Preliminary contamination investigation

Proposed residential subdivision of Lots 90 and 100 DP750401
168 Shiralee Road, Orange NSW 2800

Ref: R8543c
Date: 16 August 2017

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Interested authorities:	Orange City Council
Report number:	R8543c
Date:	16 August 2017

Summary report

Address: 168 Shiralee Road, Orange NSW

Lot: Lots 90 and 100 Section: - DP: DP750401

Dates of works:

Main areas of concern

The investigation area is Lot 90 and 100 DP750401, 168 Shiralee Road, Orange NSW. The investigation area comprised approximately 3.8 hectares. An investigation of the site was required to determine the contamination status and suitability for residential land-use.

Notable contaminant concentrations

No elevated levels of heavy metals, hydrocarbons or pesticides were identified. All samples were below the adopted thresholds for residential land-use.

Nature of works carried out

A soil investigation including sampling was undertaken across the site.

Nature and extent of residual contamination

No samples collected contained analytes exceeding the adopted residential land-use threshold.

Risk factors

The potential contamination sources included heavy metals, total recoverable hydrocarbons, BTEXN, and organochlorine and organophosphorus pesticides associated with the former orcharding land-use. The potential exposure pathways included direct (ingestion and absorption). The potential receptors included on-site workers (builders and contractors) and residents, and off-site terrestrial, residential and rural.

Waste removed

Nil

Remediation summary

Nil

Statement of suitability

The investigation area is suitable for the proposed residential land-use.

This is an accurate summary of the report titled: Preliminary Contamination Investigation, proposed residential subdivision of Lots 90 and 100 DP750401, 168 Shiralee Road, Orange NSW 2800

Produced by: Envirowest Consulting Pty Ltd Dated: 16/08/2017
Name: Gregory Madafiglio Certification details: Pending

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1. Introduction

A twenty-one lot residential subdivision is proposed for Lots 90 and 100 DP750401, 168 Shiralee Road, Orange NSW. The site has an agricultural land-use history of orcharding and grazing of livestock. An investigation of the site is required to determine the soil contamination status and suitability for the proposed residential 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 27 and 28 July 2017.

2. Scope of work

Envirowest Consulting Pty Ltd was commissioned by Peter Basha Planning and Development on behalf of Matthew Savage 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 Lots 90 and 100 DP750401, 168 Shiralee Road, Orange 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 residential land-use.

3. Site identification

Address	168 Shiralee Road Orange NSW 2800
Client	Matthew Savage
Deposited plans	Lots 90 and 100 DP750401
Locality map	Figure 1
Site plan	Figures 2 and 3
Photographs	Figure 4
Area	Total investigation area: approximately 3.8 hectares

4. Site history

4.1 Zoning

Lot 90 DP750401 is zoned R1 – General Residential and R2 - Low Density Residential under the Orange City Council Local Environmental Plan (2012). Lot 100 DP750401 is zoned R2 - Low Density Residential.

4.2 Land-use

The current land-use on-site is grazing of livestock (sheep). The existing dwelling is currently vacant. The site has a historical land-use of orcharding and grazing.

4.3 Summary of council records

None available for review.

4.4 Sources of information

- Site inspection 27 and 28 July 2017 by Envirowest Consulting Pty Ltd
- NSW EPA records of public notices under the CLM Act 1997
- Soil and geological maps
- Spatial information exchange Historical Parish Maps
- Historical aerial photographs
- Orange Local Environmental Plan 2012

4.5 Chronological list of site uses

4.5.1 Historical aerial photographs

Year of photograph	Observations
1954	A small dwelling (heritage cottage) is present on Lot 100, adjacent the boundary with Lot 90. A shed is identified as located north of the existing dwelling. Orcharding is identifiable in the southern section of the site. Pasture is present in the northern section of the site.
1974	The shed identified in 1954 is no longer present. Orcharding is present in the southern section of the site. The heritage cottage on Lot 100 is still present. Additional infrastructure comprising shed and dwelling is present in the western section of Lot 90.
1984	No orchards are present on-site.
1993	No change in infrastructure or land-use has occurred since 1984.
2003	Additional sheds adjacent the dwelling on Lot 90 are present
2006-2016	No change in infrastructure or land-use is identifiable in the 2006-2016 aerial photographs.

4.5.2 Historical parish maps

Review of historical parish maps (1914, 1930, 1948 and 1967) identify J.O.H Nunn as the landholder of Lot 90. Historical parish maps identify the landholder of Lot 100 as W.A Fitzgerald in 1914 and 1930, and as L.A Lane in 1948 and 1967.

4.6 Buildings and infrastructure

Buildings and infrastructure identified on-site at the time of site inspection included;

- Existing heritage cottage
- A number of sheds of varying dimensions – including small pump sheds
- Existing dwelling
- Water tanks
- Septic tank – disposal area not identified

4.7 Contaminant sources

The historic orcharding land-use is likely to have resulted in application of pesticides in routine management. Pesticides were regularly applied to pome and stone fruits. Fertilisers applied may contain heavy metal contaminants. No bio solids are known to have been applied to the site. The use of machinery in routine orchard management may have resulted in spills of hydrocarbons including petrol, oil or diesel.

4.8 Contaminants of concern

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

- Heavy metals (arsenic, cadmium, chromium, copper, nickel, lead, zinc, mercury)
- Organochlorine and organophosphorus pesticides (OCP and OPP)
- Total recoverable hydrocarbons (TRH C6-C40)
- Benzene, toluene, ethylbenzene, xylenes and naphthalene (BTEXN)

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 – Rural-residential, residential
South – Rural-residential, rural
East – Rural-residential, Orange rifle range
West – Rural-residential, Towac Racecourse

Historical and present neighbouring land-uses are not expected to impact on 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
Surface cover within the investigation area comprised pasture grasses, trees and ruderal weeds. Some general refuse including old tyres, timber and corrugated iron sheeting was present around the existing dwelling.

5.2 Topography
The site is located on a mid to upper slope. Aspect over Lot 100 is north west with a slope of 1 to 8%. Aspect over Lot 90 is mostly south east with varying slope of 1 to 5%. Site elevation ranged from 896m to 911m AHD.

5.3 Soils and geology
The site is located within the Spring Hill Soil Landscape (Kovac *et al*. 1990). Krasnozens are the dominant soils within the landscape. Other common soil types comprise yellow podozlic and solodic soils. Natural soils on-site comprise red brown sandy silt to silty clay. Trace gravel was encountered at some sampling locations.

The geological unit is tertiary volcanics derived from Mount Canobolas. The parent rock comprises basalt flows separated by volcanic ash forming layers of clay and slate. The parent material comprises in-situ and colluvial-alluvial materials derived from the parent rock.

5.4 Water
5.4.1 Surface water
The natural flow of surface waters is expected to follow the natural contour of the site and flow north toward Park Street from Lot 100 and south east toward an adjacent property from Lot 90. No permanent or intermittent water bodies are located within 400m of the site.

5.4.2 Groundwater

A search of the NSW Office of Water groundwater database identified three groundwater bores located within the investigation area. The location of the GW020724 and GW029715 was confirmed by site inspection as being in the south eastern corner of the investigation area and the north eastern corner of the house paddock. The bores are licensed for irrigation and general use. Water bearing zones are from 9.1m to 22.9m in basalt, shale, quartz and clay. A further eighteen groundwater bores are located within 500m of the site.

Table 1. NSW Office of Water groundwater bore summary data

Work No.	Drilled depth	Purpose	SWL	Water bearing zones	Geological material
GW029715	31.8m	Irrigation	16.8m	22.9m to 22.9m	Basalt, clay
GW029714	7.6m (hand dug)	Irrigation	-	-	-
GW020724	18.7m	General use	9.1m	9.1m to 17.7m	Shale, gravel

5.5 Evidence of contamination checklist

Site layout showing industrial processes	None present
Sewer and service plans	The existing dwelling is serviced by an on-site wastewater system.
Manufacturing processes	None known
Underground tanks	None known
Product spills and loss history	Pesticide mixing or storage of chemicals not identified during site inspection.
Discharges to land, water and air	None known
Disposal locations, presence of drums, wastes and fill materials	Corrugated iron sheet, irrigation piping and wire located in north eastern section of house paddock. General refuse was also located adjacent the existing dwelling.
Soil staining	Nil
Visible signs of plant stress, bare areas	Nil
Odours	Nil
Ruins	Nil
Other	Nil

6. Data quality objectives (DQO)

The development of data quality objectives is recommended by NSW EPA to provide a systematic framework for investigations.

6.1 State the problem

A twenty-one lot residential subdivision is proposed for Lots 90 and 100 DP750401, 168 Shiralee Road, Orange NSW. The property has a land-use history of orcharding and grazing of livestock. An investigation of the site is required to determine the soil contamination status and suitability for residential land-use.

6.2 Identify the decision

The proposed land-use is residential 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?*

6.3 Identify the inputs decision

The decision inputs provide a framework for the investigation of the site.

The primary inputs for assessing the decision are:

- Preliminary soil investigations collected in accordance with NEPC (1999).

Methods of collecting samples are described in following sections. The soil samples were analysed for potential soil contaminants as listed in the following sections.

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 residential land-use.

6.4 Define the boundaries of the study

The area requiring a preliminary contamination investigation Lots 90 and 100 DP750401, 168 Shiralee Road, Orange NSW. The site is approximately 4 hectares.

6.5 Develop a decision rule

The decision rule for remediation is based on the thresholds listed in Schedule B1 of the NEPC (1999) *Guideline on Investigation Levels for Soil and Groundwater*. The guidelines for soil were the residential land-use with access to soil thresholds.

6.6 Specify acceptable limits on the decision errors.

The 95% upper confidence limit of average levels of samples collected are less than the threshold levels.

6.7 Optimize the design for obtaining data

Soil sampling was undertaken as described in the following sections which is based on the EPA sampling guidelines.

Quality assurance and quality control objective and indicators are described in Section 9.

7. Sampling analysis plan and sampling methodology

7.1 Sampling strategy

7.1.1 Sampling design

A systematic sampling pattern was adopted to assess the probable location of contamination across the site. Uniform management practices are expected to have occurred on the site. The site has been historically managed as part of a single unit and is expected to have been treated similarly.

Judgemental samples were collected from ‘hotspot’ areas around the existing dwellings, sheds and former shed.

7.1.2 Sampling locations

Discrete soil samples were collected on an approximate 25m grid pattern over the investigation area. Four discrete samples were combined to form one composite soil sample. A total of forty-eight discrete soil samples were collected and combined to form 12 composite samples and 48 discrete samples for analysis.

An additional seven discrete samples were collected from around existing dwellings, sheds, and former shed.

The sampling locations are described in Figure 3.

7.1.3 Sampling density

The sampling density can detect a potential hot spot with a radius of 14.75m at a 95% level of confidence. Uniform management practices have been undertaken on the site and the soil sampling and laboratory analysis is considered indicative of the site as a whole. The sampling frequency equal to the minimum sampling density recommended by EPA (1995).

7.1.4 Sampling depth

Any heavy metals or persistent pesticides present are generally immobile and expected to be contained in the 0-100mm soil layer which was the target sampling depth.

7.2 Analytes

The composite soil samples were evaluated for arsenic, cadmium, chromium, copper, lead, nickel, zinc and mercury. The discrete samples collected from across the site were evaluated for organochlorine pesticides (OCP). Discrete soil samples collected from around existing dwellings and former shed were evaluated for heavy metals, organochlorine and organophosphorus pesticides (OCP and OPP), total recoverable hydrocarbons (TRH C6-C40), benzene, toluene, ethylbenzene, xylenes and naphthalene (BTEXN). These analytes were identified as the contaminants of concern possibly present as a result of previous activities (Table 1).

Table 1. Schedule of samples and analyses

Sample ID	Discrete sample ID (Figure 3)	Depth	Analysis undertaken
1	101, 102, 103, 104	0-100mm	Arsenic (As), cadmium (Cd), chromium (Cr), copper (Cu), lead (Pb), nickel (Ni), zinc (Zn), mercury (Hg)
2	105, 106, 107, 108	0-100mm	As, Cd, Cr, Cu, Pb, Ni, Zn and Hg
3	109, 110, 111, 112	0-100mm	As, Cd, Cr, Cu, Pb, Ni, Zn and Hg
4	113, 114, 115, 116	0-100mm	As, Cd, Cr, Cu, Pb, Ni, Zn and Hg
5	117, 118, 119, 120	0-100mm	As, Cd, Cr, Cu, Pb, Ni, Zn and Hg
6	121, 122, 123, 124	0-100mm	As, Cd, Cr, Cu, Pb, Ni, Zn and Hg
7	125, 126, 127, 128	0-100mm	As, Cd, Cr, Cu, Pb, Ni, Zn and Hg
8	129, 130, 131, 132	0-100mm	As, Cd, Cr, Cu, Pb, Ni, Zn and Hg
9	133, 134, 135, 136	0-100mm	As, Cd, Cr, Cu, Pb, Ni, Zn and Hg
10	137, 138, 139, 140	0-100mm	As, Cd, Cr, Cu, Pb, Ni, Zn and Hg
11	141, 142, 143, 144	0-100mm	As, Cd, Cr, Cu, Pb, Ni, Zn and Hg
12	145, 146, 147, 148	0-100mm	As, Cd, Cr, Cu, Pb, Ni, Zn and Hg
101	101	0-100mm	Organochlorine pesticides (OCP)
102	102	0-100mm	OCP
103	103	0-100mm	OCP
104	104	0-100mm	OCP

Table 1. continued

Sample ID	Discrete sample ID (Figure 3)	Depth	Analysis undertaken
105	105	0-100mm	OCP
106	106	0-100mm	OCP
107	107	0-100mm	OCP
108	108	0-100mm	OCP
109	109	0-100mm	OCP
110	110	0-100mm	OCP
111	111	0-100mm	OCP
112	112	0-100mm	OCP
113	113	0-100mm	OCP
114	114	0-100mm	OCP
115	115	0-100mm	OCP
116	116	0-100mm	OCP
117	117	0-100mm	OCP
118	118	0-100mm	OCP
119	119	0-100mm	OCP
120	120	0-100mm	OCP
121	121	0-100mm	OCP
122	122	0-100mm	OCP
123	123	0-100mm	OCP
124	124	0-100mm	OCP
125	125	0-100mm	OCP
126	126	0-100mm	OCP
127	127	0-100mm	OCP
128	128	0-100mm	OCP
129	129	0-100mm	OCP
130	130	0-100mm	OCP
131	131	0-100mm	OCP
132	132	0-100mm	OCP
133	133	0-100mm	OCP
134	134	0-100mm	OCP
135	135	0-100mm	OCP
136	136	0-100mm	OCP
137	137	0-100mm	OCP
138	138	0-100mm	OCP
139	139	0-100mm	OCP
140	140	0-100mm	OCP
141	141	0-100mm	OCP
142	142	0-100mm	OCP
143	143	0-100mm	OCP
144	144	0-100mm	OCP
145	145	0-100mm	OCP
146	146	0-100mm	OCP
147	147	0-100mm	OCP
148	148	0-100mm	OCP

Table 1. continued

Sample ID	Discrete sample ID (Figure 3)	Depth	Analysis undertaken
201	201	0-100mm	Arsenic (As), cadmium (Cd), chromium (Cr), copper (Cu), lead (Pb), nickel (Ni), zinc (Zn), mercury (Hg), organochlorine pesticides (OCP), organophosphorus pesticides (OPP), total recoverable hydrocarbons (TRH C6-C40), benzene, toluene, ethylbenzene, xylenes and naphthalene (BTEXN)
202	202	0-100mm	As, Cd, Cr, Cu, Pb, Ni, Zn, Hg, OCP, OPP, TRH C6-C40, BTEXN
203	203	0-100mm	As, Cd, Cr, Cu, Pb, Ni, Zn, Hg, OCP, OPP, TRH C6-C40, BTEXN
204	204	0-100mm	As, Cd, Cr, Cu, Pb, Ni, Zn, Hg, OCP, OPP, TRH C6-C40, BTEXN
205	205	0-100mm	As, Cd, Cr, Cu, Pb, Ni, Zn, Hg, OCP, OPP, TRH C6-C40, BTEXN
206	206	0-100mm	As, Cd, Cr, Cu, Pb, Ni, Zn, Hg, OCP, OPP, TRH C6-C40, BTEXN
207	207	0-100mm	As, Cd, Cr, Cu, Pb, Ni, Zn, Hg, OCP, OPP, TRH C6-C40, BTEXN

7.3 Sampling methods

Soil samples were taken using a stainless steel push-corer. Soil was taken at each individual sampling location below the vegetated and detrital layer.

The soil was transferred to a stainless steel bucket, mixed and transferred to a solvent rinsed glass jar with a Teflon lid. Combining 4 discrete samples made a composite sample for chemical analysis. Discrete soil samples were transferred directly to a solvent rinsed glass jar with a Teflon lid.

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 with clean tap water and allowing to air dry or using a clean towel.

8. Conceptual site model

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

Contamination source	Potential exposure pathways	Receptors
Pesticide, hydrocarbon and heavy metal impacted soil from former orcharding land-use	Direct contact (ingestion and absorption)	*On-site* Residential Site workers *Off-site* Terrestrial environment Rural Residential

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 site on an approximate grid pattern of 25 metres. This sampling density will enable the detection of an area with an elevated concentration on a radius of 14.75 metres with a 95% confidence level.

The number of sampling locations equal to the recommended density in the EPA sampling guidelines and justified due to the uniform management of the site.

9.2 Field

The collection of samples was undertaken in accordance with accepted standard protocols (NEPC 1999). Composite sampling was undertaken for some samples 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 (EPA 1995).

Composite soil samples were analysed for heavy metals. Discrete soil samples taken from across the site were analysed for organochlorine pesticides. Samples taken from 'hotspot' locations around the existing dwellings and infrastructure were analysed for heavy metals, organochlorine and organophosphorus pesticides (OCP and OPP), total recoverable hydrocarbons (TRH C6-C40), benzene, toluene, ethylbenzene, xylenes and naphthalene (BTEXN).

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 stainless steel push-corer. After collection the samples were immediately placed in new glass sampling jars and placed in a cooler.

Three intra-laboratory duplicate samples were collected. The frequency of field duplicates is slightly less than the NEPC (1999) recommendation of 5%. 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 Environmental, Sydney, which is NATA accredited for the tests undertaken. The laboratories have quality assurance and quality control programs in place, which include internal replication and analysis of spike samples and recoveries.

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

The current and proposed land-use of the site is residential. The laboratory results were assessed against the proposed land-use of residential with access to soil. The health and ecological-based investigation

levels of contaminants in the soil for residential sites, for the substances for which criteria are available, are listed in Table 2, as recommended in the NEPC (1999).

The NEPC (1999) also 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 2. TRH>16 have physical properties which make the TRH fractions non-volatiles and therefore these TRH fractions are not applicable for vapour intrusion.

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). Ecological screening levels (ESL) assess the risk to terrestrial ecosystems from petroleum hydrocarbons in the soil. The EILs and ESLs for commercial land-use are presented in Table 2.

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 2.

The investigation threshold was adjusted to enable the detection of an individual location being diluted in the composting process (EPA 1995). For composite sampling, the analyte result was divided against the number of discrete samples making up the composite. This is based on a worst-case scenario in which one sample has a high concentration whilst other discrete samples have zero concentration. This is a conservative approach.

Chromium is analysed as total chromium which is the sum of chromium (III) and chromium (VI). Chromium (VI) is a potential contaminant from industrial processes and is not expected to occur in agricultural sites. Chromium III does not have a threshold limit due to low human toxicity. Thus no threshold is set for total chromium on agricultural sites.

Table 2. Investigation levels – Metals and pesticides (NEPC 1999)

Analyte	Health investigation level (HIL A – residential with access to soil)		Ecological Investigation Level (EIL – Residential)	
	Discrete Samples (mg/kg)	Composite Samples (mg/kg)	Discrete samples (mg/kg)	Composite samples (mg/kg)
Arsenic	100	25	100	25
Cadmium	20	5	-	-
Chromium (total)	-*	-*	400	100
Copper	6,000	1,500	280	70
Lead	300	75	1,100	275
Nickel	400	100	270	67.5
Zinc	7,400	1,850	590	147.5
Mercury	40	10	-	-
OCP	-	-	-	-
DD's	240	-	180	-
OPP	-	-	-	-

* Not applicable due to low human toxicity of Cr(III) and non-industrial site

Table 3. Investigation levels – hydrocarbons (NEPC 1999)

Analyte	Ecological investigation level (EIL) residential	Health screening level (HSL) residential, clay soil 0 to <1m	Ecological screening level (ESL) residential	Management limits for TRH in fine soil / residential
TRH (C6-C10)	-	50	180	800
TRH (>C10-C16)	-	280	120	1,000
TRH (>C16-C34)	-	-	1,300	3,500
TRH (>C34-C40)	-	-	5,600	10,000
Benzene	-	0.7	65	-
Toluene	-	480	105	-
Ethylbenzene	-	NL	125	-
Xylenes	-	110	45	-
Naphthalene	170	5	-	-

11. Results and discussion

The soil sampling program did not detect elevated levels of the analysed metals, pesticides or hydrocarbons. The levels of all substances analysed in the soil samples were not detected or at environmental background levels and below the residential land-use thresholds (Table 4, 5 and 6).

Table 4. Soil analysis results - hydrocarbons (mg/kg)

Sample I.D	TRH (C6-C10)	TRH (C10-C16)	TRH (C16-C34)	TRH (C34-C40)	Benzene	Toluene	Ethylbenzene	Xylene	Naphthalene
201	ND	ND	ND	ND	ND	ND	ND	ND	ND
202	ND	ND	ND	ND	ND	ND	ND	ND	ND
203	ND	ND	ND	ND	ND	ND	ND	ND	ND
204	ND	ND	ND	ND	ND	ND	ND	ND	ND
205	ND	ND	ND	ND	ND	ND	ND	ND	ND
206	ND	ND	ND	ND	ND	ND	ND	ND	ND
207	ND	ND	ND	ND	ND	ND	ND	ND	ND
Residential land-use thresholds (NEPC 1999)									
HSL A - clay soil 0 to <1m	*50*	*280*	*-*	*-*	*0.7*	*480*	*NL*	*110*	*5*
ESL	*180*	*120*	*1,300*	*5,600*	*65*	*105*	*125*	*45*	*-*
EIL	*-*	*-*	*-*	*-*	*-*	*-*	*-*	*-*	*170*
Management limits for TRH	*800*	*1,000*	*3,500*	*10,000*	*-*	*-*	*-*	*-*	*-*

ND – not detected, HSL – health screening level, EIL – ecological investigation level, ESL – ecological screening level

Table 5. Soil analysis results – metals (composite samples) (mg/kg)

Sample ID	Arsenic	Cadmium	Chromium (total)	Copper	Lead	Nickel	Zinc	Mercury
1	4	0.3	36	14	18	8.8	19	ND
2	4	ND	51	16	17	8.3	22	ND
3	4	ND	110	22	16	12	25	ND
4	3	ND	55	18	17	12	32	ND
5	ND	0.3	68	20	13	14	48	ND
6	ND	0.3	83	37	13	16	60	ND
7	ND	0.4	110	40	16	17	78	ND
8	3	0.4	71	54	24	16	91	ND
9	ND	0.3	89	32	14	14	51	ND
10	ND	ND	75	31	20	14	53	ND
11	3	0.3	81	42	14	14	47	ND
12	ND	ND	40	36	12	10	35	ND
Residential land-use thresholds (NEPC 1999)								
HIL A								
Discrete	*100*	*20*	*-**	*6,000*	*300*	*400*	*7,400*	*40*
Composite	*25*	*5*	*-**	*1,500*	*75*	*100*	*1,850*	*10*
EIL - residential								
Discrete	*100*	*-*	*-*	*280*	*1,100*	*270*	*590*	*-*
Composite	*25*	*-*	*-*	*70*	*275*	*67.5*	*147.5*	*-*

HIL – health investigation level, EIL – ecological investigation level, ND = not detected at the detection limit, * Not applicable due to low human toxicity of Cr(III) and non-industrial site

Table 6. Soil analysis results – metals and pesticides (discrete samples) (mg/kg)

Sample ID	Arsenic	Cadmium	Chromium (total)	Copper	Lead	Nickel	Zinc	Mercury	OCP (total)	OCP DD's	OPP's
101	-	-	-	-	-	-	-	-	ND	ND	-
102	-	-	-	-	-	-	-	-	ND	ND	-
103	-	-	-	-	-	-	-	-	ND	ND	-
104	-	-	-	-	-	-	-	-	ND	ND	-
105	-	-	-	-	-	-	-	-	ND	ND	-
106	-	-	-	-	-	-	-	-	ND	ND	-
107	-	-	-	-	-	-	-	-	ND	ND	-
108	-	-	-	-	-	-	-	-	ND	ND	-
109	-	-	-	-	-	-	-	-	ND	ND	-
110	-	-	-	-	-	-	-	-	ND	ND	-
111	-	-	-	-	-	-	-	-	ND	ND	-
112	-	-	-	-	-	-	-	-	ND	ND	-
113	-	-	-	-	-	-	-	-	ND	ND	-
114	-	-	-	-	-	-	-	-	ND	ND	-
115	-	-	-	-	-	-	-	-	ND	ND	-
116	-	-	-	-	-	-	-	-	ND	ND	-
117	-	-	-	-	-	-	-	-	ND	ND	-
118	-	-	-	-	-	-	-	-	ND	ND	-
119	-	-	-	-	-	-	-	-	ND	ND	-
120	-	-	-	-	-	-	-	-	ND	ND	-
121	-	-	-	-	-	-	-	-	0.1	0.1	-
122	-	-	-	-	-	-	-	-	0.2	0.2	-
123	-	-	-	-	-	-	-	-	0.1	0.1	-
124	-	-	-	-	-	-	-	-	0.2	0.2	-
125	-	-	-	-	-	-	-	-	0.3	0.3	-
126	-	-	-	-	-	-	-	-	0.1	0.1	-
127	-	-	-	-	-	-	-	-	0.5	0.5	-
128	-	-	-	-	-	-	-	-	0.5	0.5	-
129	-	-	-	-	-	-	-	-	0.4	0.4	-
130	-	-	-	-	-	-	-	-	0.1	0.1	-
131	-	-	-	-	-	-	-	-	0.2	0.2	-
132	-	-	-	-	-	-	-	-	0.4	0.4	-
133	-	-	-	-	-	-	-	-	0.1	0.1	-
134	-	-	-	-	-	-	-	-	0.3	0.3	-
135	-	-	-	-	-	-	-	-	0.5	0.5	-
136	-	-	-	-	-	-	-	-	ND	ND	-
137	-	-	-	-	-	-	-	-	0.1	0.1	-
138	-	-	-	-	-	-	-	-	0.2	0.2	-
139	-	-	-	-	-	-	-	-	ND	ND	-
140	-	-	-	-	-	-	-	-	0.1	0.1	-
141	-	-	-	-	-	-	-	-	0.1	0.1	-
142	-	-	-	-	-	-	-	-	ND	ND	-
143	-	-	-	-	-	-	-	-	0.5	0.5	-
144	-	-	-	-	-	-	-	-	0.4	0.4	-
145	-	-	-	-	-	-	-	-	0.1	0.1	-
146	-	-	-	-	-	-	-	-	0.2	0.2	-
147	-	-	-	-	-	-	-	-	0.1	0.1	-
148	-	-	-	-	-	-	-	-	0.4	0.4	-
201	5	0.8	120	66	66	24	440	0.09	1	1	ND
202	4	0.7	120	120	37	21	200	0.14	1	1	ND
203	3	0.4	73	51	17	16	84	ND	0.3	0.3	ND
204	4	0.4	99	56	27	20	310	ND	0.2	0.2	ND
205	4	0.4	97	26	26	19	100	ND	ND	ND	ND
206	4	0.7	97	34	62	21	430	0.06	ND	ND	ND
207	ND	0.3	58	45	30	14	95	ND	0.3	0.3	ND
Residential land-use thresholds (NEPC 1999)											
HIL A	*100*	*20*	*-**	*6,000*	*300*	*400*	*7,400*	*40*	*-*	*240*	*-*
EIL - residential	*100*	*-*	*-*	*280*	*1,100*	*270*	*590*	*-*	*-*	*180*	*-*

HIL – health investigation level, EIL – ecological investigation level, ND = not detected at the detection limit, * Not applicable due to low human toxicity of Cr(III) and non-industrial site

12. Site characterisation

12.1 Environmental contamination

Not applicable as no 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

A twenty-one lot residential subdivision is proposed for Lots 90 and 100 DP750401, 168 Shiralee Road, Orange NSW. An investigation of the site is required to determine the soil contamination status and suitability for the proposed residential land-use.

An inspection of the site was undertaken on 27 and 28 July 2017. The property is located in a rural-residential area south of the Orange CBD and has an approximate area of 3.8 hectares. The property has a land-use history of orcharding and grazing of livestock. There is no evidence of mines, sheep dips 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. Forty eight discrete soil samples were collected over the investigation area on a systematic grid pattern and combined to form twelve composite samples and forty eight discrete samples. The composite soil samples were analysed for arsenic, cadmium, chromium, copper, lead, nickel, zinc and mercury. The discrete soil samples were analysed for organochlorine pesticides (OCP).

A further seven discrete samples were collected from around the existing dwellings and sheds, and former shed as identified in the 1954 historical aerial photograph. The soil samples were analysed for heavy metals, organochlorine and organophosphorus pesticides, total recoverable hydrocarbons, benzene, toluene, ethylbenzene, xylenes and naphthalene.

The soil sampling program did not detect elevated levels of the analysed metals, pesticides or hydrocarbons. The levels of all substances evaluated were below the NEPC (1999) investigation threshold for residential land-use with access to soil.

The site is suitable for the proposed residential land-use.

13.2 Assumptions in reaching the conclusions

It is assumed the sampling sites are representative of the site. An accurate history has been obtained and typical past farming practices were adopted.

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 14.75 metres and with a 95% level of confidence.

13.4 Suitability for proposed use of the site

The site is suitable for residential activities.

13.5 Limitations and constraints on the use of the site

No constraints are recommended.

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

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

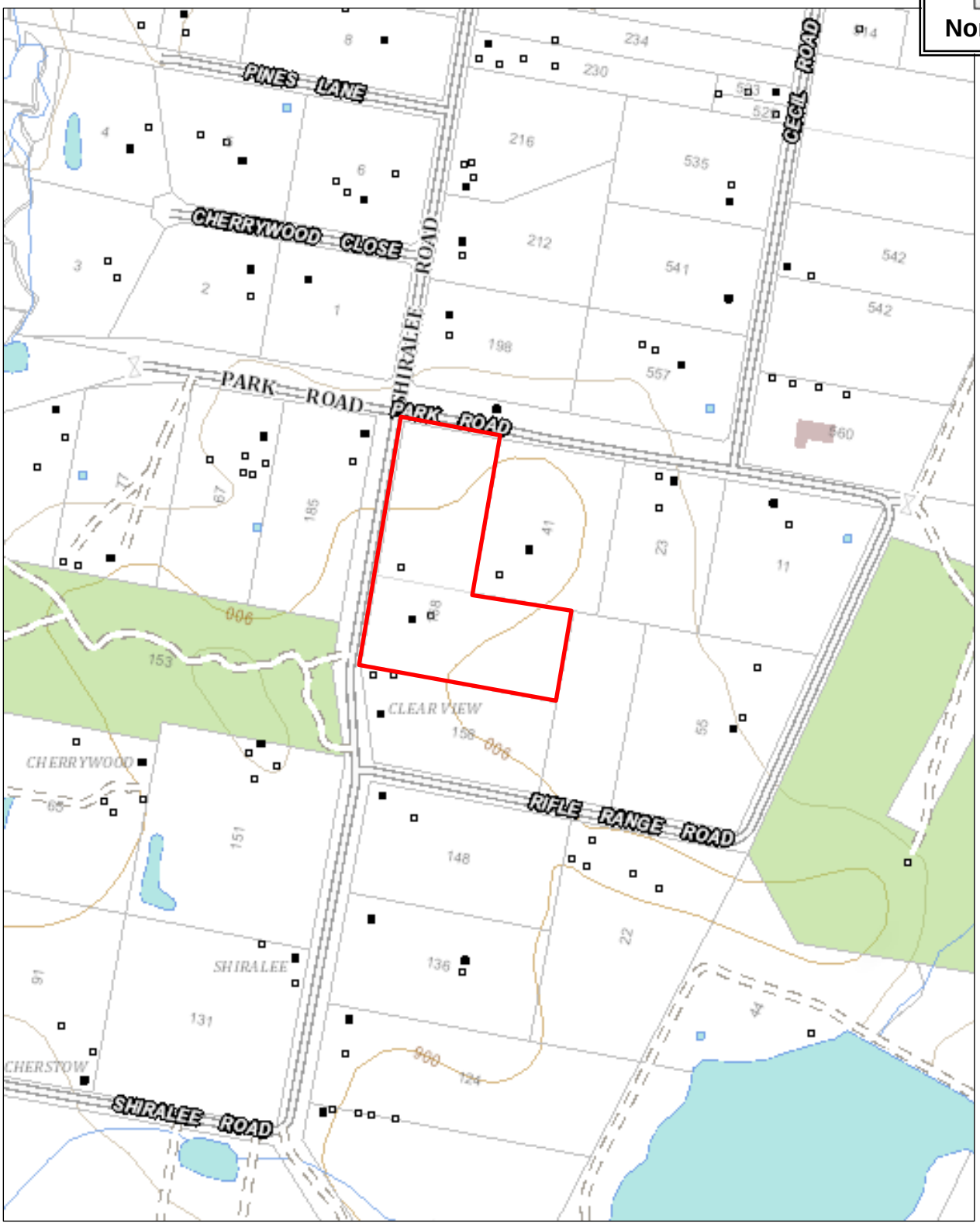
Environment Protection Authority (1995) *Contaminated sites: Sampling Design Guidelines* (NSW Environment Protection Authority, Chatswood)

Kovac M, Murphy BW and Lawrie, JW (1990) *Soil Landscapes of the Bathurst 1:250,000 Sheet* (Soil Conservation Service of NSW, Sydney)

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

Figures

Figure 1. Locality map
Figure 2. Site plan
Figure 3. Soil sampling locations
Figure 4. Photographs of the site



Legend

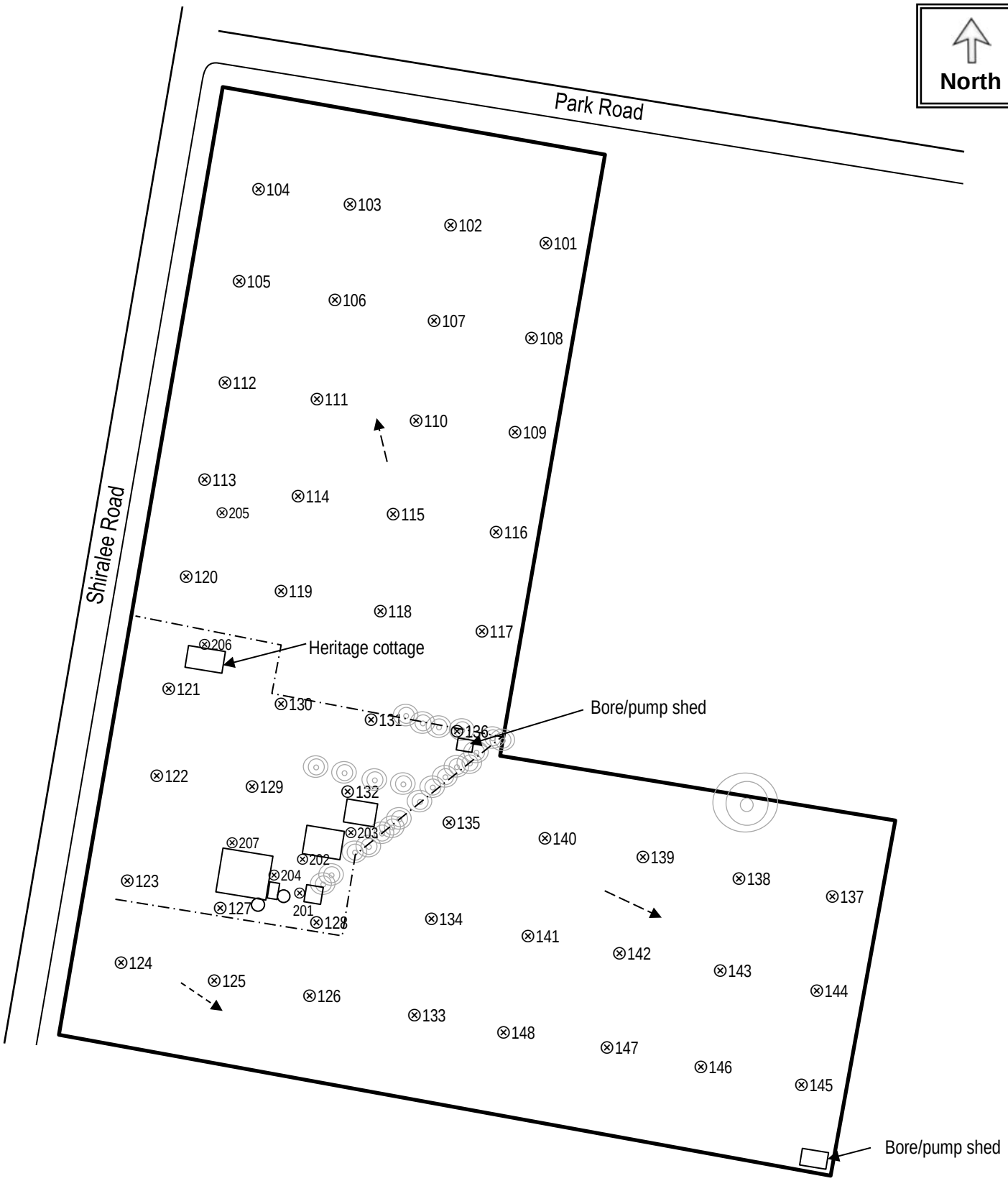
Investigation area

Figure 1: Locality map		
Lot 90 and 100 DP750401 168 Shiralee Road, Orange NSW		
	Envirowest Consulting Pty Ltd	
Job: R8543c	Drawn by: CM	Date: 24/07/2017

Legend

Investigation area

Figure 2: Aerial photograph (2016)		
Lot 90 and 100 DP750401 168 Shiralee Road, Orange NSW		
	Envirowest Consulting Pty Ltd	
Job: R8543c	Drawn by: CM	Date: 24/07/2017



Legend

- ⊗ Sampling location
- Slope
- Lot boundary
- Road
- Tree/shrub
- Existing infrastructure
- Fence

Approximate Scale 1: 1500

0 30 60m

Figure 3: Sampling locations		
Lot 90 and 100 DP750401 168 Shiralee Road, Orange NSW		
	Envirowest Consulting Pty Ltd	
Job: R8543c	Drawn by: CM	Date: 15/08/2017

Figure 4. Photographs of site

Looking north over the site

Looking east over the site

Heritage cottage

Corrugated iron, scape wire – house paddock

Looking east toward dwelling and shed

Structure adjacent existing dwelling

Bore – south east corner of site

Bore – north east corner of house paddock

Existing septic tank

Existing shed in house paddock

Appendices

Appendix 1. Sample analysis, quality assurance and quality control (QAQC) report
Appendix 2. Soil analysis results – SGS report number SE168770 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 27 and 28 July 2017. A total of 67 samples were submitted for analytical testing. The samples were collected in the field by an Environmental Scientist from Envirowest Consulting Pty Ltd and 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 Environmental, Alexandria, 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:

Laboratory analysis schedule

Sample I.D	Number of samples	Duplicate	Analyses	Date collected	Substrate	Laboratory report
1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12	12	0	As, Cd, Cr (total), Cr(VI) Cu, Pb, Ni, Zn, Hg	27/07/2017 28/07/2017	Soil	SE168770
101, 102, 103, 104, 105, 106, 107, 108, 109 110, 111, 112 113, 114, 115 116, 117, 118 119, 120, 121 122, 123, 124 125, 126, 127 128, 129, 130 131, 132, 133 134, 135, 136 137, 138, 139 140, 141, 142 143, 144, 145 146, 147, 148	48	3	OCP	27/07/2017 28/07/2017	Soil	SE168770
201, 202, 203, 204, 205, 206, 207	7	0	As, Cd, Cr (total), Cr(VI) Cu, Pb, Ni, Zn, Hg, OCP, OPP, TRH (C6-C40), BTEXN	28/07/2017	Soil	SE168770

Analytical methods

Analyte	Extraction	Laboratory methods
Metals	USEPA 200.8 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 200.8 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

Three intra laboratory duplicates were collected for the analysis batch. The frequency was slightly less than the recommended frequency of 5%. Table A1.1 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 limit of reporting (LOR).

Field duplicate frequency

Sample id.	Duplicate type	Number of samples	Duplicate	Frequency (%)	Date collected	Substrate	Laboratory report
1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148 201, 202, 203, 204, 205, 206, 207	Intra-laboratory	67	3	4	27/07/2017 28/07/2017	Soil	SE168770

Table A1.1. Relative differences for intra laboratory duplicate

Sample ID	123 and DA		138 and DB		148 and DC	
	Relative difference (%)	Pass/Fail	Relative difference (%)	Pass/Fail	Relative difference (%)	Pass/Fail
OCP	0	Pass	0	Pass	0	Pass

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	ALS 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	No	Not collected due to the preliminary nature of the investigation

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	Complied
Laboratory prepared volatile trip spikes	NA	Volatile 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

Three intra laboratory duplicates were collected for the analysis batch. The frequency was slightly less than the recommended frequency of 5%. 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.
- The target contaminates are not volatile

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 SE168770 and chain of custody form

Appendix 3. Field sampling log

Sampling log

Client	Matthew Savage
Contact	-
Job number	8543
Location	Lot 90 and 100 DP750401 681 Shiralee Road, Orange NSW
Date	26 and 27 July 2017
Investigator(s)	Claire McQueeney
Weather conditions	Sunny, cold

Sample ID	Matrix	Analysis undertaken	Observations/comments
1	Soil	Arsenic (As), cadmium (Cd), chromium (Cr), copper (Cu), lead (Pb), nickel (Ni), zinc (Zn), mercury (Hg)	Composite of 101, 102, 103, 104
2	Soil	As, Cd, Cr, Cu, Pb, Ni, Zn and Hg	Composite of 105, 106, 107, 108
3	Soil	As, Cd, Cr, Cu, Pb, Ni, Zn and Hg	Composite of 109, 110, 111, 112
4	Soil	As, Cd, Cr, Cu, Pb, Ni, Zn and Hg	Composite of 113, 114, 115, 116
5	Soil	As, Cd, Cr, Cu, Pb, Ni, Zn and Hg	Composite of 117, 118, 119, 120
6	Soil	As, Cd, Cr, Cu, Pb, Ni, Zn and Hg	Composite of 121, 122, 123, 124
7	Soil	As, Cd, Cr, Cu, Pb, Ni, Zn and Hg	Composite of 125, 126, 127, 128
8	Soil	As, Cd, Cr, Cu, Pb, Ni, Zn and Hg	Composite of 129, 130, 131, 132
9	Soil	As, Cd, Cr, Cu, Pb, Ni, Zn and Hg	Composite of 133, 134, 135, 136
10	Soil	As, Cd, Cr, Cu, Pb, Ni, Zn and Hg	Composite of 137, 138, 139, 140
11	Soil	As, Cd, Cr, Cu, Pb, Ni, Zn and Hg	Composite of 141, 142, 143, 144
12	Soil	As, Cd, Cr, Cu, Pb, Ni, Zn and Hg	Composite of 145, 146, 147, 148
101	Soil	Organochlorine pesticides (OCP)	Collected from Lot 100
102	Soil	OCP	Collected from Lot 100
103	Soil	OCP	Collected from Lot 100
104	Soil	OCP	Collected from Lot 100
105	Soil	OCP	Collected from Lot 100
106	Soil	OCP	Collected from Lot 100
107	Soil	OCP	Collected from Lot 100
108	Soil	OCP	Collected from Lot 100
109	Soil	OCP	Collected from Lot 100
110	Soil	OCP	Collected from Lot 100
111	Soil	OCP	Collected from Lot 100
112	Soil	OCP	Collected from Lot 100
113	Soil	OCP	Collected from Lot 100
114	Soil	OCP	Collected from Lot 100
115	Soil	OCP	Collected from Lot 100
116	Soil	OCP	Collected from Lot 100
117	Soil	OCP	Collected from Lot 100
118	Soil	OCP	Collected from Lot 100
119	Soil	OCP	Collected from Lot 100
120	Soil	OCP	Collected from Lot 100

121	Soil	OCP	Collected from Lot 90
122	Soil	OCP	Collected from Lot 90
123	Soil	OCP	Collected from Lot 90
124	Soil	OCP	Collected from Lot 90
125	Soil	OCP	Collected from Lot 90
126	Soil	OCP	Collected from Lot 90
127	Soil	OCP	Collected from Lot 90
128	Soil	OCP	Collected from Lot 90
129	Soil	OCP	Collected from Lot 90
130	Soil	OCP	Collected from Lot 90
131	Soil	OCP	Collected from Lot 90
132	Soil	OCP	Collected from Lot 90
133	Soil	OCP	Collected from Lot 90
134	Soil	OCP	Collected from Lot 90
135	Soil	OCP	Collected from Lot 90
136	Soil	OCP	Collected from Lot 90
137	Soil	OCP	Collected from Lot 90
138	Soil	OCP	Collected from Lot 90
139	Soil	OCP	Collected from Lot 90
140	Soil	OCP	Collected from Lot 90
141	Soil	OCP	Collected from Lot 90
142	Soil	OCP	Collected from Lot 90
143	Soil	OCP	Collected from Lot 90
144	Soil	OCP	Collected from Lot 90
145	Soil	OCP	Collected from Lot 90
146	Soil	OCP	Collected from Lot 90
147	Soil	OCP	Collected from Lot 90
148	Soil	OCP	Collected from Lot 90
201	Soil	Arsenic (As), cadmium (Cd), chromium (Cr), copper (Cu), lead (Pb), nickel (Ni), zinc (Zn), mercury (Hg), organochlorine pesticides (OCP), organophosphorus pesticides (OPP), total recoverable hydrocarbons (TRH C6-C40), benzene, toluene, ethylbenzene, xylenes and naphthalene (BTEXN)	West of dwelling
202	Soil	As, Cd, Cr, Cu, Pb, Ni, Zn, Hg, OCP, OPP, TRH C6-C40, BTEXN	Southern side of large shed
203	Soil	As, Cd, Cr, Cu, Pb, Ni, Zn, Hg, OCP, OPP, TRH C6-C40, BTEXN	Southern side of shed
204	Soil	As, Cd, Cr, Cu, Pb, Ni, Zn, Hg, OCP, OPP, TRH C6-C40, BTEXN	Adjacent dwelling to the west
205	Soil	As, Cd, Cr, Cu, Pb, Ni, Zn, Hg, OCP, OPP, TRH C6-C40, BTEXN	Approximate location of former shed as identified in 1954 aerial photograph
206	Soil	As, Cd, Cr, Cu, Pb, Ni, Zn, Hg, OCP, OPP, TRH C6-C40, BTEXN	North of heritage cottage
207	Soil	As, Cd, Cr, Cu, Pb, Ni, Zn, Hg, OCP, OPP, TRH C6-C40, BTEXN	North of dwelling

Chain of Custody Form – Ref 8543

Ref: 8543
Investigator: Envirowest Consulting
9 Cameron Place
PO Box 8158
ORANGE NSW 2800
Telephone: (02) 6361 4954
Facsimile: (02) 6360 3960
Email: claire@envirowest.net.au
Contact Person: Claire McQueeney
Invoice: accounts@envirowest.net.au

Laboratory: SGS SYDNEY
16/33 Maddox Street
ALEXANDRIA NSW 2015

Quotation #:
Courier/CN:

Sample ID	Container*	Sampling Date/Time	Sample matrix: Water	Soil	Sludge	Sample preservation: Cool	HNO3/HCl	Unpreserved	Analysis: SGS Method Code CL2 – 8 Metals	CL5 – TRH (C6-C40)/ BTEXN	OCP – OC Pesticides	OPP – OP Pesticides
1	A	27/07/2017		X		X		X	X			
2	A	27/07/2017		X		X		X	X			
3	A	27/07/2017		X		X		X	X			
4	A	27/07/2017		X		X		X	X			
5	A	27/07/2017		X		X		X	X			
6	A	27/07/2017		X		X		X	X			
7	A	27/07/2017		X		X		X	X			
8	A	28/07/2017		X		X		X	X			
9	A	28/07/2017		X		X		X	X			
10	A	28/07/2017		X		X		X	X			
11	A	28/07/2017		X		X		X	X			
12	A	28/07/2017		X		X		X	X			

SGS EHS Alexandria Laboratory

SE168770 COC
Received: 04 – Aug – 2017

Investigator: I attest that the proper field sampling procedures were used during the collection of these samples.

Sampler name: Claire McQueeney
Date : 27 and 28/07/2017 Time:

Relinquished by: (print and signature) Claire McQueeney Date 03/08/2017 Time 17:00

Received by: (print and signature) Date 4/8/17 Time 11:20

Please return completed form to Envirowest Consulting, *A = Solvent rinsed glass jar with Teflon lined lid and green label

CP 15.9.

Chain of Custody Form – Ref 8543

Ref:	**8543**	**Sample matrix**			**Sample preservation**			**Analysis**						
Investigator:	Envirowest Consulting 9 Cameron Place PO Box 8158 ORANGE NSW 2800							**SGS Method Code**						
Telephone:	(02) 6361 4954							**CL2**	**CL5**	**OCP**	**OPP**			
Facsimile:	(02) 6360 3960													
Email:	claire@envirowest.net.au													
Contact Person:	Claire McQueeney													
Invoice:	accounts@envirowest.net.au													
Laboratory:	SGS SYDNEY 16/33 Maddox Street ALEXANDRIA NSW 2015	Water	Soil	Sludge	Cool	HNO3/ HCl	Unpre-served	8 Metals	TRH (C6-C40)/ BTEXN	OC Pesticides	OP Pesticides			
Quotation #:														
Courier/CN:														
Sample ID	**Container***	**Sampling Date/Time**												
13 101	A	27/07/2017		X		X		X				X		
14 102	A	27/07/2017		X		X		X				X		
15 103	A	27/07/2017		X		X		X				X		
16 104	A	27/07/2017		X		X		X				X		
17 105	A	27/07/2017		X		X		X				X		
18 106	A	27/07/2017		X		X		X				X		
19 107	A	27/07/2017		X		X		X				X		
20 108	A	27/07/2017		X		X		X				X		
21 109	A	27/07/2017		X		X		X				X		
22 110	A	27/07/2017		X		X		X				X		
23 111	A	27/07/2017		X		X		X				X		
24 112	A	27/07/2017		X		X		X				X		

Investigator: I attest that the proper field sampling procedures were used during the collection of these samples.

Sampler name: Claire McQueeney
Date : 12-1-2017 Time:

Relinquished by: (print and signature) Claire McQueeney — Date 16-1-2017 — Time 17:00

Received by: (print and signature) — Date 4/1/17 — Time 11:20

Please return completed form to Envirowest Consulting, *A = Solvent rinsed glass jar with Teflon lined lid and green label

Chain of Custody Form – Ref 8543

Ref:	**8543**
Investigator:	Envirowest Consulting 9 Cameron Place PO Box 8158 ORANGE NSW 2800
Telephone:	(02) 6361 4954
Facsimile:	(02) 6360 3960
Email:	claire@envirowest.net.au
Contact Person:	Claire McQueeney
Invoice:	accounts@envirowest.net.au
Laboratory:	SGS SYDNEY 16/33 Maddox Street ALEXANDRIA NSW 2015
Quotation #:	
Courier/CN:	

			Sample matrix			**Sample preservation**			**Analysis**				
									SGS Method Code				
									CL2	**CL5**	**OCP**	**OPP**	
	Sample ID	**Container***	**Sampling Date/Time**	Water	Soil	Sludge	Cool	HNO3/HCl	Unpre-served	8 Metals	TRH (C6-C40)/ BTEXN	OC Pesticides	OP Pesticides
25	113	A	27/07/2017		X		X		X			X	
26	114	A	27/07/2017		X		X		X			X	
27	115	A	27/07/2017		X		X		X			X	
28	116	A	27/07/2017		X		X		X			X	
29	117	A	27/07/2017		X		X		X			X	
30	118	A	27/07/2017		X		X		X			X	
31	119	A	27/07/2017		X		X		X			X	
32	120	A	27/07/2017		X		X		X			X	
33	121	A	27/07/2017		X		X		X			X	
34	122	A	27/07/2017		X		X		X			X	
35	123	A	27/07/2017		X		X		X			X	
36	124	A	27/07/2017		X		X		X			X	

Investigator: I attest that the proper field sampling procedures were used during the collection of these samples.

Sampler name: Claire McQueeney
Date : 27/07/2017 Time:

Relinquished by: (print and signature)	Claire McQueeney	Date 03/08/2017	Time 17:00	Received by: (print and signature)	Date 4/8/17 Time 11:20

Please return completed form to Envirowest Consulting, *A = Solvent rinsed glass jar with Teflon lined lid and green label

Chain of Custody Form – Ref 8543

Ref:	**8543**
Investigator:	Envirowest Consulting 9 Cameron Place PO Box 8158 ORANGE NSW 2800
Telephone:	(02) 6361 4954
Facsimile:	(02) 6360 3960
Email:	claire@envirowest.net.au
Contact Person:	Claire McQueeney
Invoice:	accounts@envirowest.net.au
Laboratory:	SGS SYDNEY 16/33 Maddox Street ALEXANDRIA NSW 2015
Quotation #:	
Courier/CN:	

			Sample matrix			**Sample preservation**			**Analysis**				
									SGS Method Code				
									CL2	**CL5**	**OCP**	**OPP**	
Sample ID	**Container***	**Sampling Date/Time**	Water	Soil	Sludge	Cool	HNO3/HCl	Unpre-served	8 Metals	TRH (C6-C40)/ BTEXN	OC Pesticides	OP Pesticides	
125	A	27/07/2017		X		X		X			X		
126	A	27/07/2017		X		X		X			X		
127	A	27/07/2017		X		X		X			X		
128	A	27/07/2017		X		X		X			X		
129	A	27/07/2017		X		X		X			X		
130	A	27/07/2017		X		X		X			X		
131	A	27/07/2017		X		X		X			X		
132	A	27/07/2017		X		X		X			X		
133	A	27/07/2017		X		X		X			X		
134	A	27/07/2017		X		X		X			X		
135	A	27/07/2017		X		X		X			X		
136	A	27/07/2017		X		X		X			X		

Investigator: I attest that the proper field sampling procedures were used during the collection of these samples.

Sampler name: Claire McQueeney
Date : 27/07/2017 Time:

Relinquished by: (print and signature) Claire McQueeney Date 03/08/2017 Time 17:00

Received by: (print and signature) Date 4/8/17 Time 11:20

Please return completed form to Envirowest Consulting, *A = Solvent rinsed glass jar with Teflon lined lid and green label

Chain of Custody Form – Ref 8543

Ref:	**8543**	**Sample matrix**			**Sample preservation**			**Analysis**						
Investigator:	Envirowest Consulting 9 Cameron Place PO Box 8158 ORANGE NSW 2800							**SGS Method Code**						
Telephone:	(02) 6361 4954							**CL2**	**CL5**	**OCP**	**OPP**			
Facsimile:	(02) 6360 3960													
Email:	claire@envirowest.net.au													
Contact Person:	Claire McQueeney													
Invoice:	accounts@envirowest.net.au													
Laboratory:	SGS SYDNEY 16/33 Maddox Street ALEXANDRIA NSW 2015	Water	Soil	Sludge	Cool	HNO3/HCl	Unpre-served	8 Metals	TRH (C6-C40)/ BTEXN	OC Pesticides	OP Pesticides			
Quotation #:														
Courier/CN:														
Sample ID	**Container***	**Sampling Date/Time**												
137	A	27/07/2017		X		X					X			
138	A	27/07/2017		X		X					X			
139	A	27/07/2017		X		X					X			
140	A	27/07/2017		X		X					X			
141	A	27/07/2017		X		X					X			
142	A	27/07/2017		X		X					X			
143	A	27/07/2017		X		X					X			
144	A	27/07/2017		X		X					X			
145	A	27/07/2017		X		X					X			
146	A	27/07/2017		X		X					X			
147	A	27/07/2017		X		X					X			
148	A	27/07/2017		X		X					X			

Investigator: I attest that the proper field sampling procedures were used during the collection of these samples.

Sampler name: Claire McQueeney
Date : 27/07/2017 Time:

Relinquished by: (print and signature) Claire McQueeney Date 03/08/2017 Time 17:00

Received by: (print and signature) Date 4/8/17 Time 11:20

Please return completed form to Envirowest Consulting, *A = Solvent rinsed glass jar with Teflon lined lid and green label

Chain of Custody Form – Ref 8543

Ref:	**8543**		**Sample matrix**			**Sample preservation**			**Analysis**					
Investigator:	Envirowest Consulting 9 Cameron Place PO Box 8158 ORANGE NSW 2800								**SGS Method Code**					
Telephone:	(02) 6361 4954								**CL2**	**CL5**	**OCP**	**OPP**		
Facsimile:	(02) 6360 3960													
Email:	claire@envirowest.net.au													
Contact Person:	Claire McQueeney													
Invoice:	accounts@envirowest.net.au													
Laboratory:	SGS SYDNEY 16/33 Maddox Street ALEXANDRIA NSW 2015		Water	Soil	Sludge	Cool	HNO3/HCl	Unpre-served	8 Metals	TRH (C6-C40)/ BTEXN	OC Pesticides	OP Pesticides		
Quotation #:														
Courier/CN:														
Sample ID	**Container***	**Sampling Date/Time**												
201	A	28/07/2017		X		X		X	X	X	X	X		
202	A	28/07/2017		X		X		X	X	X	X	X		
203	A	28/07/2017		X		X		X	X	X	X	X		
204	A	28/07/2017		X		X		X	X	X	X	X		
205	A	28/07/2017		X		X		X	X	X	X	X		
206	A	28/07/2017		X		X		X	X	X	X	X		
207	A	28/07/2017		X		X		X	X	X	X	X		
DA	A	27/07/2017		X		X		X	X	X	X	X		
DB	A	28/07/2017		X		X		X	X	X	X	X		
DC	A	28/07/2017		X		X		X	X	X	X	X		

Investigator: I attest that the proper field sampling procedures were used during the collection of these samples.

Sampler name: Claire McQueeney
Date : 28/07/2017 Time:

Relinquished by: (print and signature) Claire McQueeney Date 03/08/2017 Time 17:00

Received by: (print and signature) Date 4/8/17 Time 11:20

Please return completed form to Envirowest Consulting, *A = Solvent rinsed glass jar with Teflon lined lid and green label

ANALYTICAL REPORT

Accreditation No. 2562

CLIENT DETAILS

Contact	Claire McQueeney
Client	ENVIROWEST CONSULTING PTY LIMITED
Address	PO BOX 8158 ORANGE NSW 2800
Telephone	61 2 63614954
Facsimile	(Not specified)
Email	claire@envirowest.net.au
Project	**8543**
Order Number	**8543**
Samples	70

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
SGS Reference	**SE168770 R0**
Date Received	4/8/2017
Date Reported	14/8/2017

COMMENTS

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

SIGNATORIES

Akheeqar Beniameen
Chemist

Dong Liang
Metals/Inorganics Team Leader

Huong Crawford
Production Manager

Kamrul Ahsan
Senior Chemist

Teresa Nguyen
Organic Chemist

VOC's in Soil [AN433] Tested: 8/8/2017

PARAMETER	UOM	LOR	201 SOIL - 28/7/2017 SE168770.061	202 SOIL - 28/7/2017 SE168770.062	203 SOIL - 28/7/2017 SE168770.063	204 SOIL - 28/7/2017 SE168770.064	205 SOIL - 28/7/2017 SE168770.065
Benzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Toluene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Ethylbenzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
m/p-xylene	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
o-xylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Xylenes	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Total BTEX	mg/kg	0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1

PARAMETER	UOM	LOR	206 SOIL - 28/7/2017 SE168770.066	207 SOIL - 28/7/2017 SE168770.067	DA SOIL - 28/7/2017 SE168770.068	DB SOIL - 28/7/2017 SE168770.069	DC SOIL - 28/7/2017 SE168770.070
Benzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Toluene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Ethylbenzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
m/p-xylene	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
o-xylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Xylenes	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Total BTEX	mg/kg	0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1

Volatile Petroleum Hydrocarbons in Soil [AN433] Tested: 8/8/2017

PARAMETER	UOM	LOR	201 SOIL - 28/7/2017 SE168770.061	202 SOIL - 28/7/2017 SE168770.062	203 SOIL - 28/7/2017 SE168770.063	204 SOIL - 28/7/2017 SE168770.064	205 SOIL - 28/7/2017 SE168770.065
TRH C6-C9	mg/kg	20	<20	<20	<20	<20	<20
Benzene (F0)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TRH C6-C10	mg/kg	25	<25	<25	<25	<25	<25
TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	<25	<25	<25

PARAMETER	UOM	LOR	206 SOIL - 28/7/2017 SE168770.066	207 SOIL - 28/7/2017 SE168770.067	DA SOIL - 28/7/2017 SE168770.068	DB SOIL - 28/7/2017 SE168770.069	DC SOIL - 28/7/2017 SE168770.070
TRH C6-C9	mg/kg	20	<20	<20	<20	<20	<20
Benzene (F0)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TRH C6-C10	mg/kg	25	<25	<25	<25	<25	<25
TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	<25	<25	<25

TRH (Total Recoverable Hydrocarbons) in Soil [AN403] Tested: 8/8/2017

PARAMETER	UOM	LOR	201 SOIL - 28/7/2017 SE168770.061	202 SOIL - 28/7/2017 SE168770.062	203 SOIL - 28/7/2017 SE168770.063	204 SOIL - 28/7/2017 SE168770.064	205 SOIL - 28/7/2017 SE168770.065
TRH C10-C14	mg/kg	20	<20	<20	<20	<20	<20
TRH C15-C28	mg/kg	45	<45	<45	<45	<45	<45
TRH C29-C36	mg/kg	45	<45	<45	<45	<45	**48**
TRH C37-C40	mg/kg	100	<100	<100	<100	<100	<100
TRH >C10-C16 (F2)	mg/kg	25	<25	<25	<25	<25	<25
TRH >C10-C16 (F2) - Naphthalene	mg/kg	25	<25	<25	<25	<25	<25
TRH >C16-C34 (F3)	mg/kg	90	<90	<90	<90	<90	<90
TRH >C34-C40 (F4)	mg/kg	120	<120	<120	<120	<120	<120
TRH C10-C36 Total	mg/kg	110	<110	<110	<110	<110	<110
TRH C10-C40 Total	mg/kg	210	<210	<210	<210	<210	<210

PARAMETER	UOM	LOR	206 SOIL - 28/7/2017 SE168770.066	207 SOIL - 28/7/2017 SE168770.067	DA SOIL - 28/7/2017 SE168770.068	DB SOIL - 28/7/2017 SE168770.069	DC SOIL - 28/7/2017 SE168770.070
TRH C10-C14	mg/kg	20	<20	<20	<20	<20	<20
TRH C15-C28	mg/kg	45	<45	<45	<45	<45	<45
TRH C29-C36	mg/kg	45	<45	**55**	<45	<45	<45
TRH C37-C40	mg/kg	100	<100	<100	<100	<100	<100
TRH >C10-C16 (F2)	mg/kg	25	<25	<25	<25	<25	<25
TRH >C10-C16 (F2) - Naphthalene	mg/kg	25	<25	<25	<25	<25	<25
TRH >C16-C34 (F3)	mg/kg	90	<90	<90	<90	<90	<90
TRH >C34-C40 (F4)	mg/kg	120	<120	<120	<120	<120	<120
TRH C10-C36 Total	mg/kg	110	<110	<110	<110	<110	<110
TRH C10-C40 Total	mg/kg	210	<210	<210	<210	<210	<210

OC Pesticides in Soil [AN420] Tested: 8/8/2017

PARAMETER	UOM	LOR	101 SOIL - 27/7/2017 SE168770.013	102 SOIL - 27/7/2017 SE168770.014	103 SOIL - 27/7/2017 SE168770.015	104 SOIL - 27/7/2017 SE168770.016	105 SOIL - 27/7/2017 SE168770.017
Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Alpha BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Lindane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Beta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Delta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor epoxide	mg/kg	0.1	<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	<0.1
Alpha Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Gamma Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Alpha Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
trans-Nonachlor	mg/kg	0.1	<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	<0.1
Dieldrin	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Endrin	mg/kg	0.2	<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	<0.1
o,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Beta Endosulfan	mg/kg	0.2	<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	<0.1
p,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Ketone	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Isodrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Mirex	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total CLP OC Pesticides	mg/kg	1	<1	<1	<1	<1	<1

OC Pesticides in Soil [AN420] Tested: 8/8/2017 (continued)

PARAMETER	UOM	LOR	106 SOIL - 27/7/2017 SE168770.018	107 SOIL - 27/7/2017 SE168770.019	108 SOIL - 27/7/2017 SE168770.020	109 SOIL - 27/7/2017 SE168770.021	110 SOIL - 27/7/2017 SE168770.022
Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Alpha BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Lindane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Beta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Delta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor epoxide	mg/kg	0.1	<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	<0.1
Alpha Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Gamma Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Alpha Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
trans-Nonachlor	mg/kg	0.1	<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	<0.1
Dieldrin	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Endrin	mg/kg	0.2	<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	<0.1
o,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Beta Endosulfan	mg/kg	0.2	<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	<0.1
p,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Ketone	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Isodrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Mirex	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total CLP OC Pesticides	mg/kg	1	<1	<1	<1	<1	<1

OC Pesticides in Soil [AN420] Tested: 8/8/2017 (continued)

PARAMETER	UOM	LOR	111 SOIL - 27/7/2017 SE168770.023	112 SOIL - 27/7/2017 SE168770.024	113 SOIL - 27/7/2017 SE168770.025	114 SOIL - 27/7/2017 SE168770.026	115 SOIL - 27/7/2017 SE168770.027
Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Alpha BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Lindane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Beta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Delta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor epoxide	mg/kg	0.1	<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	<0.1
Alpha Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Gamma Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Alpha Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
trans-Nonachlor	mg/kg	0.1	<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	<0.1
Dieldrin	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Endrin	mg/kg	0.2	<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	<0.1
o,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Beta Endosulfan	mg/kg	0.2	<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	<0.1
p,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Ketone	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Isodrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Mirex	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total CLP OC Pesticides	mg/kg	1	<1	<1	<1	<1	<1

OC Pesticides in Soil [AN420] Tested: 8/8/2017 (continued)

PARAMETER	UOM	LOR	116 SOIL - 27/7/2017 SE168770.028	117 SOIL - 27/7/2017 SE168770.029	118 SOIL - 27/7/2017 SE168770.030	119 SOIL - 27/7/2017 SE168770.031	120 SOIL - 27/7/2017 SE168770.032
Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Alpha BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Lindane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Beta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Delta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor epoxide	mg/kg	0.1	<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	<0.1
Alpha Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Gamma Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Alpha Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
trans-Nonachlor	mg/kg	0.1	<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	<0.1
Dieldrin	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Endrin	mg/kg	0.2	<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	<0.1
o,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Beta Endosulfan	mg/kg	0.2	<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	<0.1
p,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Ketone	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Isodrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Mirex	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total CLP OC Pesticides	mg/kg	1	<1	<1	<1	<1	<1

OC Pesticides in Soil [AN420] Tested: 8/8/2017 (continued)

PARAMETER	UOM	LOR	121 SOIL - 27/7/2017 SE168770.033	122 SOIL - 27/7/2017 SE168770.034	123 SOIL - 27/7/2017 SE168770.035	124 SOIL - 27/7/2017 SE168770.036	125 SOIL - 27/7/2017 SE168770.037
Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Alpha BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Lindane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Beta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Delta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor epoxide	mg/kg	0.1	<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	<0.1
Alpha Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Gamma Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Alpha Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
trans-Nonachlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
p,p'-DDE	mg/kg	0.1	**0.1**	**0.2**	**0.1**	**0.2**	**0.3**
Dieldrin	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Endrin	mg/kg	0.2	<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	<0.1
o,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Beta Endosulfan	mg/kg	0.2	<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	<0.1
p,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Ketone	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Isodrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Mirex	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total CLP OC Pesticides	mg/kg	1	<1	<1	<1	<1	<1

OC Pesticides in Soil [AN420] Tested: 8/8/2017 (continued)

PARAMETER	UOM	LOR	126 SOIL - 27/7/2017 SE168770.038	127 SOIL - 27/7/2017 SE168770.039	128 SOIL - 27/7/2017 SE168770.040	129 SOIL - 27/7/2017 SE168770.041	130 SOIL - 27/7/2017 SE168770.042
Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Alpha BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Lindane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Beta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Delta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor epoxide	mg/kg	0.1	<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	<0.1
Alpha Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Gamma Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Alpha Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
trans-Nonachlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
p,p'-DDE	mg/kg	0.1	**0.1**	**0.5**	**0.5**	**0.4**	**0.1**
Dieldrin	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Endrin	mg/kg	0.2	<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	<0.1
o,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Beta Endosulfan	mg/kg	0.2	<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	<0.1
p,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Ketone	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Isodrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Mirex	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total CLP OC Pesticides	mg/kg	1	<1	<1	<1	<1	<1

OC Pesticides in Soil [AN420] Tested: 8/8/2017 (continued)

PARAMETER	UOM	LOR	131 SOIL - 27/7/2017 SE168770.043	132 SOIL - 27/7/2017 SE168770.044	133 SOIL - 27/7/2017 SE168770.045	134 SOIL - 27/7/2017 SE168770.046	135 SOIL - 27/7/2017 SE168770.047
Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Alpha BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Lindane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Beta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Delta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor epoxide	mg/kg	0.1	<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	<0.1
Alpha Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Gamma Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Alpha Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
trans-Nonachlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
p,p'-DDE	mg/kg	0.1	**0.2**	**0.4**	**0.1**	**0.3**	**0.5**
Dieldrin	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Endrin	mg/kg	0.2	<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	<0.1
o,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Beta Endosulfan	mg/kg	0.2	<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	<0.1
p,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Ketone	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Isodrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Mirex	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total CLP OC Pesticides	mg/kg	1	<1	<1	<1	<1	<1

OC Pesticides in Soil [AN420] Tested: 8/8/2017 (continued)

PARAMETER	UOM	LOR	136 SOIL - 27/7/2017 SE168770.048	137 SOIL - 27/7/2017 SE168770.049	138 SOIL - 27/7/2017 SE168770.050	139 SOIL - 27/7/2017 SE168770.051	140 SOIL - 27/7/2017 SE168770.052
Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Alpha BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Lindane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Beta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Delta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor epoxide	mg/kg	0.1	<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	<0.1
Alpha Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Gamma Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Alpha Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
trans-Nonachlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
p,p'-DDE	mg/kg	0.1	<0.1	**0.1**	**0.2**	<0.1	**0.1**
Dieldrin	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Endrin	mg/kg	0.2	<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	<0.1
o,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Beta Endosulfan	mg/kg	0.2	<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	<0.1
p,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Ketone	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Isodrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Mirex	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total CLP OC Pesticides	mg/kg	1	<1	<1	<1	<1	<1

OC Pesticides in Soil [AN420] Tested: 8/8/2017 (continued)

PARAMETER	UOM	LOR	141 SOIL - 27/7/2017 SE168770.053	142 SOIL - 27/7/2017 SE168770.054	143 SOIL - 27/7/2017 SE168770.055	144 SOIL - 27/7/2017 SE168770.056	145 SOIL - 27/7/2017 SE168770.057
Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Alpha BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Lindane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Beta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Delta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor epoxide	mg/kg	0.1	<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	<0.1
Alpha Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Gamma Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Alpha Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
trans-Nonachlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
p,p'-DDE	mg/kg	0.1	**0.1**	<0.1	**0.5**	**0.4**	**0.1**
Dieldrin	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Endrin	mg/kg	0.2	<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	<0.1
o,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Beta Endosulfan	mg/kg	0.2	<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	<0.1
p,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Ketone	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Isodrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Mirex	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total CLP OC Pesticides	mg/kg	1	<1	<1	<1	<1	<1

OC Pesticides in Soil [AN420] Tested: 8/8/2017 (continued)

PARAMETER	UOM	LOR	146 SOIL - 27/7/2017 SE168770.058	147 SOIL - 27/7/2017 SE168770.059	148 SOIL - 27/7/2017 SE168770.060	201 SOIL - 28/7/2017 SE168770.061	202 SOIL - 28/7/2017 SE168770.062
Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Alpha BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Lindane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Beta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Delta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor epoxide	mg/kg	0.1	<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	<0.1
Alpha Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Gamma Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Alpha Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
trans-Nonachlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
p,p'-DDE	mg/kg	0.1	**0.2**	**0.1**	**0.4**	**0.8**	**0.8**
Dieldrin	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Endrin	mg/kg	0.2	<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	<0.1
o,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Beta Endosulfan	mg/kg	0.2	<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	<0.1
p,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	**0.2**	**0.2**
Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Ketone	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Isodrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Mirex	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total CLP OC Pesticides	mg/kg	1	<1	<1	<1	<1	<1

OC Pesticides in Soil [AN420] Tested: 8/8/2017 (continued)

PARAMETER	UOM	LOR	203 SOIL - 28/7/2017 SE168770.063	204 SOIL - 28/7/2017 SE168770.064	205 SOIL - 28/7/2017 SE168770.065	206 SOIL - 28/7/2017 SE168770.066	207 SOIL - 28/7/2017 SE168770.067
Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Alpha BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Lindane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Beta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Delta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor epoxide	mg/kg	0.1	<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	<0.1
Alpha Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Gamma Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Alpha Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
trans-Nonachlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
p,p'-DDE	mg/kg	0.1	**0.3**	**0.2**	<0.1	<0.1	**0.3**
Dieldrin	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Endrin	mg/kg	0.2	<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	<0.1
o,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Beta Endosulfan	mg/kg	0.2	<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	<0.1
p,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Ketone	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Isodrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Mirex	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total CLP OC Pesticides	mg/kg	1	<1	<1	<1	<1	<1

OC Pesticides in Soil [AN420] Tested: 8/8/2017 (continued)

PARAMETER	UOM	LOR	DA SOIL - 28/7/2017 SE168770.068	DB SOIL - 28/7/2017 SE168770.069	DC SOIL - 28/7/2017 SE168770.070
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**	**0.2**	**0.4**
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
Total CLP OC Pesticides	mg/kg	1	<1	<1	<1

OP Pesticides in Soil [AN420] Tested: 8/8/2017

PARAMETER	UOM	LOR	201 SOIL - 28/7/2017 SE168770.061	202 SOIL - 28/7/2017 SE168770.062	203 SOIL - 28/7/2017 SE168770.063	204 SOIL - 28/7/2017 SE168770.064	205 SOIL - 28/7/2017 SE168770.065
Dichlorvos	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dimethoate	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Diazinon (Dimpylate)	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Fenitrothion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Malathion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Bromophos Ethyl	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Methidathion	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Total OP Pesticides*	mg/kg	1.7	<1.7	<1.7	<1.7	<1.7	<1.7

PARAMETER	UOM	LOR	206 SOIL - 28/7/2017 SE168770.066	207 SOIL - 28/7/2017 SE168770.067	DA SOIL - 28/7/2017 SE168770.068	DB SOIL - 28/7/2017 SE168770.069	DC SOIL - 28/7/2017 SE168770.070
Dichlorvos	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dimethoate	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Diazinon (Dimpylate)	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Fenitrothion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Malathion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Bromophos Ethyl	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Methidathion	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Total OP Pesticides*	mg/kg	1.7	<1.7	<1.7	<1.7	<1.7	<1.7

Total Recoverable Metals in Soil/Waste Solids/Materials by ICPOES [AN040/AN320] Tested: 10/8/2017

PARAMETER	UOM	LOR	1 SOIL - 27/7/2017 SE168770.001	2 SOIL - 27/7/2017 SE168770.002	3 SOIL - 27/7/2017 SE168770.003	4 SOIL - 27/7/2017 SE168770.004	5 SOIL - 27/7/2017 SE168770.005
Arsenic, As	mg/kg	3	4	4	4	3	<3
Cadmium, Cd	mg/kg	0.3	0.3	<0.3	<0.3	<0.3	0.3
Chromium, Cr	mg/kg	0.3	36	51	110	55	68
Copper, Cu	mg/kg	0.5	14	16	22	18	20
Lead, Pb	mg/kg	1	18	17	16	17	13
Nickel, Ni	mg/kg	0.5	8.8	8.3	12	12	14
Zinc, Zn	mg/kg	0.5	19	22	25	32	48

PARAMETER	UOM	LOR	6 SOIL - 27/7/2017 SE168770.006	7 SOIL - 27/7/2017 SE168770.007	8 SOIL - 27/7/2017 SE168770.008	9 SOIL - 27/7/2017 SE168770.009	10 SOIL - 27/7/2017 SE168770.010
Arsenic, As	mg/kg	3	<3	<3	3	<3	<3
Cadmium, Cd	mg/kg	0.3	0.3	0.4	0.4	0.3	<0.3
Chromium, Cr	mg/kg	0.3	83	110	71	89	72
Copper, Cu	mg/kg	0.5	37	40	54	32	31
Lead, Pb	mg/kg	1	13	16	24	14	20
Nickel, Ni	mg/kg	0.5	16	17	16	14	14
Zinc, Zn	mg/kg	0.5	60	78	91	51	53

PARAMETER	UOM	LOR	11 SOIL - 27/7/2017 SE168770.011	12 SOIL - 27/7/2017 SE168770.012	201 SOIL - 28/7/2017 SE168770.061	202 SOIL - 28/7/2017 SE168770.062	203 SOIL - 28/7/2017 SE168770.063
Arsenic, As	mg/kg	3	3	<3	5	4	3
Cadmium, Cd	mg/kg	0.3	0.3	<0.3	0.8	0.7	0.4
Chromium, Cr	mg/kg	0.3	81	40	120	120	73
Copper, Cu	mg/kg	0.5	42	36	66	120	51
Lead, Pb	mg/kg	1	14	12	66	37	17
Nickel, Ni	mg/kg	0.5	14	10	24	21	16
Zinc, Zn	mg/kg	0.5	47	35	440	200	84

PARAMETER	UOM	LOR	204 SOIL - 28/7/2017 SE168770.064	205 SOIL - 28/7/2017 SE168770.065	206 SOIL - 28/7/2017 SE168770.066	207 SOIL - 28/7/2017 SE168770.067	DA SOIL - 28/7/2017 SE168770.068
Arsenic, As	mg/kg	3	4	4	4	<3	<3
Cadmium, Cd	mg/kg	0.3	0.4	0.4	0.7	0.3	0.3
Chromium, Cr	mg/kg	0.3	99	97	97	58	85
Copper, Cu	mg/kg	0.5	56	26	34	45	41
Lead, Pb	mg/kg	1	27	26	62	30	14
Nickel, Ni	mg/kg	0.5	20	19	21	14	18
Zinc, Zn	mg/kg	0.5	310	100	430	95	67

Total Recoverable Metals in Soil/Waste Solids/Materials by ICPOES [AN040/AN320] Tested: 10/8/2017 (continued)

PARAMETER	UOM	LOR	DB SOIL - 28/7/2017 SE168770.069	DC SOIL - 28/7/2017 SE168770.070
Arsenic, As	mg/kg	3	<3	<3
Cadmium, Cd	mg/kg	0.3	**0.3**	**0.3**
Chromium, Cr	mg/kg	0.3	**74**	**64**
Copper, Cu	mg/kg	0.5	**38**	**47**
Lead, Pb	mg/kg	1	**14**	**12**
Nickel, Ni	mg/kg	0.5	**15**	**12**
Zinc, Zn	mg/kg	0.5	**48**	**41**

Mercury in Soil [AN312] Tested: 10/8/2017

PARAMETER	UOM	LOR	1 SOIL - 27/7/2017 SE168770.001	2 SOIL - 27/7/2017 SE168770.002	3 SOIL - 27/7/2017 SE168770.003	4 SOIL - 27/7/2017 SE168770.004	5 SOIL - 27/7/2017 SE168770.005
Mercury	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05	<0.05

PARAMETER	UOM	LOR	6 SOIL - 27/7/2017 SE168770.006	7 SOIL - 27/7/2017 SE168770.007	8 SOIL - 27/7/2017 SE168770.008	9 SOIL - 27/7/2017 SE168770.009	10 SOIL - 27/7/2017 SE168770.010
Mercury	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05	<0.05

PARAMETER	UOM	LOR	11 SOIL - 27/7/2017 SE168770.011	12 SOIL - 27/7/2017 SE168770.012	201 SOIL - 28/7/2017 SE168770.061	202 SOIL - 28/7/2017 SE168770.062	203 SOIL - 28/7/2017 SE168770.063
Mercury	mg/kg	0.05	<0.05	<0.05	**0.09**	**0.14**	<0.05

PARAMETER	UOM	LOR	204 SOIL - 28/7/2017 SE168770.064	205 SOIL - 28/7/2017 SE168770.065	206 SOIL - 28/7/2017 SE168770.066	207 SOIL - 28/7/2017 SE168770.067	DA SOIL - 28/7/2017 SE168770.068
Mercury	mg/kg	0.05	<0.05	<0.05	**0.06**	<0.05	<0.05

PARAMETER	UOM	LOR	DB SOIL - 28/7/2017 SE168770.069	DC SOIL - 28/7/2017 SE168770.070
Mercury	mg/kg	0.05	<0.05	<0.05

Moisture Content [AN002] Tested: 10/8/2017

PARAMETER	UOM	LOR	1 SOIL - 27/7/2017 SE168770.001	2 SOIL - 27/7/2017 SE168770.002	3 SOIL - 27/7/2017 SE168770.003	4 SOIL - 27/7/2017 SE168770.004	5 SOIL - 27/7/2017 SE168770.005
% Moisture	%w/w	0.5	9.0	13	11	13	14

PARAMETER	UOM	LOR	6 SOIL - 27/7/2017 SE168770.006	7 SOIL - 27/7/2017 SE168770.007	8 SOIL - 27/7/2017 SE168770.008	9 SOIL - 27/7/2017 SE168770.009	10 SOIL - 27/7/2017 SE168770.010
% Moisture	%w/w	0.5	16	26	16	19	20

PARAMETER	UOM	LOR	11 SOIL - 27/7/2017 SE168770.011	12 SOIL - 27/7/2017 SE168770.012	101 SOIL - 27/7/2017 SE168770.013	102 SOIL - 27/7/2017 SE168770.014	103 SOIL - 27/7/2017 SE168770.015
% Moisture	%w/w	0.5	18	21	8.8	9.3	8.5

PARAMETER	UOM	LOR	104 SOIL - 27/7/2017 SE168770.016	105 SOIL - 27/7/2017 SE168770.017	106 SOIL - 27/7/2017 SE168770.018	107 SOIL - 27/7/2017 SE168770.019	108 SOIL - 27/7/2017 SE168770.020
% Moisture	%w/w	0.5	16	14	14	9.3	13

PARAMETER	UOM	LOR	109 SOIL - 27/7/2017 SE168770.021	110 SOIL - 27/7/2017 SE168770.022	111 SOIL - 27/7/2017 SE168770.023	112 SOIL - 27/7/2017 SE168770.024	113 SOIL - 27/7/2017 SE168770.025
% Moisture	%w/w	0.5	11	9.5	11	8.9	9.3

PARAMETER	UOM	LOR	114 SOIL - 27/7/2017 SE168770.026	115 SOIL - 27/7/2017 SE168770.027	116 SOIL - 27/7/2017 SE168770.028	117 SOIL - 27/7/2017 SE168770.029	118 SOIL - 27/7/2017 SE168770.030
% Moisture	%w/w	0.5	15	12	12	13	14

PARAMETER	UOM	LOR	119 SOIL - 27/7/2017 SE168770.031	120 SOIL - 27/7/2017 SE168770.032	121 SOIL - 27/7/2017 SE168770.033	122 SOIL - 27/7/2017 SE168770.034	123 SOIL - 27/7/2017 SE168770.035
% Moisture	%w/w	0.5	17	12	15	14	16

Moisture Content [AN002] Tested: 10/8/2017 (continued)

PARAMETER	UOM	LOR	124 SOIL - 27/7/2017 SE168770.036	125 SOIL - 27/7/2017 SE168770.037	126 SOIL - 27/7/2017 SE168770.038	127 SOIL - 27/7/2017 SE168770.039	128 SOIL - 27/7/2017 SE168770.040
% Moisture	%w/w	0.5	13	19	23	17	21

PARAMETER	UOM	LOR	129 SOIL - 27/7/2017 SE168770.041	130 SOIL - 27/7/2017 SE168770.042	131 SOIL - 27/7/2017 SE168770.043	132 SOIL - 27/7/2017 SE168770.044	133 SOIL - 27/7/2017 SE168770.045
% Moisture	%w/w	0.5	15	16	12	21	20

PARAMETER	UOM	LOR	134 SOIL - 27/7/2017 SE168770.046	135 SOIL - 27/7/2017 SE168770.047	136 SOIL - 27/7/2017 SE168770.048	137 SOIL - 27/7/2017 SE168770.049	138 SOIL - 27/7/2017 SE168770.050
% Moisture	%w/w	0.5	17	19	19	16	19

PARAMETER	UOM	LOR	139 SOIL - 27/7/2017 SE168770.051	140 SOIL - 27/7/2017 SE168770.052	141 SOIL - 27/7/2017 SE168770.053	142 SOIL - 27/7/2017 SE168770.054	143 SOIL - 27/7/2017 SE168770.055
% Moisture	%w/w	0.5	19	16	18	17	17

PARAMETER	UOM	LOR	144 SOIL - 27/7/2017 SE168770.056	145 SOIL - 27/7/2017 SE168770.057	146 SOIL - 27/7/2017 SE168770.058	147 SOIL - 27/7/2017 SE168770.059	148 SOIL - 27/7/2017 SE168770.060
% Moisture	%w/w	0.5	16	16	16	22	23

PARAMETER	UOM	LOR	201 SOIL - 28/7/2017 SE168770.061	202 SOIL - 28/7/2017 SE168770.062	203 SOIL - 28/7/2017 SE168770.063	204 SOIL - 28/7/2017 SE168770.064	205 SOIL - 28/7/2017 SE168770.065
% Moisture	%w/w	0.5	12	18	18	17	14

PARAMETER	UOM	LOR	206 SOIL - 28/7/2017 SE168770.066	207 SOIL - 28/7/2017 SE168770.067	DA SOIL - 28/7/2017 SE168770.068	DB SOIL - 28/7/2017 SE168770.069	DC SOIL - 28/7/2017 SE168770.070
% Moisture	%w/w	0.5	14	9.1	16	21	20

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/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.
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.
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
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	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

*	NATA accreditation does not cover the performance of this service.	-	Not analysed.	UOM	Unit of Measure.
		NVL	Not validated.	LOR	Limit of Reporting.
**	Indicative data, theoretical holding time exceeded.	IS	Insufficient sample for analysis.	↑↓	Raised/lowered Limit of Reporting.
		LNR	Sample listed, but not received.		

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 calculated 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