Appendix C

Preliminary Contamination Investigations

Preliminary contamination investigation

Proposed Multi-Purposes Services (MPS), 2 Nullamut Street, Cobar NSW

Ref: R7367
Date: 29 August 2016

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Environmental
Geotechnical
Asbestos
Services

Client:	Health Infrastructure C/- APP Corporation Level 2, 426 King Street Newcastle NSW 2300
Assessor:	Andrew Ruming BSc Senior Environmental Scientist
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Report number:	R7367c
Date:	29 August 2016

Executive summary

Background
A new multi-purpose services (MPS) development is proposed at 2 Nullamut Street, Cobar NSW. The MPS development will be located in a vacant area in the southern section of the lot.

A preliminary contamination investigation of the MPS development site is required to determine the soil contamination status and suitability for commercial use land-use.

Objectives of the investigation
A preliminary site investigation was conducted in accordance with the contaminated land management planning guidelines State Environmental Planning Policy No. 55 (SEPP 55) to determine the soil contamination status of the MPS location at 2 Nullamut Street, Cobar NSW.

Investigation and conclusions
An inspection of the site was made on 3 and 4 August 2016. The investigation site is the vacant area in the southern section of the lot with an area of approximately 7,200m^2.

The site was heavily vegetated with native trees, shrubs and species including mallow, vetch, wild carrot and brassica. The site contained a gravel track around the perimeter and small bicycle tracks within the centre. Small soil stockpiles were located across the site. The stockpiles are expected to be residual material from on-site construction of a bicycle track. The edge of the vehicle gravel track contained fill material expected to be residual windrows from grading of the track.

There is no evidence of orchards, mines or contaminating industrial activities on the site from the review of site history or site walkover.

The contamination status of the site was assessed from a soil sampling and laboratory analysis program. Twenty boreholes were drilled over the investigation area to a depth of up to 1m and representative soil samples collected for analysis. The soil samples were collected from depths of 100mm and 300mm and combined to form ten composite samples. Four discrete samples were collected from the soil stockpiles for analysis.

The soil profile at the borehole locations was generally silty sand, clayey gravel, sandy gravel and gravelly sand. Drill refusal occurred from depths of 0.5m on rock.

Ten composite soil samples were analysed for arsenic, cadmium, chromium, copper, lead, nickel, zinc, mercury and organochlorine pesticides (OCP). Four discrete samples from the stockpiles were analysed for total recoverable hydrocarbons (TRH C6-C40), benzene, toluene, ethyl benzene, xylene and naphthalene (BTEXN), polycyclic aromatic hydrocarbons (PAH), organochlorine pesticides (OCP), polychlorinated biphenyls (PCB).

The soil sampling program did not detect elevated levels of the analysed metals, TRH, BTEXN, PAH, OCP or PCB. The levels of all substances evaluated were below the investigation threshold for commercial land-use.

The site was not assessed for the presence of asbestos containing materials (ACM).

Recommendations
The site is suitable for commercial land use as an MPS development.

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1. Introduction

A preliminary contamination investigation is required for the MPS development prior to construction. The site has a history of commercial land-use. The investigation of the site is required to determine the soil contamination status and suitability for commercial use land-use.

A desktop study and a review of the available history were undertaken of the site. A walkover and site inspection for evidence of contamination from past activities was conducted on 3 and 4 August 2016. Soil samples were collected and analysed for metals, persistent pesticides and hydrocarbons.

2. Scope of work

Envirowest Consulting Pty Ltd was commissioned by APP Corporation on behalf of Health Infrastructure to undertake a preliminary contamination investigation, in accordance with the contaminated land management planning guidelines, from the *Contaminated Land Management Act 1997* and the *State Environmental Policy No. 55 (SEPP 55)*, of the MPS development area at 2 Nullamut Street, Cobar NSW. The objective was to identify past potentially contaminating activities, identify potential contamination types, discuss the site condition, provide a preliminary assessment of site contamination and assess the need for further investigation or suitability for commercial land-use.

3. Site identification

Address	2 Nullamut Street Cobar NSW
Client	Health Infrastructure
Deposited plans	Part Lot 102 DP 615721
Locality map	Figure 1
Site plan	Figure 2
Photographs	Figure 3
Area	MPS development area is approximately 7,200m^2

4. Site history

4.1 Zoning

The site is zoned R2 Low Density Residential under the Cobar Council Local Environmental Plan (2011).

4.2 Land-use

The site is currently vacant land. The investigation site is mainly a heavily vegetated site with some vehicle and bicycle tracks. Some refuse material and soil stockpiles were located on the site.

4.3 Summary of council records

None expected

4.4 Sources of information

Site inspection 3/8/2016 and 4/8/2016 by Andrew Ruming
NSW EPA records of public notices under the CLM Act 1997
Soil and geological maps
Spatial information exchange historic parish maps
Historical aerial photographs
Cobar LEP 2011

4.5 Chronological list of site uses

The Historical charting map (1916 - 1958) identifies the area as dedicated to hospital site.

The 2006, 2011, 2013 and 2014 aerial photographs depict the site as vacant land which is heavily vegetated.

No orchards, mines or contaminating industrial activities are known to have been located on the site from the site inspection and site history.

4.6 Buildings and infrastructure

The vacant site consists of gravel and unsealed tracks and varied natural vegetation. No buildings were located on the site.

4.7 Contaminant sources

No known contaminants have been applied to the site. Fill material may have been applied to the development site. Illegal dumping may have occurred on the site.

4.8 Contaminants of concern

Based on historical activities and site inspection the contaminants of concern are:

- Heavy metals (arsenic, cadmium, chromium, copper, nickel, lead, zinc, mercury)
- Organochlorine pesticides (OCP)
- Hydrocarbons in fill stockpile material

4.9 Relevant complaint history

Nil

4.10 Contaminated site register

The investigation area is not listed on the NSW EPA register of contaminated sites.

4.11 Previous investigations

No previous investigations are known to have been undertaken on the site.

4.12 Neighbouring land-use

North – Lillian Brady Village
South – Woodiwiss Avenue and residential
East – Cobar MPS and hospital
West – Vacant land, heavily vegetated

Historical and present neighbouring land-uses are not expected to impact of the site.

4.13 Integrity assessment

The site history was obtained from a site inspection and history review. The information is consistent with the current site condition and to the best of the assessor's knowledge is accurate.

5. Site condition and environment

5.1 Surface cover

The surface cover at the development site was heavy vegetation and gravel areas used for vehicle and bicycle movements. The site was heavily vegetated with native trees and shrubs and species including mallow, vetch, wild carrot and brassica.

5.2 Topography

The general site is located on a gently inclined mid-slope with a western aspect and inclination of 2-8%.

5.3 Soils and geology

The Cobar region contains a wide range of soil types. Sands, sandy earths and red earth soils are dominant in the upland areas. The footslopes and lower areas are predominantly colluvial and aeolian (wind deposited) sediments with alluvial sediments associated along streams (Brunker 1967).

The geology on the site is the Cobar Group slate, shale, sandstone and greywacke overlain by quaternary alluvium (Brunker 1967).

5.4 Surface water

Surface water drains to the west.

5.5 Groundwater

A search of the NSW Office of Water groundwater database did not identify any groundwater bores on the site. No operational bores were identified within 500m of the site. Bores in the area have water bearing zones from 12m in depth.

5.5 Evidence of contamination checklist

Site layout showing industrial processes	None present
Sewer and service plans	Yes
Manufacturing processes	None known
Underground tanks	None known
Product spills and loss history	None known
Discharges to land, water and air	None known
Disposal locations, presence of drums, wastes and fill materials	Some small stockpiles on site and some scattered refuse material
Soil staining	Nil
Visible signs of plant stress, bare areas	Vehicle tracks
Odours	Nil

Ruins	Nil
Other	Nil

6. Conceptual site model

Potential contamination sources, exposure pathways and receptors are presented below.

Contamination source	Potential exposure pathways	Receptors
Pesticides Fill Refuse material	Direct contact (ingestion and absorption, inhalation)	***On-site*** Site visitors Site workers Residents Terrestrial environment ***Off-site*** Public Rural Residential Commercial

7. Data quality objectives (DQO)

7.1 State the problem

A new MPS development is proposed for the southern section of 2 Nullamut Street, Cobar NSW. The site is vacant land. A contamination investigation is required to be undertaken as part of council requirements to determine the suitability of the site for commercial land-use.

7.2 Identify the decision

The proposed land-use is commercial and the levels of contaminants should be less than the thresholds listed in Schedule B1 of the NEPC (1999) *Guideline on Investigation Levels for Soil and Groundwater*. The decision problem is: *Is any contamination present above the adopted thresholds and is the site suitable for commercial land-use?*

7.3 Identify the inputs decision

The primary inputs for assessing the decision are outlined in Section 9. Methods of collecting samples were in accordance with NEPC (1999) and described in Section 8.3. The soil samples were analysed for potential soil contaminants as listed in Section 8.2.

The samples were analysed in NATA accredited laboratories using EPA approved methods and levels of detection. Individual levels of each analyte evaluated were compared with the adopted investigation levels to determine suitability for commercial land-use (Section 10).

7.4 Define the boundaries of the study

The investigation area is the southern section of 2 Nullamut Street, Cobar NSW. The area of the site is approximately 0.72ha (Figure 1).

7.5 Develop a decision rule

The initial guidelines for soil were the health investigation levels for commercial land-use with (NEPC 1999).

If soil contamination was identified then the contaminant source and extent of contamination was determined.

7.6 Specify acceptable limits on the decision errors.

The analyte levels in the samples collected are less than the threshold levels.

7.7 Optimize the design for obtaining data

Soil sampling was undertaken as described in Section 8 which is based on the NEPC sampling guidelines.

8. Sampling analysis plan and sampling methodology

8.1 Sampling design

A systematic sampling pattern was adopted to assess the investigation area. Soil samples were collected from depths of 100mm to 300mm (or natural soil). Soil stockpiles were assessed using a judgemental pattern.

8.1.1 Sampling locations

Soil samples were collected from the site at 20 locations (and two depths per location) on an approximate 25m grid pattern across the investigation area (Figure 2). Soil stockpiles on the site were also assessed by collecting 1 sample per stockpile.

8.1.2 Sampling density

The sampling density can detect a potential hot spot with a radius of 15m at a 95% level of confidence. The site and the soil sampling and laboratory analysis is considered indicative of the site as a whole. The sampling frequency is greater than the minimum recommended by EPA (1995). Soil stockpiles on the site were assessed by collecting 1 sample per stockpile.

8.1.3 Sampling depth

The target sampling depth was 0 to 100mm and 300mm to 500mm (or natural soil) for composite samples and 100mm to 200mm for discrete samples from the soil stockpiles.

8.2 Analytes

The composite soil samples were analysed for arsenic, cadmium, chromium, copper, lead, nickel, zinc, mercury and OCP (Table 1).

The discrete soil samples from the stockpiles on the site were analysed for arsenic, cadmium, chromium, copper, lead, nickel, zinc, mercury, OCP, TRH, BTEXN, PCB and PAH (Table 1).

Table 1. Schedule of samples and analyses

Sample ID	Location	Sample type	Depth (mm)	Analysis undertaken
C1-100	New MPS	Composite	100	Arsenic (As), cadmium (Cd), chromium (Cr), copper (Cu), lead (Pb), nickel (Ni), zinc (Zn), mercury (Hg), organochlorine pesticides(OCP)
C1-300	New MPS	Composite	300	As, Cd, Cr, Cu, Pb, Ni, Zn, Hg, OCP
C2-100	New MPS	Composite	100	As, Cd, Cr, Cu, Pb, Ni, Zn, Hg, OCP
C2-300	New MPS	Composite	300	As, Cd, Cr, Cu, Pb, Ni, Zn, Hg, OCP
C3-100	New MPS	Composite	100	As, Cd, Cr, Cu, Pb, Ni, Zn, Hg, OCP
C3-300	New MPS	Composite	300	As, Cd, Cr, Cu, Pb, Ni, Zn, Hg, OCP
C4-100	New MPS	Composite	100	As, Cd, Cr, Cu, Pb, Ni, Zn, Hg, OCP
C4-300	New MPS	Composite	300	As, Cd, Cr, Cu, Pb, Ni, Zn, Hg, OCP
C5-100	New MPS	Composite	100	As, Cd, Cr, Cu, Pb, Ni, Zn, Hg, OCP
C5-300	New MPS	Composite	300	As, Cd, Cr, Cu, Pb, Ni, Zn, Hg, OCP
S1	Soil stockpile	Discrete	100-200	Metals, total recoverable hydrocarbons (TRH C6-C40), benzene, toluene, ethyl benzene, xylene and naphthalene (BTEXN), polycyclic aromatic hydrocarbons (PAH), OCP, polychlorinated biphenyls (PCB)
S2	Soil stockpile	Discrete	100-200	Metals, TRH, BTEXN, PAH, OCP, PCB
S3	Soil stockpile	Discrete	100-200	Metals, TRH, BTEXN, PAH, OCP, PCB
S4	Soil stockpile	Discrete	100-200	Metals, TRH, BTEXN, PAH, OCP, PCB

8.3 Sampling methods

Soil samples were undertaken by construction of boreholes using an EVH truck mounted auger drill rig. Soil stockpiles were assessed by collecting samples with a sharpened spade.

Soil samples were collected at each individual sampling location from the auger tip. The soil from the outside of the auger was removed with a sharpened spade prior to sampling.

The soil was transferred to a solvent rinsed glass jar with a Teflon lid using clean latex gloves. The sampling jars were filled with no airspace to prevent loss of volatiles. Tools were decontaminated between sampling locations to prevent cross contamination by: brushing to remove caked or encrusted material, washing in detergent and tap water, rinsing in an organic solvent, rinsing with clean tap water and allowing to air dry or using a clean towel.

9. Quality assurance and quality control

9.1 Sampling design

The sampling program is intended to provide data as to the presence and levels of contaminants.

Discrete soil samples were collected on a systematic pattern across the investigation area on an approximate grid pattern of 25 metres and combined in lots of four to make a composite sample. This sampling density will enable the detection of an area with an elevated concentration on a radius of 15 metres with a 95% confidence level.

Soil stockpiles on the site were assessed by collecting 1 sample per stockpile.

The number of sampling locations is the recommended density in the EPA sampling guidelines. No "hot spots" smaller than the sampled grid are expected over the site.

9.2 Field

The collection of samples was undertaken in accordance with accepted standard protocols (NEPC 1999). Composite sampling was undertaken for metal analysis to reduce the cost of chemical analysis. Combining equal amounts from four discrete samples created the composite samples. A composite sample represents the average concentration of the sub-sample.

The rules for composite sampling were observed (NEPC 1999). Composite sampling is suitable for the analytes assessed (NEPC 1999). All composite samples were analysed for arsenic, cadmium, chromium (total), copper, lead, nickel and zinc

Sampling equipment was decontaminated between each sampling event. The appropriate storage conditions and duration were observed between sampling and analysis. A chain of custody form accompanied the samples to the laboratory (Appendix 2).

A single sampler was used to collect the samples using standard methods. Soil collected was a fresh sample from a hand shovel. After collection the samples were immediately placed in new glass sampling jars and placed in a cooler.

One field duplicate laboratory sample was collected. The duplicate was from the same sampling location and analysed for the same analytes. Additional details on field sampling procedures are presented in Appendix 1.

No field blank, rinsate, trip blank or matrix spikes were submitted for analysis. Some samples from all batches did not contain contaminants which confirm the absence of cross contamination during transport and storage. A field sampling log is presented in Appendix 3.

9.3 Laboratory

Chemical analysis was conducted by SGS Laboratories, Alexandria, which is NATA accredited for the tests undertaken. The laboratories have quality assurance programs in place.

Method blanks, matrix duplicates and laboratory control samples were within acceptance criteria. The quality assurance and quality control report is presented together with the laboratory report as Appendix 2.

9.4 Data evaluation

The laboratory quality control report indicates the data variability is within acceptable industry limits. The data is considered representative and usable for the purposes of the investigation. Data quality indicators are presented in Appendix 1.

10. Assessment criteria

10.1 Soil

The assessment criteria is commercial land-use which is appropriate for the proposed hospital site. The assessment criteria for the soil data in commercial sites is described in Table 1A(1) of *Guideline on Investigation Levels for Soil and Groundwater* (NEPC 1999). The criteria lists health investigation levels (HIL) for a range of land-uses. The appropriate initial comparison for the site is column 4, *commercial or industrial (HIL D)*. The HIL D threshold is considered appropriate for the current land-use of the site and is provided in Table 2a and 2b.

Ecological investigation levels (EIL) have been developed for the protection of terrestrial ecosystems for selected metals and organic substances in the soil in the guideline (NEPC 1999)

EILs vary with land-use and apply to contaminants up to 2m depth below the surface. The EILs for commercial land-use are listed in Table 2a. EILs for lead are determined by identifying ambient background concentration (ABC) and adding the added contaminant limits (ACL). The ABC has been assumed to be zero for lead as a conservative measure.

NEPC (1999) provides health screening levels (HSL) for hydrocarbons in soil. The HSLs have been developed to be protective of human health for soil types, depths below surface and apply to exposure to hydrocarbons through the predominant vapour exposure pathway. The appropriate HSL for the site is listed in Table 2b. TRH>C16 have physical properties which make the TRH fractions non-volatiles and therefore these TRH fractions are not limiting for vapour intrusion.

Management limits have been developed to assess petroleum hydrocarbons following evaluation of human health and ecological risks (NEPC 1999). Management units are applicable as screening levels after consideration of relevant ESLs and HSLs. The appropriate management limit for the site is listed in Table 2b.

Table 2a. Assessment criteria for metals and OCP in soil (mg/kg)

Analyte	HIL Commercial		EIL Commercial	
	Discrete	Composite	Discrete	Composite
Arsenic	3,000	750	160	40
Cadmium	900	225	NA	NA
Chromium	3,600	900	310	77.5
Copper	240,000	6,000	280	70
Lead	1,500	375	1,800	450
Nickel	6,000	1,500	290	72.5
Zinc	400,000	100,000	620	155
Mercury	730	182.5	NA	NA
OCP	3,600	900	640	160

HIL – health investigation level, EIL – ecological investigation level, NL – non limiting, NA – not applicable

Table 2b. Assessment criteria for hydrocarbons in soil (mg/kg)

Analyte	HIL Commercial/ industrial D	HSL Commercial/ clay soil		EIL Commercial	ESL Commercial / fine soil	Management limits for TRH in fine soil / Commercial
		0m to <1m	1m to <2m			
TRH (C6-C10)	-	310	480	-	215	800
TRH (C10-C16)	-	NL	NL	-	170	1,000
TRH (>C16-C34)	-	NA	NA	-	2500	5,000
TRH (>C34-C40)	-	NA	NA	-	6600	10,000
Benzene	-	4	6	-	95	-
Toluene	-	NL	NL	-	135	-
Ethylbenzene	-	NL	NL	-	185	-
Xylenes	-	NL	NL	-	95	-
Naphthalene	-	NL	NL	370	-	-
Benzo(a)pyrene	40	-	-	-	0.7	-
Total PAH	4,000	-	-	-	-	-
PCB	7	-	-	-	-	-

NL= Non limiting, NA= Not applicable

11. Results and discussion

Surface cover on the site consisted of heavily vegetated areas with native trees and shrubs and species including mallow, vetch, wild carrot and brassica. No staining or evidence of contamination was observed during the site assessment.

A small amount of bitumen and slag material was detected on the surface in the north east and section of the site. Refuse material was sparsely scattered throughout the site including a car battery, concrete, an old metal water tank, wire and metal scrap.

Soil stockpiles were located across the site. The stockpiles are expected to be residual material from on-site construction of a bicycle track. The edge of the vehicle gravel track contained fill material expected to be residual windrows from grading of the track.

The soil profile at the borehole locations was generally silty sand, gravel sand and sandy gravel. Shallow rock was encountered from depths of 0.5m to 1.0m.

The levels of all metals, TRH, BTEXN, PAH, OCP and PCB analysed in the soil samples (Table 3a and 3b) were not detected or at very low levels and **below** the commercial land-use thresholds (NEPC 1999).

The site was not assessed for the presence of asbestos containing materials (ACM).

Table 3a. Soil analysis results, metals and OCP (mg/kg)

Sample ID	Sample depth (mm)	Sample type	Arsenic	Cadmium	Chromium	Copper	Lead	Nickel	Zinc	Mercury	OCP
C1-100	100	Composite	6	0.6	19	69	18	6.0	41	ND	ND
C1-300	300	Composite	6	0.4	15	31	15	4.9	22	ND	ND
C2-100	100	Composite	6	0.6	21	37	14	5.7	33	ND	ND
C2-300	300	Composite	5	0.5	17	20	10	4.9	19	ND	ND
C3-100	100	Composite	5	0.5	18	180	12	4.5	23	ND	ND
C3-300	300	Composite	5	0.5	17	34	15	4.4	20	ND	ND
C4-100	100	Composite	5	0.7	22	56	17	4.3	26	ND	ND
C4-300	300	Composite	5	0.5	17	81	12	4.4	27	ND	ND
C5-100	100	Composite	5	0.4	17	50	13	4.6	28	ND	ND
C5-300	300	Composite	5	0.4	17	27	11	5.0	21	ND	ND
S1	200	Discrete	8	0.5	21	96	28	5.3	35	ND	ND
S2	100	Discrete	8	0.6	14	110	820	7.1	290	0.11	ND
S3	200	Discrete	7	0.5	20	49	17	4.7	31	ND	ND
S4	100	Discrete	5	0.4	16	29	14	4.2	27	ND	ND
Commercial land-use HIL threshold (NEPC 1999)											
Discrete			*3,000*	*900*	*3,600*	*240,000*	*1,500*	*6,000*	*400,000*	*730*	*3,600*
Composite			*750*	*225*	*900*	*60,000*	*375*	*1,500*	*100,000*	*182.5*	*900*
Commercial land-use EIL threshold (NEPC 1999)											
Discrete			*160*	*-*	*310*	*280*	*1,800*	*290*	*620*	*-*	*640*
Composite			*40*	*-*	*77.5*	*70*	*450*	*72.5*	*155*	*-*	*160*

ND = not detected at the detection limit, NA = not assessed.

Table 3b. Soil analysis results - hydrocarbons (mg/kg)

Sample ID	Sample depth (mm)	Sample type	TRH (C6-C10)	TRH (C10-C16)	TRH (C16-C34)	TRH (C34-C40)	Benzene	Toluene	Ethyl benzene	Xylenes	Naphthalene	Total PAH	PCB
S1	200	0.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
S2	100	0.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
S3	200	0.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
S4	100	0.3	ND	75	ND	ND	ND	ND	ND	ND	ND	ND	ND
HSL – commercial		*0m to 1m*	*310*	*NL*	*NA*	*NA*	*4*	*NL*	*NL*	*NL*	*NL*	*-*	*-*
EIL – commercial			*-*	*-*	*-*	*-*	*-*	*-*	*-*	*-*	*370*		*-*
ESL – commercial			*215*	*170*	*2,500*	*6,600*	*95*	*135*	*185*	*95*	*-*	*-*	*-*
Management limits for TRH fractions – commercial			*800*	*1,000*	*5,000*	*10,000*	*-*	*-*	*-*	*-*	*-*	*-*	*-*
HIL D - commercial			*-*	*-*	*-*	*-*	*-*	*-*	*-*	*-*	*-*	*4,000*	*7*

ND – not detected, HSL – health screening level, EIL – ecological investigation level, ESL – ecological screening level, NL – non limiting, NA – not applicable

12. Site characterisation

12.1 Environmental contamination

No soil contamination was detected.

12.2 Chemical degradation production

Not applicable as no contamination was detected.

12.3 Exposed population

Not applicable as no contamination was detected.

13. Conclusions and recommendations

13.1 Summary

The site was heavily vegetated with native trees, shrubs and species including mallow, vetch, wild carrot and brassica. The site contained a gravel track around the perimeter and small bicycle tracks within the centre. Small soil stockpiles were located across the site. The stockpiles are expected to be residual material from on-site construction of a bicycle track. The edge of the vehicle gravel track contained fill material expected to be residual windrows from grading of the track.

There is no evidence of orchards, mines or contaminating industrial activities on the site from the review of site history or site walkover.

The contamination status of the site was assessed from a soil sampling and laboratory analysis program. Twenty boreholes were drilled over the investigation area to a depth of up to 1m and representative soil samples collected for analysis. The soil samples were collected from depths of 100mm and 300mm and combined to form composite samples. Four discrete samples were collected from the soil stockpiles for analysis.

The soil profile at the borehole locations was generally silty sand, clayey gravel, sandy gravel and gravelly sand. Drill refusal occurred from depths of 0.5m on rock.

Ten composite soil samples were analysed for arsenic, cadmium, chromium, copper, lead, nickel, zinc, mercury and organochlorine pesticides (OCP). Four discrete samples were analysed for total recoverable hydrocarbons (TRH C6-C40), benzene, toluene, ethyl benzene, xylene and naphthalene (BTEXN), polycyclic aromatic hydrocarbons (PAH), organochlorine pesticides (OCP), polychlorinated biphenyls (PCB).

The soil sampling program did not detect elevated levels of the analysed metals, OCP, PCB or hydrocarbons. The levels of all substances evaluated were below the investigation threshold for commercial land-use.

The site was not assessed for the presence of asbestos containing materials (ACM).

13.2 Assumptions in reaching the conclusions

It is assumed the sampling sites are representative of the site.

13.3 Extent of uncertainties

The analytical data relate only to the locations sampled. Soil conditions can vary both laterally and vertically and it cannot be excluded that unidentified contaminants may be present. The sampling

density was designed to detect a 'hot spot' in the field area within a radius of approximately 15 metres and with a 95% level of confidence.

The site is suitable for commercial land use as an MPS development.

13.4 Suitability for proposed use of the site

The site is suitable for commercial land use as an MPS development.

13.5 Limitations and constraints on the use of the site

No constraints are recommended. The site was not assessed for the presence of asbestos containing materials (ACM).

13.6 Recommendation for further work

Nil

14. Report limitations and intellectual property

This report has been prepared for the use of the client to achieve the objectives given the clients requirements. The level of confidence of the conclusion reached is governed by the scope of the investigation and the availability and quality of existing data. Where limitations or uncertainties are known, they are identified in the report. No liability can be accepted for failure to identify conditions or issues which arise in the future and which could not reasonably have been predicted using the scope of the investigation and the information obtained.

The investigation identifies the actual subsurface conditions only at those points where samples are taken, when they are taken. Data derived through sampling and subsequent laboratory testing is interpreted by geologists, engineers or scientists who then render an opinion about overall subsurface conditions, the nature and extent of the contamination, it's likely impact on the proposed development and appropriate remediation measures. Actual conditions may differ from those inferred to exist, because no professional, no matter how well qualified, and no sub-surface exploration program, no matter how comprehensive, can reveal what is hidden by earth, rock or time. The actual interface between materials may be far more gradual or abrupt than a report indicates. Actual conditions in areas not sampled may differ from predictions. It is thus important to understand the limitations of the investigation and recognise that we are not responsible for these limitations.

15. References

Brunker, R.J (1967) *Cobar 1:250,000 Geological Sheet SH/55-14* (Geological Survey of New South Wales, Sydney)

DEC (2006) *Contaminated Sites: Guidelines for the NSW Site Auditors Scheme* (NSW Department of Environment and Conservation, Chatswood)

Environment Protection Authority (1995) *Contaminated sites: Sampling Design Guidelines* (NSW Environment Protection Authority, Chatswood)

Landcom (2004) *Managing Urban Stormwater; Soils and Construction* (New South Wales Government)

NEPC (1999 revised 2013) *National Environment Protection (Assessment of Site Contamination) Measure 1999* (National Environment Protection Council Service Corporation, Adelaide)

Offenberg AC (1967) *Gilgandra 1:250 000 Geological Sheet SH/55-16 First Edition* (Geological Survey of New South Wales, Sydney)

Figures

North

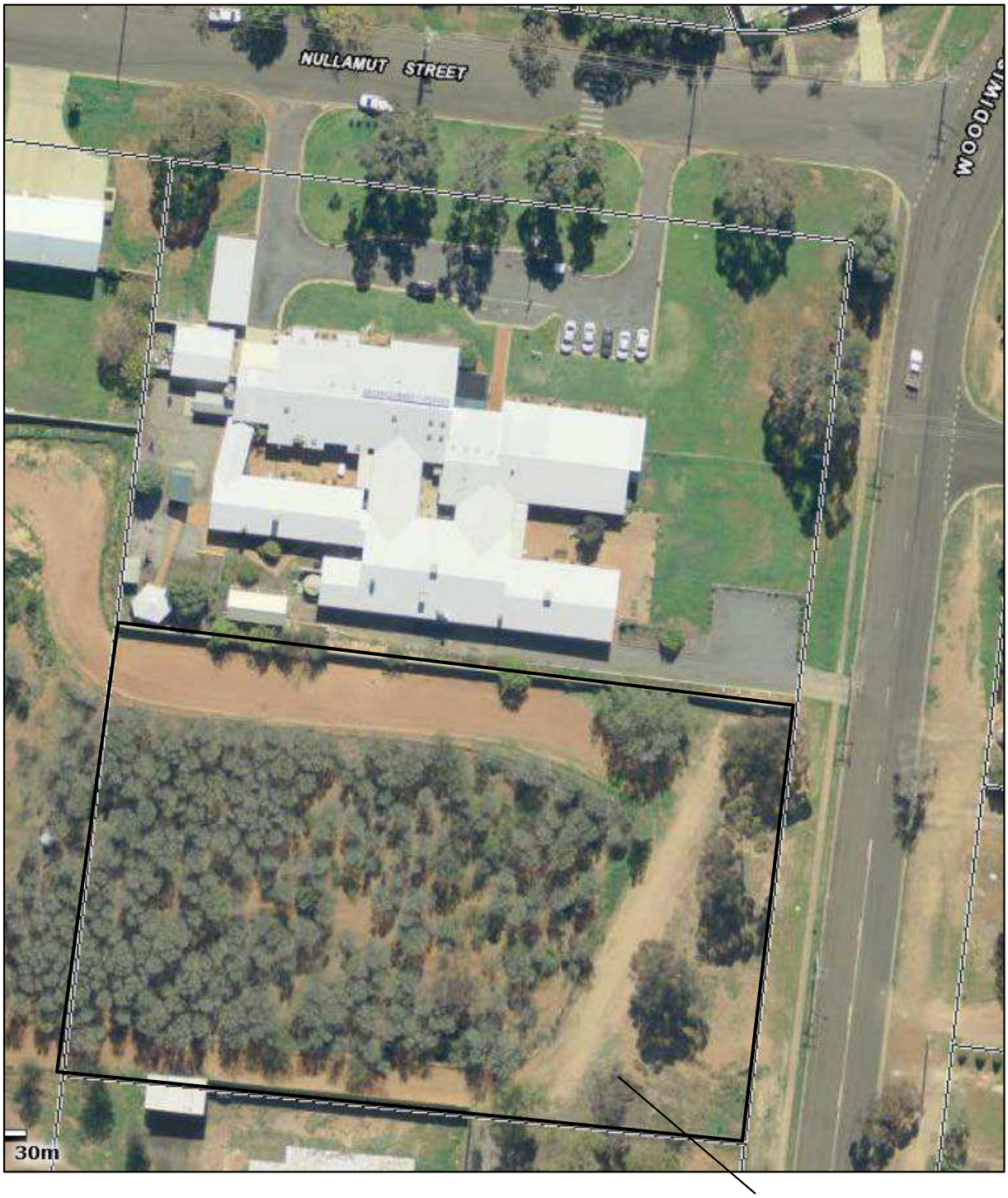
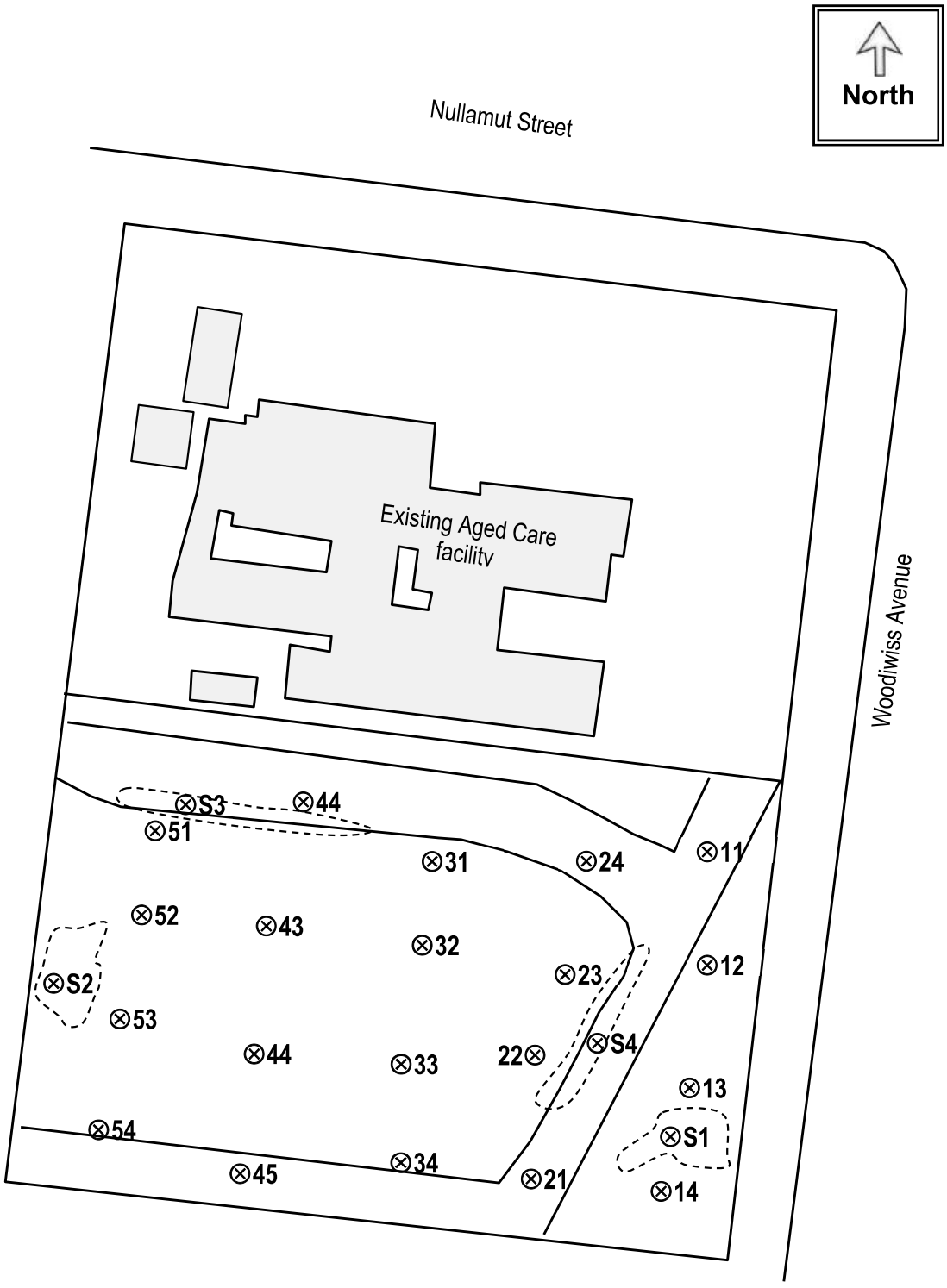


Figure 1. Site locality		
2 Nullamut Street, Cobar NSW		
	Envirowest Consulting Pty Ltd	
Job: R7367	Drawn by: AR	Date: 25/08/2016



Legend

⊗ Borehole and sampling location

Stockpile

Figure 2. Site plan and sampling location		
Proposed new MPS, 2 Nullamut Street, Cobar NSW		
	Envirowest Consulting Pty Ltd	
Job: R7367	Drawn by: AR	Date: 25/08/2016

Figure 3. Photographs of the site

Looking southeast over the site

Stockpile in the west of the lot

Looking at the centre of the lot

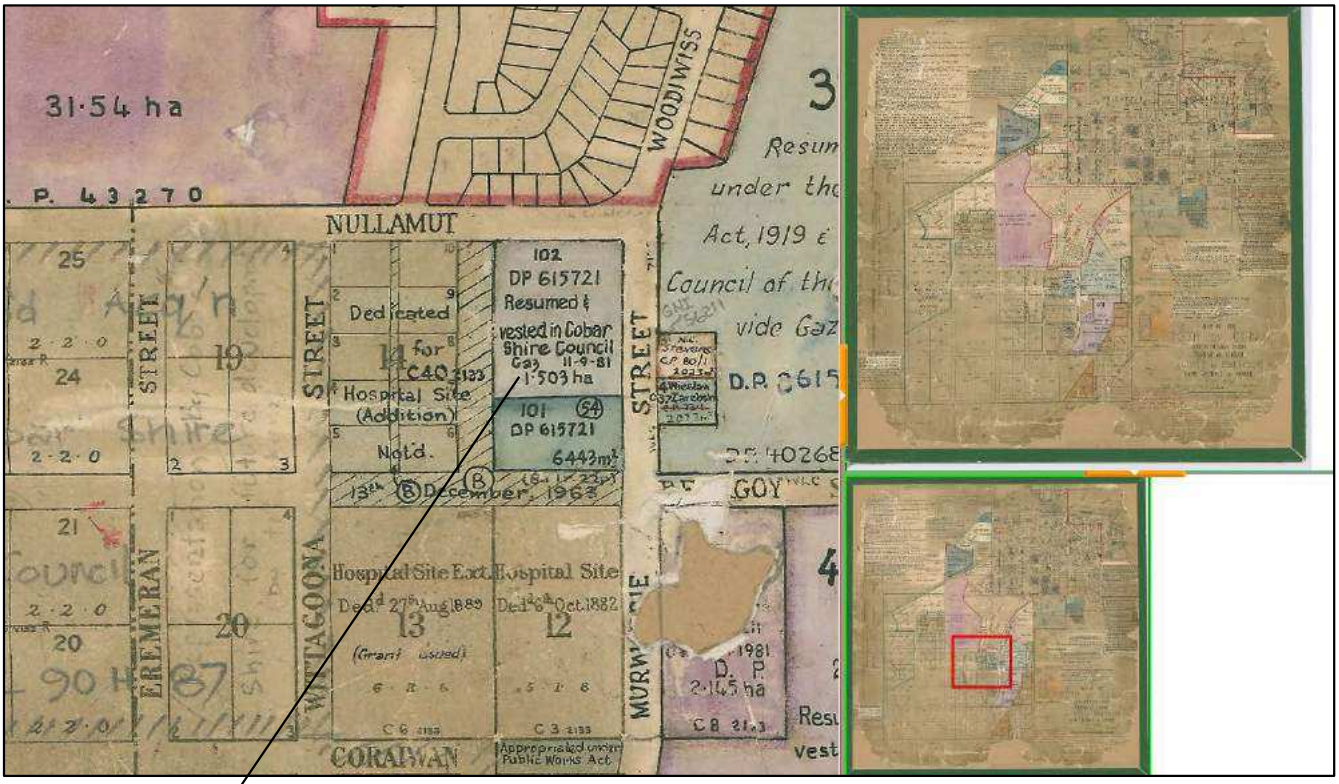


Figure 4. Historical map		
Regional charting map (1916-1958) Cobar NSW		
	Envirowest Consulting Pty Ltd	
Job: R7367	Drawn by: Spatial information exchange	Date: 25/08/2016

Appendices

Appendix 1. Sample analysis, quality assurance and quality control (QAQC) report
Appendix 2. Soil analysis results – SGS report number SE155708 and chain of custody form
Appendix 3. Field sampling log

Appendix 1. Sample analysis, quality assurance and quality control (QAQC) report

1. Data quality indicators (DQI) requirements

1.1 Completeness

A measure of the amount of usable data for a data collection activity. Greater than 95% of the data must be reliable based on the quality objectives. Where greater than two quality objectives have less reliability than the acceptance criterion the data may be considered with uncertainty.

1.1.1 Field

Consideration	Requirement
Locations and depths to be sampled	Described in the sampling plan. The acceptance criterion is 95% data retrieved compared with proposed. Acceptance criterion is 100% in crucial areas.
SOP appropriate and compiled	Described in the sampling plan.
Experienced sampler	Sampler or supervisor
Documentation correct	Sampling log and chain of custody completed

1.1.2 Laboratory

Consideration	Requirement
Samples analysed	Number according to sampling and quality plan
Analytes	Number according to sampling and quality plan
Methods	EPA or other recognised methods with suitable PQL
Sample documentation	Complete including chain of custody and sample description
Sample holding times	Metals 6 months, OCP, PAH, TPH, PCB 14 days

1.2 Comparability

The confidence that data may be considered to be equivalent for each sampling and analytical event. The data must show little or no inconsistencies with results and field observations.

1.2.1 Field

Consideration	Requirement
SOP	Same sampling procedures to be used
Experienced sampler	Sampler or supervisor
Climatic conditions	Described as may influence results
Samples collected	Sample medium, size, preparation, storage, transport

1.2.2 Laboratory

Consideration	Requirement
Analytical methods	Same methods, approved methods
PQL	Same
Same laboratory	Justify if different
Same units	Justify if different

1.3 Representativeness

The confidence (expressed qualitatively) that data are representative of each media present on the site.

1.3.1 Field

Consideration	Requirement
Appropriate media sampled	Sampled according to sampling and quality plan or in accordance with the EPA (1995) sampling guidelines.
All media identified	Sampling media identified in the sampling and quality plan. Where surface water bodies on the site sampled.

1.3.2 Laboratory

Consideration	Requirement
Samples analysed	Blanks

1.4 Precision

A quantitative measure of the variability (or reproduced of the data). Is measured by standard deviation or relative percent difference (RPD). A RPD analysis is calculated and compared to the practical quantitation limit (PQL) or absolute difference AD.

- Levels greater than 10 times the PQL the RPD is 50%
- Levels between 5 and 10 times the PQL the RPD is 75%
- Levels between 2 and 5 times the PQL the RPD is 100%
- Levels less than 2 times the PQL, the AD is less than 2.5 times the PQL

Data not conforming to the acceptance criterion will be examined for determination of suitability for the purpose of site characterisation.

1.4.1 Field

Consideration	Requirement
Field duplicates	Frequency of 5%, results to be within RPD or discussion required indicate the appropriateness of SOP

1.4.2 Laboratory

Consideration	Requirement
Laboratory and inter lab duplicates	Frequency of 5%, results to be within RPD or discussion required. Inter laboratory duplicates will be one sample per batch.
Field duplicates	Frequency of 5%, results to be within RPD or discussion required
Laboratory prepared volatile trip spikes	One per sampling batch, results to be within RPD or discussion required

1.5 Accuracy

A quantitative measure of the closeness of the reported data to the true value.

1.5.1 Field

Consideration	Requirement
SOP	Complied
Inter laboratory duplicates	Frequency of 5%. Analysis criterion 60% RPD for levels greater than 10 times the PQL 85% RPD for levels between 5 to 10 times the PQL 100% RPD at levels between 2 to 5 times the PQL Absolute difference, 3.5 times the PQL where levels are, 2 times PQL

1.5.2 Laboratory

Recovery data (surrogates, laboratory control samples and matrix spikes) data subject to the following control limits:

- 60 to 140% acceptable data
- 20-60% discussion required, may be considered acceptable
- 10-20% data should considered as estimates
- 10% data should be rejected

Consideration	Requirement
Field blanks	Frequency of 5%, <5 times the PQL, PQL may be adjusted
Rinsate blanks	Frequency of 5%, <5 times the PQL, PQL may be adjusted
Method blanks	Frequency of 5%, <5 times the PQL, PQL may be adjusted
Matrix spikes	Frequency of 5%, results to be within +/-40% or discussion required
Matrix duplicates	Sample injected with a known concentration of contaminants with tested. Frequency of 5%, results to be within +/-40% or discussion required
Surrogate spikes	QC monitoring spikes to be added to samples at the extraction process in the laboratory where applicable. Surrogates are closely related to the organic target analyte and not normally found in the natural environment. Frequency of 5%, results to be within +/-40% or discussion required
Laboratory control samples	Externally prepared reference material containing representative analytes under investigation. These will be undertaken at one per batch. It is to be within +/-40% or discussion required
Laboratory prepared spikes	Frequency of 5%, results to be within +/-40% or discussion required

2. Laboratory analysis summary

One analysis batch was undertaken over the preliminary investigation program. Samples were collected on 3 and 4 August 2016. A total of 14 were submitted for analytical testing. The samples were collected in the field by an environmental scientist from Envirowest Consulting Pty Ltd, placed into laboratory prepared receptacles as recommended in NEPC (1999). The samples preservation and storage was undertaken using standard industry practices (NEPC 1999). A chain of custody form accompanied transport of the samples to the laboratory.

The samples were analysed at the laboratories of SGS, Alexandria, NSW which is National Association of Testing Authorities (NATA) accredited for the tests undertaken. The analyses undertaken, number of samples tested and methods are presented in the following tables:

Field duplicate frequency

Sample id.	Number of samples	Duplicate	Frequency (%)	Date collected	Substrate	Laboratory report
C1-100-C5-300 S1 – S4	14	1	7.4	3/8/2016	Soil	SE155708

Laboratory analysis schedule

Sample id. (sampling location)	Number of samples	Duplicate	Analyses	Date collected	Substrate	Laboratory report
C1-100-C5-300	10	1	metals, OCP	3/8/2016	Soil	SE155708
S1 – S4	4	0	metals, OCP, TRH, BTEXN, PAH, PCB	3/8/2016	Soil	SE155708

Analytical methods

Analyte	Extraction	Laboratory methods
Metals	USEPA 200.2 Mod	APHA USEPA SW846-6010
Chromium (III)	-	APHA 3500 CR-A&B & 3120 and USEPA SW846-3060A
Chromium (VI)	USEPA SW846-3060A	USEPA SW846-3060A
Mercury	USEPA 200.2 Mod	APHA 3112
TPH(C6-C9)	USPEA SW846-5030A	USPEA SW 846-8260B
TPH(C10-C36), PAH	Tumbler extraction of solids	USEPA SW 846-8270B
PCB	Tumbler extraction of solids	USEPA SW 846-8270B

OC Pesticides	Tumbler extraction of solids	USEPA SW 846-8270B
BTEX	Tumbler extraction of solids	USEPA SW 846-8260B

3. Field quality assurance and quality control

One intra laboratory duplicate sample was collected for the investigation. The frequency was greater than the recommended frequency of 5%. Table A5.1 outlines the samples collected and differences in replicate analyses. Relative differences were deemed to pass if they were within the acceptance limits of +/- 40% for replicate analyses or less than 5 times the detection limit.

Table A5.1. Relative differences for intra laboratory duplicates

	DB-100, C2-100	
	Relative difference (%)	Pass/Fail
Arsenic	0	Pass
Cadmium	4	Pass
Chromium	15	Pass
Copper	27	Pass
Lead	7	Pass
Nickel	11	Pass
Zinc	24	Pass
OCP	0	Pass

NA – relative difference unable to be calculated as results are less than laboratory detection limit

No trip blanks or spikes were submitted for analysis. This is not considered to create significant uncertainty in the analysis results because of the following rationale:

- The fieldwork was completed within a short time period and consistent methods were used for soil sampling.
- Soil samples were placed in insulated cooled containers after sampling to ensure preservation during transport and storage.
- The samples were placed in single use jars using clean sampling tools and disposable gloves from material not in contact with other samples. This reduces the likelihood of cross contamination.
- Samples in the analysis batch contain analytes below the level of detection. It is considered unlikely that contamination has occurred as a result of transport and handling.

4. Laboratory quality assurance and quality control

Sample holding times are recommended in NEPC (1999). The time between collection and extraction for all samples was less than the criteria listed below:

Analyte	**Maximum holding time**
Metals, cyanide	6 months
OCP, TPH, PCB, BTEX, PAH	14 days

The laboratory interpretative reports are presented with individual laboratory report. Assessment is made of holding time, frequency of control samples and quality control samples. No significant outliers exist for the sampling batches. The laboratory report also contains a detailed description of preparation methods and analytical methods.

The results, quality report, interpretative report and chain of custody are presented in the attached appendices. The quality report contains the laboratory duplicates, spikes, laboratory control samples, blanks and where appropriate matrix spike recovery (surrogate).

5. Data quality indicators (DQI) analysis

5.1 Completeness

A measure of the amount of usable data for a data collection activity (total to be greater than 95%).

The data set was found to be complete based on the scope of work. No critical areas of contamination were omitted from the data set.

5.1.1 Field

Consideration	Accepted	Comment
Locations to be sampled	Yes	In accordance with sampling methodology, described in the report. Sampling locations described in figures.
Depth to be sampled	Yes	In accordance with sampling methodology
SOP appropriate and compiled	Yes	In accordance with sampling methodology Sampled with stainless steel spade into lab prepared containers, decontamination between samples, latex gloves worn by sampler
Experienced sampler	Yes	Same soil sampler, environmental scientist
Documentation correct	Yes	Sampling log completed Chain of custody completed

5.1.2 Laboratory

Consideration	Accepted	Comment
Samples analysed	Yes	All critical samples analysed in accordance with chain of custody and analysis plan
Analytes	Yes	All analytes in accordance with chain of custody and analysis plan
Methods	Yes	Analysed in NATA accredited laboratory with recognised methods and suitable PQL
Sample documentation	Yes	Completed including chain of custody and sample results and quality results report for each batch
Sample holding times	Yes	Metals less than 6 months. OCP, TPH, PCB, BTEX less than 14 days

5.2 Comparability

The confidence that data may be considered to be equivalent for each sampling and analytical event.

The data sets were found to be acceptable.

5.2.1 Field

Consideration	Accepted	Comment
SOP	Yes	Same sampling procedures used and sampled on one date
Experienced sampler	Yes	Experienced scientist
Climatic conditions	Yes	Described in field sampling log
Samples collected	Yes	Suitable size, storage and transport

5.2.2 Laboratory

Consideration	Accepted	Comment
Analytical methods	Yes	Same methods all samples, in accordance with NEPC(1999) or USEPA
PQL	Yes	Suitable for analytes
Same laboratory	Yes	SGS Environmental is NATA accredited for the test
Same units	Yes	-

5.3 Representativeness

The confidence (expressed qualitatively) that data are representative of each media present on the site.

The data sets were found to be acceptable.

5.3.1 Field

Consideration	Accepted	Comment
Appropriate media sampled	Yes	Sampled according to sampling and quality plan
All media identified	Yes	Soil Sampling media identified in the sampling and quality plan

5.3.2 Laboratory

Consideration	Accepted	Comment
Samples analysed	Yes	Undertaken in NATA accredited laboratory. No blanks analysed. Samples in the analysis batch contain analytes below the level of detection. It is considered unlikely that contamination has occurred as a result of transport and handling.

5.4 Precision

A quantitative measure of the variability (or reproduced of the data).
The data sets were found to be acceptable.

5.4.1 Field

Consideration	Accepted	Comment
SOP	Yes	Complied
Field duplicates	Yes	Collected.

5.4.2 Laboratory

Consideration	Accepted	Comment
Laboratory and inter lab duplicates	Yes	Frequency of 5%, results to be within +/-40% or discussion required
Field duplicates	Yes	Frequency of 5%, results to be within +/-40% or discussion required
Laboratory prepared volatile trip spikes	NA	Volatiles analytes were not analysed

5.5 Accuracy

A quantitative measure of the closeness of the reported data to the true value.

The data sets were found to be acceptable.

5.5.1 Field

Consideration	Accepted	Comment
SOP	Yes	Complied
Field blanks	NA	Frequency of 5%, <5 times the PQL, PQL may be adjusted
Rinsate blanks	NA	Frequency of 5%, <5 times the PQL, PQL may be adjusted

5.5.2 Laboratory

Consideration	Accepted	Comment
Method blanks	Yes	Frequency of 5%, <5 times the PQL, PQL may be adjusted
Matrix spikes	Yes	Frequency of 5%, results to be within +/-40% or discussion required.
Matrix duplicates	Yes	Frequency of 5%, results to be within +/-40% or discussion required
Surrogate spikes	Yes	Frequency of 5%, results to be within +/-40% or discussion required
Laboratory control samples	Yes	Frequency of 5%, results to be within +/-40% or discussion required
Laboratory prepared spikes	Yes	Frequency of 5%, results to be within +/-40% or discussion required

No trip blanks, field spikes or sample rinsates were submitted for analysis. This is not considered to create significant uncertainty in the analysis results because of the following rationale:

- The fieldwork methods used for soil sampling were consistent throughout the project with all in situ samples collected from material which had not been subject to exposure.
- The fieldwork was completed within a short time period and consistent methods were used for soil sampling.
- Soil samples were placed in insulated cooled containers as quickly as possible, with the containers filled to minimize headspace. The sample containers were sealed immediately after the sample was collected and chilled in an esky containing ice.
- The samples were stored in a refrigerator and transported with ice bricks to ensure preservation during transport and storage.
- The samples were placed in single use jars using clean sampling tools and disposable gloves from material not in contact with other samples. This reduces the likelihood of cross contamination.
- Samples in the analysis batches contained analytes below the level of detection. It is considered unlikely that contamination has occurred as a result of transport and handling.

6. Conclusion

All media appropriate to the objectives of this investigation have been adequately analysed and no area of significant uncertainty exist. It is concluded the data is usable for the purposes of the investigation.

Appendix 2. Soil analysis results – SGS report number SE155708 and chain of custody form

ANALYTICAL REPORT

Accreditation No. 2562

CLIENT DETAILS		LABORATORY DETAILS	
Contact	Greg Madafiglio	Manager	Huong Crawford
Client	ENVIROWEST CONSULTING PTY LIMITED	Laboratory	SGS Alexandria Environmental
Address	PO BOX 8158 ORANGE NSW 2800	Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	61 2 63614954	Telephone	+61 2 8594 0400
Facsimile	(Not specified)	Facsimile	+61 2 8594 0499
Email	andrew@envirowest.net.au	Email	au.environmental.sydney@sgs.com
Project	**7367**	SGS Reference	**SE155708 R0**
Order Number	(Not specified)	Date Received	09 Aug 2016
Samples	15	Date Reported	16 Aug 2016

COMMENTS

Accredited for compliance with ISO/IEC 17025. NATA accredited laboratory 2562(4354).

SIGNATORIES

Dong Liang
Metals/Inorganics Team Leader

Kamrul Ahsan
Senior Chemist

Ly Kim Ha
Organic Section Head

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name SE155708.001 Soil 04 Aug 2016 C1-100	SE155708.002 Soil 04 Aug 2016 C1-300	SE155708.003 Soil 04 Aug 2016 C2-100	SE155708.004 Soil 04 Aug 2016 C2-300
VOC's in Soil Method: AN433 Tested: 15/8/2016						
Monocyclic Aromatic Hydrocarbons						
Benzene	mg/kg	0.1	-	-	-	-
Toluene	mg/kg	0.1	-	-	-	-
Ethylbenzene	mg/kg	0.1	-	-	-	-
m/p-xylene	mg/kg	0.2	-	-	-	-
o-xylene	mg/kg	0.1	-	-	-	-
Polycyclic VOCs						
Naphthalene	mg/kg	0.1	-	-	-	-
Surrogates						
Dibromofluoromethane (Surrogate)	%	-	-	-	-	-
d4-1,2-dichloroethane (Surrogate)	%	-	-	-	-	-
d8-toluene (Surrogate)	%	-	-	-	-	-
Bromofluorobenzene (Surrogate)	%	-	-	-	-	-
Totals						
Total Xylenes*	mg/kg	0.3	-	-	-	-
Total BTEX	mg/kg	0.6	-	-	-	-
Volatile Petroleum Hydrocarbons in Soil Method: AN433 Tested: 15/8/2016						
TRH C6-C10	mg/kg	25	-	-	-	-
TRH C6-C9	mg/kg	20	-	-	-	-
Surrogates						
Dibromofluoromethane (Surrogate)	%	-	-	-	-	-
d4-1,2-dichloroethane (Surrogate)	%	-	-	-	-	-
d8-toluene (Surrogate)	%	-	-	-	-	-
Bromofluorobenzene (Surrogate)	%	-	-	-	-	-

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name SE155708.001 Soil 04 Aug 2016 C1-100	SE155708.002 Soil 04 Aug 2016 C1-300	SE155708.003 Soil 04 Aug 2016 C2-100	SE155708.004 Soil 04 Aug 2016 C2-300
Volatile Petroleum Hydrocarbons in Soil Method: AN433 Tested: 15/8/2016 (continued)						
VPH F Bands						
Benzene (F0)	mg/kg	0.1	-	-	-	-
TRH C6-C10 minus BTEX (F1)	mg/kg	25	-	-	-	-
TRH (Total Recoverable Hydrocarbons) in Soil Method: AN403 Tested: 10/8/2016						
TRH C10-C14	mg/kg	20	-	-	-	-
TRH C15-C28	mg/kg	45	-	-	-	-
TRH C29-C36	mg/kg	45	-	-	-	-
TRH C37-C40	mg/kg	100	-	-	-	-
TRH C10-C36 Total	mg/kg	110	-	-	-	-
TRH C10-C40 Total	mg/kg	210	-	-	-	-
TRH F Bands						
TRH >C10-C16 (F2)	mg/kg	25	-	-	-	-
TRH >C10-C16 (F2) - Naphthalene	mg/kg	25	-	-	-	-
TRH >C16-C34 (F3)	mg/kg	90	-	-	-	-
TRH >C34-C40 (F4)	mg/kg	120	-	-	-	-
PAH (Polynuclear Aromatic Hydrocarbons) in Soil Method: AN420 Tested: 10/8/2016						
Naphthalene	mg/kg	0.1	-	-	-	-
2-methylnaphthalene	mg/kg	0.1	-	-	-	-
1-methylnaphthalene	mg/kg	0.1	-	-	-	-
Acenaphthylene	mg/kg	0.1	-	-	-	-
Acenaphthene	mg/kg	0.1	-	-	-	-
Fluorene	mg/kg	0.1	-	-	-	-
Phenanthrene	mg/kg	0.1	-	-	-	-
Anthracene	mg/kg	0.1	-	-	-	-
Fluoranthene	mg/kg	0.1	-	-	-	-
Pyrene	mg/kg	0.1	-	-	-	-
Benzo(a)anthracene	mg/kg	0.1	-	-	-	-
Chrysene	mg/kg	0.1	-	-	-	-
Benzo(b&j)fluoranthene	mg/kg	0.1	-	-	-	-
Benzo(k)fluoranthene	mg/kg	0.1	-	-	-	-
Benzo(a)pyrene	mg/kg	0.1	-	-	-	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	-	-	-	-
Dibenzo(ah)anthracene	mg/kg	0.1	-	-	-	-
Benzo(ghi)perylene	mg/kg	0.1	-	-	-	-
Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ	0.2	-	-	-	-
Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	-	-	-	-
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	-	-	-	-
Total PAH (18)	mg/kg	0.8	-	-	-	-
Total PAH (NEPM/WHO 16)	mg/kg	0.8	-	-	-	-

Parameter	Units	LOR	Sample Number: SE155708.001 Sample Matrix: Soil Sample Date: 04 Aug 2016 Sample Name: C1-100	SE155708.002 Soil 04 Aug 2016 C1-300	SE155708.003 Soil 04 Aug 2016 C2-100	SE155708.004 Soil 04 Aug 2016 C2-300
PAH (Polynuclear Aromatic Hydrocarbons) in Soil Method: AN420 Tested: 10/8/2016 (continued)						
Surrogates						
d5-nitrobenzene (Surrogate)	%	-	-	-	-	-
2-fluorobiphenyl (Surrogate)	%	-	-	-	-	-
d14-p-terphenyl (Surrogate)	%	-	-	-	-	-
OC Pesticides in Soil Method: AN400/AN420 Tested: 10/8/2016						
Hexachlorobenzene (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
Lindane	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
Aldrin	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
Delta BHC	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
o,p'-DDE	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Alpha Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
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
trans-Nonachlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
p,p'-DDE	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Endrin	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
o,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
o,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Beta Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
p,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
p,p'-DDT	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
Endrin Aldehyde	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
Endrin Ketone	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Isodrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Mirex	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Surrogates						
Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	**98**	**115**	**115**	**111**
PCBs in Soil Method: AN400/AN420 Tested: 10/8/2016						
Arochlor 1016	mg/kg	0.2	-	-	-	-
Arochlor 1221	mg/kg	0.2	-	-	-	-
Arochlor 1232	mg/kg	0.2	-	-	-	-
Arochlor 1242	mg/kg	0.2	-	-	-	-
Arochlor 1248	mg/kg	0.2	-	-	-	-
Arochlor 1254	mg/kg	0.2	-	-	-	-
Arochlor 1260	mg/kg	0.2	-	-	-	-
Arochlor 1262	mg/kg	0.2	-	-	-	-
Arochlor 1268	mg/kg	0.2	-	-	-	-
Total PCBs (Arochlors)	mg/kg	1	-	-	-	-

Parameter	Units	LOR	Sample Number: SE155708.001 Sample Matrix: Soil Sample Date: 04 Aug 2016 Sample Name: C1-100	SE155708.002 Soil 04 Aug 2016 C1-300	SE155708.003 Soil 04 Aug 2016 C2-100	SE155708.004 Soil 04 Aug 2016 C2-300
PCBs in Soil Method: AN400/AN420 Tested: 10/8/2016 (continued)						
Surrogates						
Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	-	-	-	-
Total Recoverable Metals in Soil/Waste Solids/Materials by ICPOES Method: AN040/AN320 Tested: 12/8/2016						
Arsenic, As	mg/kg	1	**6**	**6**	**6**	**5**
Cadmium, Cd	mg/kg	0.3	**0.6**	**0.4**	**0.6**	**0.5**
Chromium, Cr	mg/kg	0.5	**19**	**15**	**21**	**17**
Copper, Cu	mg/kg	0.5	**69**	**31**	**37**	**20**
Lead, Pb	mg/kg	1	**18**	**15**	**14**	**10**
Nickel, Ni	mg/kg	0.5	**6.0**	**4.9**	**5.7**	**4.9**
Zinc, Zn	mg/kg	2	**41**	**22**	**33**	**19**
Mercury in Soil Method: AN312 Tested: 12/8/2016						
Mercury	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05
Moisture Content Method: AN002 Tested: 12/8/2016						
% Moisture	%w/w	0.5	**12**	**9.5**	**13**	**13**

Parameter	Units	LOR	Sample Number: SE155708.005 Sample Matrix: Soil Sample Date: 04 Aug 2016 Sample Name: C3-100	SE155708.006 Soil 04 Aug 2016 C3-300	SE155708.007 Soil 04 Aug 2016 C4-100	SE155708.008 Soil 04 Aug 2016 C4-300
VOC's in Soil Method: AN433 Tested: 15/8/2016						
Monocyclic Aromatic Hydrocarbons						
Benzene	mg/kg	0.1	-	-	-	-
Toluene	mg/kg	0.1	-	-	-	-
Ethylbenzene	mg/kg	0.1	-	-	-	-
m/p-xylene	mg/kg	0.2	-	-	-	-
o-xylene	mg/kg	0.1	-	-	-	-
Polycyclic VOCs						
Naphthalene	mg/kg	0.1	-	-	-	-
Surrogates						
Dibromofluoromethane (Surrogate)	%	-	-	-	-	-
d4-1,2-dichloroethane (Surrogate)	%	-	-	-	-	-
d8-toluene (Surrogate)	%	-	-	-	-	-
Bromofluorobenzene (Surrogate)	%	-	-	-	-	-
Totals						
Total Xylenes*	mg/kg	0.3	-	-	-	-
Total BTEX	mg/kg	0.6	-	-	-	-
Volatile Petroleum Hydrocarbons in Soil Method: AN433 Tested: 15/8/2016						
TRH C6-C10	mg/kg	25	-	-	-	-
TRH C6-C9	mg/kg	20	-	-	-	-
Surrogates						
Dibromofluoromethane (Surrogate)	%	-	-	-	-	-
d4-1,2-dichloroethane (Surrogate)	%	-	-	-	-	-
d8-toluene (Surrogate)	%	-	-	-	-	-
Bromofluorobenzene (Surrogate)	%	-	-	-	-	-

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name SE155708.005 Soil 04 Aug 2016 C3-100	SE155708.006 Soil 04 Aug 2016 C3-300	SE155708.007 Soil 04 Aug 2016 C4-100	SE155708.008 Soil 04 Aug 2016 C4-300
Volatile Petroleum Hydrocarbons in Soil Method: AN433 Tested: 15/8/2016 (continued)						
VPH F Bands						
Benzene (F0)	mg/kg	0.1	-	-	-	-
TRH C6-C10 minus BTEX (F1)	mg/kg	25	-	-	-	-
TRH (Total Recoverable Hydrocarbons) in Soil Method: AN403 Tested: 10/8/2016						
TRH C10-C14	mg/kg	20	-	-	-	-
TRH C15-C28	mg/kg	45	-	-	-	-
TRH C29-C36	mg/kg	45	-	-	-	-
TRH C37-C40	mg/kg	100	-	-	-	-
TRH C10-C36 Total	mg/kg	110	-	-	-	-
TRH C10-C40 Total	mg/kg	210	-	-	-	-
TRH F Bands						
TRH >C10-C16 (F2)	mg/kg	25	-	-	-	-
TRH >C10-C16 (F2) - Naphthalene	mg/kg	25	-	-	-	-
TRH >C16-C34 (F3)	mg/kg	90	-	-	-	-
TRH >C34-C40 (F4)	mg/kg	120	-	-	-	-
PAH (Polynuclear Aromatic Hydrocarbons) in Soil Method: AN420 Tested: 10/8/2016						
Naphthalene	mg/kg	0.1	-	-	-	-
2-methylnaphthalene	mg/kg	0.1	-	-	-	-
1-methylnaphthalene	mg/kg	0.1	-	-	-	-
Acenaphthylene	mg/kg	0.1	-	-	-	-
Acenaphthene	mg/kg	0.1	-	-	-	-
Fluorene	mg/kg	0.1	-	-	-	-
Phenanthrene	mg/kg	0.1	-	-	-	-
Anthracene	mg/kg	0.1	-	-	-	-
Fluoranthene	mg/kg	0.1	-	-	-	-
Pyrene	mg/kg	0.1	-	-	-	-
Benzo(a)anthracene	mg/kg	0.1	-	-	-	-
Chrysene	mg/kg	0.1	-	-	-	-
Benzo(b&j)fluoranthene	mg/kg	0.1	-	-	-	-
Benzo(k)fluoranthene	mg/kg	0.1	-	-	-	-
Benzo(a)pyrene	mg/kg	0.1	-	-	-	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	-	-	-	-
Dibenzo(ah)anthracene	mg/kg	0.1	-	-	-	-
Benzo(ghi)perylene	mg/kg	0.1	-	-	-	-
Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ	0.2	-	-	-	-
Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	-	-	-	-
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	-	-	-	-
Total PAH (18)	mg/kg	0.8	-	-	-	-
Total PAH (NEPM/WHO 16)	mg/kg	0.8	-	-	-	-

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	SE155708.005 Soil 04 Aug 2016 C3-100	SE155708.006 Soil 04 Aug 2016 C3-300	SE155708.007 Soil 04 Aug 2016 C4-100	SE155708.008 Soil 04 Aug 2016 C4-300
PAH (Polynuclear Aromatic Hydrocarbons) in Soil Method: AN420 Tested: 10/8/2016 (continued)							
Surrogates							
d5-nitrobenzene (Surrogate)	%	-		-	-	-	-
2-fluorobiphenyl (Surrogate)	%	-		-	-	-	-
d14-p-terphenyl (Surrogate)	%	-		-	-	-	-
OC Pesticides in Soil Method: AN400/AN420 Tested: 10/8/2016							
Hexachlorobenzene (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
Lindane	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
Aldrin	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
Delta BHC	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
o,p'-DDE	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1
Alpha Endosulfan	mg/kg	0.2		<0.2	<0.2	<0.2	<0.2
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
trans-Nonachlor	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1
p,p'-DDE	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	0.2		<0.2	<0.2	<0.2	<0.2
Endrin	mg/kg	0.2		<0.2	<0.2	<0.2	<0.2
o,p'-DDD	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1
o,p'-DDT	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1
Beta Endosulfan	mg/kg	0.2		<0.2	<0.2	<0.2	<0.2
p,p'-DDD	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1
p,p'-DDT	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
Endrin Aldehyde	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
Endrin Ketone	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1
Isodrin	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1
Mirex	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1
Surrogates							
Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-		**111**	**95**	**89**	**91**
PCBs in Soil Method: AN400/AN420 Tested: 10/8/2016							
Arochlor 1016	mg/kg	0.2		-	-	-	-
Arochlor 1221	mg/kg	0.2		-	-	-	-
Arochlor 1232	mg/kg	0.2		-	-	-	-
Arochlor 1242	mg/kg	0.2		-	-	-	-
Arochlor 1248	mg/kg	0.2		-	-	-	-
Arochlor 1254	mg/kg	0.2		-	-	-	-
Arochlor 1260	mg/kg	0.2		-	-	-	-
Arochlor 1262	mg/kg	0.2		-	-	-	-
Arochlor 1268	mg/kg	0.2		-	-	-	-
Total PCBs (Arochlors)	mg/kg	1		-	-	-	-

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name SE155708.005 Soil 04 Aug 2016 C3-100	SE155708.006 Soil 04 Aug 2016 C3-300	SE155708.007 Soil 04 Aug 2016 C4-100	SE155708.008 Soil 04 Aug 2016 C4-300
PCBs in Soil Method: AN400/AN420 Tested: 10/8/2016 (continued)						
Surrogates						
Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	-	-	-	-
Total Recoverable Metals in Soil/Waste Solids/Materials by ICPOES Method: AN040/AN320 Tested: 12/8/2016						
Arsenic, As	mg/kg	1	**5**	**5**	**5**	**5**
Cadmium, Cd	mg/kg	0.3	**0.5**	**0.5**	**0.7**	**0.5**
Chromium, Cr	mg/kg	0.5	**18**	**17**	**22**	**17**
Copper, Cu	mg/kg	0.5	**180**	**34**	**56**	**81**
Lead, Pb	mg/kg	1	**12**	**15**	**17**	**12**
Nickel, Ni	mg/kg	0.5	**4.5**	**4.4**	**4.3**	**4.4**
Zinc, Zn	mg/kg	2	**23**	**20**	**26**	**27**
Mercury in Soil Method: AN312 Tested: 12/8/2016						
Mercury	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05
Moisture Content Method: AN002 Tested: 12/8/2016						
% Moisture	%w/w	0.5	**11**	**9.1**	**10**	**12**

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	SE155708.009 Soil 04 Aug 2016 C5-100	SE155708.010 Soil 04 Aug 2016 C5-300	SE155708.011 Soil 04 Aug 2016 DB-100	SE155708.012 Soil 04 Aug 2016 S1
VOC's in Soil Method: AN433 Tested: 15/8/2016							
Monocyclic Aromatic Hydrocarbons							
Benzene	mg/kg	0.1		-	-	-	<0.1
Toluene	mg/kg	0.1		-	-	-	<0.1
Ethylbenzene	mg/kg	0.1		-	-	-	<0.1
m/p-xylene	mg/kg	0.2		-	-	-	<0.2
o-xylene	mg/kg	0.1		-	-	-	<0.1
Polycyclic VOCs							
Naphthalene	mg/kg	0.1		-	-	-	<0.1
Surrogates							
Dibromofluoromethane (Surrogate)	%	-		-	-	-	**106**
d4-1,2-dichloroethane (Surrogate)	%	-		-	-	-	**113**
d8-toluene (Surrogate)	%	-		-	-	-	**108**
Bromofluorobenzene (Surrogate)	%	-		-	-	-	**98**
Totals							
Total Xylenes*	mg/kg	0.3		-	-	-	<0.3
Total BTEX	mg/kg	0.6		-	-	-	<0.6
Volatile Petroleum Hydrocarbons in Soil Method: AN433 Tested: 15/8/2016							
TRH C6-C10	mg/kg	25		-	-	-	<25
TRH C6-C9	mg/kg	20		-	-	-	<20
Surrogates							
Dibromofluoromethane (Surrogate)	%	-		-	-	-	**106**
d4-1,2-dichloroethane (Surrogate)	%	-		-	-	-	**113**
d8-toluene (Surrogate)	%	-		-	-	-	**108**
Bromofluorobenzene (Surrogate)	%	-		-	-	-	**98**

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	SE155708.009 Soil 04 Aug 2016 C5-100	SE155708.010 Soil 04 Aug 2016 C5-300	SE155708.011 Soil 04 Aug 2016 DB-100	SE155708.012 Soil 04 Aug 2016 S1
Volatile Petroleum Hydrocarbons in Soil Method: AN433 Tested: 15/8/2016 (continued)							
VPH F Bands							
Benzene (F0)	mg/kg	0.1		-	-	-	<0.1
TRH C6-C10 minus BTEX (F1)	mg/kg	25		-	-	-	<25
TRH (Total Recoverable Hydrocarbons) in Soil Method: AN403 Tested: 10/8/2016							
TRH C10-C14	mg/kg	20		-	-	-	<20
TRH C15-C28	mg/kg	45		-	-	-	<45
TRH C29-C36	mg/kg	45		-	-	-	<45
TRH C37-C40	mg/kg	100		-	-	-	<100
TRH C10-C36 Total	mg/kg	110		-	-	-	<110
TRH C10-C40 Total	mg/kg	210		-	-	-	<210
TRH F Bands							
TRH >C10-C16 (F2)	mg/kg	25		-	-	-	<25
TRH >C10-C16 (F2) - Naphthalene	mg/kg	25		-	-	-	<25
TRH >C16-C34 (F3)	mg/kg	90		-	-	-	<90
TRH >C34-C40 (F4)	mg/kg	120		-	-	-	<120
PAH (Polynuclear Aromatic Hydrocarbons) in Soil Method: AN420 Tested: 10/8/2016							
Naphthalene	mg/kg	0.1		-	-	-	<0.1
2-methylnaphthalene	mg/kg	0.1		-	-	-	<0.1
1-methylnaphthalene	mg/kg	0.1		-	-	-	<0.1
Acenaphthylene	mg/kg	0.1		-	-	-	<0.1
Acenaphthene	mg/kg	0.1		-	-	-	<0.1
Fluorene	mg/kg	0.1		-	-	-	<0.1
Phenanthrene	mg/kg	0.1		-	-	-	<0.1
Anthracene	mg/kg	0.1		-	-	-	<0.1
Fluoranthene	mg/kg	0.1		-	-	-	<0.1
Pyrene	mg/kg	0.1		-	-	-	<0.1
Benzo(a)anthracene	mg/kg	0.1		-	-	-	<0.1
Chrysene	mg/kg	0.1		-	-	-	<0.1
Benzo(b&j)fluoranthene	mg/kg	0.1		-	-	-	<0.1
Benzo(k)fluoranthene	mg/kg	0.1		-	-	-	<0.1
Benzo(a)pyrene	mg/kg	0.1		-	-	-	<0.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.1		-	-	-	<0.1
Dibenzo(ah)anthracene	mg/kg	0.1		-	-	-	<0.1
Benzo(ghi)perylene	mg/kg	0.1		-	-	-	<0.1
Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ	0.2		-	-	-	<0.2
Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3		-	-	-	<0.3
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2		-	-	-	<0.2
Total PAH (18)	mg/kg	0.8		-	-	-	<0.8
Total PAH (NEPM/WHO 16)	mg/kg	0.8		-	-	-	<0.8

Parameter	Units	LOR	Sample Number: SE155708.009 Sample Matrix: Soil Sample Date: 04 Aug 2016 Sample Name: C5-100	SE155708.010 Soil 04 Aug 2016 C5-300	SE155708.011 Soil 04 Aug 2016 DB-100	SE155708.012 Soil 04 Aug 2016 S1
PAH (Polynuclear Aromatic Hydrocarbons) in Soil Method: AN420 Tested: 10/8/2016 (continued)						
Surrogates						
d5-nitrobenzene (Surrogate)	%	-	-	-	-	**86**
2-fluorobiphenyl (Surrogate)	%	-	-	-	-	**88**
d14-p-terphenyl (Surrogate)	%	-	-	-	-	**102**
OC Pesticides in Soil Method: AN400/AN420 Tested: 10/8/2016						
Hexachlorobenzene (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
Lindane	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
Aldrin	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
Delta BHC	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
o,p'-DDE	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Alpha Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
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
trans-Nonachlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
p,p'-DDE	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Endrin	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
o,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
o,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Beta Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
p,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
p,p'-DDT	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
Endrin Aldehyde	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
Endrin Ketone	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Isodrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Mirex	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Surrogates						
Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	**83**	**81**	**105**	**89**
PCBs in Soil Method: AN400/AN420 Tested: 10/8/2016						
Arochlor 1016	mg/kg	0.2	-	-	-	<0.2
Arochlor 1221	mg/kg	0.2	-	-	-	<0.2
Arochlor 1232	mg/kg	0.2	-	-	-	<0.2
Arochlor 1242	mg/kg	0.2	-	-	-	<0.2
Arochlor 1248	mg/kg	0.2	-	-	-	<0.2
Arochlor 1254	mg/kg	0.2	-	-	-	<0.2
Arochlor 1260	mg/kg	0.2	-	-	-	<0.2
Arochlor 1262	mg/kg	0.2	-	-	-	<0.2
Arochlor 1268	mg/kg	0.2	-	-	-	<0.2
Total PCBs (Arochlors)	mg/kg	1	-	-	-	<1

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name SE155708.009 Soil 04 Aug 2016 C5-100	SE155708.010 Soil 04 Aug 2016 C5-300	SE155708.011 Soil 04 Aug 2016 DB-100	SE155708.012 Soil 04 Aug 2016 S1
PCBs in Soil Method: AN400/AN420 Tested: 10/8/2016 (continued)						
Surrogates						
Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	-	-	-	**89**
Total Recoverable Metals in Soil/Waste Solids/Materials by ICPOES Method: AN040/AN320 Tested: 12/8/2016						
Arsenic, As	mg/kg	1	**5**	**5**	**6**	**8**
Cadmium, Cd	mg/kg	0.3	**0.4**	**0.4**	**0.4**	**0.5**
Chromium, Cr	mg/kg	0.5	**17**	**17**	**18**	**21**
Copper, Cu	mg/kg	0.5	**50**	**27**	**28**	**96**
Lead, Pb	mg/kg	1	**13**	**11**	**15**	**28**
Nickel, Ni	mg/kg	0.5	**4.6**	**5.0**	**5.1**	**5.3**
Zinc, Zn	mg/kg	2	**28**	**21**	**26**	**35**
Mercury in Soil Method: AN312 Tested: 12/8/2016						
Mercury	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05
Moisture Content Method: AN002 Tested: 12/8/2016						
% Moisture	%w/w	0.5	**11**	**10**	**13**	**13**

Parameter	Units	LOR	Sample Number: SE155708.013 Sample Matrix: Soil Sample Date: 04 Aug 2016 Sample Name: S2	SE155708.014 Soil 04 Aug 2016 S3	SE155708.015 Soil 04 Aug 2016 S4
VOC's in Soil Method: AN433 Tested: 10/8/2016					
Monocyclic Aromatic Hydrocarbons					
Benzene	mg/kg	0.1	<0.1	<0.1	<0.1
Toluene	mg/kg	0.1	<0.1	<0.1	<0.1
Ethylbenzene	mg/kg	0.1	<0.1	<0.1	<0.1
m/p-xylene	mg/kg	0.2	<0.2	<0.2	<0.2
o-xylene	mg/kg	0.1	<0.1	<0.1	<0.1
Polycyclic VOCs					
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1
Surrogates					
Dibromofluoromethane (Surrogate)	%	-	**101**	**120**	**106**
d4-1,2-dichloroethane (Surrogate)	%	-	**110**	**128**	**111**
d8-toluene (Surrogate)	%	-	**101**	**121**	**105**
Bromofluorobenzene (Surrogate)	%	-	**90**	**108**	**99**
Totals					
Total Xylenes*	mg/kg	0.3	<0.3	<0.3	<0.3
Total BTEX	mg/kg	0.6	<0.6	<0.6	<0.6
Volatile Petroleum Hydrocarbons in Soil Method: AN433 Tested: 10/8/2016					
TRH C6-C10	mg/kg	25	<25	<25	<25
TRH C6-C9	mg/kg	20	<20	<20	<20
Surrogates					
Dibromofluoromethane (Surrogate)	%	-	**101**	**120**	**106**
d4-1,2-dichloroethane (Surrogate)	%	-	**110**	**128**	**111**
d8-toluene (Surrogate)	%	-	**101**	**121**	**105**
Bromofluorobenzene (Surrogate)	%	-	**90**	**108**	**99**

Parameter	Units	LOR	Sample Number: SE155708.013 Sample Matrix: Soil Sample Date: 04 Aug 2016 Sample Name: S2	SE155708.014 Soil 04 Aug 2016 S3	SE155708.015 Soil 04 Aug 2016 S4
Volatile Petroleum Hydrocarbons in Soil Method: AN433 Tested: 10/8/2016 (continued)					
VPH F Bands					
Benzene (F0)	mg/kg	0.1	<0.1	<0.1	<0.1
TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	<25
TRH (Total Recoverable Hydrocarbons) in Soil Method: AN403 Tested: 10/8/2016					
TRH C10-C14	mg/kg	20	<20	<20	**40**
TRH C15-C28	mg/kg	45	<45	<45	**100**
TRH C29-C36	mg/kg	45	<45	<45	<45
TRH C37-C40	mg/kg	100	<100	<100	<100
TRH C10-C36 Total	mg/kg	110	<110	<110	**140**
TRH C10-C40 Total	mg/kg	210	<210	<210	<210
TRH F Bands					
TRH >C10-C16 (F2)	mg/kg	25	<25	<25	**75**
TRH >C10-C16 (F2) - Naphthalene	mg/kg	25	<25	<25	**75**
TRH >C16-C34 (F3)	mg/kg	90	<90	<90	<90
TRH >C34-C40 (F4)	mg/kg	120	<120	<120	<120
PAH (Polynuclear Aromatic Hydrocarbons) in Soil Method: AN420 Tested: 10/8/2016					
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1
2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1
1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	0.1	<0.1	<0.1	<0.1
Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	mg/kg	0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	<0.1
Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	<0.1
Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ	0.2	<0.2	<0.2	<0.2
Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	<0.3	<0.3	<0.3
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	<0.2	<0.2	<0.2
Total PAH (18)	mg/kg	0.8	<0.8	<0.8	<0.8
Total PAH (NEPM/WHO 16)	mg/kg	0.8	<0.8	<0.8	<0.8

Parameter	Units	LOR	Sample Number: SE155708.013 Sample Matrix: Soil Sample Date: 04 Aug 2016 Sample Name: S2	SE155708.014 Soil 04 Aug 2016 S3	SE155708.015 Soil 04 Aug 2016 S4
PAH (Polynuclear Aromatic Hydrocarbons) in Soil Method: AN420 Tested: 10/8/2016 (continued)					
Surrogates					
d5-nitrobenzene (Surrogate)	%	-	**84**	**82**	**88**
2-fluorobiphenyl (Surrogate)	%	-	**84**	**84**	**88**
d14-p-terphenyl (Surrogate)	%	-	**100**	**102**	**106**
OC Pesticides in Soil Method: AN400/AN420 Tested: 10/8/2016					
Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	<0.1	<0.1
Alpha BHC	mg/kg	0.1	<0.1	<0.1	<0.1
Lindane	mg/kg	0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	0.1	<0.1	<0.1	<0.1
Beta BHC	mg/kg	0.1	<0.1	<0.1	<0.1
Delta BHC	mg/kg	0.1	<0.1	<0.1	<0.1
Heptachlor epoxide	mg/kg	0.1	<0.1	<0.1	<0.1
o,p'-DDE	mg/kg	0.1	<0.1	<0.1	<0.1
Alpha Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2
Gamma Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1
Alpha Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1
trans-Nonachlor	mg/kg	0.1	<0.1	<0.1	<0.1
p,p'-DDE	mg/kg	0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	0.2	<0.2	<0.2	<0.2
Endrin	mg/kg	0.2	<0.2	<0.2	<0.2
o,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1
o,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1
Beta Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2
p,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1
p,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1
Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	0.1	<0.1	<0.1	<0.1
Endrin Ketone	mg/kg	0.1	<0.1	<0.1	<0.1
Isodrin	mg/kg	0.1	<0.1	<0.1	<0.1
Mirex	mg/kg	0.1	<0.1	<0.1	<0.1
Surrogates					
Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	**87**	**81**	**91**
PCBs in Soil Method: AN400/AN420 Tested: 10/8/2016					
Arochlor 1016	mg/kg	0.2	<0.2	<0.2	<0.2
Arochlor 1221	mg/kg	0.2	<0.2	<0.2	<0.2
Arochlor 1232	mg/kg	0.2	<0.2	<0.2	<0.2
Arochlor 1242	mg/kg	0.2	<0.2	<0.2	<0.2
Arochlor 1248	mg/kg	0.2	<0.2	<0.2	<0.2
Arochlor 1254	mg/kg	0.2	<0.2	<0.2	<0.2
Arochlor 1260	mg/kg	0.2	<0.2	<0.2	<0.2
Arochlor 1262	mg/kg	0.2	<0.2	<0.2	<0.2
Arochlor 1268	mg/kg	0.2	<0.2	<0.2	<0.2
Total PCBs (Arochlors)	mg/kg	1	<1	<1	<1

Parameter	Units	LOR	Sample Number: SE155708.013 Sample Matrix: Soil Sample Date: 04 Aug 2016 Sample Name: S2	SE155708.014 Soil 04 Aug 2016 S3	SE155708.015 Soil 04 Aug 2016 S4
PCBs in Soil Method: AN400/AN420 Tested: 10/8/2016 (continued)					
Surrogates					
Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	**87**	**81**	**91**
Total Recoverable Metals in Soil/Waste Solids/Materials by ICPOES Method: AN040/AN320 Tested: 12/8/2016					
Arsenic, As	mg/kg	1	**8**	**7**	**5**
Cadmium, Cd	mg/kg	0.3	**0.6**	**0.5**	**0.4**
Chromium, Cr	mg/kg	0.5	**14**	**20**	**16**
Copper, Cu	mg/kg	0.5	**110**	**49**	**29**
Lead, Pb	mg/kg	1	**820**	**17**	**14**
Nickel, Ni	mg/kg	0.5	**7.1**	**4.7**	**4.2**
Zinc, Zn	mg/kg	2	**290**	**31**	**27**
Mercury in Soil Method: AN312 Tested: 12/8/2016					
Mercury	mg/kg	0.05	**0.11**	<0.05	<0.05
Moisture Content Method: AN002 Tested: 12/8/2016					
% Moisture	%w/w	0.5	**25**	**4.8**	**15**

QC SUMMARY

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage.* Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

Mercury in Soil Method: ME-(AU)-[ENV]AN312

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Mercury	LB107526	mg/kg	0.05	<0.05	0%	101%	97%
	LB107527	mg/kg	0.05	<0.05	8 - 39%	101%	90%

Moisture Content Method: ME-(AU)-[ENV]AN002

Parameter	QC Reference	Units	LOR	DUP %RPD
% Moisture	LB107531	%w/w	0.5	0 - 3%

OC Pesticides in Soil Method: ME-(AU)-[ENV]AN400/AN420

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Hexachlorobenzene (HCB)	LB107365	mg/kg	0.1	<0.1	0%	NA	NA
Alpha BHC	LB107365	mg/kg	0.1	<0.1	0%	NA	NA
Lindane	LB107365	mg/kg	0.1	<0.1	0%	NA	NA
Heptachlor	LB107365	mg/kg	0.1	<0.1	0%	77%	89%
Aldrin	LB107365	mg/kg	0.1	<0.1	0%	78%	88%
Beta BHC	LB107365	mg/kg	0.1	<0.1	0%	NA	NA
Delta BHC	LB107365	mg/kg	0.1	<0.1	0%	78%	81%
Heptachlor epoxide	LB107365	mg/kg	0.1	<0.1	0%	NA	NA
o,p'-DDE	LB107365	mg/kg	0.1	<0.1	0%	NA	NA
Alpha Endosulfan	LB107365	mg/kg	0.2	<0.2	0%	NA	NA
Gamma Chlordane	LB107365	mg/kg	0.1	<0.1	0%	NA	NA
Alpha Chlordane	LB107365	mg/kg	0.1	<0.1	0%	NA	NA
trans-Nonachlor	LB107365	mg/kg	0.1	<0.1	0%	NA	NA
p,p'-DDE	LB107365	mg/kg	0.1	<0.1	0%	NA	NA
Dieldrin	LB107365	mg/kg	0.2	<0.2	0%	75%	80%
Endrin	LB107365	mg/kg	0.2	<0.2	0%	82%	98%
o,p'-DDD	LB107365	mg/kg	0.1	<0.1	0%	NA	NA
o,p'-DDT	LB107365	mg/kg	0.1	<0.1	0%	NA	NA
Beta Endosulfan	LB107365	mg/kg	0.2	<0.2	0%	NA	NA
p,p'-DDD	LB107365	mg/kg	0.1	<0.1	0%	NA	NA
p,p'-DDT	LB107365	mg/kg	0.1	<0.1	0%	76%	82%
Endosulfan sulphate	LB107365	mg/kg	0.1	<0.1	0%	NA	NA
Endrin Aldehyde	LB107365	mg/kg	0.1	<0.1	0%	NA	NA
Methoxychlor	LB107365	mg/kg	0.1	<0.1	0%	NA	NA
Endrin Ketone	LB107365	mg/kg	0.1	<0.1	0%	NA	NA
Isodrin	LB107365	mg/kg	0.1	<0.1	0%	NA	NA
Mirex	LB107365	mg/kg	0.1	<0.1	0%	NA	NA

Surrogates

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Tetrachloro-m-xylene (TCMX) (Surrogate)	LB107365	%	-	73%	0 - 3%	75%	83%

QC SUMMARY

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage.* Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

PAH (Polynuclear Aromatic Hydrocarbons) in Soil Method: ME-(AU)-[ENV]AN420

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Naphthalene	LB107365	mg/kg	0.1	<0.1	15%	99%
2-methylnaphthalene	LB107365	mg/kg	0.1	<0.1	16%	NA
1-methylnaphthalene	LB107365	mg/kg	0.1	<0.1	21%	NA
Acenaphthylene	LB107365	mg/kg	0.1	<0.1	23%	100%
Acenaphthene	LB107365	mg/kg	0.1	<0.1	52%	105%
Fluorene	LB107365	mg/kg	0.1	<0.1	39%	NA
Phenanthrene	LB107365	mg/kg	0.1	<0.1	43%	97%
Anthracene	LB107365	mg/kg	0.1	<0.1	33%	102%
Fluoranthene	LB107365	mg/kg	0.1	<0.1	35%	100%
Pyrene	LB107365	mg/kg	0.1	<0.1	35%	101%
Benzo(a)anthracene	LB107365	mg/kg	0.1	<0.1	34%	NA
Chrysene	LB107365	mg/kg	0.1	<0.1	38%	NA
Benzo(b&j)fluoranthene	LB107365	mg/kg	0.1	<0.1	22%	NA
Benzo(k)fluoranthene	LB107365	mg/kg	0.1	<0.1	40%	NA
Benzo(a)pyrene	LB107365	mg/kg	0.1	<0.1	35%	104%
Indeno(1,2,3-cd)pyrene	LB107365	mg/kg	0.1	<0.1	30%	NA
Dibenzo(ah)anthracene	LB107365	mg/kg	0.1	<0.1	79%	NA
Benzo(ghi)perylene	LB107365	mg/kg	0.1	<0.1	33%	NA
Carcinogenic PAHs, BaP TEQ <LOR=0	LB107365	TEQ	0.2	<0.2	37%	NA
Carcinogenic PAHs, BaP TEQ <LOR=LOR	LB107365	TEQ (mg/kg)	0.3	<0.3	37%	NA
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	LB107365	TEQ (mg/kg)	0.2	<0.2	37%	NA
Total PAH (18)	LB107365	mg/kg	0.8	<0.8	35%	NA
Total PAH (NEPM/WHO 16)	LB107365	mg/kg	0.8	<0.8		

Surrogates

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
d5-nitrobenzene (Surrogate)	LB107365	%	-	90%	0%	82%
2-fluorobiphenyl (Surrogate)	LB107365	%	-	90%	6%	84%
d14-p-terphenyl (Surrogate)	LB107365	%	-	110%	2%	96%

QC SUMMARY

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage.* Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

PCBs in Soil **Method: ME-(AU)-[ENV]AN400/AN420**

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Arochlor 1016	LB107365	mg/kg	0.2	<0.2	0%	NA
Arochlor 1221	LB107365	mg/kg	0.2	<0.2	0%	NA
Arochlor 1232	LB107365	mg/kg	0.2	<0.2	0%	NA
Arochlor 1242	LB107365	mg/kg	0.2	<0.2	0%	NA
Arochlor 1248	LB107365	mg/kg	0.2	<0.2	0%	NA
Arochlor 1254	LB107365	mg/kg	0.2	<0.2	0%	NA
Arochlor 1260	LB107365	mg/kg	0.2	<0.2	0%	85%
Arochlor 1262	LB107365	mg/kg	0.2	<0.2	0%	NA
Arochlor 1268	LB107365	mg/kg	0.2	<0.2	0%	NA
Total PCBs (Arochlors)	LB107365	mg/kg	1	<1	0%	NA

Surrogates

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Tetrachloro-m-xylene (TCMX) (Surrogate)	LB107365	%	-	73%	0%	85%

Total Recoverable Metals in Soil/Waste Solids/Materials by ICPOES **Method: ME-(AU)-[ENV]AN040/AN320**

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Arsenic, As	LB107534	mg/kg	1	<1	9 - 52%	98%	85%
	LB107536	mg/kg	1	<1	8 - 41%	100%	93%
Cadmium, Cd	LB107534	mg/kg	0.3	<0.3	0 - 23%	101%	88%
	LB107536	mg/kg	0.3	<0.3	23 - 32%	100%	94%
Chromium, Cr	LB107534	mg/kg	0.5	<0.5	11 - 17%	99%	103%
	LB107536	mg/kg	0.5	<0.5	57 - 62%	100%	94%
Copper, Cu	LB107534	mg/kg	0.5	<0.5	6 - 8%	101%	93%
	LB107536	mg/kg	0.5	<0.5	9 - 25%	100%	81%
Lead, Pb	LB107534	mg/kg	1	<1	8 - 18%	100%	95%
	LB107536	mg/kg	1	<1	9 - 16%	100%	89%
Nickel, Ni	LB107534	mg/kg	0.5	<0.5	1 - 15%	101%	88%
	LB107536	mg/kg	0.5	<0.5	12 - 27%	101%	93%
Zinc, Zn	LB107534	mg/kg	2	<2	1 - 24%	100%	91%
	LB107536	mg/kg	2	<2	9 - 24%	101%	87%

QC SUMMARY

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage.* Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

TRH (Total Recoverable Hydrocarbons) in Soil Method: ME-(AU)-[ENV]AN403

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
TRH C10-C14	LB107365	mg/kg	20	<20	0%	93%
TRH C15-C28	LB107365	mg/kg	45	<45	14%	103%
TRH C29-C36	LB107365	mg/kg	45	<45	17%	80%
TRH C37-C40	LB107365	mg/kg	100	<100	0%	NA
TRH C10-C36 Total	LB107365	mg/kg	110	<110	14%	NA
TRH C10-C40 Total	LB107365	mg/kg	210	<210	14%	NA

TRH F Bands

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
TRH >C10-C16 (F2)	LB107365	mg/kg	25	<25	0%	93%
TRH >C10-C16 (F2) - Naphthalene	LB107365	mg/kg	25	<25	0%	NA
TRH >C16-C34 (F3)	LB107365	mg/kg	90	<90	16%	100%
TRH >C34-C40 (F4)	LB107365	mg/kg	120	<120	0%	75%

VOC's in Soil Method: ME-(AU)-[ENV]AN433

Monocyclic Aromatic Hydrocarbons

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Benzene	LB107360	mg/kg	0.1	<0.1	NVL	73%	66%
Toluene	LB107360	mg/kg	0.1	<0.1	NVL	76%	68%
Ethylbenzene	LB107360	mg/kg	0.1	<0.1	NVL	76%	67%
m/p-xylene	LB107360	mg/kg	0.2	<0.2	NVL	77%	69%
o-xylene	LB107360	mg/kg	0.1	<0.1	NVL	76%	68%

Polycyclic VOCs

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Naphthalene	LB107360	mg/kg	0.1	<0.1	NVL	NA	NA

Surrogates

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Dibromofluoromethane (Surrogate)	LB107360	%	-	113%	NVL	108%	99%
d4-1,2-dichloroethane (Surrogate)	LB107360	%	-	120%	NVL	114%	106%
d8-toluene (Surrogate)	LB107360	%	-	114%	NVL	114%	98%
Bromofluorobenzene (Surrogate)	LB107360	%	-	102%	NVL	125%	114%

Totals

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Total Xylenes*	LB107360	mg/kg	0.3	<0.3	NVL	NA	NA
Total BTEX	LB107360	mg/kg	0.6	<0.6	NVL	NA	NA

QC SUMMARY

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage.* Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

Volatile Petroleum Hydrocarbons in Soil **Method: ME-(AU)-[ENV]AN433**

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
TRH C6-C10	LB107360	mg/kg	25	<25	NVL	84%	85%
TRH C6-C9	LB107360	mg/kg	20	<20	NVL	72%	73%

Surrogates

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Dibromofluoromethane (Surrogate)	LB107360	%	-	113%	NVL	108%	99%
d4-1,2-dichloroethane (Surrogate)	LB107360	%	-	120%	NVL	114%	106%
d8-toluene (Surrogate)	LB107360	%	-	114%	NVL	114%	98%
Bromofluorobenzene (Surrogate)	LB107360	%	-	102%	NVL	125%	114%

VPH F Bands

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Benzene (F0)	LB107360	mg/kg	0.1	<0.1	NVL	NA	NA
TRH C6-C10 minus BTEX (F1)	LB107360	mg/kg	25	<25	NVL	105%	128%

METHOD SUMMARY

METHOD	METHODOLOGY SUMMARY
AN002	The test is carried out by drying (at either 40°C or 105°C) a known mass of sample in a weighed evaporating basin. After fully dry the sample is re-weighed. Samples such as sludge and sediment having high percentages of moisture will take some time in a drying oven for complete removal of water.
AN040	A portion of sample is digested with Nitric acid to decompose organic matter and Hydrochloric acid to complete the digestion of metals and then filtered for analysis by ASS or ICP as per USEPA Method 200.8.
AN040/AN320	A portion of sample is digested with nitric acid to decompose organic matter and hydrochloric acid to complete the digestion of metals. The digest is then analysed by ICP OES with metals results reported on the dried sample basis. Based on USEPA method 200.8 and 6010C.
AN312	Mercury by Cold Vapour AAS in Soils: After digestion with nitric acid, hydrogen peroxide and hydrochloric acid, mercury ions are reduced by stannous chloride reagent in acidic solution to elemental mercury. This mercury vapour is purged by nitrogen into a cold cell in an atomic absorption spectrometer or mercury analyser. Quantification is made by comparing absorbances to those of the calibration standards. Reference APHA 3112/3500
AN400	OC and OP Pesticides by GC-ECD: The determination of organochlorine (OC) and organophosphorus (OP) pesticides and polychlorinated biphenyls (PCBs) in soils, sludges and groundwater. (Based on USEPA methods 3510, 3550, 8140 and 8080.)
AN403	Total Recoverable Hydrocarbons: Determination of Hydrocarbons by gas chromatography after a solvent extraction. Detection is by flame ionisation detector (FID) that produces an electronic signal in proportion to the combustible matter passing through it. Total Recoverable Hydrocarbons (TRH) are routinely reported as four alkane groupings based on the carbon chain length of the compounds: C6-C9, C10-C14, C15-C28 and C29-C36 and in recognition of the NEPM 1999 (2013), >C10-C16 (F2), >C16-C34 (F3) and >C34-C40 (F4). F2 is reported directly and also corrected by subtracting Naphthalene (from VOC method AN433) where available.
AN403	Additionally, the volatile C6-C9 fraction may be determined by a purge and trap technique and GC/MS because of the potential for volatiles loss. Total Petroleum Hydrocarbons (TPH) follows the same method of analysis after silica gel cleanup of the solvent extract. Aliphatic/Aromatic Speciation follows the same method of analysis after fractionation of the solvent extract over silica with differential polarity of the eluent solvents .
AN403	The GC/FID method is not well suited to the analysis of refined high boiling point materials (ie lubricating oils or greases) but is particularly suited for measuring diesel, kerosene and petrol if care to control volatility is taken. This method will detect naturally occurring hydrocarbons, lipids, animal fats, phenols and PAHs if they are present at sufficient levels, dependent on the use of specific cleanup/fractionation techniques. Reference USEPA 3510B, 8015B.
AN420	(SVOCs) including OC, OP, PCB, Herbicides, PAH, Phthalates and Speciated Phenols (etc) in soils, sediments and waters are determined by GCMS/ECD technique following appropriate solvent extraction process (Based on USEPA 3500C and 8270D).
AN420	SVOC Compounds: Semi-Volatile Organic Compounds (SVOCs) including OC, OP, PCB, Herbicides, PAH, Phthalates and Speciated Phenols in soils, sediments and waters are determined by GCMS/ECD technique following appropriate solvent extraction process (Based on USEPA 3500C and 8270D).
AN433	VOCs and C6-C9 Hydrocarbons by GC-MS P&T: VOC`s are volatile organic compounds. The sample is presented to a gas chromatograph via a purge and trap (P&T) concentrator and autosampler and is detected with a Mass Spectrometer (MSD). Solid samples are initially extracted with methanol whilst liquid samples are processed directly. References: USEPA 5030B, 8020A, 8260.

FOOTNOTES

IS	Insufficient sample for analysis.	LOR	Limit of Reporting
LNR	Sample listed, but not received.	↑↓	Raised or Lowered Limit of Reporting
*	NATA accreditation does not cover the performance of this service.	QFH	QC result is above the upper tolerance
		QFL	QC result is below the lower tolerance
**	Indicative data, theoretical holding time exceeded.	-	The sample was not analysed for this analyte
		NVL	Not Validated

Samples analysed as received.
Solid samples expressed on a dry weight basis.

Where "Total" analyte groups are reported (for example, Total PAHs, Total OC Pesticides) the total will be calculated as the sum of the individual analytes, with those analytes that are reported as <LOR being assumed to be zero. The summed (Total) limit of reporting is calcuated by summing the individual analyte LORs and dividing by two. For example, where 16 individual analytes are being summed and each has an LOR of 0.1 mg/kg, the "Totals" LOR will be 1.6 / 2 (0.8 mg/kg). Where only 2 analytes are being summed, the " Total" LOR will be the sum of those two LORs.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

If reported, measurement uncertainty follow the ± sign after the analytical result and is expressed as the expanded uncertainty calculated using a coverage factor of 2, providing a level of confidence of approximately 95%, unless stated otherwise in the comments section of this report.

Results reported for samples tested under test methods with codes starting with ARS-SOP, radionuclide or gross radioactivity concentrations are expressed in becquerel (Bq) per unit of mass or volume or per wipe as stated on the report. Becquerel is the SI unit for activity and equals one nuclear transformation per second.
Note that in terms of units of radioactivity:

a. 1 Bq is equivalent to 27 pCi
b. 37 MBq is equivalent to 1 mCi

For results reported for samples tested under test methods with codes starting with ARS-SOP, less than (<) values indicate the detection limit for each radionuclide or parameter for the measurement system used. The respective detection limits have been calculated in accordance with ISO 11929.

The QC criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here : http://www.sgs.com.au/~/media/Local/Australia/Documents/Technical%20Documents/MP-AU-ENV-QU-022%20QA%20QC%20Plan.pdf

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Appendix 3. Field sampling log

Sampling log

Client	Health Infrastructure
Contact	Alana Travis
Job number	R7367
Location	2 Nullamut Street, Cobar NSW
Date	3 and 4 August 2016
Investigator(s)	Andrew Ruming
Weather conditions	Fine

Sample id	Matrix	Date	Analysis required	Observations/comments
-100	Soil	04/08/2016	Arsenic (As), cadmium (Cd), chromium (Cr), copper (Cu), lead (Pb), nickel (Ni), zinc (Zn), Organochlorine pesticides (OCP)	
C1-300	Soil	04/08/2016	As, Cd, Cr, Cu, Pb, Ni, Zn, OCP	
C2-100	Soil	04/08/2016	As, Cd, Cr, Cu, Pb, Ni, Zn, OCP	
C2-300	Soil	04/08/2016	As, Cd, Cr, Cu, Pb, Ni, Zn, OCP	
C3-100	Soil	04/08/2016	As, Cd, Cr, Cu, Pb, Ni, Zn, OCP	
C3-300	Soil	04/08/2016	As, Cd, Cr, Cu, Pb, Ni, Zn, OCP	
C4-100	Soil	04/08/2016	As, Cd, Cr, Cu, Pb, Ni, Zn, OCP	
C4-300	Soil	04/08/2016	As, Cd, Cr, Cu, Pb, Ni, Zn, OCP	
C5-100	Soil	04/08/2016	As, Cd, Cr, Cu, Pb, Ni, Zn, OCP	
C5-300	Soil	04/08/2016	As, Cd, Cr, Cu, Pb, Ni, Zn, OCP	
DB-100	Soil	04/08/2016	As, Cd, Cr, Cu, Pb, Ni, Zn, OCP	
S1	Soil	04/08/2016	Total recoverable hydrocarbons (TRH C6-C40), benzene, toluene, ethyl benzene, xylene and naphthalene (BTEXN), polycyclic aromatic hydrocarbons (PAH), OCP, polychlorinated biphenyls (PCB), As, Cd, Cr, Cu, Pb, Ni, Zn, Hg	
S2	Soil	04/08/2016	TRH (C6-C40), BTEXN, PAH, OCP, PCB, As, Cd, Cr, Cu, Pb, Ni, Zn, Hg	
S3	Soil	04/08/2016	TRH (C6-C40), BTEXN, PAH, OCP, PCB, As, Cd, Cr, Cu, Pb, Ni, Zn, Hg	
S4	Soil	04/08/2016	TRH (C6-C40), BTEXN, PAH, OCP, PCB, As, Cd, Cr, Cu, Pb, Ni, Zn, Hg	