

Precise Planning

Detailed Site Investigation:
45 Noongah Street and 25 Gwynn
Hughes Road, Bargo, 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), for Precise Planning documents a Detailed Site Investigation (DSI) completed for 45 Noongah Street and 25 Gwynn Hughes Road, Bargo, NSW (the site).

A Preliminary Site Investigation (PSI) was completed by MA (MA, 2015) and should be read in conjunction with this report.

1.2 Objectives

The objectives of the DSI is to investigate data gaps noted in PSI, assess site contamination status and determine suitability for site redevelopment for residential land use.

1.3 Scope of Works

The scope of works includes:

- Assessment of historic information data gaps outlined in MA (2015).
- Intrusive soil investigation and soil sampling for laboratory analysis, targeting areas of environmental concern (AEC) as outlined in MA (2015).
- Preparation of a report in general accordance with the relevant sections of ASC NEPM (1999, amended 2013), NSW OEH (2011) and DEC (2006).

1.4 Reference Guidelines

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

- NSW OEH (2011) Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites.
- NSW DEC (2005) Guidelines for Assessing Former Orchards and Market Gardens.
- NSW DEC (2006) 2nd Ed. Contaminated Sites: Guidelines for the NSW Site Auditor Scheme.

- o NEPC (1999, amended 2013) National Environmental Protection Measure, (NEPM 1999, amended 2013).

1.5 Abbreviations

ABC – Ambient background concentrations

ACM – Asbestos containing material

AEC – Area of environmental concern

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

BTEX – Benzene, toluene, ethyl benzene, xylene

BGL – Below ground level

CEC – Cation exchange capacity

COPC – Chemical of primary concern

CSM – Conceptual site model

DEC – NSW Department of Environment and Conservation

DQO – Data quality objectives

DP – Deposited Plan

DSI – Detailed Site Investigation

EAC - Ecological assessment criteria

EPA – NSW Environmental Protection Authority

ESA – Environmental site assessment

ESL - Ecological screening levels

HIL – Health investigation levels

HM – Heavy metals

HSL – Health screening levels

LOR – Limit of reporting

LGA – Local government area

MA – Martens and Associates Pty Ltd

mBGL – Metres below ground level

NATA – National Association of Testing Authorities

NEPM – National Environmental Protection Measure

OCP – Organochloride pesticides

OEH – NSW Office of Environment and Heritage

OPP – Organophosphate pesticides

PACM – Potential asbestos containing material

PAH – Polycyclic aromatic hydrocarbons

PCB – Polychlorinated biphenyl

PSI – Preliminary site investigation

RAP – Remediation action plan

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

SAC – Site acceptance criteria

SOP – Standard operating procedure

TB – Trip blank

TRH – Total recoverable hydrocarbons

TS – Trip spike

2 Site Background Information

2.1 Location and Setting

Site information is summarised in Table 1.

Table 1: Site background information.

Item	Description/Detail
Site address	45 Noongah Street and 25 Gwynn Hughes Street, Bargo, NSW
Lot/DP	Lot 22 DP 619150 and Lot 95 DP 13116
Site area	Approximately 20.7 ha
Investigation area	Entire site
Existing site development	Both lots are rural residential properties with no existing site infrastructure
Aspect	Generally east
Typical slopes	<5 %
Existing vegetation	Lot 22 is vegetated along the watercourse corridor in the south western portion of the lot, with the remainder of the lot grassed paddock. Lot 95 is mainly vegetated
Neighbouring environments	The site is surrounded by rural residential allotments to the north and residential lots to the east. Bushland to the west and south
Local Government Area (LGA)	Wollondilly Shire Council
Drainage	Hornes Creek, which forms a major tributary of the Bargo River, bisects the site and flows in a northerly direction An east west orientated drainage depression, located in the eastern portion of the site, flows into Hornes Creek

Item	Description/Detail
Geology and soil landscapes	The Wollongong Port Hacking 1:100,000 Geological Series Sheet (1985) describes the geology being at the boundary of Wianamatta Group and Hawkesbury Sandstone. Wianamatta Group consisting of laminate and dark-grey siltstone. Hawkesbury Sandstone consisting of medium to coarse-grained quartz sandstone, very minor shale and laminate lenses The NSW Environment and Heritage eSPADE website identifies the north eastern portion of the site as having soils of the Blacktown soil landscapes consisting of shallow to moderately deep hardsetting mottled texture contrast soils, red and brown podzolic soils on crests grading to yellow podzic soils on lower slopes and in drainage lines. The remainder of the site is identified as having Lucas Heights soil landscapes consisting of moderately deep hardsetting yellow podzolic soils and yellow soloths on ridges and plateau surfaces and earthy sands in valley flats
Environmental receptors	Hornes Creek and drainage depression located in the eastern portion of the site
Human receptors	Existing surrounding residential and rural residential developments Future residents and site workers / builders

2.2 Hydrogeology

Review of NSW Office of Water's Real Time groundwater database indicated one groundwater bore located within approximately 1 km of the site (Table 2).

Table 2: Available hydrogeological information.

Groundwater Bore Identification	Distance/ Orientation From Site	Depth To Groundwater (mbgl)	Intended Use	Water Bearing Zone Substrates
GW112473	0.65km south	42.0	Irrigation	Sandstone

From review of the information in Table 2, groundwater well in the vicinity is used for irrigation purposes with groundwater levels approximately 42.0 m below ground level (mbgl). Groundwater levels are likely to be indicative of the site as site elevation and topographic units are similar; however, further investigation would be required to characterise site hydrogeology.

Groundwater was encountered in TP310 to TP315 in the western portion of the site, with measured groundwater levels ranging from 0.7 to 1.1 mbgl.

3 Preliminary Conceptual Site Model

3.1 Overview

The summary of the PSI MA (2015) has been used as the preliminary conceptual site model (CSM). Historical data gaps noted in Chapter 5 of that report are to be assessed as part of this DSI.

3.2 Summary of PSI Findings

The following summarises the PSI (MA, 2015) general findings.

- Both lots are vacant with no existing site infrastructure. Sheds and dwellings on Lot 22 have recently been demolished and cleared, in accordance with DA 010.2015.00000095.001 (March 2015).
- Remains of metal and timber shed in north western portion of Lot 95.
- Development applications were approved for free range chicken farming (1987) and a chicken processing plant (1988) on Lot 22. These operations have been terminated, with all infrastructure removed sometime after February 2010.
- Former dwelling and shed construction and maintenance on both lots have the potential to have introduced contaminants in the form of asbestos (as a construction material or possible floor insulation for chicken sheds), pesticides (pest control) and heavy metals (paints, pest control). Former sheds may previously have stored fuel, oils or other chemicals, leading to hydrocarbon, OCP/OPP and heavy metal contamination.
- Localised fill importation may also have occurred during the long history of rural land use and may have introduced site contaminants. Potential fill was observed near the location of the former chicken processing plant near the western boundary of Lot 22.
- Past agricultural use, possible use of Lot 22 for irrigation of liquid waste from the chicken processing plant have potential to have caused widespread contamination with heavy metals and pesticides.
- Possible burial of solid waste for chicken processing plant.

- Coal wash with blue metal gravel (likely used as fill) near location of former chicken processing plant near the western boundary of Lot 22.
- Lot 95 is heavily vegetated. Lot 22 is primarily vegetated near the Homes Creek corridor and in the south western portion of the site. The remainder of Lot 22 is grassed.

The PSI recommended that further searches of Council and EPA (successor of SPCC) records be undertaken to determine if chicken processing plant utilised onsite waste (liquid or solid) disposal. In addition, a review of all available aerial photographs between 1987 and 1998 was recommended to be undertaken to identify any evidence of waste irrigation or burial pits.

3.3 Supplementary Historical Investigation

3.3.1 Detailed Aerial Photograph Interpretation

An additional 3 aerial photographs taken of the site during 1990, 1994 and 1998 were reviewed to identify any evidence of waste irrigation or burial pits. Copies of aerial photographs are provided in Attachment C.

Photos indicate no evidence of site waste (liquid or solid) disposal.

3.3.2 EPA/Council Records Search

A letter from the SPCC regarding the development application for the chicken processing plant was identified during the EPA and Council records search. The letter stated the applicant would require formal approval from the Commission under Section 17R of the State Pollution Control Commission Act for the "installation and disposal of waste water" (SPCC ref. 150.649 GD:TG) arising from the chicken processing plant. A copy of the letter is provided in Attachment D.

Investigations and requests made to NSW EPA by MA resulted in no finding of formal approval for onsite waste disposal arising from the chicken processing plant.

3.4 Areas of Environmental Concern (AEC) and Contaminants of Primary Concern (COPC) Assessed During DSI Works

The PSI findings and supplementary historical investigations have identified AECs and associated COPC summarised in Table 3.

Table 3: Site AEC and COPC.

AEC ¹	Potential for Contamination	COPC	Contamination Likelihood
A – Former dwellings/sheds	Pesticides and heavy metals may have been used underneath dwellings and/or sheds for pest control. Dwelling and/or shed construction may have included ACM and/or lead based paints. Sheds may have previously stored fuel, oils, asbestos sheeting (PACM) or pesticides.	HM, TPH, BTEX, PAH, OCP/OPP and asbestos.	Medium - high
B – Potential site filling	Fill material of unknown origin and quality.	HM, TRH, BTEX, PAH, OCP/OPP and asbestos.	Medium
C – Cleared site areas	Past agricultural use, most likely grazing.	HM and OCP/OPP.	Low
D – Lot 22	Processing plant approval notes the irrigation of liquid waste on to land is approved subject to SPCC license. No detail is available regarding this operation. Waste irrigation may have led to contamination with agricultural chemicals (primarily HM) and nutrients (which are not "contaminants" considered in a PSI).	HM.	Low (based on updated historical investigations)
E – Buried pits	DA 63/88 notes burial of solid waste may occur with written Council approval. If this occurred, there is a risk of localised contamination depending on the nature of burial waste. The scale of any such buried pits are likely to be small and shall be difficult to identify without further site evidence of location.	HM, OCP/OPP, TRH, BTEX and PAH.	Low (based on updated historical investigations)

3.5 Sensitive Receptors and Exposure Pathways

Table 4 provides a summary of identified sensitive receptors and potential exposure pathways connecting receptors to identified AEC/COPC outlined in Table 3.

Table 4: Summary of receptors and potential pathways.

Receptor	Pathway
<u>Human Receptors:</u>	
o Future site occupants.	o Dermal contact.
o Site visitors.	o Ingestion of potentially contaminated soil.
o Site workers during any future construction works.	o Inhalation of airborne contaminants.
o Surrounding offsite occupants.	o Migration of pollutants via site surface and groundwaters.
<u>Environmental Receptors</u>	
o Homes Creek	o Migration of contaminated runoff.
o Existing vegetated areas across the site.	o Direct contact of soil with site flora.
o Vegetated or landscaped areas of any future site design plans.	

3.6 Data Gaps

The PSI (MA, 2015) recommended reviewing aerial photographs between 1987 and 1998 and further searches of Council and EPA records to determine if the chicken processing plant utilised onsite waste (liquid or solid) disposal. The Council/EPA records search and aerial photograph interpretation did not find any evidence of onsite waste (liquid or solid) disposal.

Based on identified AECs, COPC and potential pathways to receptors, a soil sampling regime is recommended in potential filled areas, under all dwelling and shed footprints (plus 1 m curtilage) and possibly across other site areas to characterise potential adverse human and environmental risks which may impact the proposed development. These investigations are documented in the next chapter of this report.

4 Field and Laboratory Investigations

4.1 Field Programme overview

Referencing the preliminary CSM (Section 3), a soil investigation program was planned to:

- Investigate the contamination status of areas associated with previous structures (being chicken processing plant, dwellings and sheds).
- Investigate identified potential hotspot areas of contamination from filling, stockpiles and possible burial of solid waste.

4.2 Intrusive Investigation Methodology

An overview of site investigation methodology is provided in Table 5.

Table 5: Investigation methodology.

Investigation date	10 September 2015.
Number of sampling points	20 test pits (18 test pit samples / 3 material samples / 16 asbestos in soil samples).
Investigation method	Excavator / hand spade.

Site sampling locations are presented in Figure 1, Attachment A with test pit logs provided in Attachment B.

4.3 Data Quality Objectives (DQO)

Data quality objectives (DQO) have been prepared as statements specifying qualitative and quantitative data required to support project decisions. DQO have been prepared in general accordance with NSW DEC (2006) and US EPA (2006) guidelines and are presented in Table 6.

Table 6: Data quality objectives for the assessment of soil investigations.

Step 1 Stating the Problem	The proposed site development will include residential land use with garden/accessible soil as well as open space land use. Therefore the site must be deemed suitable to accommodate proposed uses. This DSI is required to assess risk posed by potentially contaminated soil to onsite sensitive receptors.
Step 2 Identifying the Decision(s)	Historical investigations have identified AECs which may be the source of contamination including site filling, stockpiles, previous structures and possible burial of solid waste. To assess the suitability of the site for future residential and open space use, decisions are to be made based on the following questions: - o Is site soil quality suitable for the intended residential and open space land use? - o Do site soils require remediation or management to prior to onsite residential land use?
Step 3 Identification of Inputs to the Decision	The inputs to the assessment of site soil quality will include: - o Soil sampling at nominated locations (where access is available) across the site. - o Laboratory analytical results for relevant COPC for soil. - o Assessment of analytical results against site suitable human health and ecological risk criteria.
Step 4 Study Boundary Definitions	Study boundaries are as follows: - o Lateral – Lateral boundary of the assessment is defined by the site boundary as indicated in Figure 1 (Attachment A). - o Vertical – Vertical boundary will be governed by the maximum depth reached during subsurface investigations.
Step 5 Development of Decision Rules	The decision rule for this investigation area as follows: If the concentration of contaminants in the soils data exceeds the adopted assessment criteria; an assessment of the need to further investigate, remediate and or manage the onsite impacts in relation to the proposed development will be undertaken.
Step 6 Specification of Limits on Decision Errors	Guidance found in ASC NEPM (1999 amended 2013) Schedule B2 regarding 95% upper confidence limit (UCL) states that the 95% UCL of the arithmetic mean provides a 95% confidence level that the true population mean will be less than or equal to this value. Therefore a decision can be made based on a probability that 95% of the data collected will satisfy the site acceptance criteria. A limit on decision error will be 5% that a conclusive statement may be incorrect.
Step 7 Optimisation of Sampling Design	Proposed sampling locations shall provide even coverage across the site (with consideration to the existing development constraints). Sampling shall attempt to ensure that critical locations are assessed, sampled, and analysed for appropriate contaminants of concern. Soil sampling locations were set using judgement across the site (access permitting).

4.4 Sampling Methodology and Quality Assurance / Quality Control

Test pit samples were collected from the middle of a clod of soil removed with the excavator bucket or hand spade.

Soil sampling methodology (Table 7) was completed to meet data quality objectives.

Table 7: Soil sampling methodology.

Activity	Detail / Comments
Soil logging	Test pits were logged by an experienced environmental engineer in accordance with Martens and Associates SOP.
Soil sampling	Soil sampling was completed by the supervising environmental engineer from MA. Soil samples were collected from the centre of excavator bucket or hand spade. Each sample was placed into a laboratory-supplied, acid-rinsed 250mL glass jar, labelled with a unique identification number and no headspace to limit volatile loss. A clean pair of disposable gloves was used when handling each sample.
Soil screening	An assessment of VOC compounds with a PID was outside the scope of works
QA / QC sampling	Three duplicate samples were collected for intra-laboratory analysis. One trip blank (TB) and one trip spike (TS) sample was 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.
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 NATA-accredited laboratories under chain of custody documentation within holding times.
Decontamination of sampling equipment	Hand sampling equipment was decontaminated between sampling locations by pressurised water spray with a solution of Decon-90™, a phosphate-free detergent, followed by rinsing with potable water.

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

4.5 Laboratory Analytical Suite

The analytical suite for laboratory analysis (Table 8) was selected to address site AECs and potential COPC identified in the updated CSM (Chapter 3). Laboratory analysis was carried out by Envirolab Pty Ltd a NATA accredited laboratory. Laboratory analytical documentation is presented in Attachment F.

Table 8: Summary of primary laboratory analyses.

COC	Number of Samples Analysed
BTEX	15
TRH	15
PAH	15
Asbestos in soil	16
Heavy metals ¹	15
OCP/OPP	18

Note:

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

5 Assessment Criteria

5.1 Overview

The site assessment criteria (SAC) adopted for this DSI has been derived from the following sources:

- ASC NEPM (1999, amended 2013) National Environmental Protection (Assessment of Site Contamination) Measure (NEPM).
- Friebe & Nadebaum (2011) HSL for petroleum hydrocarbons in soil and groundwater, part 1 technical development document.

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

Table 9 summarises the applicability of the SAC adopted for this investigation.

Table 9: Summary of SAC.

SAC	Applicability
Health investigation levels (HIL)	Based on the proposed residential site use, HIL – A Residential with soil access (ASC NEPM 1999, amended 2013) have been adopted.
Health screening levels (HSL) for petroleum hydrocarbons	HSLs A – low density residential for sand (ASC NEPM 1999, amended 2013) have been adopted. Sand has been selected as it provides the most conservative screening level values. Soil sampled from former dwelling/shed locations consisted of silty sand and topsoil material. Soil HSL provide a preliminary assessment of human risk via inhalation of vapours from potential contamination. For this purpose HSL A criteria are considered appropriate.
Direct contact petroleum hydrocarbon HSL	Direct contact HSL have been adopted from Friebe & Nadebaum (2011) and provide assessment criteria for human health risk where direct contact with TPH contaminated soil is likely.

SAC	Applicability
Ecological assessment criteria (EAC)	A preliminary assessment of ecological risk has been undertaken with reference to ecological screening levels (ESL). ESL apply principally to contamination contained in the top 2m of soil. ESLs for course grained soils in urban residential and open spaces (ASC NEPM 1999, amended 2013) have been adopted as a conservative measure.
Ecological investigation levels (EILs)	Site EILs have been calculated using methodology outlined in ASC NEPM (1999, amended 2013). Added contaminant levels have been calculated using physicochemical properties of site soils (pH and CEC) from previous site laboratory testing undertaken by MA (2013) and ambient background concentrations (ABC) have been taken from Olszowy et al. (1995) for aged contamination in high traffic areas in NSW.
Asbestos in soil	Based on the preliminary nature of this assessment the 'presence/absence' of asbestos in soil has been adopted as the SAC.

5.2 Guideline Values for Contaminant Assessment

Guideline values used in this assessment are presented below.

5.2.1 Health Investigation Levels for Soil Assessment

Table 10: 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 ¹	3	0.5
Arsenic (total)	100	4.0
Cadmium	20	0.5
Chromium (VI)	100	1.0
Copper	6,000	1.0
Lead	300	1.0
Mercury	40	0.1
Nickel	400	1.0
Zinc	7,400	1.0
Vinyl Chloride	0.03	1.0

Contaminant of Concern	Adopted HIL (mg/kg)	LOR (mg/kg)
Total PAH	300	<2.55
Aldrin + Dieldrin	6	0.2
Chlordane	50	0.1
DDT+DDD+DDE	240	0.3
Heptachlor	6	0.1
PCB (total)	1	<0.7
MEK ³	44	<10.0
Styrene ⁴	120	<1.0
Toluene ⁴	223	<0.5
Trichlorofluoromethane ³	5.8	<1.0
Asbestos in soil	0.01% w/w ² bonded 0.001% w/w ² friable asbestos No visible asbestos on soil surface	0.01% w/w

Notes:

¹ Benzo(a)pyrene TEQ – HIL is based on 8 carcinogenic PAHs and their potency relative to Benzo(a)pyrene as outlined in the NEPM (1999, amended).

² W/W – Weight for weight, e.g. 0.1g/kg would equal 0.01% w/w.

³ SAC adopted from Canadian guidelines, Ministry of the Environment (2011) *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act*, Table 3.

⁴ SAC adopted from Dutch guidelines, (Esdat 2009) *Dutch Soil Remediation Circular 2009*, Table 1.

5.2.2 Health Screening Levels for Petroleum Hydrocarbon Compounds

Table 11: Residential soil HSLs for vapour intrusion in sand (mg/kg).

	0m – <1m	1m – <2m	2m – <4m	4m+	Soil Saturation Concentration (C _{sat}) ¹
Toluene	160	220	310	540	560
Ethylbenzene	57	NL	NL	NL	64
Xylenes	NL	NL	NL	NL	300
Naphthalene	NL	NL	NL	NL	9
Benzene	0.5	0.5	0.5	0.5	360
F1 (C₆ – C₁₀)	44	70	110	200	950
F2 (C₁₀ – C₁₆)	110	240	440	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)

Table 12: Direct contact TPH health screening levels (HSL) and laboratory LOR.

Contaminant of Concern	Soil Criteria (mg/kg)	LOR (mg/kg)
TPH (C ₆ -C ₁₀)	4,400	25
TPH(C ₁₀ -C ₁₆)	3,300	50
TPH (C ₁₆ -C ₃₄)	4,500	100
TPH (C ₃₄ – C ₄₀)	6,300	100
Benzene	100	0.2
Toluene	14,000	0.5
Ethyl benzene	4,500	1
Naphthalene	1,400	1
Xylene (total)	12,000	3

5.2.3 Ecological Screening Levels for Petroleum Hydrocarbon Compounds

Table 13: TPH and BTEX ecological screening levels (ESL) (for coarse grained soil) and LOR.

Contaminant of Concern	Soil Criteria (mg/kg)	LOR (mg/kg)
F1 (C ₆ -C ₁₀)	180	25
F2 (C ₁₀ -C ₁₆)	120	50
F3 (C ₁₆ -C ₃₄)	300	100
F4 (C ₃₄ -C ₄₀)	2,800	100
Benzene	50	0.2
Toluene	85	0.5
Ethyl benzene	70	1
Xylene (total)	105	3
Benzo(a)pyrene	0.7	0.1

6 Results

6.1 Field Investigations

6.1.1 Sub Surface Conditions

TP313 encountered general refuse (fill) including glass bottles, metal, metal cans and wire. This area was targeted for testing as a possible waste burial pit, based on evidence from aerial photographs.

TP314 – TP316, located within the former chicken processing plant footprint, encountered the former building slab and building materials including metal beams and metal sheeting.

TP301 – TP312 and TP317, within former dwelling and shed footprints, generally encountered fill/disturbed sandy clay/clayey sand soils up to a depth of 0.6 mBGL, overlying residual clays or alluvial sands. Fill/disturbed soils typically contained building materials including tile, brick, concrete, timber, plastic and PACM fragments.

TP318 - TP320 encountered sandy clay topsoil overlying residual clay.

6.2 Laboratory Analytical Results

6.2.1 Soil Analytical Results

Comparison of soil laboratory results with the relevant SAC is available in the laboratory tables in Attachment E. A summary of results is presented in Table 14.

Table 14: Summary of soil laboratory results.

Analyte	Results Compared to SAC
Heavy metals	<u>HILs</u> All results below SAC. <u>EILs</u> Zinc was detected in 3 samples over the adopted SAC of 200 mg/kg. 4816/305/0.15 (680 mg/kg) 4816/311/0.15 (220 mg/kg) 4816/317/0.15 (330 mg/kg)
TPH/BTEX	<u>HSL</u> All results below SAC. <u>ESL</u>

Analyte	Results Compared to SAC
	All results below SAC. <u>Direct Contact</u> All results below SAC.
OCP/OPP	<u>HILs</u> All results below SAC.
PAH	<u>HILs</u> All results below SAC. <u>ESL</u> All results below SAC.
Asbestos in soil	Soil samples reported negative for asbestos in soil detection.

6.2.2 Material Analytical Results

Positive identification of asbestos was made in material samples **4816/306/ASB1**, **4816/306/ASB2** and **4816/312/ASB3**.

7 Discussion

7.1 Soil Contamination

A summary of identified soil contamination is as follows:

- Zinc was detected over the adopted EIL (200 mg/kg) in samples 4816/305/0.15 (680 mg/kg), 4816/311/0.15 (220 mg/kg) and 4816/317/0.15 (330 mg/kg). Samples were collected at the locations of former sheds identified as AEC in MA (2015).

Zinc levels are significantly under adopted HIL (7,400 mg/kg). It is expected that elevated zinc levels are the result of previous galvanised structures/building materials associated with the shed.

7.2 Material Contamination

ACM was identified in test pits 309 and 312 (ASB1/0.05, ASB2/0.05 and ASB3/0.1) in the form of fibre cement sheeting fragments.

7.3 Source and Extent of Material Contamination

Material samples ASB1, ASB2 and ASB3 were likely from a former shed (now demolished) which was identified as an AEC in MA (2015). There is a high likelihood of other ACM fragments within the former dwelling and shed footprints.

Conclusions and Recommendations

Identified SAC exceedances and the positive identification of ACM cement fibre sheeting identifies risks to environmental and human receptors respectively, identified in the preliminary CSM. A remediation action plan (RAP) will be required to address these contamination risks and site remediation be completed prior to residential development and use.

We consider that the site can be readily made suitable for proposed residential development provided that a RAP is developed and implemented accordingly. A likely remediation strategy would involve the removal and offsite disposal of identified asbestos containing material. Where zinc exceeds EIL, we recommend additional testing within the building footprints and curtilage of former sheds exceeding EIL for zinc, to define the extent of zinc contamination. It is possible that future testing will reduce 95% UCL below EIL; however if values still exceed, soil amelioration by way of adding gypsum (or similar) to increase pH and CEC, may allow a higher EIL to be implemented.

Filling identified in burial pit located at TP313 and slab/builder's rubble (TP314-316) of the former chicken processing plant should be removed and disposed of. Soil beneath the slab should be tested for COPC.

Concrete structure adjacent to TP320 should be removed and disposed of. Soil beneath the concrete structure should be tested for COPC.

Following remediation works, a validation report is required to be prepared to confirm site suitability for the proposed development.

Based on the large site area, there remains a risk of unexpected finds (such as fill material), which contain contaminant levels above the adopted SAC. It is therefore recommended that an unexpected finds protocol be developed for the site and implemented as part of a construction management plan (CMP). The unexpected finds protocol should outline all procedures associated with the discovery of any new potentially contaminated material.

Prior to any soil or ACM material being removed from site, a formal waste classification assessment in accordance with NSW EPA - Waste Classification Guidelines (2014) is required.

9 Limitations

This DSI 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 accepts no responsibility, and provides no guarantee regarding the characteristics of areas of the site not specifically studied in this investigation.

10 References

- Agency for Toxic Substances and Diseases Registry (ATSDR, 1999) *Toxicological profile for total petroleum hydrocarbons (TPH)* – US Department of Health and Human Services.
- Chapman and Murphy (1983) Penrith 1:100 000 Soil Landscapes Sheet 9131.
- Department of Mineral Resources (1983) Penrith 1:100,000 Geological Sheet 9131.
- Martens and Associates (2015) *Preliminary Site Investigation: 45 Noongah Street and 25 Gwynn Hughes Street, Bargo, NSW* (P1504816JR01V01)
- Martens and Associates (2013) *Preliminary Wastewater Assessment: Rezoning Application, 45 Noongah Street, Bargo, NSW* (P1303944JR01V01)
- NEPC (1999, amended 2013) *National Environmental Protection (Assessment of Site Contamination) Measure* – Referred to as ASC NEPM (1999, amended 2013).
- NSW DEC (2005) *Guidelines for Assessing Former Orchards and Market Gardens*.
- NSW DEC (2006) 2nd Ed. *Contaminated Sites: Guidelines for the NSW Site Auditor Scheme*.
- NSW EPA (2005) *Contaminated Sites: Guidelines for Assessing Former Orchards and Market Gardens*
- NSW EPA (1995) *Sampling Design Guidelines*.
- NSW OEH (2011) *Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites*.
- Olszowy, H, Torr, P, Imray, P 1995, *Trace element concentrations in soils from rural and urban areas of Australia*, Contaminated sites monograph no. 4, South Australian Health Commission.
- SEPP 55 *Remediation of Land*.

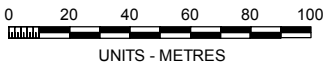
11 **Attachment A – Site Plan**



Source: Nearmap (2014)

KEY

- SITE BOUNDARY
- POTENTIAL FILLED AREA
- TEST PIT
- ACM FRAGMENT
- FORMER DWELLINGS AND SHEDS
- FORMER CHICKEN PROCESSING PLANT
- BH LOCATION (MA, 2013)
- ZINC EIL EXCEEDANCE



UNITS - METRES

Martens & Associates Pty Ltd ABN 85 070 240 890

Designed:	GMT
Approved:	JF
Date:	7.12.15
Scale @A3:	1:2500

Environment | Water | Wastewater | Geotechnical | Civil | Management

Test Pit Sampling Locations
45 Noongah Street and 25 Gwynn Hughes Street, Bargo, NSW

Drawing No./ID:

Figure 1

Suite 201, 20 George St, Hornsby, NSW 2077 Australia Phone: (02) 9476 9999 Fax: (02) 9476 8767
Email: mail@martens.com.au Internet: <http://www.martens.com.au>

Project:	File:	Revision:
P1504816	JD05V01	A

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12 **Attachment B – Test Pit Logs**

CLIENT	Precise Planning	COMMENCED	10/09/15	COMPLETED	10/09/15	REF TP301							
PROJECT	Stage 2 Contamination Assessment	LOGGED	GMT/GL	CHECKED	JF	Sheet 1 of 1							
SITE	45 Noonganh St and 25 Gwynn Hughes St, Bargo, NSW	GEOLOGY	Shale	VEGETATION	Grass	PROJECT NO. P1504816							
EQUIPMENT	Bobcat 5.5t	EASTING	NA	RL SURFACE	NA								
EXCAVATION DIMENSIONS	0.3 x 0.8 x 1.0m depth	NORTHING	NA	ASPECT	West	SLOPE	<2%						
EXCAVATION DATA		MATERIAL DATA				SAMPLING & TESTING							
METHOD	SUPPORT	WATER	MOISTURE	DEPTH (M)	DRILLING RESISTANCE	GRAPHIC LOG	CLASSIFICATION	MATERIAL DESCRIPTION	CONSISTENCY	DENSITY INDEX	TYPE	DEPTH (M)	RESULTS AND ADDITIONAL OBSERVATIONS
SOIL NAME, plasticity or particle characteristics, colour, secondary and minor components, moisture condition, consistency/relative density, ROCK NAME, grain size, texture/fabric, colour, strength, weathering.													
E	Nil	N	M	0.25			CL-CL	Sandy CLAY - Low to medium plasticity, brown/dark brown, with tile, brick, concrete (2-150mm, angular), timber fragments.			B	0.1	4816/301/ 0.1
											A	0.15	4816/301/ 0.15
											A	0.4	4816/301/ 0.4
				0.5									
E	Nil	N	M	0.75			CL-CL	CLAY - Low to medium plasticity, light brown/orange.			A	0.7	4816/301/ 0.7
				1.0									
				1.25				Test pit terminated at 1.0m on clay.					
				1.5									
				1.75									
				2.0									
				2.25									
EQUIPMENT / METHOD													
SUPPORT													
WATER													
MOISTURE													
DRILLING RESISTANCE													
CONSISTENCY													
DENSITY													
SAMPLING & TESTING													
CLASSIFICATION SYMBOLS AND SOIL DESCRIPTION													
EXCAVATION LOG TO BE READ IN CONJUNCTION WITH ACCOMPANYING REPORT NOTES AND ABBREVIATIONS													
MARTENS & ASSOCIATES PTY LTD													
Engineering Log - Excavation													

CLIENT		Precise Planning				COMMENCED		10/09/15		COMPLETED		10/09/15		REF		TP302	
PROJECT		Stage 2 Contamination Assessment				LOGGED		GMT/GL		CHECKED		JF		Sheet 1 of 1			
SITE		45 Noonganh St and 25 Gwynn Hughes St, Bargo, NSW				GEOLOGY		Shale		VEGETATION		Grass		PROJECT NO. P1504816			
EQUIPMENT		Bobcat 5.5t				EASTING		NA		RL SURFACE		NA					
EXCAVATION DIMENSIONS		0.3 x 1.0 x 1.2m depth				NORTHING		NA		ASPECT		West		SLOPE		<2%	
EXCAVATION DATA						MATERIAL DATA						SAMPLING & TESTING					
METHOD	SUPPORT	WATER	MOISTURE	DEPTH (M)	DRILLING RESISTANCE	GRAPHIC LOG	CLASSIFICATION	MATERIAL DESCRIPTION		CONSISTENCY	DENSITY INDEX	TYPE	DEPTH (M)	RESULTS AND ADDITIONAL OBSERVATIONS			
					L N H R			SOIL NAME, plasticity or particle characteristics, colour, secondary and minor components, moisture condition, consistency/relative density, ROCK NAME, grain size, texture/fabric, colour, strength, weathering.									
E	Nil	N	M	0.25			CL-CI	Sandy CLAY - Low to medium plasticity, dark brown, with plastic, tile, brick fragments (2-100mm).				B	0.1	4816/302/ 0.1			
												A	0.15	4816/302/ 0.15			
				0.45								A	0.4	4816/302/ 0.4			
E	Nil	N	M	0.5			CL-CI	CLAY - Low to medium plasticity, light brown/orange.						0.5			
				0.75										0.75			
				1.0										1.0			
				1.2										1.2			
				1.25				Test pit terminated at 1.2m on clay.						1.25			
				1.5										1.5			
				1.75										1.75			
				2.0										2.0			
				2.25										2.25			
EQUIPMENT / METHOD		SUPPORT		WATER		MOISTURE		DRILLING RESISTANCE		CONSISTENCY		DENSITY		SAMPLING & TESTING		CLASSIFICATION SYMBOLS AND SOIL DESCRIPTION	
N Natural exposure		SH Shoring		N None observed		D Dry		VS Very Soft		VL Very Loose		A Auger sample		VS Vane shear		Y USCS	
X Existing excavation		SC Shotcrete		X Not measured		M Moist		S Soft		L Loose		B Bulk sample		DCP Dynamic cone penetrometer		N Agricultural	
BH Backhoe bucket		RB Rock Bolts		Water level		W Wet		F Firm		MD Medium Dense		U Undisturbed sample					
HA Hand auger		Nil No support		Water outflow		Wp Plastic limit		St Stiff		D Dense		D Disturbed sample		FD Field density			
S Spade				Water inflow		WL Liquid limit		VSt Very Stiff		VD Very Dense		Ux Tube sample (x mm)		M Moisture content			
CC Concrete Corer								H Hard				pp Pocket penetrometer		WS Water sample			
V V-bit								F Friable				S Standard penetration test					
TC Tungsten Carbide Bit												CBR California Bearing Ratio					
PT Push tube																	
EXCAVATION LOG TO BE READ IN CONJUNCTION WITH ACCOMPANYING REPORT NOTES AND ABBREVIATIONS																	
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CLIENT	Precise Planning	COMMENCED	10/09/15	COMPLETED	10/09/15	REF TP304																											
PROJECT	Stage 2 Contamination Assessment	LOGGED	GMT/GL	CHECKED	JF	Sheet 1 of 1																											
SITE	45 Noonganh St and 25 Gwynn Hughes St, Bargo, NSW	GEOLOGY	Shale	VEGETATION	Grass	PROJECT NO. P1504816																											
EQUIPMENT	Bobcat 5.5t	EASTING	NA	RL SURFACE	NA																												
EXCAVATION DIMENSIONS	0.3 x 1.0 x 1.1m depth	NORTHING	NA	ASPECT	West	SLOPE	<2%																										
EXCAVATION DATA		MATERIAL DATA				SAMPLING & TESTING																											
METHOD	SUPPORT	WATER	MOISTURE	DEPTH (M)	DRILLING RESISTANCE	GRAPHIC LOG	CLASSIFICATION	MATERIAL DESCRIPTION	CONSISTENCY	DENSITY INDEX	TYPE	DEPTH (M)	RESULTS AND ADDITIONAL OBSERVATIONS																				
SOIL NAME, plasticity or particle characteristics, colour, secondary and minor components, moisture condition, consistency/relative density, ROCK NAME, grain size, texture/fabric, colour, strength, weathering.																																	
E	Nil	N	M	0.25			CL-CL	Sandy CLAY - Low to medium plasticity, light brown/brown, concrete (10-200mm) angular, cans, tile, plastic, timber fragments.			B	0.1	4816/304/ 0.1																				
				0.4							A	0.15	4816/304/ 0.15																				
				0.5																													
				0.75			CL-CL	CLAY - Low to medium plasticity, light brown/orange.			A	0.5	4816/304/ 0.5																				
				1.0																													
				1.1				Test pit terminated at 1.1m on clay.																									
				1.25																													
				1.5																													
				1.75																													
				2.0																													
				2.25																													
EQUIPMENT / METHOD N Natural exposure X Existing excavation BH Backhoe bucket HA Hand auger S 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		DRILLING RESISTANCE 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 Ux Tube sample (x mm) pp Pocket penetrometer S Standard penetration test CBR California Bearing Ratio		VS Vane shear DCP Dynamic cone penetrometer FD Field density M Moisture content 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	Precise Planning	COMMENCED	10/09/15	COMPLETED	10/09/15	REF TP305																																																																																																																																					
PROJECT	Stage 2 Contamination Assessment	LOGGED	GMT/GL	CHECKED	JF	Sheet 1 of 1																																																																																																																																					
SITE	45 Noonganh St and 25 Gwynn Hughes St, Bargo, NSW	GEOLOGY	Shale	VEGETATION	Grass	PROJECT NO. P1504816																																																																																																																																					
EQUIPMENT	Bobcat 5.5t	EASTING	NA	RL SURFACE	NA																																																																																																																																						
EXCAVATION DIMENSIONS	0.3 x 1.0 x 0.9m depth	NORTHING	NA	ASPECT	West	SLOPE	<2%																																																																																																																																				
EXCAVATION DATA		MATERIAL DATA				SAMPLING & TESTING																																																																																																																																					
METHOD	SUPPORT	WATER	MOISTURE	DEPTH (M)	DRILLING RESISTANCE	GRAPHIC LOG	CLASSIFICATION	MATERIAL DESCRIPTION	CONSISTENCY	DENSITY INDEX	TYPE	DEPTH (M)	RESULTS AND ADDITIONAL OBSERVATIONS																																																																																																																														
SOIL NAME, plasticity or particle characteristics, colour, secondary and minor components, moisture condition, consistency/relative density, ROCK NAME, grain size, texture/fabric, colour, strength, weathering.																																																																																																																																											
E	Nil	N	M	0.25			CL	Sandy CLAY - Low to medium plasticity, light brown/ brown, sandstone, tile and brick, gravels (2-150mm, angular), glass, timber and general rubbish.			B	0.1	- FILL																																																																																																																														
				0.4							A	0.15	4816/305/ 0.1																																																																																																																														
													4816/305/ 0.15																																																																																																																														
											A	0.3	4816/305/ 0.3																																																																																																																														
E	Nil	N	M	0.5			CL	CLAY - Low to medium plasticity, light brown/orange.			A	0.5	4816/305/ 0.5																																																																																																																														
				0.75																																																																																																																																							
				0.9																																																																																																																																							
				1.0				Test pit terminated at 0.9m on clay.																																																																																																																																			
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				2.0																																																																																																																																							
				2.25																																																																																																																																							
EQUIPMENT / METHOD N Natural exposure X Existing excavation BH Backhoe bucket HA Hand auger S 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														DRILLING RESISTANCE 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 Ux Tube sample (x mm) pp Pocket penetrometer S Standard penetration test CBR California Bearing Ratio														VS Vane shear DCP Dynamic cone penetrometer FD Field density M Moisture content 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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CLIENT	Precise Planning	COMMENCED	10/09/15	COMPLETED	10/09/15	REF TP306							
PROJECT	Stage 2 Contamination Assessment	LOGGED	GMT/GL	CHECKED	JF	Sheet 1 of 1							
SITE	45 Noonganh St and 25 Gwynn Hughes St, Bargo, NSW	GEOLOGY	Alluvial	VEGETATION	Grass	PROJECT NO. P1504816							
EQUIPMENT	Bobcat 5.5t	EASTING	NA	RL SURFACE	NA								
EXCAVATION DIMENSIONS	0.3 x 1.0 x 2.2m depth	NORTHING	NA	ASPECT	West	SLOPE	<2%						
EXCAVATION DATA		MATERIAL DATA			SAMPLING & TESTING								
METHOD	SUPPORT	WATER	MOISTURE	DEPTH (M)	DRILLING RESISTANCE	GRAPHIC LOG	CLASSIFICATION	MATERIAL DESCRIPTION	CONSISTENCY	DENSITY INDEX	TYPE	DEPTH (M)	RESULTS AND ADDITIONAL OBSERVATIONS
SOIL NAME, plasticity or particle characteristics, colour, secondary and minor components, moisture condition, consistency/relative density, ROCK NAME, grain size, texture/fabric, colour, strength, weathering.													
E	Nil	N	M	0.25			SC	Clayey SAND - Coarse grained, dark grey/brown, with coal and burnt timber, glass, tile, gravels (10-40mm, angular), PACM fragments (10-40mm).			B	0.1	- FILL
				0.15							A	0.15	4816/306/ 0.1 (ASB 2)
				0.25									
				0.5									
				0.75									
				1.0									
				1.25			SP	SAND - Medium to coarse grained, light yellow.			A	1.0	4816/306/ 1.0
				1.5									
				1.75									
				2.0									
				2.2							A	2.0	4816/306/ 2.0
				2.25									
Test pit terminated at 2.2m on sand.													
2.25													
EQUIPMENT / METHOD N Natural exposure X Existing excavation BH Backhoe bucket HA Hand auger S 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													
DRILLING RESISTANCE 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 Ux Tube sample (x mm) pp Pocket penetrometer S Standard penetration test CBR California Bearing Ratio													
VS Vane shear DCP Dynamic cone penetrometer FD Field density M Moisture content 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		Precise Planning		COMMENCED	10/09/15	COMPLETED	10/09/15	REF		TP307				
PROJECT		Stage 2 Contamination Assessment		LOGGED	GMT/GL	CHECKED	JF	Sheet		1 of 1				
SITE		45 Noonganh St and 25 Gwynn Hughes St, Bargo, NSW		GEOLOGY	Alluvial	VEGETATION	Grass	PROJECT NO.		P1504816				
EQUIPMENT		Bobcat 5.5t		EASTING	NA	RL SURFACE	NA							
EXCAVATION DIMENSIONS		0.3 x 1.0 x 2.1m depth		NORTHING	NA	ASPECT	West	SLOPE	<2%					
EXCAVATION DATA				MATERIAL DATA				SAMPLING & TESTING						
METHOD	SUPPORT	WATER	MOISTURE	DEPTH (M)	DRILLING RESISTANCE	GRAPHIC LOG	CLASSIFICATION	MATERIAL DESCRIPTION		CONSISTENCY	DENSITY INDEX	TYPE	DEPTH (M)	RESULTS AND ADDITIONAL OBSERVATIONS
								SOIL NAME, plasticity or particle characteristics, colour, secondary and minor components, moisture condition, consistency/relative density, ROCK NAME, grain size, texture/fabric, colour, strength, weathering.						
E	Nil	N	M	0.1			SC	Clayey SAND - Coarse grained, dark grey/brown, with coal and burnt timber, glass, tile, gravels (10-40mm, angular), PACM fragments (10-40mm).				B	0.1	4816/307/ 0.1
				0.15								A	0.15	4816/307/ 0.15
				0.2										
				0.25								A	0.3	4816/307/ 0.3
				0.5										
				0.75										
				1.0								A	1.0	4816/307/ 1.0
E	Nil	N	M	1.25			SP	SAND - Medium to coarse grained, light yellow.						
				1.5										
				1.75										
				2.0								A	2.0	4816/307/ 2.0
				2.1										
				2.25										
Test pit terminated at 2.1m on sand.														
2.25														
EQUIPMENT / METHOD N Natural exposure X Existing excavation BH Backhoe bucket HA Hand auger S 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														
DRILLING RESISTANCE 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 Ux Tube sample (x mm) pp Pocket penetrometer S Standard penetration test CBR California Bearing Ratio														
VS Vane shear DCP Dynamic cone penetrometer FD Field density M Moisture content 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														
martens MARTENS & ASSOCIATES PTY LTD Suite 201, 20 George St, Hornsby, NSW 2077 Australia Phone: (02) 9476 9999 Fax: (02) 9476 8767 mail@martens.com.au WEB: http://www.martens.com.au														
Engineering Log - Excavation														

CLIENT		Precise Planning		COMMENCED		10/09/15		COMPLETED		10/09/15		REF		TP308	
PROJECT		Stage 2 Contamination Assessment		LOGGED		GMT/GL		CHECKED		JF		Sheet		1 of 1	
SITE		45 Noonganh St and 25 Gwynn Hughes St, Bargo, NSW		GEOLOGY		Alluvial		VEGETATION		Grass		PROJECT NO.		P1504816	
EQUIPMENT		Bobcat 5.5t		EASTING		NA		RL SURFACE		NA					
EXCAVATION DIMENSIONS		0.3 x 1.0 x 1.5m depth		NORTHING		NA		ASPECT		West		SLOPE		<2%	
EXCAVATION DATA				MATERIAL DATA				SAMPLING & TESTING							
METHOD	SUPPORT	WATER	MOISTURE	DEPTH (M)	DRILLING RESISTANCE	GRAPHIC LOG	CLASSIFICATION	MATERIAL DESCRIPTION	CONSISTENCY	DENSITY INDEX	TYPE	DEPTH (M)	RESULTS AND ADDITIONAL OBSERVATIONS		
								SOIL NAME, plasticity or particle characteristics, colour, secondary and minor components, moisture condition, consistency/relative density, ROCK NAME, grain size, texture/fabric, colour, strength, weathering.							
E	Nil	N	M	0.1			SC	Clayey SAND - Coarse grained, dark grey/brown, with coal and burnt timber, glass, tile, gravels (10-40mm, angular), PACM fragments (10-40mm).			B	0.1	- FILL		
				0.15							A	0.15	4816/308/ 0.15		
				0.2											
				0.25							A	0.3	4816/308/ 0.3		
				0.5											
E	Nil	N	M	0.75			SP	SAND - Medium to coarse grained, light yellow.							
				1.0							A	1.0	4816/308/ 1.0		
				1.1											
				1.25											
				1.5							A	1.4	4816/308/ 1.4		
E	Nil	N	M	1.75			CL	Sandy CLAY - Light orange/orange.							
				2.0											
				2.1											
				2.25				Test pit terminated at 1.5m on sandy clay.							
				2.25											
EQUIPMENT / METHOD N Natural exposure X Existing excavation BH Backhoe bucket HA Hand auger S 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 DRILLING RESISTANCE 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 Ux Tube sample (x mm) pp Pocket penetrometer S Standard penetration test CBR California Bearing Ratio VS Vane shear DCP Dynamic cone penetrometer FD Field density M Moisture content 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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CLIENT	Precise Planning	COMMENCED	10/09/15	COMPLETED	10/09/15	REF TP309							
PROJECT	Stage 2 Contamination Assessment	LOGGED	GMT/GL	CHECKED	JF	Sheet 1 of 1							
SITE	45 Noonganh St and 25 Gwynn Hughes St, Bargo, NSW	GEOLOGY	Alluvial	VEGETATION	Grass	PROJECT NO. P1504816							
EQUIPMENT	Bobcat 5.5t	EASTING	NA	RL SURFACE	NA								
EXCAVATION DIMENSIONS	0.3 x 1.0 x 0.8m depth	NORTHING	NA	ASPECT	West	SLOPE	<2%						
EXCAVATION DATA		MATERIAL DATA				SAMPLING & TESTING							
METHOD	SUPPORT	WATER	MOISTURE	DEPTH (M)	DRILLING RESISTANCE	GRAPHIC LOG	CLASSIFICATION	MATERIAL DESCRIPTION	CONSISTENCY	DENSITY INDEX	TYPE	DEPTH (M)	RESULTS AND ADDITIONAL OBSERVATIONS
SOIL NAME, plasticity or particle characteristics, colour, secondary and minor components, moisture condition, consistency/relative density, ROCK NAME, grain size, texture/fabric, colour, strength, weathering.													
E	Nil	N	M	0.1			SC	Sandy CLAY - Low to medium plasticity, brown, with car gas strut.			B	0.1	4816/309/ 0.1
				0.2							A	0.15	4816/309/ 0.15
				0.25									
				0.3							A	0.3	4816/309/ 0.3
E	Nil	N	M	0.5			SP	SAND - Medium to coarse grained, light yellow.					
				0.75									
				0.7							A	0.7	4816/309/ 0.7
				0.8									
				1.0				Test pit terminated at 0.8m on sand.					
				1.25									
				1.5									
				1.75									
				2.0									
				2.25									
EQUIPMENT / METHOD													
SUPPORT													
WATER													
MOISTURE													
DRILLING RESISTANCE													
CONSISTENCY													
DENSITY													
SAMPLING & TESTING													
CLASSIFICATION SYMBOLS AND SOIL DESCRIPTION													
USCS													
Agricultural													
EXCAVATION LOG TO BE READ IN CONJUNCTION WITH ACCOMPANYING REPORT NOTES AND ABBREVIATIONS													
MARTENS & ASSOCIATES PTY LTD													
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Engineering Log - Excavation													

CLIENT	Precise Planning	COMMENCED	10/09/15	COMPLETED	10/09/15	REF TP310								
PROJECT	Stage 2 Contamination Assessment	LOGGED	GMT/GL	CHECKED	JF	Sheet 1 of 1								
SITE	45 Noonganh St and 25 Gwynn Hughes St, Bargo, NSW	GEOLOGY	Shale	VEGETATION	Grass	PROJECT NO. P1504816								
EQUIPMENT	Bobcat 5.5t	EASTING	NA	RL SURFACE	NA									
EXCAVATION DIMENSIONS	0.3 x 1.0 x 1.1m depth	NORTHING	NA	ASPECT	East	SLOPE	<2%							
EXCAVATION DATA		MATERIAL DATA				SAMPLING & TESTING								
METHOD	SUPPORT	WATER	MOISTURE	DEPTH (M)	DRILLING RESISTANCE	GRAPHIC LOG	CLASSIFICATION	MATERIAL DESCRIPTION	CONSISTENCY	DENSITY INDEX	TYPE	DEPTH (M)	RESULTS AND ADDITIONAL OBSERVATIONS	
SOIL NAME, plasticity or particle characteristics, colour, secondary and minor components, moisture condition, consistency/relative density, ROCK NAME, grain size, texture/fabric, colour, strength, weathering.														
E	Nil	N	M	0.1			SC	Clayey SAND - Coarse grained, brown/black, with charcoal fragments and concrete gravels (10-150mm, angular).			B	0.1	4816/310/ 0.1	
				0.15							A	0.15	4816/310/ 0.15	
				0.2										
				0.25							A	0.3	4816/310/ 0.3	
				0.5										
E	Nil	N	M	0.75			SP	SAND - Medium to coarse grained, light yellow.						
				0.9										
				1.0										
E	Nil	N	W	1.1			CL	CLAY - Low to medium plasticity, light orange/ orange.			A	1.0	4816/310/ 1.0 - Water at 1.0m.	
				1.25										
				1.5										
				1.75										
				2.0										
				2.25				Test pit terminated at 1.1m on clay.						
EQUIPMENT / METHOD														
N	Natural exposure	SH	Shoring	N	None observed	D	Dry	VS	Very Soft	VL	Very Loose	A	Auger sample	
X	Existing excavation	SC	Shotcrete	X	Not measured	M	Moist	S	Soft	L	Loose	B	Bulk sample	
BH	Backhoe bucket	RB	Rock Bolts	W	Water level	Wp	Plastic limit	F	Firm	MD	Medium Dense	U	Undisturbed sample	
S	Spade	Nil	No support	W	Water outflow	WI	Liquid limit	St	Stiff	D	Dense	D	Disturbed sample	
CC	Concrete Corer				Water inflow			VSt	Very Stiff	VD	Very Dense	Ux	Tube sample (x mm)	
V	V-bit							H	Hard			pp	Pocket penetrometer	
TC	Tungsten Carbide Bit							F	Friable			S	Standard penetration test	
PT	Push tube												CBR	California Bearing Ratio
VS Vane shear														
DCP Dynamic cone penetrometer														
FD Field density														
M Moisture content														
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		Precise Planning		COMMENCED	10/09/15	COMPLETED	10/09/15	REF TP311					
PROJECT		Stage 2 Contamination Assessment		LOGGED	GMT/GL	CHECKED	JF	Sheet 1 of 1					
SITE		45 Noonganh St and 25 Gwynn Hughes St, Bargo, NSW		GEOLOGY	Shale	VEGETATION	Grass	PROJECT NO. P1504816					
EQUIPMENT		Bobcat 5.5t		EASTING	NA	RL SURFACE	NA						
EXCAVATION DIMENSIONS		0.3 x 1.0 x 1.2m depth		NORTHING	NA	ASPECT	East	SLOPE	<2%				
EXCAVATION DATA				MATERIAL DATA				SAMPLING & TESTING					
METHOD	SUPPORT	WATER	MOISTURE	DEPTH (M)	DRILLING RESISTANCE	GRAPHIC LOG	CLASSIFICATION	MATERIAL DESCRIPTION	CONSISTENCY	DENSITY INDEX	TYPE	DEPTH (M)	RESULTS AND ADDITIONAL OBSERVATIONS
SOIL NAME, plasticity or particle characteristics, colour, secondary and minor components, moisture condition, consistency/relative density, ROCK NAME, grain size, texture/fabric, colour, strength, weathering.													
E	Nil	N	M	0.1			SC	Clayey SAND - Coarse grained, brown/black, with charcoal fragments and concrete gravels (10-150mm, angular).			B	0.1	4816/311/ 0.1
				0.15							A	0.15	4816/311/ 0.15 + DUP1
				0.2									
				0.25							A	0.3	4816/311/ 0.3
				0.5			SP	SAND - Medium to coarse grained, light yellow.					
				0.75									
				0.9									
E	Nil	N	W	1.0			CL	CLAY - Low to medium plasticity, light orange/orange with shale gravels (2-50mm, angular).			A	1.0	4816/311/ 1.0
				1.2									- Water at 1.1m.
				1.25				Test pit terminated at 1.2m on clay.					
				1.5									
				1.75									
				2.0									
				2.25									
EQUIPMENT / METHOD													
SUPPORT													
WATER													
MOISTURE													
DRILLING RESISTANCE													
CONSISTENCY													
DENSITY													
SAMPLING & TESTING													
CLASSIFICATION SYMBOLS AND SOIL DESCRIPTION													
EXCAVATION LOG TO BE READ IN CONJUNCTION WITH ACCOMPANYING REPORT NOTES AND ABBREVIATIONS													
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Engineering Log - Excavation													

CLIENT	Precise Planning	COMMENCED	10/09/15	COMPLETED	10/09/15	REF TP313																																											
PROJECT	Stage 2 Contamination Assessment	LOGGED	GMT/GL	CHECKED	JF	Sheet 1 of 1																																											
SITE	45 Noonganh St and 25 Gwynn Hughes St, Bargo, NSW	GEOLOGY	Sandstone	VEGETATION	Grass	PROJECT NO. P1504816																																											
EQUIPMENT	Bobcat 5.5t	EASTING	NA	RL SURFACE	NA																																												
EXCAVATION DIMENSIONS	0.3 x 1.0 x 0.8m depth	NORTHING	NA	ASPECT	East	SLOPE	<2%																																										
EXCAVATION DATA		MATERIAL DATA				SAMPLING & TESTING																																											
METHOD	SUPPORT	WATER	MOISTURE	DEPTH (M)	DRILLING RESISTANCE	GRAPHIC LOG	CLASSIFICATION	MATERIAL DESCRIPTION	CONSISTENCY	DENSITY INDEX	TYPE	DEPTH (M)	RESULTS AND ADDITIONAL OBSERVATIONS																																				
SOIL NAME, plasticity or particle characteristics, colour, secondary and minor components, moisture condition, consistency/relative density, ROCK NAME, grain size, texture/fabric, colour, strength, weathering.																																																	
E	Nil	N	M	0.25			CL- CI	Sandy CLAY - Dark brown/black, with burnt timber, general rubbish including, glass bottles, steel, cans, tins and wire.			B	0.1	4816/313/ 0.1																																				
											A	0.15	4816/313/ 0.15																																				
				0.5							A	0.3	4816/313/ 0.3																																				
				0.7							A	0.5	4816/313/ 0.5																																				
E	Nil	N	W	0.75			CL- CI	CLAY - Low to medium plasticity, light orange/orange.					- Water at 0.7m.																																				
				0.8																																													
				1.0				Test pit terminated due to water causing. Test pit collapse.																																									
				1.25																																													
				1.5																																													
				1.75																																													
				2.0																																													
				2.25																																													
EQUIPMENT / METHOD N Natural exposure X Existing excavation BH Backhoe bucket HA Hand auger S 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				DRILLING RESISTANCE 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 Ux Tube sample (x mm) pp Pocket penetrometer S Standard penetration test CBR California Bearing Ratio				VS Vane shear DCP Dynamic cone penetrometer FD Field density M Moisture content 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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CLIENT	Precise Planning	COMMENCED	10/09/15	COMPLETED	10/09/15	REF TP314							
PROJECT	Stage 2 Contamination Assessment	LOGGED	GMT/GL	CHECKED	JF	Sheet 1 of 1							
SITE	45 Noonganh St and 25 Gwynn Hughes St, Bargo, NSW	GEOLOGY	Sandstone	VEGETATION	Grass	PROJECT NO. P1504816							
EQUIPMENT	Bobcat 5.5t	EASTING	NA	RL SURFACE	NA								
EXCAVATION DIMENSIONS	0.3 x 1.0 x 1.2m depth	NORTHING	NA	ASPECT	East	SLOPE	<2%						
EXCAVATION DATA		MATERIAL DATA				SAMPLING & TESTING							
METHOD	SUPPORT	WATER	MOISTURE	DEPTH (M)	DRILLING RESISTANCE	GRAPHIC LOG	CLASSIFICATION	MATERIAL DESCRIPTION	CONSISTENCY	DENSITY INDEX	TYPE	DEPTH (M)	RESULTS AND ADDITIONAL OBSERVATIONS
SOIL NAME, plasticity or particle characteristics, colour, secondary and minor components, moisture condition, consistency/relative density, ROCK NAME, grain size, texture/fabric, colour, strength, weathering.													
E	Nil	N	M	0.1			SC	Sandy CLAY - Brown/black, with charcoal fragments, black plastic, metal beams, concrete boulders (200-600mm, angular).			B	0.1	4816/314/ 0.1
				0.15							A	0.15	4816/314/ 0.15
				0.2									
				0.25							A	0.3	4816/314/ 0.3
				0.5									
				0.75									
E	Nil	N	M	1.0			SP	CLAY - Low to medium plasticity, light orange/orange.					
				1.1									
				1.2									
E	Nil	N	W	1.25				SANDSTONE - Coarse grained, light grey, inferred low strength.					
				1.5									
				1.75									
				2.0									
				2.25				Test pit terminated at 1.2m on sandstone.					
EQUIPMENT / METHOD													
N Natural exposure													
X Existing excavation													
BH Backhoe bucket													
S 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													
DRILLING RESISTANCE													
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													
Ux Tube sample (x mm)													
pp Pocket penetrometer													
S Standard penetration test													
CBR California Bearing Ratio													
VS Vane shear													
DCP Dynamic cone penetrometer													
FD Field density													
M Moisture content													
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													
martens													
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mail@martens.com.au WEB: http://www.martens.com.au													
Engineering Log - Excavation													

CLIENT	Precise Planning	COMMENCED	10/09/15	COMPLETED	10/09/15	REF TP315																															
PROJECT	Stage 2 Contamination Assessment	LOGGED	GMT/GL	CHECKED	JF	Sheet 1 of 1																															
SITE	45 Noonganh St and 25 Gwynn Hughes St, Bargo, NSW	GEOLOGY	Sandstone	VEGETATION	Grass	PROJECT NO. P1504816																															
EQUIPMENT	Bobcat 5.5t	EASTING	NA	RL SURFACE	NA																																
EXCAVATION DIMENSIONS	0.3 x 1.0 x 1.1m depth	NORTHING	NA	ASPECT	East	SLOPE	<2%																														
EXCAVATION DATA		MATERIAL DATA				SAMPLING & TESTING																															
METHOD	SUPPORT	WATER	MOISTURE	DEPTH (M)	DRILLING RESISTANCE	GRAPHIC LOG	CLASSIFICATION	MATERIAL DESCRIPTION	CONSISTENCY	DENSITY INDEX	TYPE	DEPTH (M)	RESULTS AND ADDITIONAL OBSERVATIONS																								
SOIL NAME, plasticity or particle characteristics, colour, secondary and minor components, moisture condition, consistency/relative density, ROCK NAME, grain size, texture/fabric, colour, strength, weathering.																																					
E	Nil	N	M	0.1			SC	Sandy CLAY - Brown/black, with charcoal fragments, black plastic, steel beams, concrete boulders (200-600mm, angular).			B	0.1	- FILL 4816/315/ 0.1																								
				0.25							A	0.15	4816/315/ 0.15																								
				0.3							A	0.3	4816/315/ 0.3																								
E	Nil	N	M	0.5			SP	CLAY - Low to medium plasticity, light orange/orange.																													
				0.75																																	
				1.0									- Water at 1.0m.																								
E	Nil	N	W	1.1				SANDSTONE - Coarse grained, light grey, inferred low strength.					- ROCK																								
				1.25				Test pit terminated at 1.1m on sandstone.																													
				1.5																																	
				1.75																																	
				2.0																																	
				2.25																																	
EQUIPMENT / METHOD N Natural exposure X Existing excavation BH Backhoe bucket HA Hand auger S 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		DRILLING RESISTANCE 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 Ux Tube sample (x mm) pp Pocket penetrometer S Standard penetration test CBR California Bearing Ratio		VS Vane shear DCP Dynamic cone penetrometer FD Field density M Moisture content 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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CLIENT	Precise Planning	COMMENCED	10/09/15	COMPLETED	10/09/15	REF TP317																																																																																																																																					
PROJECT	Stage 2 Contamination Assessment	LOGGED	GMT/GL	CHECKED	JF	Sheet 1 of 1																																																																																																																																					
SITE	45 Noonganh St and 25 Gwynn Hughes St, Bargo, NSW	GEOLOGY	Sandstone	VEGETATION	Grass	PROJECT NO. P1504816																																																																																																																																					
EQUIPMENT	Bobcat 5.5t	EASTING	NA	RL SURFACE	NA																																																																																																																																						
EXCAVATION DIMENSIONS	0.3 x 1.0 x 0.8m depth	NORTHING	NA	ASPECT	East	SLOPE	<2%																																																																																																																																				
EXCAVATION DATA		MATERIAL DATA				SAMPLING & TESTING																																																																																																																																					
METHOD	SUPPORT	WATER	MOISTURE	DEPTH (M)	DRILLING RESISTANCE	GRAPHIC LOG	CLASSIFICATION	MATERIAL DESCRIPTION	CONSISTENCY	DENSITY INDEX	TYPE	DEPTH (M)	RESULTS AND ADDITIONAL OBSERVATIONS																																																																																																																														
SOIL NAME, plasticity or particle characteristics, colour, secondary and minor components, moisture condition, consistency/relative density, ROCK NAME, grain size, texture/fabric, colour, strength, weathering.																																																																																																																																											
E	Nil	N	M	0.25			CL	Sandy CLAY - Light brown, with concrete and tile gravel (10-20mm, angular), plastic, timber.			B	0.1	4816/317/ 0.1																																																																																																																														
											A	0.15	4816/317/ 0.15																																																																																																																														
											A	0.2	4816/317/ 0.2																																																																																																																														
				0.25									0.25																																																																																																																														
E	Nil	N	M	0.5			CL-CI	CLAY - Low to medium plasticity, light orange/orange.			A	0.4	4816/317/ 0.4																																																																																																																														
				0.75									0.75																																																																																																																														
				0.8				Test pit terminated at 0.8m on clay.																																																																																																																																			
				1.0									1.0																																																																																																																														
				1.25									1.25																																																																																																																														
				1.5									1.5																																																																																																																														
				1.75									1.75																																																																																																																														
				2.0									2.0																																																																																																																														
				2.25									2.25																																																																																																																														
EQUIPMENT / METHOD N Natural exposure X Existing excavation BH Backhoe bucket HA Hand auger S 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														DRILLING RESISTANCE 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 Ux Tube sample (x mm) pp Pocket penetrometer S Standard penetration test CBR California Bearing Ratio														VS Vane shear DCP Dynamic cone penetrometer FD Field density M Moisture content 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																																																																																																																																											
martens (C) Copyright Martens & Associates Pty. Ltd . 2015														MARTENS & ASSOCIATES PTY LTD Suite 201, 20 George St, Hornsby, NSW 2077 Australia Phone: (02) 9476 9999 Fax: (02) 9476 8767 mail@martens.com.au WEB: http://www.martens.com.au														Engineering Log - Excavation																																																																																																															

CLIENT	Precise Planning	COMMENCED	10/09/15	COMPLETED	10/09/15	REF TP318																											
PROJECT	Stage 2 Contamination Assessment	LOGGED	GMT/GL	CHECKED	JF	Sheet 1 of 1																											
SITE	45 Noonganh St and 25 Gwynn Hughes St, Bargo, NSW	GEOLOGY	Sandstone	VEGETATION	Grass	PROJECT NO. P1504816																											
EQUIPMENT	Spade		EASTING	NA	RL SURFACE	NA																											
EXCAVATION DIMENSIONS	0.2 x 0.2 x 0.35m depth		NORTHING	NA	ASPECT	East	SLOPE <2%																										
EXCAVATION DATA			MATERIAL DATA				SAMPLING & TESTING																										
METHOD	SUPPORT	WATER	MOISTURE	DEPTH (M)	DRILLING RESISTANCE	GRAPHIC LOG	CLASSIFICATION	MATERIAL DESCRIPTION	CONSISTENCY	DENSITY INDEX	TYPE	DEPTH (M)	RESULTS AND ADDITIONAL OBSERVATIONS																				
SOIL NAME, plasticity or particle characteristics, colour, secondary and minor components, moisture condition, consistency/relative density, ROCK NAME, grain size, texture/fabric, colour, strength, weathering.																																	
S	Nil	N	M	0.2			CL-CI	Sandy CLAY - Low to medium plasticity, brown, with rootlets.			B	0.1	4816/318/ 0.1																				
				0.25			CL-CI	CLAY - Low to medium plasticity, light orange/orange.			A	0.15	4816/318/ 0.15																				
S	Nil	N	M	0.35			CL-CI	CLAY - Low to medium plasticity, light orange/orange.			A	0.3	4816/318/ 0.3																				
				0.5				Test pit terminated at 0.35m on clay.																									
				0.75																													
				1.0																													
				1.25																													
				1.5																													
				1.75																													
				2.0																													
				2.25																													
EQUIPMENT / METHOD N Natural exposure X Existing excavation BH Backhoe bucket HA Hand auger S 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		DRILLING RESISTANCE 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 Ux Tube sample (x mm) pp Pocket penetrometer S Standard penetration test CBR California Bearing Ratio		VS Vane shear DCP Dynamic cone penetrometer FD Field density M Moisture content 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																																	
 (C) Copyright Martens & Associates Pty. Ltd . 2015													MARTENS & ASSOCIATES PTY LTD Suite 201, 20 George St, Hornsby, NSW 2077 Australia Phone: (02) 9476 9999 Fax: (02) 9476 8767 mail@martens.com.au WEB: http://www.martens.com.au										Engineering Log - Excavation										

CLIENT	Precise Planning	COMMENCED	10/09/15	COMPLETED	10/09/15	REF TP319																																																																																																																																					
PROJECT	Stage 2 Contamination Assessment	LOGGED	GMT/GL	CHECKED	JF	Sheet 1 of 1																																																																																																																																					
SITE	45 Noonganh St and 25 Gwynn Hughes St, Bargo, NSW	GEOLOGY	Sandstone	VEGETATION	Grass	PROJECT NO. P1504816																																																																																																																																					
EQUIPMENT	Spade		EASTING	NA	RL SURFACE	NA																																																																																																																																					
EXCAVATION DIMENSIONS	0.2 x 0.2 x 0.4m depth		NORTHING	NA	ASPECT	East	SLOPE <2%																																																																																																																																				
EXCAVATION DATA			MATERIAL DATA			SAMPLING & TESTING																																																																																																																																					
METHOD	SUPPORT	WATER	MOISTURE	DEPTH (M)	DRILLING RESISTANCE	GRAPHIC LOG	CLASSIFICATION	MATERIAL DESCRIPTION	CONSISTENCY	DENSITY INDEX	TYPE	DEPTH (M)	RESULTS AND ADDITIONAL OBSERVATIONS																																																																																																																														
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S	Nil	N	M	0.2			CL-CL	Sandy CLAY - Low to medium plasticity, brown, with rootlets.			B	0.1	4816/319/ 0.1																																																																																																																														
				0.25							A	0.15	4816/319/ 0.15																																																																																																																														
S	Nil	N	M	0.4			CL-CL	CLAY - Low to medium plasticity, light orange/orange.			A	0.3	4816/319/ 0.3																																																																																																																														
				0.5				Test pit terminated at 0.4m on clay.																																																																																																																																			
				0.75																																																																																																																																							
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CLIENT	Precise Planning	COMMENCED	10/09/15	COMPLETED	10/09/15	REF TP320																																																																																																																																					
PROJECT	Stage 2 Contamination Assessment	LOGGED	GMT/GL	CHECKED	JF	Sheet 1 of 1																																																																																																																																					
SITE	45 Noonganh St and 25 Gwynn Hughes St, Bargo, NSW	GEOLOGY	Sandstone	VEGETATION	Grass	PROJECT NO. P1504816																																																																																																																																					
EQUIPMENT	Spade		EASTING	NA	RL SURFACE	NA																																																																																																																																					
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EXCAVATION DATA			MATERIAL DATA			SAMPLING & TESTING																																																																																																																																					
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S	Nil	N	M	0.2			CL-CL	Sandy CLAY - Low to medium plasticity, brown, with rootlets.			B	0.1	4816/320/ 0.1																																																																																																																														
				0.25							A	0.15	4816/320/ 0.15																																																																																																																														
S	Nil	N	M	0.4			CL-CL	CLAY - Low to medium plasticity, light orange/orange.			A	0.3	4816/320/ 0.3																																																																																																																														
				0.5				Test pit terminated at 0.4m on clay.																																																																																																																																			
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				2.25																																																																																																																																							
EQUIPMENT / METHOD N Natural exposure X Existing excavation BH Backhoe bucket HA Hand auger S 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														DRILLING RESISTANCE 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 Ux Tube sample (x mm) pp Pocket penetrometer S Standard penetration test CBR California Bearing Ratio														VS Vane shear DCP Dynamic cone penetrometer FD Field density M Moisture content WS Water sample														CLASSIFICATION SYMBOLS AND SOIL DESCRIPTION Y USCS N Agricultural													
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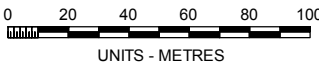
13 **Attachment C – Historical Aerial Photographs**



martens

KEY

 SITE BOUNDARY

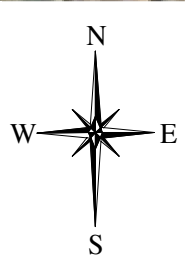


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Martens & Associates Pty Ltd		Environment Water Wastewater Geotechnical Civil Management		
ABN 85 070 240 890		1990 Aerial Source: NSW Department of Lands (1990)		Drawing No./ID:
Designed:	GMT			Figure 2
Approved:	JF			
Date:	7.12.15			
Scale @A3:	1:2500	Suite 201, 20 George St, Hornsby, NSW 2077 Australia Phone: (02) 9476 9999 Fax: (02) 9476 8767 Email: mail@martens.com.au Internet: http://www.martens.com.au		Project: P1504816
				File: JD05V01
				Revision: A



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KEY



SITE BOUNDARY



UNITS - METRES

Martens & Associates Pty Ltd ABN 85 070 240 890

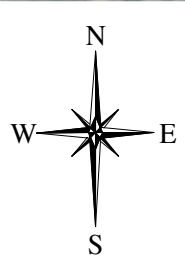
Designed:	GMT
Approved:	JF
Date:	7.12.15
Scale @A3:	1:2500

Environment | Water | Wastewater | Geotechnical | Civil | Management

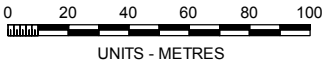
1994 Aerial Source: NSW Department of Lands (1994)		Drawing No./ID:	
		Figure 3	
Suite 201, 20 George St, Hornsby, NSW 2077 Australia Phone: (02) 9476 9999 Fax: (02) 9476 8767 Email: mail@martens.com.au Internet: http://www.martens.com.au	Project: P1504816	File: JD05V01	Revision: A



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 SITE BOUNDARY



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Martens & Associates Pty Ltd		Environment Water Wastewater Geotechnical Civil Management		
Designed:	GMT	1998 Aerial Source: NSW Department of Lands (1998)	Drawing No./ID:	
Approved:	JF		Figure 4	
Date:	7.12.15			
Scale @A3:	1:2500	Suite 201, 20 George St, Hornsby, NSW 2077 Australia Phone: (02) 9476 9999 Fax: (02) 9476 8767 Email: mail@martens.com.au Internet: http://www.martens.com.au	Project: P1504816	File: JD05V01
			Revision:	A

14 **Attachment D – EPA Records Search**



State Pollution Control Commission



The Shire of
Wollondilly
62 Menangle
PICTON 257

R
WOLLON
Shire 20 MAR 1988
Street

A.M.P. Building
166 Keira Street
Wollongong 2500
P.O. Box 1665 Wollongong 2500

Our reference 150,649 GD:TG

Your reference

FILE: D4088/C9(1)

CONNECTED 112209

Telephone 28 5755
28 5192
28 5966

COPIES:

1	1	1	1
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REFER TO: CT

Dear Sir,

Development Application 63/88

Thank you for your letter of 11 March 1988 concerning a proposal to construct a chicken processing plant at Lot 22, Noongah Street, Bargo.

The Commission would have no objection to the proposal but the following comments are made for Council's consideration:-

- * What is the maximum daily kill.
- * What is the estimated water usage for each kill.
- * Storage area for sealed offal container should be drained into the waste water drainage system.

Furthermore, the applicant will require a formal approval from the Commission under Section 17K of the State Pollution Control Commission Act for the installation and disposal of the waste water arising from the processing plant.

Should you require further information in regard to this matter may I suggest you contact G. Dover at this office.

Yours faithfully,

J.P. O'GORMAN
for Secretary

15 **Attachment E – Laboratory Summary Tables**

	Lead	Metals						
	Lead	Arsenic	Cadmium	Chromium (III+VI)	Copper	Mercury	Nickel	Zinc
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL	1	4	0.4	1	1	0.1	1	1
NEPM 2013 Table 1A(1) HILs Res A Soil	300	100	20		6000	40	400	7400
NEPM 2013 EILs Urban Res and Open Spaces	1100	100		410	75		75	200

Field_ID	LocCode	Sample_Depth_Range	Sampled_Date-Time	Matrix_Description								
4816/302	4816/302	0.15	10/09/2015		22	4	<0.4	19	8	<0.1	10	58
4816/303	4816/303	0.15	10/09/2015		26	6	<0.4	17	11	<0.1	8	47
4816/304	4816/304	0.15	10/09/2015		21	<4	<0.4	15	9	<0.1	6	100
4816/305	4816/305	0.15	10/09/2015		34	6	1	14	10	<0.1	2	680
4816/306	4816/306	0.15	10/09/2015		6	<4	<0.4	3	3	<0.1	1	50
4816/307	4816/307	0.15	10/09/2015		7	<4	<0.4	4	2	<0.1	1	61
4816/309	4816/309	0.15	10/09/2015		9	<4	<0.4	6	1	<0.1	2	4
4816/311	4816/311	0.15	10/09/2015		7	<4	0.4	5	1	<0.1	1	220
4816/312	4816/312	0.15	10/09/2015		13	4	<0.4	6	7	<0.1	1	73
4816/313	4816/313	0.3	10/09/2015		7	10	<0.4	7	10	<0.1	1	69
4816/314	4816/314	0.15	10/09/2015		11	<4	<0.4	18	2	<0.1	3	7
4816/316	4816/316	0.15	10/09/2015		34	5	<0.4	10	10	<0.1	7	68
4816/317	4816/317	0.15	10/09/2015		16	<4	<0.4	12	6	<0.1	5	330
4816/319	4816/319	0.15	10/09/2015		53	<4	<0.4	10	37	<0.1	4	75
4816/320	4816/320	0.15	10/09/2015		18	14	0.7	46	4	<0.1	5	38

Statistical Summary

Number of Results	15	15	15	15	15	15	15	15
Number of Detects	15	7	3	15	15	0	15	15
Minimum Concentration	6	<4	<0.4	3	1	<0.1	1	4
Minimum Detect	6	4	0.4	3	1	ND	1	4
Maximum Concentration	53	14	1	46	37	<0.1	10	680
Maximum Detect	53	14	1	46	37	ND	10	680
Average Concentration	19	4.3	0.3	13	8.1	0.05	3.8	125
Median Concentration	16	2	0.2	10	7	0.05	3	68
Standard Deviation	13	3.5	0.24	11	8.8	0	2.9	175
Number of Guideline Exceedances	0	0	0	0	0	0	0	3
Number of Guideline Exceedances(Detects Only)	0	0	0	0	0	0	0	3

[illegible][illegible][illegible]

Field Duplicates (SOIL)		SDG	ENVIROLAB 2015-09-11T00:00:00	ENVIROLAB 2015-09-11T00:00:00	ENVIROLAB 2015-09-11T00:00:00	RPD	ENVIROLAB 2015-09-11T00:00:00	RPD
Filter: SDG in 'ENVIRC		Field ID	4816/311	4816/DUP1	4816/DUP2		4816/DUP2	
		Sampled Date/Time	10/09/2015	10/09/2015	10/09/2015		10/09/2015	
Chem	Gr	ChemName	Units	EQL				
Inorganics	Moisture	%						
Lead	Lead	mg/kg	1	13.0	16.0	21	19.0	0
				7.0	8.0	13	13.0	48
Metals	Arsenic	mg/kg	4	<4.0	<4.0	0	4.0	0
	Cadmium	mg/kg	0.4	0.4	0.4	0	<0.4	0
	Chromium	mg/kg	1	5.0	3.0	50	6.0	40
	Copper	mg/kg	1	1.0	2.0	67	7.0	15
	Mercury	mg/kg	0.1	<0.1	<0.1	0	<0.1	0
	Nickel	mg/kg	1	1.0	1.0	0	1.0	0
	Zinc	mg/kg	1	220.0	260.0	17	73.0	30

	A	B	C	D	E	F	G	H	I	J	K	L
1	Lognormal UCL Statistics for Uncensored Full Data Sets											
2												
3	User Selected Options											
4	Date/Time of Computation	21/10/2015 9:41:54 AM										
5	From File	WorkSheet.xls										
6	Full Precision	OFF										
7	Confidence Coefficient	95%										
8	Number of Bootstrap Operations	2000										
9												
10												
11	Zn											
12												
13	General Statistics											
14	Total Number of Observations	15					Number of Distinct Observations					15
15							Number of Missing Observations					0
16	Minimum	4					Mean					125.3
17	Maximum	680					Median					68
18	SD	174.8					Std. Error of Mean					45.13
19	Coefficient of Variation	1.395					Skewness					2.683
20												
21	Lognormal GOF Test											
22	Shapiro Wilk Test Statistic	0.909					Shapiro Wilk Lognormal GOF Test					
23	5% Shapiro Wilk Critical Value	0.881					Data appear Lognormal at 5% Significance Level					
24	Lilliefors Test Statistic	0.211					Lilliefors Lognormal GOF Test					
25	5% Lilliefors Critical Value	0.229					Data appear Lognormal at 5% Significance Level					
26	Data appear Lognormal at 5% Significance Level											
27												
28	Lognormal Statistics											
29	Minimum of Logged Data	1.386					Mean of logged Data					4.152
30	Maximum of Logged Data	6.522					SD of logged Data					1.284
31												
32	Assuming Lognormal Distribution											
33	95% H-UCL	437.9					90% Chebyshev (MVUE) UCL					281.1
34	95% Chebyshev (MVUE) UCL	348.3					97.5% Chebyshev (MVUE) UCL					441.6
35	99% Chebyshev (MVUE) UCL	624.8										
36												
37	Nonparametric Distribution Free UCLs											
38	95% CLT UCL	199.6					95% Jackknife UCL					204.8
39	95% Standard Bootstrap UCL	197.8					95% Bootstrap-t UCL					348.1
40	95% Hall's Bootstrap UCL	464.5					95% Percentile Bootstrap UCL					206.6
41	95% BCA Bootstrap UCL	239.4										
42	90% Chebyshev(Mean, Sd) UCL	260.7					95% Chebyshev(Mean, Sd) UCL					322.1
43	97.5% Chebyshev(Mean, Sd) UCL	407.2					99% Chebyshev(Mean, Sd) UCL					574.4
44												
45	Suggested UCL to Use											
46	95% Chebyshev (Mean, Sd) UCL	322.1										
47												
48	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
49	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
50	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
51	For additional insight the user may want to consult a statistician.											
52												

**16 Attachment F – Laboratory Analytical Certificates and
Chain of Custody Documentation**

SOIL ANALYSIS CHAIN OF CUSTODY FORM

Additional Testing									
Stage 2 – 45 Noongah St and 25 Gwynn Hughes Street, Bargo, NSW									
Name	Grant Taylor			Contact Email	granttaylor@martens.com.au				
Martens Contact Officer	Grant Taylor			Sample Date	10/09/2015	Dispatch Date	11/09/2015	Turnaround Time	standard
Sampling and Shipping	Our Reference			P1504816JCOC02V01			Shipping Method (X)	Hand	Courier
	On Ice (X)			☒	No Ice (X)			☐	Other (X)
	Other (X)			☐	Other (X)			☐	Other (X)
Laboratory									
Name	Envirolab								
Sample Delivery Address	12 Ashley Street, Chatswood								
Delivery Contact	Name	Aileen	Phone	9910 6200	Fax		Email	ahie@envirolabservices.com.au	
Please Send Report By (X)	Post		Fax		Reporting Email Address			granttaylor@martens.com.au & ifulton@martens.com.au	

Sample ID	Sample depth	OCP/OPP	HM	Combo 5b	Asbestos I.D. (WA dept. of health)	Btex	TRH	Asbestos I.D. (Material)	HOLD
4816/302/0.15	0.15			X					
4816/303/0.15	0.15			X					
4816/304/0.15	0.15			X					
4816/305/0.15	0.15			X					
4816/306/0.15	0.15			X					
4816/307/0.15	0.15			X					
4816/309/0.15	0.15			X					
4816/311/0.15	0.15			X					
4816/312/0.15	0.15			X					
4816/313/0.3	0.3			X					
4816/314/0.15	0.15			X					
4816/316/0.15	0.15			X					
4816/317/0.15	0.15			X					
4816/319/0.15	0.15			X					
4816/320/0.15	0.15			X					

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



Job No: 134206

Date Received: 11/09/15
Time Received: 16:30
Received by: O.F.
Temp: Cool/Ambient
Cooling: Ice/icepack
Security: Intact/Broken/None

Head Office
Suite 201, 20 George Street
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	Sample depth	OCP/OPP	HM	Combo 5b	Asbestos I.D. (WA dept. of health)	Btex	TRH	Asbestos I.D. (Material)	HOLD
16	4816/301/0.15	0.15	x							
17	4816/301/0.4	0.4	x							
18	4816/318/0.15	0.15	x							
19	4816/301/0.1	0.1				x				
20	4816/302/0.1	0.1				x				
21	4816/303/0.1	0.1				x				
22	4816/304/0.1	0.1				x				
23	4816/305/0.1	0.1				x				
24	4816/306/0.1	0.1				x				
25	4816/307/0.1	0.1				x				
26	4816/309/0.1	0.1				x				
27	4816/310/0.1	0.1				x				
28	4816/312/0.1	0.1				x				
29	4816/313/0.1	0.1				x				
30	4816/314/0.1	0.1				x				
31	4816/316/0.1	0.1				x				
32	4816/317/0.1	0.1				x				
33	4816/318/0.1	0.1				x				
34	4816/320/0.1	0.1				x				
35	4816/306/ASB1	0.1							x	
36	4816/308/ASB2	312 mg/0.1							x	
37	4816/312/ASB3	0.1							x	
38	4816/DUP1			x						
39	4816/DUP2			x						
40	Trip Blank						x	x		
41	Trip Spike						x	x		

CERTIFICATE OF ANALYSIS

134206

Client:

Martens & Associates Pty Ltd
Suite 201, 20 George St
Hornsby
NSW 2077

Attention: Grant Taylor

Sample log in details:

Your Reference:	P1504816JCOC02V01, Bargo
No. of samples:	38 Soils 3 Materials
Date samples received / completed instructions received	11/09/2015 / 11/09/2015

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:	18/09/15 / 18/09/15
Date of Preliminary Report:	Not 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	134206-1	134206-2	134206-3	134206-4	134206-5
Your Reference	-----	4816/302	4816/303	4816/304	4816/305	4816/306
Depth	-----	0.15	0.15	0.15	0.15	0.15
Date Sampled		10/09/2015	10/09/2015	10/09/2015	10/09/2015	10/09/2015
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	14/09/2015	14/09/2015	14/09/2015	14/09/2015	14/09/2015
Date analysed	-	17/09/2015	17/09/2015	17/09/2015	17/09/2015	17/09/2015
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	%	86	88	90	88	89

vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	134206-6	134206-7	134206-8	134206-9	134206-10
Your Reference	-----	4816/307	4816/309	4816/311	4816/312	4816/313
Depth	-----	0.15	0.15	0.15	0.15	0.3
Date Sampled		10/09/2015	10/09/2015	10/09/2015	10/09/2015	10/09/2015
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	14/09/2015	14/09/2015	14/09/2015	14/09/2015	14/09/2015
Date analysed	-	17/09/2015	17/09/2015	17/09/2015	17/09/2015	17/09/2015
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	%	90	90	90	84	88

vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	134206-11	134206-12	134206-13	134206-14	134206-15
Your Reference	-----	4816/314	4816/316	4816/317	4816/319	4816/320
Depth	-----	0.15	0.15	0.15	0.15	0.15
Date Sampled		10/09/2015	10/09/2015	10/09/2015	10/09/2015	10/09/2015
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	14/09/2015	14/09/2015	14/09/2015	14/09/2015	14/09/2015
Date analysed	-	17/09/2015	17/09/2015	17/09/2015	17/09/2015	17/09/2015
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	%	88	87	89	86	83

vTRH(C6-C10)/BTEXN in Soil			
Our Reference:	UNITS	134206-40	134206-41
Your Reference	-----	Trip Blank	Trip Spike
Depth	-----	-	-
Date Sampled		10/09/2015	10/09/2015
Type of sample		Soil	Soil
Date extracted	-	14/09/2015	14/09/2015
Date analysed	-	17/09/2015	17/09/2015
TRHC ₆ - C ₉	mg/kg	<25	[NA]
TRHC ₆ - C ₁₀	mg/kg	<25	[NA]
Benzene	mg/kg	<0.2	99%
Toluene	mg/kg	<0.5	98%
Ethylbenzene	mg/kg	<1	98%
m+p-xylene	mg/kg	<2	97%
o-Xylene	mg/kg	<1	98%
Surrogate aaa-Trifluorotoluene	%	94	74

svTRH (C10-C40) in Soil						
Our Reference:	UNITS	134206-1	134206-2	134206-3	134206-4	134206-5
Your Reference	-----	4816/302	4816/303	4816/304	4816/305	4816/306
Depth	-----	0.15	0.15	0.15	0.15	0.15
Date Sampled		10/09/2015	10/09/2015	10/09/2015	10/09/2015	10/09/2015
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	14/09/2015	14/09/2015	14/09/2015	14/09/2015	14/09/2015
Date analysed	-	14/09/2015	14/09/2015	14/09/2015	14/09/2015	15/09/2015
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	%	98	94	93	99	90

svTRH (C10-C40) in Soil						
Our Reference:	UNITS	134206-6	134206-7	134206-8	134206-9	134206-10
Your Reference	-----	4816/307	4816/309	4816/311	4816/312	4816/313
Depth	-----	0.15	0.15	0.15	0.15	0.3
Date Sampled		10/09/2015	10/09/2015	10/09/2015	10/09/2015	10/09/2015
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	14/09/2015	14/09/2015	14/09/2015	14/09/2015	14/09/2015
Date analysed	-	15/09/2015	15/09/2015	15/09/2015	15/09/2015	15/09/2015
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	%	89	92	90	94	98

svTRH (C10-C40) in Soil						
Our Reference:	UNITS	134206-11	134206-12	134206-13	134206-14	134206-15
Your Reference	-----	4816/314	4816/316	4816/317	4816/319	4816/320
Depth	-----	0.15	0.15	0.15	0.15	0.15
Date Sampled		10/09/2015	10/09/2015	10/09/2015	10/09/2015	10/09/2015
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	14/09/2015	14/09/2015	14/09/2015	14/09/2015	14/09/2015
Date analysed	-	15/09/2015	15/09/2015	15/09/2015	15/09/2015	15/09/2015
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	200	<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	190	<100	<100	<100
TRH>C ₃₄ -C ₄₀	mg/kg	<100	150	<100	<100	<100
Surrogate o-Terphenyl	%	96	104	93	104	115

PAHs in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ----- -----	134206-1 4816/302 0.15 10/09/2015 Soil	134206-2 4816/303 0.15 10/09/2015 Soil	134206-3 4816/304 0.15 10/09/2015 Soil	134206-4 4816/305 0.15 10/09/2015 Soil	134206-5 4816/306 0.15 10/09/2015 Soil
Date extracted	-	14/09/2015	14/09/2015	14/09/2015	14/09/2015	14/09/2015
Date analysed	-	14/09/2015	14/09/2015	14/09/2015	14/09/2015	14/09/2015
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Total Positive PAHs	mg/kg	NIL (+)VE	NIL (+)VE	0.23	NIL (+)VE	NIL (+)VE
Surrogate p-Terphenyl-d14	%	109	101	101	104	99

PAHs in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ----- -----	134206-6 4816/307 0.15 10/09/2015 Soil	134206-7 4816/309 0.15 10/09/2015 Soil	134206-8 4816/311 0.15 10/09/2015 Soil	134206-9 4816/312 0.15 10/09/2015 Soil	134206-10 4816/313 0.3 10/09/2015 Soil
Date extracted	-	14/09/2015	14/09/2015	14/09/2015	14/09/2015	14/09/2015
Date analysed	-	14/09/2015	14/09/2015	14/09/2015	14/09/2015	14/09/2015
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Total Positive PAHs	mg/kg	NIL (+)VE	NIL (+)VE	NIL (+)VE	NIL (+)VE	NIL (+)VE
Surrogate p-Terphenyl-d14	%	79	100	101	100	104

PAHs in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ----- -----	134206-11 4816/314 0.15 10/09/2015 Soil	134206-12 4816/316 0.15 10/09/2015 Soil	134206-13 4816/317 0.15 10/09/2015 Soil	134206-14 4816/319 0.15 10/09/2015 Soil	134206-15 4816/320 0.15 10/09/2015 Soil
Date extracted	-	14/09/2015	14/09/2015	14/09/2015	14/09/2015	14/09/2015
Date analysed	-	14/09/2015	14/09/2015	14/09/2015	14/09/2015	14/09/2015
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	0.5	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Total Positive PAHs	mg/kg	NIL (+)VE	0.77	NIL (+)VE	NIL (+)VE	NIL (+)VE
Surrogate p-Terphenyl-d14	%	102	103	105	114	107

Organochlorine Pesticides in soil						
Our Reference:	UNITS	134206-1	134206-2	134206-3	134206-4	134206-5
Your Reference	-----	4816/302	4816/303	4816/304	4816/305	4816/306
Depth	-----	0.15	0.15	0.15	0.15	0.15
Date Sampled		10/09/2015	10/09/2015	10/09/2015	10/09/2015	10/09/2015
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	14/09/2015	14/09/2015	14/09/2015	14/09/2015	14/09/2015
Date analysed	-	16/09/2015	16/09/2015	16/09/2015	16/09/2015	16/09/2015
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	100	95	93	97	98

Organochlorine Pesticides in soil						
Our Reference:	UNITS	134206-6	134206-7	134206-8	134206-9	134206-10
Your Reference	-----	4816/307	4816/309	4816/311	4816/312	4816/313
Depth	-----	0.15	0.15	0.15	0.15	0.3
Date Sampled		10/09/2015	10/09/2015	10/09/2015	10/09/2015	10/09/2015
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	14/09/2015	14/09/2015	14/09/2015	14/09/2015	14/09/2015
Date analysed	-	16/09/2015	16/09/2015	16/09/2015	16/09/2015	16/09/2015
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	92	97	94	98	97

Organochlorine Pesticides in soil						
Our Reference:	UNITS	134206-11	134206-12	134206-13	134206-14	134206-15
Your Reference	-----	4816/314	4816/316	4816/317	4816/319	4816/320
Depth	-----	0.15	0.15	0.15	0.15	0.15
Date Sampled		10/09/2015	10/09/2015	10/09/2015	10/09/2015	10/09/2015
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	14/09/2015	14/09/2015	14/09/2015	14/09/2015	14/09/2015
Date analysed	-	16/09/2015	16/09/2015	16/09/2015	16/09/2015	16/09/2015
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	92	95	95	107	95

Organochlorine Pesticides in soil				
Our Reference:	UNITS	134206-16	134206-17	134206-18
Your Reference	-----	4816/301	4816/301	4816/318
Depth	-----	0.15	0.4	0.15
Date Sampled		10/09/2015	10/09/2015	10/09/2015
Type of sample		Soil	Soil	Soil
Date extracted	-	14/09/2015	14/09/2015	14/09/2015
Date analysed	-	16/09/2015	16/09/2015	16/09/2015
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	%	90	92	97

Organophosphorus Pesticides						
Our Reference:	UNITS	134206-1	134206-2	134206-3	134206-4	134206-5
Your Reference	-----	4816/302	4816/303	4816/304	4816/305	4816/306
Depth	-----	0.15	0.15	0.15	0.15	0.15
Date Sampled		10/09/2015	10/09/2015	10/09/2015	10/09/2015	10/09/2015
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	14/09/2015	14/09/2015	14/09/2015	14/09/2015	14/09/2015
Date analysed	-	16/09/2015	16/09/2015	16/09/2015	16/09/2015	16/09/2015
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyrifos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyrifos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	100	95	93	97	98

Organophosphorus Pesticides						
Our Reference:	UNITS	134206-6	134206-7	134206-8	134206-9	134206-10
Your Reference	-----	4816/307	4816/309	4816/311	4816/312	4816/313
Depth	-----	0.15	0.15	0.15	0.15	0.3
Date Sampled		10/09/2015	10/09/2015	10/09/2015	10/09/2015	10/09/2015
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	14/09/2015	14/09/2015	14/09/2015	14/09/2015	14/09/2015
Date analysed	-	16/09/2015	16/09/2015	16/09/2015	16/09/2015	16/09/2015
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyrifos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyrifos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	92	97	94	98	97

Organophosphorus Pesticides						
Our Reference:	UNITS	134206-11	134206-12	134206-13	134206-14	134206-15
Your Reference	-----	4816/314	4816/316	4816/317	4816/319	4816/320
Depth	-----	0.15	0.15	0.15	0.15	0.15
Date Sampled		10/09/2015	10/09/2015	10/09/2015	10/09/2015	10/09/2015
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	14/09/2015	14/09/2015	14/09/2015	14/09/2015	14/09/2015
Date analysed	-	16/09/2015	16/09/2015	16/09/2015	16/09/2015	16/09/2015
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyrifos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyrifos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	92	95	95	107	95

Organophosphorus Pesticides				
Our Reference:	UNITS	134206-16	134206-17	134206-18
Your Reference	-----	4816/301	4816/301	4816/318
Depth	-----	0.15	0.4	0.15
Date Sampled		10/09/2015	10/09/2015	10/09/2015
Type of sample		Soil	Soil	Soil
Date extracted	-	14/09/2015	14/09/2015	14/09/2015
Date analysed	-	16/09/2015	16/09/2015	16/09/2015
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1
Chlorpyrifos	mg/kg	<0.1	<0.1	<0.1
Chlorpyrifos-methyl	mg/kg	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1
Dichlorvos	mg/kg	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1
Surrogate TCMX	%	90	92	97

Acid Extractable metals in soil						
Our Reference:	UNITS	134206-1	134206-2	134206-3	134206-4	134206-5
Your Reference	-----	4816/302	4816/303	4816/304	4816/305	4816/306
Depth	-----	0.15	0.15	0.15	0.15	0.15
Date Sampled		10/09/2015	10/09/2015	10/09/2015	10/09/2015	10/09/2015
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	14/09/2015	14/09/2015	14/09/2015	14/09/2015	14/09/2015
Date analysed	-	15/09/2015	15/09/2015	15/09/2015	15/09/2015	15/09/2015
Arsenic	mg/kg	4	6	<4	6	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	1	<0.4
Chromium	mg/kg	19	17	15	14	3
Copper	mg/kg	8	11	9	10	3
Lead	mg/kg	22	26	21	34	6
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	10	8	6	2	1
Zinc	mg/kg	58	47	100	680	50

Acid Extractable metals in soil						
Our Reference:	UNITS	134206-6	134206-7	134206-8	134206-9	134206-10
Your Reference	-----	4816/307	4816/309	4816/311	4816/312	4816/313
Depth	-----	0.15	0.15	0.15	0.15	0.3
Date Sampled		10/09/2015	10/09/2015	10/09/2015	10/09/2015	10/09/2015
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	14/09/2015	14/09/2015	14/09/2015	14/09/2015	14/09/2015
Date analysed	-	15/09/2015	15/09/2015	15/09/2015	15/09/2015	15/09/2015
Arsenic	mg/kg	<4	<4	<4	4	10
Cadmium	mg/kg	<0.4	<0.4	0.4	<0.4	<0.4
Chromium	mg/kg	4	6	5	6	7
Copper	mg/kg	2	1	1	7	10
Lead	mg/kg	7	9	7	13	7
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	1	2	1	1	1
Zinc	mg/kg	61	4	220	73	69

Acid Extractable metals in soil						
Our Reference:	UNITS	134206-11	134206-12	134206-13	134206-14	134206-15
Your Reference	-----	4816/314	4816/316	4816/317	4816/319	4816/320
Depth	-----	0.15	0.15	0.15	0.15	0.15
Date Sampled		10/09/2015	10/09/2015	10/09/2015	10/09/2015	10/09/2015
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	14/09/2015	14/09/2015	14/09/2015	14/09/2015	14/09/2015
Date analysed	-	15/09/2015	15/09/2015	15/09/2015	15/09/2015	15/09/2015
Arsenic	mg/kg	<4	5	<4	<4	14
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	0.7
Chromium	mg/kg	18	10	12	10	46
Copper	mg/kg	2	10	6	37	4
Lead	mg/kg	11	34	16	53	18
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	3	7	5	4	5
Zinc	mg/kg	7	68	330	75	38

Acid Extractable metals in soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ----- -----	134206-38 4816/DUP1 - 10/09/2015 Soil	134206-39 4816/DUP2 - 10/09/2015 Soil	134206-42 4816/314 - TRIPLICATE 0.15 10/09/2015 Soil
Date prepared	-	14/09/2015	14/09/2015	14/09/2015
Date analysed	-	15/09/2015	15/09/2015	15/09/2015
Arsenic	mg/kg	<4	<4	5
Cadmium	mg/kg	0.4	<0.4	<0.4
Chromium	mg/kg	3	4	19
Copper	mg/kg	2	6	1
Lead	mg/kg	8	8	12
Mercury	mg/kg	<0.1	<0.1	<0.1
Nickel	mg/kg	1	1	3
Zinc	mg/kg	260	54	6

Moisture						
Our Reference:	UNITS	134206-1	134206-2	134206-3	134206-4	134206-5
Your Reference	-----	4816/302	4816/303	4816/304	4816/305	4816/306
Depth	-----	0.15	0.15	0.15	0.15	0.15
Date Sampled		10/09/2015	10/09/2015	10/09/2015	10/09/2015	10/09/2015
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	14/09/2015	14/09/2015	14/09/2015	14/09/2015	14/09/2015
Date analysed	-	15/09/2015	15/09/2015	15/09/2015	15/09/2015	15/09/2015
Moisture	%	23	18	23	21	9.2

Moisture						
Our Reference:	UNITS	134206-6	134206-7	134206-8	134206-9	134206-10
Your Reference	-----	4816/307	4816/309	4816/311	4816/312	4816/313
Depth	-----	0.15	0.15	0.15	0.15	0.3
Date Sampled		10/09/2015	10/09/2015	10/09/2015	10/09/2015	10/09/2015
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	14/09/2015	14/09/2015	14/09/2015	14/09/2015	14/09/2015
Date analysed	-	15/09/2015	15/09/2015	15/09/2015	15/09/2015	15/09/2015
Moisture	%	6.2	15	13	19	33

Moisture						
Our Reference:	UNITS	134206-11	134206-12	134206-13	134206-14	134206-15
Your Reference	-----	4816/314	4816/316	4816/317	4816/319	4816/320
Depth	-----	0.15	0.15	0.15	0.15	0.15
Date Sampled		10/09/2015	10/09/2015	10/09/2015	10/09/2015	10/09/2015
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	14/09/2015	14/09/2015	14/09/2015	14/09/2015	14/09/2015
Date analysed	-	15/09/2015	15/09/2015	15/09/2015	15/09/2015	15/09/2015
Moisture	%	17	17	22	26	21

Moisture						
Our Reference:	UNITS	134206-16	134206-17	134206-18	134206-38	134206-39
Your Reference	-----	4816/301	4816/301	4816/318	4816/DUP1	4816/DUP2
Depth	-----	0.15	0.4	0.15	-	-
Date Sampled		10/09/2015	10/09/2015	10/09/2015	10/09/2015	10/09/2015
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	14/09/2015	14/09/2015	14/09/2015	14/09/2015	14/09/2015
Date analysed	-	15/09/2015	15/09/2015	15/09/2015	15/09/2015	15/09/2015
Moisture	%	15	18	17	16	19

Moisture		
Our Reference:	UNITS	134206-40
Your Reference	-----	TripBlank
Depth	-----	-
Date Sampled		10/09/2015
Type of sample		Soil
Date prepared	-	14/09/2015
Date analysed	-	15/09/2015
Moisture	%	0.9

Asbestos ID - soils NEPM*						
Our Reference:	UNITS	134206-19	134206-20	134206-21	134206-22	134206-23
Your Reference	-----	4816/301	4816/302	4816/303	4816/304	4816/305
Depth	-----	0.1	0.1	0.1	0.1	0.1
Date Sampled		10/09/2015	10/09/2015	10/09/2015	10/09/2015	10/09/2015
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	17- 18/09/2015	17- 18/09/2015	17- 18/09/2015	17- 18/09/2015	17- 18/09/2015
Sample mass tested	g	576.25g	923.87g	604.10g	914.46g	712.13g
Sample Description	-	Brown coarse- grained soil & rocks	Brown coarse- grained soil & rocks	Brown coarse- grained soil & rocks	Brown fine- grained soil & rocks	Brown coarse- grained soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected
ACM >7mm Estimation*	g	--	--	--	--	--
ACM <7mm Estimation*	g	--	--	--	--	--
FA and AF Estimation*	g	--	--	--	--	--
Total Asbestos g/kg*	g/kg	<0.1	<0.1	<0.1	<0.1	<0.1
ACM >7mm Estimation %(w/w)*	%	<0.01	<0.01	<0.01	<0.01	<0.01
ACM <7mm Estimation %(w/w)*	%	<0.001	<0.001	<0.001	<0.001	<0.001
FA and AF Estimation %(w/w)*	%	<0.001	<0.001	<0.001	<0.001	<0.001
Total Asb Est w/w* Note [#]	%	<0.001	<0.001	<0.001	<0.001	<0.001

Asbestos ID - soils NEPM*						
Our Reference:	UNITS	134206-24	134206-25	134206-26	134206-27	134206-28
Your Reference	-----	4816/306	4816/307	4816/309	4816/310	4816/312
Depth	-----	0.1	0.1	0.1	0.1	0.1
Date Sampled		10/09/2015	10/09/2015	10/09/2015	10/09/2015	10/09/2015
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	17- 18/09/2015	17- 18/09/2015	17- 18/09/2015	17- 18/09/2015	17- 18/09/2015
Sample mass tested	g	968.53g	570.90g	674.43g	855.76g	688.75g
Sample Description	-	Brown coarse- grained sandy soil	Brown fine- grained soil & rocks	Brown coarse- grained soil & rocks	Brown coarse- grained soil & rocks	Brown fine- grained soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected
ACM >7mm Estimation*	g	--	--	--	--	--
ACM <7mm Estimation*	g	--	--	--	--	--
FA and AF Estimation*	g	--	--	--	--	--
Total Asbestos g/kg*	g/kg	<0.1	<0.1	<0.1	<0.1	<0.1
ACM >7mm Estimation %(w/w)*	%	<0.01	<0.01	<0.01	<0.01	<0.01
ACM <7mm Estimation %(w/w)*	%	<0.001	<0.001	<0.001	<0.001	<0.001
FA and AF Estimation %(w/w)*	%	<0.001	<0.001	<0.001	<0.001	<0.001
Total Asb Est w/w* Note [#]	%	<0.001	<0.001	<0.001	<0.001	<0.001

Asbestos ID - soils NEPM*						
Our Reference:	UNITS	134206-29	134206-30	134206-31	134206-32	134206-33
Your Reference	-----	4816/313	4816/314	4816/316	4816/317	4816/318
Depth	-----	0.1	0.1	0.1	0.1	0.1
Date Sampled		10/09/2015	10/09/2015	10/09/2015	10/09/2015	10/09/2015
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	17- 18/09/2015	17- 18/09/2015	17- 18/09/2015	17- 18/09/2015	17- 18/09/2015
Sample mass tested	g	1242.96g	839.64g	637.00g	673.47g	684.34g
Sample Description	-	Brown coarse- grained clayey soil	Brown fine- grained soil & rocks	Brown fine- grained soil & rocks	Brown fine- grained soil & rocks	Brown coarse- grained soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected
ACM >7mm Estimation*	g	--	--	--	--	--
ACM <7mm Estimation*	g	--	--	--	--	--
FA and AF Estimation*	g	--	--	--	--	--
Total Asbestos g/kg*	g/kg	<0.1	<0.1	<0.1	<0.1	<0.1
ACM >7mm Estimation %(w/w)*	%	<0.01	<0.01	<0.01	<0.01	<0.01
ACM <7mm Estimation %(w/w)*	%	<0.001	<0.001	<0.001	<0.001	<0.001
FA and AF Estimation %(w/w)*	%	<0.001	<0.001	<0.001	<0.001	<0.001
Total Asb Est w/w* Note [#]	%	<0.001	<0.001	<0.001	<0.001	<0.001

Asbestos ID - soils NEPM*		
Our Reference:	UNITS	134206-34
Your Reference	-----	4816/320
Depth	-----	0.1
Date Sampled		10/09/2015
Type of sample		Soil
Date analysed	-	17- 18/09/2015
Sample mass tested	g	948.00g
Sample Description	-	Brown coarse- grained soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected
ACM >7mm Estimation*	g	--
ACM <7mm Estimation*	g	--
FA and AF Estimation*	g	--
Total Asbestos g/kg*	g/kg	<0.1
ACM >7mm Estimation %(w/w)*	%	<0.01
ACM <7mm Estimation %(w/w)*	%	<0.001
FA and AF Estimation %(w/w)*	%	<0.001
Total Asb Est w/w* Note [#]	%	<0.001

Asbestos ID - materials				
Our Reference:	UNITS	134206-35	134206-36	134206-37
Your Reference	-----	4816/306/AS	4816/306/AS	4816/312/AS
		B1	B2	B3
Depth	-----	0.1	0.1	0.1
Date Sampled		10/09/2015	10/09/2015	10/09/2015
Type of sample		Material	Material	Material
Date analysed	-	17/09/2015	17/09/2015	17/09/2015
Mass / Dimension of Sample	-	65x45x5mm	140x35x7mm	100x36x5mm
Sample Description	-	Grey compressed fibre cement material	Grey compressed fibre cement material	Grey compressed fibre cement material
Asbestos ID in materials	-	Chrysotile asbestos detected	Chrysotile asbestos detected	Chrysotile asbestos detected

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 (HSLs Tables 1A (3, 4)). 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. For soil results:- 1. 'TEQ PQL' values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'TEQ zero' values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'TEQ half PQL' values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-008	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
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.
ASB-001	Asbestos ID - Identification of asbestos in soil samples using Polarised Light Microscopy and Dispersion Staining Techniques. Minimum 500mL soil sample was analysed as recommended by "National Environment Protection (Assessment of site contamination) Measure, Schedule B1 and "The Guidelines from the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia - May 2009" with a reporting limit of 0.1g/kg (0.01% w/w) as per Australian Standard AS4964-2004. Results reported denoted with * are outside our scope of NATA accreditation. NOTE # The screening level of 0.001% w/w asbestos in soil for FA and AF only applies where the FA and AF are able to be quantified by gravimetric procedures. This screening level is not applicable to free fibres. Results reported with "--" is equivalent to no visible asbestos identified using Polarised Light Microscopy and Dispersion Staining Techniques.
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.

Client Reference: P1504816JCOC02V01, Bargo

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	-			14/09/2015	134206-1	14/09/2015 14/09/2015	LCS-6	14/09/2015
Date analysed	-			17/09/2015	134206-1	17/09/2015 17/09/2015	LCS-6	17/09/2015
TRHC ₆ - C ₉	mg/kg	25	Org-016	<25	134206-1	<25 <25	LCS-6	102%
TRHC ₆ - C ₁₀	mg/kg	25	Org-016	<25	134206-1	<25 <25	LCS-6	102%
Benzene	mg/kg	0.2	Org-016	<0.2	134206-1	<0.2 <0.2	LCS-6	90%
Toluene	mg/kg	0.5	Org-016	<0.5	134206-1	<0.5 <0.5	LCS-6	94%
Ethylbenzene	mg/kg	1	Org-016	<1	134206-1	<1 <1	LCS-6	107%
m+p-xylene	mg/kg	2	Org-016	<2	134206-1	<2 <2	LCS-6	109%
o-Xylene	mg/kg	1	Org-016	<1	134206-1	<1 <1	LCS-6	106%
naphthalene	mg/kg	1	Org-014	<1	134206-1	<1 <1	[NR]	[NR]
Surrogate aaa-Trifluorotoluene	%		Org-016	94	134206-1	86 88 RPD: 2	LCS-6	96%
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	-			14/09/2015	134206-1	14/09/2015 14/09/2015	LCS-6	14/09/2015
Date analysed	-			14/09/2015	134206-1	14/09/2015 14/09/2015	LCS-6	14/09/2015
TRHC ₁₀ - C ₁₄	mg/kg	50	Org-003	<50	134206-1	<50 <50	LCS-6	116%
TRHC ₁₅ - C ₂₈	mg/kg	100	Org-003	<100	134206-1	<100 <100	LCS-6	109%
TRHC ₂₈ - C ₃₆	mg/kg	100	Org-003	<100	134206-1	<100 <100	LCS-6	87%
TRH>C ₁₀ -C ₁₆	mg/kg	50	Org-003	<50	134206-1	<50 <50	LCS-6	116%
TRH>C ₁₆ -C ₃₄	mg/kg	100	Org-003	<100	134206-1	<100 <100	LCS-6	109%
TRH>C ₃₄ -C ₄₀	mg/kg	100	Org-003	<100	134206-1	<100 <100	LCS-6	87%
Surrogate o-Terphenyl	%		Org-003	95	134206-1	98 98 RPD: 0	LCS-6	105%
QUALITY CONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
PAHs in Soil						Base II Duplicate II %RPD		
Date extracted	-			14/09/2015	134206-1	14/09/2015 14/09/2015	LCS-6	14/09/2015
Date analysed	-			14/09/2015	134206-1	14/09/2015 14/09/2015	LCS-6	14/09/2015
Naphthalene	mg/kg	0.1	Org-012 subset	<0.1	134206-1	<0.1 <0.1	LCS-6	95%
Acenaphthylene	mg/kg	0.1	Org-012 subset	<0.1	134206-1	<0.1 <0.1	[NR]	[NR]
Acenaphthene	mg/kg	0.1	Org-012 subset	<0.1	134206-1	<0.1 <0.1	[NR]	[NR]
Fluorene	mg/kg	0.1	Org-012 subset	<0.1	134206-1	<0.1 <0.1	LCS-6	88%
Phenanthrene	mg/kg	0.1	Org-012 subset	<0.1	134206-1	<0.1 <0.1	LCS-6	98%
Anthracene	mg/kg	0.1	Org-012 subset	<0.1	134206-1	<0.1 <0.1	[NR]	[NR]
Fluoranthene	mg/kg	0.1	Org-012 subset	<0.1	134206-1	<0.1 <0.1	LCS-6	96%

Client Reference: P1504816JCOC02V01, Bargo

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	134206-1	<0.1 <0.1	LCS-6	102%
Benzo(a)anthracene	mg/kg	0.1	Org-012 subset	<0.1	134206-1	<0.1 <0.1	[NR]	[NR]
Chrysene	mg/kg	0.1	Org-012 subset	<0.1	134206-1	<0.1 <0.1	LCS-6	96%
Benzo(b,j+k) fluoranthene	mg/kg	0.2	Org-012 subset	<0.2	134206-1	<0.2 <0.2	[NR]	[NR]
Benzo(a)pyrene	mg/kg	0.05	Org-012 subset	<0.05	134206-1	<0.05 <0.05	LCS-6	109%
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012 subset	<0.1	134206-1	<0.1 <0.1	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012 subset	<0.1	134206-1	<0.1 <0.1	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012 subset	<0.1	134206-1	<0.1 <0.1	[NR]	[NR]
Surrogate p-Terphenyl-d14	%		Org-012 subset	102	134206-1	109 104 RPD: 5	LCS-6	109%
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	-			14/09/2015	134206-1	14/09/2015 14/09/2015	LCS-6	14/09/2015
Date analysed	-			16/09/2015	134206-1	16/09/2015 16/09/2015	LCS-6	16/09/2015
HCB	mg/kg	0.1	Org-005	<0.1	134206-1	<0.1 <0.1	[NR]	[NR]
alpha-BHC	mg/kg	0.1	Org-005	<0.1	134206-1	<0.1 <0.1	LCS-6	78%
gamma-BHC	mg/kg	0.1	Org-005	<0.1	134206-1	<0.1 <0.1	[NR]	[NR]
beta-BHC	mg/kg	0.1	Org-005	<0.1	134206-1	<0.1 <0.1	LCS-6	93%
Heptachlor	mg/kg	0.1	Org-005	<0.1	134206-1	<0.1 <0.1	LCS-6	83%
delta-BHC	mg/kg	0.1	Org-005	<0.1	134206-1	<0.1 <0.1	[NR]	[NR]
Aldrin	mg/kg	0.1	Org-005	<0.1	134206-1	<0.1 <0.1	LCS-6	78%
Heptachlor Epoxide	mg/kg	0.1	Org-005	<0.1	134206-1	<0.1 <0.1	LCS-6	97%
gamma-Chlordane	mg/kg	0.1	Org-005	<0.1	134206-1	<0.1 <0.1	[NR]	[NR]
alpha-chlordane	mg/kg	0.1	Org-005	<0.1	134206-1	<0.1 <0.1	[NR]	[NR]
Endosulfan I	mg/kg	0.1	Org-005	<0.1	134206-1	<0.1 <0.1	[NR]	[NR]
pp-DDE	mg/kg	0.1	Org-005	<0.1	134206-1	<0.1 <0.1	LCS-6	99%
Dieldrin	mg/kg	0.1	Org-005	<0.1	134206-1	<0.1 <0.1	LCS-6	106%
Endrin	mg/kg	0.1	Org-005	<0.1	134206-1	<0.1 <0.1	LCS-6	115%
pp-DDD	mg/kg	0.1	Org-005	<0.1	134206-1	<0.1 <0.1	LCS-6	97%
Endosulfan II	mg/kg	0.1	Org-005	<0.1	134206-1	<0.1 <0.1	[NR]	[NR]
pp-DDT	mg/kg	0.1	Org-005	<0.1	134206-1	<0.1 <0.1	[NR]	[NR]
Endrin Aldehyde	mg/kg	0.1	Org-005	<0.1	134206-1	<0.1 <0.1	[NR]	[NR]
Endosulfan Sulphate	mg/kg	0.1	Org-005	<0.1	134206-1	<0.1 <0.1	LCS-6	68%
Methoxychlor	mg/kg	0.1	Org-005	<0.1	134206-1	<0.1 <0.1	[NR]	[NR]
Surrogate TCMX	%		Org-005	97	134206-1	100 100 RPD: 0	LCS-6	112%

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QUALITY CONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
Organophosphorus Pesticides						Base II Duplicate II %RPD		
Date extracted	-			14/09/2015	134206-1	14/09/2015 14/09/2015	LCS-6	14/09/2015
Date analysed	-			16/09/2015	134206-1	16/09/2015 16/09/2015	LCS-6	16/09/2015
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-008	<0.1	134206-1	<0.1 <0.1	LCS-6	82%
Bromophos-ethyl	mg/kg	0.1	Org-008	<0.1	134206-1	<0.1 <0.1	[NR]	[NR]
Chlorpyrifos	mg/kg	0.1	Org-008	<0.1	134206-1	<0.1 <0.1	LCS-6	84%
Chlorpyrifos-methyl	mg/kg	0.1	Org-008	<0.1	134206-1	<0.1 <0.1	[NR]	[NR]
Diazinon	mg/kg	0.1	Org-008	<0.1	134206-1	<0.1 <0.1	[NR]	[NR]
Dichlorvos	mg/kg	0.1	Org-008	<0.1	134206-1	<0.1 <0.1	LCS-6	90%
Dimethoate	mg/kg	0.1	Org-008	<0.1	134206-1	<0.1 <0.1	[NR]	[NR]
Ethion	mg/kg	0.1	Org-008	<0.1	134206-1	<0.1 <0.1	LCS-6	83%
Fenitrothion	mg/kg	0.1	Org-008	<0.1	134206-1	<0.1 <0.1	LCS-6	110%
Malathion	mg/kg	0.1	Org-008	<0.1	134206-1	<0.1 <0.1	LCS-6	82%
Parathion	mg/kg	0.1	Org-008	<0.1	134206-1	<0.1 <0.1	LCS-6	107%
Ronnel	mg/kg	0.1	Org-008	<0.1	134206-1	<0.1 <0.1	[NR]	[NR]
Surrogate TCMX	%		Org-008	97	134206-1	100 100 RPD: 0	LCS-6	112%
QUALITY CONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
Acid Extractable metals in soil						Base II Duplicate II %RPD		
Date prepared	-			14/09/2015	134206-1	14/09/2015 14/09/2015	LCS-1	14/09/2015
Date analysed	-			15/09/2015	134206-1	15/09/2015 15/09/2015	LCS-1	15/09/2015
Arsenic	mg/kg	4	Metals-020 ICP-AES	<4	134206-1	4 5 RPD: 22	LCS-1	121%
Cadmium	mg/kg	0.4	Metals-020 ICP-AES	<0.4	134206-1	<0.4 <0.4	LCS-1	114%
Chromium	mg/kg	1	Metals-020 ICP-AES	<1	134206-1	19 19 RPD: 0	LCS-1	116%
Copper	mg/kg	1	Metals-020 ICP-AES	<1	134206-1	8 9 RPD: 12	LCS-1	114%
Lead	mg/kg	1	Metals-020 ICP-AES	<1	134206-1	22 23 RPD: 4	LCS-1	114%
Mercury	mg/kg	0.1	Metals-021 CV-AAS	<0.1	134206-1	<0.1 <0.1	LCS-1	106%
Nickel	mg/kg	1	Metals-020 ICP-AES	<1	134206-1	10 11 RPD: 10	LCS-1	112%
Zinc	mg/kg	1	Metals-020 ICP-AES	<1	134206-1	58 56 RPD: 4	LCS-1	115%

Client Reference: P1504816JCOC02V01, Bargo

QUALITY CONTROL vTRH(C6-C10)/BTEXN in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	134206-11	14/09/2015 14/09/2015	134206-2	14/09/2015
Date analysed	-	134206-11	17/09/2015 17/09/2015	134206-2	17/09/2015
TRHC ₆ - C ₉	mg/kg	134206-11	<25 <25	134206-2	96%
TRHC ₆ - C ₁₀	mg/kg	134206-11	<25 <25	134206-2	96%
Benzene	mg/kg	134206-11	<0.2 <0.2	134206-2	84%
Toluene	mg/kg	134206-11	<0.5 <0.5	134206-2	90%
Ethylbenzene	mg/kg	134206-11	<1 <1	134206-2	101%
m+p-xylene	mg/kg	134206-11	<2 <2	134206-2	103%
o-Xylene	mg/kg	134206-11	<1 <1	134206-2	100%
naphthalene	mg/kg	134206-11	<1 <1	[NR]	[NR]
Surrogate aaa- Trifluorotoluene	%	134206-11	88 86 RPD: 2	134206-2	90%
QUALITY CONTROL svTRH (C10-C40) in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	134206-11	14/09/2015 14/09/2015	134206-2	14/09/2015
Date analysed	-	134206-11	15/09/2015 15/09/2015	134206-2	14/09/2015
TRHC ₁₀ - C ₁₄	mg/kg	134206-11	<50 <50	134206-2	119%
TRHC ₁₅ - C ₂₈	mg/kg	134206-11	<100 <100	134206-2	99%
TRHC ₂₉ - C ₃₆	mg/kg	134206-11	<100 <100	134206-2	74%
TRH>C ₁₀ -C ₁₆	mg/kg	134206-11	<50 <50	134206-2	119%
TRH>C ₁₆ -C ₃₄	mg/kg	134206-11	<100 <100	134206-2	99%
TRH>C ₃₄ -C ₄₀	mg/kg	134206-11	<100 <100	134206-2	74%
Surrogate o-Terphenyl	%	134206-11	96 92 RPD: 4	134206-2	99%
QUALITY CONTROL PAHs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	134206-11	14/09/2015 14/09/2015	134206-2	14/09/2015
Date analysed	-	134206-11	14/09/2015 14/09/2015	134206-2	14/09/2015
Naphthalene	mg/kg	134206-11	<0.1 <0.1	134206-2	90%
Acenaphthylene	mg/kg	134206-11	<0.1 <0.1	[NR]	[NR]
Acenaphthene	mg/kg	134206-11	<0.1 <0.1	[NR]	[NR]
Fluorene	mg/kg	134206-11	<0.1 <0.1	134206-2	84%
Phenanthrene	mg/kg	134206-11	<0.1 <0.1	134206-2	95%
Anthracene	mg/kg	134206-11	<0.1 <0.1	[NR]	[NR]
Fluoranthene	mg/kg	134206-11	<0.1 <0.1	134206-2	92%
Pyrene	mg/kg	134206-11	<0.1 <0.1	134206-2	98%
Benzo(a)anthracene	mg/kg	134206-11	<0.1 <0.1	[NR]	[NR]
Chrysene	mg/kg	134206-11	<0.1 <0.1	134206-2	92%
Benzo(b,j+k)fluoranthene	mg/kg	134206-11	<0.2 <0.2	[NR]	[NR]
Benzo(a)pyrene	mg/kg	134206-11	<0.05 <0.05	134206-2	103%
Indeno(1,2,3-c,d)pyrene	mg/kg	134206-11	<0.1 <0.1	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	134206-11	<0.1 <0.1	[NR]	[NR]

QUALITY CONTROL PAHs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Benzo(g,h,i)perylene	mg/kg	134206-11	<0.1 <0.1	[NR]	[NR]
Surrogate p-Terphenyl-d14	%	134206-11	102 104 RPD: 2	134206-2	99%
QUALITY CONTROL Organochlorine Pesticides in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	134206-11	14/09/2015 14/09/2015	134206-2	14/09/2015
Date analysed	-	134206-11	16/09/2015 16/09/2015	134206-2	16/09/2015
HCB	mg/kg	134206-11	<0.1 <0.1	[NR]	[NR]
alpha-BHC	mg/kg	134206-11	<0.1 <0.1	134206-2	82%
gamma-BHC	mg/kg	134206-11	<0.1 <0.1	[NR]	[NR]
beta-BHC	mg/kg	134206-11	<0.1 <0.1	134206-2	91%
Heptachlor	mg/kg	134206-11	<0.1 <0.1	134206-2	83%
delta-BHC	mg/kg	134206-11	<0.1 <0.1	[NR]	[NR]
Aldrin	mg/kg	134206-11	<0.1 <0.1	134206-2	98%
Heptachlor Epoxide	mg/kg	134206-11	<0.1 <0.1	134206-2	95%
gamma-Chlordane	mg/kg	134206-11	<0.1 <0.1	[NR]	[NR]
alpha-chlordane	mg/kg	134206-11	<0.1 <0.1	[NR]	[NR]
Endosulfan I	mg/kg	134206-11	<0.1 <0.1	[NR]	[NR]
pp-DDE	mg/kg	134206-11	<0.1 <0.1	134206-2	99%
Dieldrin	mg/kg	134206-11	<0.1 <0.1	134206-2	105%
Endrin	mg/kg	134206-11	<0.1 <0.1	134206-2	112%
pp-DDD	mg/kg	134206-11	<0.1 <0.1	134206-2	100%
Endosulfan II	mg/kg	134206-11	<0.1 <0.1	[NR]	[NR]
pp-DDT	mg/kg	134206-11	<0.1 <0.1	[NR]	[NR]
Endrin Aldehyde	mg/kg	134206-11	<0.1 <0.1	[NR]	[NR]
Endosulfan Sulphate	mg/kg	134206-11	<0.1 <0.1	134206-2	82%
Methoxychlor	mg/kg	134206-11	<0.1 <0.1	[NR]	[NR]
Surrogate TCMX	%	134206-11	92 91 RPD: 1	134206-2	102%

Client Reference: P1504816JCOC02V01, Bargo

QUALITY CONTROL Organophosphorus Pesticides	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	134206-11	14/09/2015 14/09/2015	134206-2	14/09/2015
Date analysed	-	134206-11	16/09/2015 16/09/2015	134206-2	16/09/2015
Azinphos-methyl (Guthion)	mg/kg	134206-11	<0.1 <0.1	134206-2	66%
Bromophos-ethyl	mg/kg	134206-11	<0.1 <0.1	[NR]	[NR]
Chlorpyrifos	mg/kg	134206-11	<0.1 <0.1	134206-2	86%
Chlorpyrifos-methyl	mg/kg	134206-11	<0.1 <0.1	[NR]	[NR]
Diazinon	mg/kg	134206-11	<0.1 <0.1	[NR]	[NR]
Dichlorvos	mg/kg	134206-11	<0.1 <0.1	134206-2	90%
Dimethoate	mg/kg	134206-11	<0.1 <0.1	[NR]	[NR]
Ethion	mg/kg	134206-11	<0.1 <0.1	134206-2	87%
Fenitrothion	mg/kg	134206-11	<0.1 <0.1	134206-2	115%
Malathion	mg/kg	134206-11	<0.1 <0.1	134206-2	101%
Parathion	mg/kg	134206-11	<0.1 <0.1	134206-2	101%
Ronnel	mg/kg	134206-11	<0.1 <0.1	[NR]	[NR]
Surrogate TCMX	%	134206-11	92 91 RPD: 1	134206-2	102%
QUALITY CONTROL Acid Extractable metals in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	134206-11	14/09/2015 14/09/2015	134206-2	14/09/2015
Date analysed	-	134206-11	15/09/2015 15/09/2015	134206-2	15/09/2015
Arsenic	mg/kg	134206-11	<4 8	134206-2	89%
Cadmium	mg/kg	134206-11	<0.4 <0.4	134206-2	93%
Chromium	mg/kg	134206-11	18 31 RPD: 53	134206-2	96%
Copper	mg/kg	134206-11	2 1 RPD: 67	134206-2	94%
Lead	mg/kg	134206-11	11 15 RPD: 31	134206-2	88%
Mercury	mg/kg	134206-11	<0.1 <0.1	134206-2	107%
Nickel	mg/kg	134206-11	3 3 RPD: 0	134206-2	87%
Zinc	mg/kg	134206-11	7 7 RPD: 0	134206-2	79%

Report Comments:

Acid Extractable Metals in Soil: The laboratory RPD acceptance criteria has been exceeded for 134206-11 for Cr. Therefore a triplicate result has been issued as laboratory sample number 134206-42.

Asbestos-ID in soil: NEPM

This report is consistent with the reporting recommendations in the National Environment Protection (Assessment of Site Contamination) Measure, Schedule B1, May 2013.

This is reported outside our scope of NATA accreditation.

Asbestos: Sampels: 134206-19, 21, 22, 25 to 33

Excessive sample volume was provided for asbestos analysis. A portion of the supplied sample was sub-sampled according to Envirolab procedures. We cannot guarantee that this sub-sample is indicative of the entire sample. Envirolab recommends supplying 500mL of sample in it's own container.

Asbestos ID was analysed by Approved Identifier: Lulu Scott

Asbestos ID was authorised by Approved Signatory: Lulu Scott

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 (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

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

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

SOIL CONSERVATION SERVICE
Scone Research Centre

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Report No: SCO13/308R1
Client Reference: J Fulton
Martens & Associates Pty Ltd
6/37 Leighton Place
Hornsby NSW 2077

Lab No	Method	C1A/5	C2A/4	C2B/4	C5A/4 CEC & exchangeable cations (me/100g)							C8B/1		P9B/2	P18B/3 AWC (%)		
	Sample Id	EC (dS/m)	pH	pH (CaCl ₂)	CEC	Na	K	Ca	Mg	Al	ESP (%)	P sorp (mg/kg)	P sorp index	EAT	FC 0.1bar	WP 15bar	AWC
1	3944/103/0.1	0.02	5.8	4.6	6.1	0.1	0.3	3.5	1.6	0.8	2	334	2.6	3(1)	19	8	11
2	3944/103/0.7	0.01	6.1	4.7	6.0	0.2	0.1	1.2	2.9	0.5	3	625	4.1	5	19	10	9
3	3944/107/0.25	0.01	5.8	4.5	5.4	0.2	0.1	1.3	1.7	1.1	4	585	3.9	5	29	11	18
4	3944/107/0.65	0.02	6.0	4.5	10.5	0.6	0.2	0.8	5.9	1.2	6	777	5.3	5	27	17	10

AWC = moisture content (%) by weight



END OF TEST REPORT

17 **Attachment G – Data Validation Report**

DATA VALIDATION REPORT:

45 Noongah St and 25 Gwynn Hughes St, Bargo, NSW

2. Precision / Accuracy Statement

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

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

COMMENTS

Precision / Accuracy of the Laboratory Report:

✓

Satisfactory

Partially Satisfactory

Unsatisfactory

DATA VALIDATION REPORT:

45 Noongah St and 25 Gwynn Hughes St, Bargo, NSW

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

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

b. Number of days of sampling

c. Number and Type of QA/QC Samples analysed

Intra-Laboratory Field Duplicates

Inter-Laboratory Field triplicates

Trip Blanks

Wash Blanks

Other (Field Blanks, Spikes, Trip Blanks, etc.)

Media	Number
Soil:	34
Water:	-
Material	3
	1
Soil	Water
2	
1	
1	

Field Duplicates

Adequate Numbers of intra-laboratory field duplicates analysed?

Adequate Numbers of inter-laboratory field duplicates analysed?

Were RPDs within Control Limits?

i. Organics (+ 50%)

ii. Metals / Inorganics (+ 35%)

iii. Nutrients (+ 50%)

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

COMMENTS

RPD for chromium and copper was 50 % and 67 % respectively at duplicate sample location 4816/311. RPD for lead and chromium was 48 % and 40 % respectively at duplicate sample location 4816/312. Difference between primary and duplicate soil chromium, copper and lead values suggest variable soil chromium, copper and lead concentrations. Chromium, copper and lead levels

DATA VALIDATION REPORT:

45 Noongah St and 25 Gwynn Hughes St, Bargo, NSW

are well below HIL of 20 mg/kg, 6000 mg/kg and 300 mg/kg respectively. Therefore variability observed is not likely to signify any localised exceedance of SAC and the data is considered fit for use.

4. Summary of Quality Assurance / Quality Control (QA/QC)

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

Data Usability

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

COMMENTS
