Additional testing on soils
Date samples received / completed instructions received	21/02/14 / 17/03/14

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: / Issue Date:	19/03/14 / 19/03/14
Date of Preliminary Report:	None Issued

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Accredited for compliance with ISO/IEC 17025. **Tests not covered by NATA are denoted with *.**

Results Approved By:



Jacinta Hurst
Laboratory Manager

Asbestos ID - soils					
Our Reference:	UNITS	105486-C-2	105486-C-3	105486-C-12	105486-C-16
Your Reference	-----	4106/107	4106/109	4106/116	4106/119
Depth	-----	0.2	0.5	0.05	0.05
Date Sampled		20/02/2014	20/02/2014	20/02/2014	20/02/2014
Type of sample		soil	soil	soil	soil
Date analysed	-	19/03/2014	19/03/2014	19/03/2014	19/03/2014
Sample mass tested	g	Approx 40g	Approx 40g	Approx 40g	Approx 40g
Sample Description	-	Orange sandy soil	Light brown sandy soil	Dark brown sandy soil	Beige sandy soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg
Trace Analysis	-	No respirable fibres detected	No respirable fibres detected	No respirable fibres detected	No respirable fibres 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.

Report Comments:

Asbestos: A portion of the supplied sample was sub-sampled for asbestos analysis according to Envirolab procedures. We cannot guarantee that this sub-sample is indicative of the entire sample. Envirolab recommends supplying 40-50g of sample in its own container.

Asbestos ID was analysed by Approved Identifier:
Asbestos ID was authorised by Approved Signatory:

Matt Mansfield
Paul Ching

INS: Insufficient sample for this test
NA: Test not required
<: Less than

PQL: Practical Quantitation Limit
RPD: Relative Percent Difference
>: Greater than

NT: Not tested
NA: Test not required
LCS: Laboratory Control Sample

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.

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 and 10-140% for SVOC 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.

15 **Attachment E – Data Validation Report**

DATA VALIDATION REPORT:

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

Hold time was not met for 2 samples due to samples being misplaced by the laboratory. Results for the analytes were non detect and therefore results are considered appropriate for use.

Sample handling is:

- ✓ Satisfactory
- Partially Satisfactory
- Unsatisfactory

DATA VALIDATION REPORT:

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:

3. Field Quality Assurance / Quality Control (QA/QC)

	Media	Number
a. Number of Primary Samples analysed (does not include duplicates)	Soil:	23
	Water:	-
b. Number of days of sampling		1
c. Number and Type of QA/QC Samples analysed		
Intra-Laboratory Field Duplicates	Soil	2
Inter-Laboratory Field triplicates	Water	0
Trip Blanks		1
Wash Blanks		0
Other (Field Blanks, Trip Spikes etc.)		1

Field Duplicates

	Yes	No (Comments below)
Adequate Numbers of intra-laboratory field duplicates analysed?	✓	
Adequate Numbers of inter-laboratory field duplicates analysed?	✓	
Were RPDs within Control Limits?		
i. Organics ($\pm 50\%$)		N/A
ii. Metals / Inorganics ($\pm 50\%$)		✓
iii. Nutrients ($\pm 50\%$)		N/A

COMMENTS

50% threshold exceeded for lead, zinc and nickel. However, all results at concentrations well below soil assessment criteria and therefore data is considered directly useable.

DATA VALIDATION REPORT:

4. Field Quality Assurance / Quality Control (QA/QC) - Continued

Trip Blank / Wash Blanks

Were Adequate Numbers of trip blanks analysed?

✓

Were Adequate Numbers of wash blanks analysed?

NA

Were the Trip Blanks free of contaminants?

✓

Were the Wash Blanks free of contaminants?

(If no, comment whether the contaminants present are also detected in the samples and whether they are common laboratory chemicals.)

NA

COMMENTS

Trip Spikes

Were adequate numbers of Trip Spikes analysed?

✓

Were the Trip Spike results within control limits?

✓

COMMENTS

Field QA/QC:

✓

Satisfactory

Partially
Satisfactory

Unsatisfactory

DATA VALIDATION REPORT:

5. Laboratory Internal Quality Assurance / Quality Control (QA/QC) Procedures

a. Type and Number of QA/QC Samples

QA/QC Type	Yes	No
Laboratory Blanks/Reagent Blanks (at least 1 per batch)	✓	
Matrix Spikes/Matrix Spike Duplicates (1 for each soil type)	✓	
Laboratory Control Samples	✓	
Laboratory Duplicates (at least one per batch or 1 per 10 samples, whichever is smaller)	✓	
Surrogates (where appropriate) ¹	✓	

¹ Number of surrogate spikes carried out on each sample

- b. Were the laboratory blanks/reagents blanks free of contamination?
- c. Were the spike recoveries within control limits?
- d. Were the RPDs of the laboratory duplicates within control limits?
- i. Organics (+-50 %)
- ii. Metals / Inorganics (+-50 %)
- e. Were the surrogate recoveries within control limits?

Yes	No (Comments below)
✓	
✓	
	✓
	✓
✓	

COMMENTS

Inter-laboratory RPD for Acenaphthylene (86%) and Mercury (67%) exceeded control limits. Levels for both were low and well below site assessment criteria therefore this variability is considered acceptable and does not affect the suitability of data for use.

Laboratory internal QA / QC is: ✓ **Satisfactory**

Partially Satisfactory

Unsatisfactory

DATA VALIDATION REPORT:

6. 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	✓		

iv. Data Usability

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

✓

COMMENTS

16 Attachment F – Relative Percentage Differences (RPDs)

Supplementary Stage 1 and 2 ESA: Relative Percentage Difference (RPD)

LOR ¹		Primary	Intra-laboratory	RPD (%)	Primary	Intra-laboratory	RPD (%)		
		4106/115/1.0	4106/DUPB1		4106/120/0.5	4106/DUPB2			
		Soil	Soil		Soil	Soil			
BTEX									
Benzene	<0.2								
Toluene	<0.5								
Ethylbenzene	<0.5								
Total Xylene	<1								
Total Recoverable Hydrocarbons									
TPH C ₆ - C ₉	<10								
TPH C ₁₀ - C ₁₄	<50								
TPH C ₁₅ - C ₂₈	<100								
TPH C ₂₉ - C ₃₆	<100								
Total TPH C ₁₀ - C ₃₆	<250								
Polyaromatic Hydrocarbons									
Benzo[a]pyrene	<0.05								
Total PAH	<0.5								
Heavy Metals									
Arsenic	<4	7	5	33	<4	<4	NA		
Cadmium	<0.5	<0.4	<0.4	NA	<0.4	<0.4	NA		
Chromium (III)	<1	14	21	-40	3	4	-29		
Copper	<1	22	18	20	2	3	-40		
Lead	<1	35	63	-57	2	3	-40		
Mercury	<0.1	<0.1	0.2	NA	<0.1	<0.1	NA		
Nickel	<1	4	6	-40	1	2	-67		
Zinc	<1	51	94	-59	4	5	-22		

Note:
¹ Limit of Reporting
All results in mg/kg unless otherwise noted