Environmental Site Assessment

Site Address:
9 Rose Lane
South Launceston

Project No: 7928

Date: November 2022
(Version 4)

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Contents

List of Tables

List of Figures

1 Executive Summary

Environmental Service and Design (ES&D) were commissioned by their client Errol Stewart, to undertake an Environmental Site Assessment of 9 Rose Lane, South Launceston 7249, specifically three land titles, CT 159336/1, 247578/2 and 200709/1.

The land is located downslope of a former small municipal landfill which extends from under Westbury Road to the boundary of 9 Rose Lane. However, the full extent of the landfilling has not been confirmed, and no post closure information is available of the municipal landfill as it ceased in the early 1970's.

It is proposed to develop the site into six commercial tenancies with car parking and associated infrastructure.

Our assessment has revealed the following:

- Concentration of contaminants in soil are within acceptable commercial screening levels of the *National Environmental Protection (Assessment of Site Contamination) Measure 1999* as amended 2013 (NEPASCM)

- There is evidence of the presence of bulk ground gases under the site, most likely from the former landfill to the east and/or convict cemetery to the south of the site.

- Onsite gas measurements using portable Gas Detector and in bore gas sampler (gas clam) for 6 days revealed elevated concentrations of methane, carbon dioxide and carbon monoxide underground in vapour bores.

- Canister air samples taken from vapour bores detected elevated concentrations of methane and carbon dioxide. All other volatile compounds were below the limit of reporting (not detected).

Further gas monitoring bores were installed across the site to provide further information about ground gases, in conjunction with surface gas emissions testing. This information has been included in this report, and will support the design of any mitigation measures to prevent the ingress of ground gases into buildings, and to manage other risks associated with ground gases.

Our recommendations are as follows.

The site is suitable for future commercial use with appropriate vapour mitigation measures as determined by a suitably qualified vapour mitigation design consultant. A letter from the vapour consultant regarding protection of buildings from ground gas risk is attached in Appendix C.

2 Scope of Works

The scope included:

- Desktop review of the site and surrounding land use history,
- Determination of potential contaminants of concern,
- Field investigations and site visit,
- Sampling of the soil across the site focusing on disturbed and possible filled areas,
- Consideration of the site's environmental settings,
- Identification of potential human and ecological receptors and consideration of risks to identified receptors,
- Development of a Conceptual Site Model (CSM), and
- Preparation of the assessment report.

Figure 1: Assessment Area

3 Assessment Criteria

The assessment is required to be completed to address the *National Environmental protection (Assessment of Site Contamination) Measure* 1999, as amended April 11, 2013 (NEPASCM) and ground gas guidelines.

The following screening levels have been considered in the assessment: Health Screening Levels (HSLs), Health Investigation Levels (HILs), Ecological Investigation Levels (EILs), Ecological Screening Levels (ESLs) provided in the *National Environmental protection (Assessment of Site Contamination) Measure* 1999, as amended April 11, 2013 (NEPASCM).

Additional NEPASCM reference material considered in the assessment include CRC CARE *Technical Report No. 10 "Health Screening Levels for Petroleum Hydrocarbons in Soil and Groundwater Part 2: Application Document"*.

The following references have been considered in the assessment of ground gases:

- NSW EPA, *Assessment and management of hazardous ground gases, 2020.*

- OSWER *Technical Guide for Assessing and Mitigating the Vapour Intrusion Pathway from Sub Surface Vapour Sources to Indoor Air, 2015.*

4 Site Details

4.1 Ownership and Property Details

The land is owned by OSLP Pty Ltd, and this report has been prepared for the landowner Errol Stewart.

Site details are shown in Table 1.

Table 1: Site Details

Street Address	*Property ID*	*Title Reference*	*Approx. Area (m^2)*
9 Rose Lane	6618792	159336/1 247578/2 200709/1	1.4 hectare (total)

4.2 Surrounding Land Use

The site is in South Launceston and adjacent to Westbury Road which is a main arterial Road. The site is currently vacant with no buildings on the site. Minor earthworks have been completed including placement of clean imported fill cover (fine aggregate) over the surface of the northern and middle lots up to a depth of 0.5 m with fill depth greatest towards the north.

The land borders Council owned land, upslope and to the east which is the location of the former clay quarry and later landfill which was closed in the 1960s or early 1970s. The southern title (CT 200709/1) borders a convict cemetery which is located upslope to the subject site.

The surrounding land use includes a mix of residential and commercial. Commercial sites are located to the northeast in Norwich Street. These uses include a builder's material storage yard and offices and long-term storage facility and retail flooring office space and showroom. The land north across Rose Lane is the Glen Dhu Primary School. Downslope of the site to the west is a church and some residential dwellings. Residential dwellings are also located upslope of the site to the south and north (refer to Figure 4).

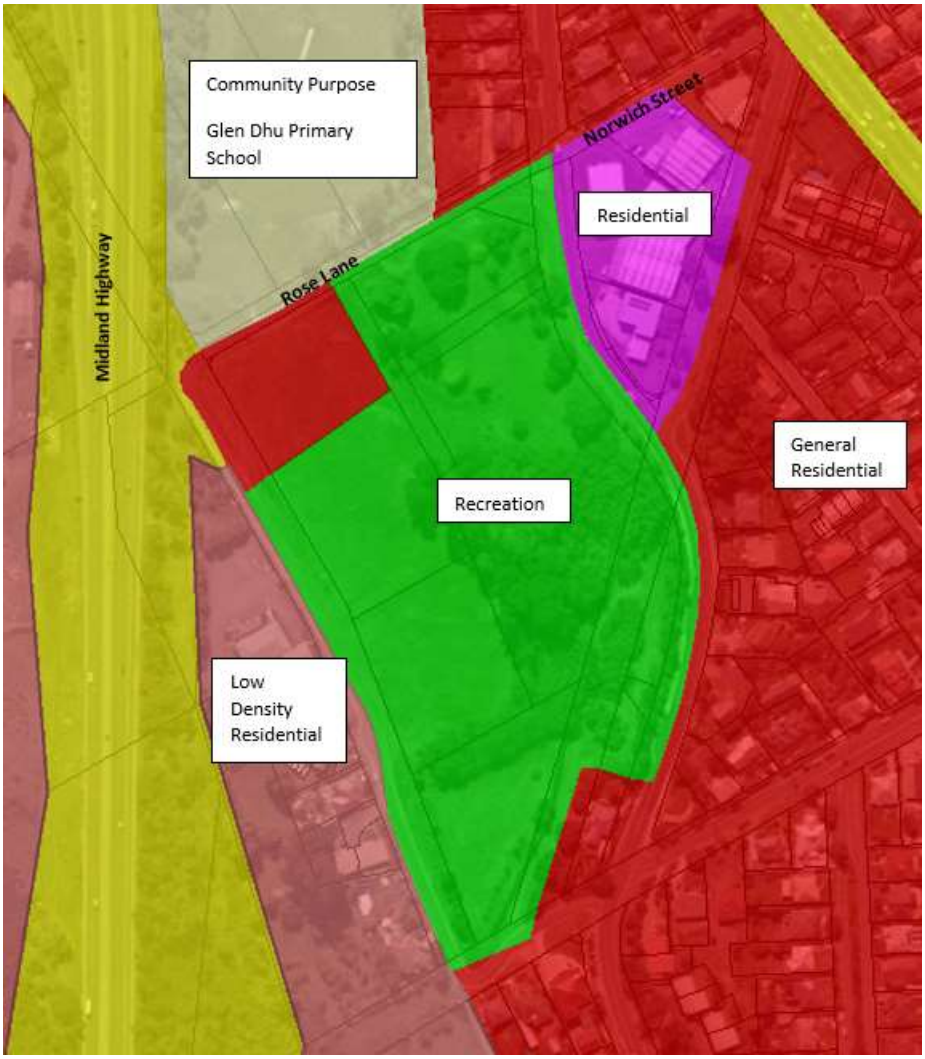


Figure 2: Surrounding Land Use and Planning Zones

4.3 Proposed Development

It is proposed to construct a commercial property comprising six tenancies on the property (see Figure 3). The southern area will remain vacant as the shallow stormwater drainage network on this title makes building difficult to achieve. There is a web like network of PVC stormwater pipes running from east to west on the southern title which discharge into the Council stormwater main on Rose Lane.

Construction of the commercial buildings will require excavation, however excavation will be limited to within the new fill material at the site. There are no below ground structures such as basements being proposed.

Figure 3: Proposed Commercial Development

5 Background Information Sources

- Land Information System Tasmania (The ListMap - www.thelist.tas.gov.au),
- DPIPWE Groundwater Information Portal (hhtp://wrt.tas.gov.au/groundwater-info

- Launceston Interim Planning Scheme 2015 (www.iplan.tas.gov.au)
- Google Earth Pro
- Mineral Resources Tasmania (MRT) Digital Geological Atlas (http://www.mrt.tas.gov.au/products/geoscience_maps/digital_geological_atlas_125_000_scale_series)
- EPBC Act search tool (https://www.environment.gov.au/epbc/protected-matters-search-tool)
- Trove, https://trove.nla.gov.au/
- Examiner Newspaper, Convict cemetery article.

5.1 Zoning

The middle and southern lots are located within the 'Recreation' zone and the northern most lot is located within the 'General Residential' zone of the City of Launceston Interim Planning Scheme 2015 (refer to Figure 4).

5.2 Topography

A review of Google Earth and topographic contours via The LISTMap indicates that the site slopes east to west Refer to Figure 6). A large fall of 25 m (60 to 35 AHD) is seen from the top of Westbury Road to the western section of Rose Lane (lower title boundary of 6 Rose Lane) The title above 6 Rose Lane has been filled approximately 15 metres above the current title. Therefore, the municipal waste is likely to be sitting level with the AHD of 6 Rose Lane, although this has not been confirmed and could be deeper than AHD 35m. Also, it is important to note that 6 Rose Lane has also been filled up to 5 metres. Therefore, the upslope landfill could possibly be situated at AHD 30 which would be consistent with the fill level at 6 Rose Lane.

Figure 4: Elevation contours (DPIPWE, ListMap)

5.3 Surface Water

The nearest surface water body is the Tamar Estuary, approximately 2.2 kilometres to the north. The Midland Highway was constructed on a former riverbed and surface and groundwater flows are expected to be to the north, northwest.

5.4 Hydrogeology

Based on contours, groundwater from the site is likely to flow to the north, northwest.

Figure 5: Topography and inferred groundwater flow direction

5.5 Geology

The site is underlain predominantly by high plasticity SILTY CLAY with pockets of low to moderate plasticity SANDY CLAY and CLAYEY SAND. The upper adjacent Council land was formerly mined for clay for the manufacture of bricks, at the brickworks on the subject site. Whilst there are natural high plasticity CLAY bands these vary in thickness and are intercepted with sand pockets (refer to Field Sheets and Bore logs Appendix B and C). This aligns with comments made in a report from the Mineral Resources Tasmania website, *Jennings, I., Geological Factors Affecting Proposed Building at Cosgrove Park Launceston, July 1962*. Jennings inspected the Cosgrove Park site up the hill from the Rose Lane site and commented that the site is underlain by some 9 – 12 metres of clay which may contain thin beds and lenses of sand and gravel.

5.6 Acid Sulphate Soils

Acid sulphate soils (ASS) are soils which contain naturally occurring sulphides. If left undisturbed and waterlogged they are harmless, however, exposure to air can cause oxidation which allows subsequent rain events to produce sulfuric acid. According to the LIST, the site is located within an unmapped area for acid sulphate soils however the land to the north is mapped as low probability for acid sulphate soils. The likelihood of the occurrence of acid sulphate soils is low.

5.7 Flora and Fauna

The site has been subject to clearing, mining activity and manufacturing and is not likely to contain threatened species. A review of The ListMap indicates that threatened species have not been observed on the site or within 100 metres of the site. There is remnant vegetation remaining on the adjacent Council land, however this will not be disturbed by the development.

5.8 European and Aboriginal Heritage

The site is not listed on the Australian heritage database, nor is it listed as a site at risk of impacting Aboriginal relics (Aboriginal Heritage property search record Job Number: 30302754 (Sequence Number: 201765500) on 13 August 2021.

The site is not listed as protected under the EPBC Act (*Environment Protection and Biodiversity Conservation Act 1999*).

6 Site History

The following information has been reviewed alongside the above to determine the historical land use and assess the likelihood of potentially contaminating activities occurring on the site:

- ES&D Contaminated Sites Database,
- ListMap dangerous good storage,
- Site visit, and
- Historical aerial photographs.

- Dangerous goods are not known to be stored on the site. The site has been vacant for the past sixty years. Previous buildings can be seen on aerial photographs (refer to Figures 6 to 10).

6.1 Contaminated Sites Database

The contaminated sites database contains information on sites which have held or currently hold Workplace Standards (now WorkSafe Tasmania) dangerous goods licenses. This

database shows the nearest underground petroleum tank/s are approximately 400 metres to the north (Ampol, Wellington Street).

Table 2: Dangerous Goods Details

Licence No.	Address	Distance from Site	Details
unknown	325-327 Wellington Street	400 m	Underground Tanks at Service Station

6.2 Historical Aerial photography

A review of historical aerial photographs and satellite imagery available on The LISTMap and Google Earth Pro was undertaken to identify any historical potentially contaminating land uses in the area.

Figure 6: 1945 Aerial photo- showing former brickworks and quarry

Figure 7: 1945 Possible former brickworks and quarry

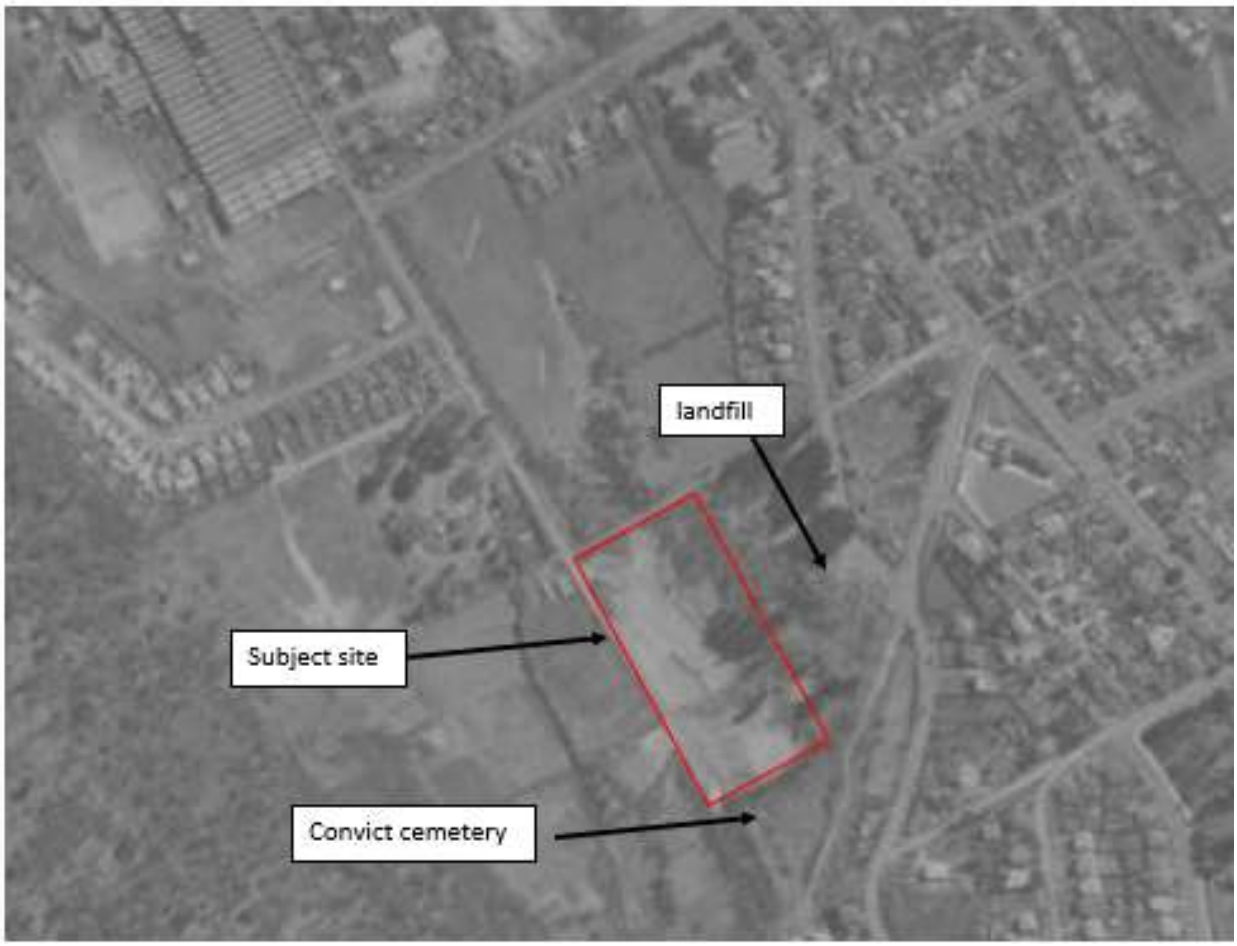


Figure 8: 1957

Figure 9: 1967

Figure 10: 1971

6.3 Potential Sources of Contamination

The following activities have been identified as potential sources of contaminants on the subject sites:

- Onsite Brickworks – petroleum hydrocarbons, including possible diesel fired kiln,
- Land filling on the site – observations of materials include crushed brick, aggregate, concrete, coal, metal fragments,
- Municipal Landfill upslope at 5 Rose Lane, and
- Convict cemetery to the south of the site.

Brickworks

Anecdotal information exists on the use of the site in the early 1900's as 'brick manufacturing'. This is consistent with the type of fill materials found on the site including crushed brick, coal and low-level hydrocarbons detected in soil samples.

Landfilling of inert waste onsite

The onsite soil investigations revealed foreign fill material buried up to 5 metres below the existing ground surface. The foreign material found included crushed brick, glass, coal, plastic and sawdust.

Offsite Municipal Landfill

The historical operation of a landfill at 5 Rose Lane, land upslope and adjacent to the subject site is confirmed by Geological Report. The report shows on site plan the location of the landfill.

Convict Cemetery

Although the exact size and outer boundary of the convict cemetery cannot be confirmed we can see that the lower extent of the cemetery is not likely to extend onto the subject site. Cemeteries can contribute to underground methane concentrations and other gases similar to landfills, as well as groundwater contamination.

Figure 11: The Site – Assessment Area includes three land titles shown

7 Sampling Plan and Methodology

The sampling plan included the following sampling/assessment methods:

a. Soil Sampling

Assess the soil against the NEPASCM screening levels for commercial development to determine if an acceptable level of risk exists for the direct contact, inhalation and ingestion pathways. Soil samples were taken at eight locations across the site and varying depths for comparison with guideline values.

b. Groundwater Assessment

Initial intentions were to install three groundwater monitoring wells to understand if volatile contaminants were present in groundwater under the site which could pose a vapour intrusion risk into the future buildings, and to confirm groundwater depth, soil profile and groundwater flow direction. However, groundwater was not encountered up to 8.0 m in 'MW1' which was the depth extent of the driller. This aligns with the geological reports mentioned in section 5.5 above, which describes a significant high plasticity clay layer, about 9 – 12 metres thick in the area.

c. Gas Clam Monitoring

The gas clam was set up in vapour bores VB1, VB3 and MW1 for a total of 6 days. Attended measurements were also recorded using Gas Detector GA5000 in the same bores for comparison.

d. Canister sampling

Collection of canister samples were completed using ALS Newcastle issued 1.4 L canisters. Leak checks were completed using pressure pump on train lines and tracer gas, isobutylene. Canister samples were collected from vapour bores MW1 and VB3. A duplicate sample was collected at MW1, namely MW1-B.

7.1 Installation of monitoring bores

Five vapour bores were installed on the 16th and 17th August 2021, on the northern lot which is the location of some of the future commercial buildings. It was intended to drill a groundwater bore. However, groundwater was not encountered in the bore up to 8 metres which was the maximum capacity of the drill rig. Therefore, 'MW1' was constructed for use as a vapour bore.

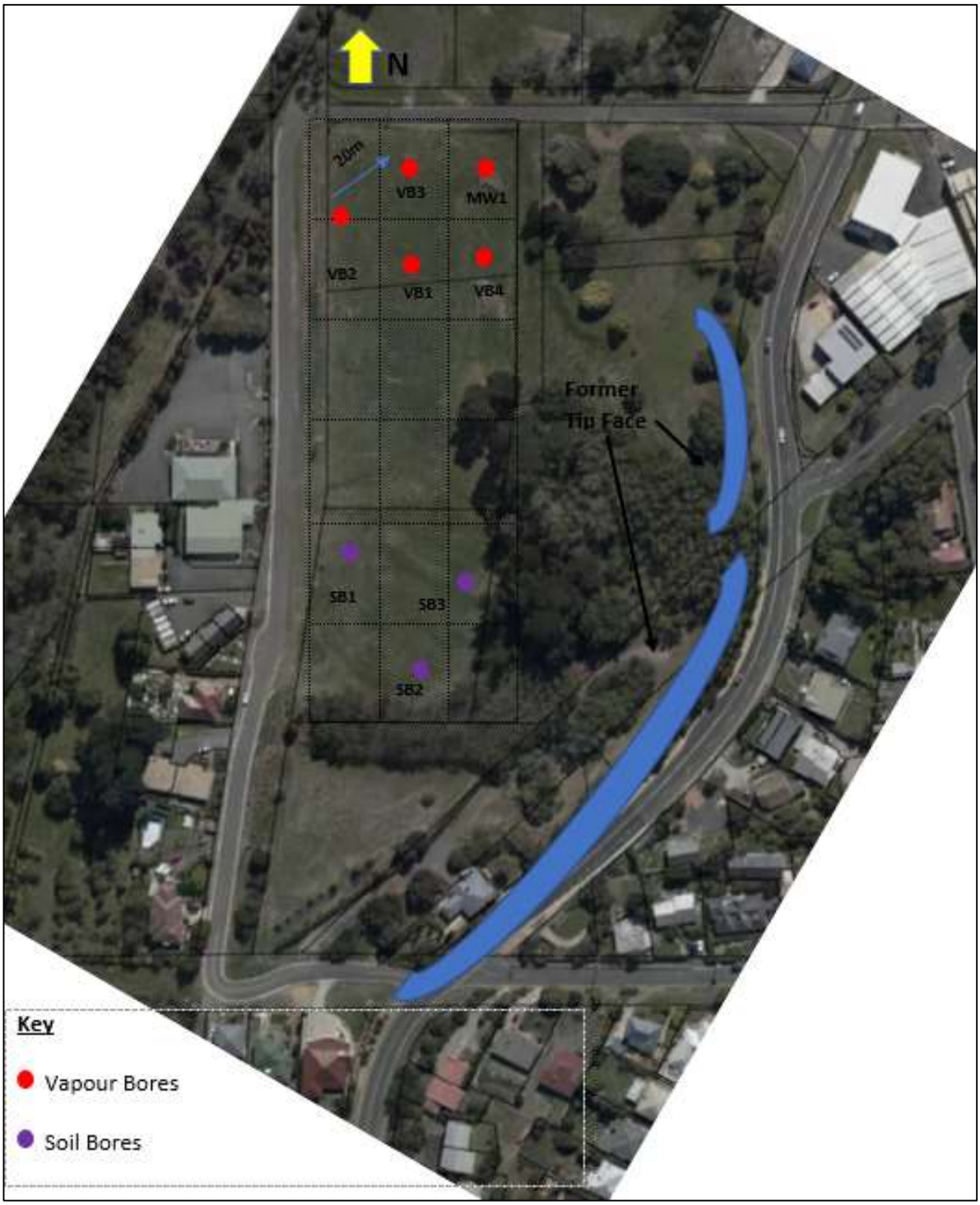


Figure 12: Sampling Points- vapour bores and soil bores.

7.2 Installation of further gas monitoring wells

The development concept has been changed from the initial proposal, which was a residential development, to a commercial development, which includes six tenancies, and covers a larger footprint of the site. For this reason, a further five gas monitoring locations have been installed at the site, to provide more thorough coverage of the site. These locations have been tested over a period of four weeks initially to inform the design of passive and/or active protective measures, as per the NSW guidelines. In conjunction

with this monitoring, further surface emission measurements (see Figure 14) have been undertaken and provided to the design consultant to inform the design process.

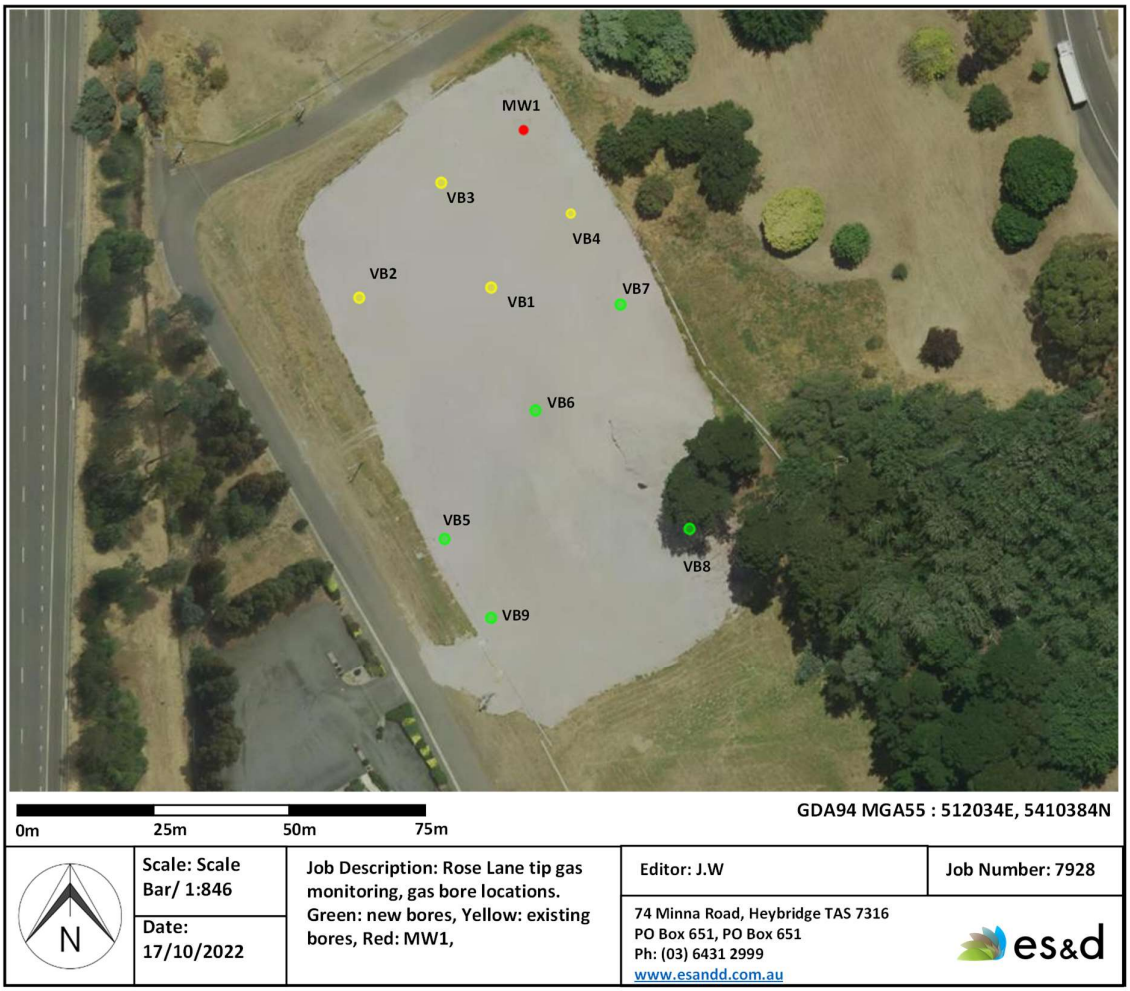


Figure 13: Updated gas bore locations

Figure 14: Surface gas monitoring locations

7.3 Site Characteristics

High plasticity, orange mottled clay then light grey CLAY was encountered in the bore 'MW1' from 5.3 to 8.0 mbgs. The top 0.0 to 5.3 mbgs contained fill material imported gravel and foreign materials (brick, coal). The remaining vapour bores (VB1, 2 and 3) were terminated in fill up to 3.0 mbgs and did not intersect natural ground.

Natural ground was intersected on the southernmost lot at around 1.2-1.5 mbgs although further investigation would be required to confirm the depth of fill on this lot. The middle and northern lots appear to have been filled up to 5.0 mbgs. It is important to note that recent works have included the addition of clean imported road base on the middle and northern lots. However, the depth of this recent cover was only around 0.2-0.4 mbgs on average and the maximum depth of fill has been reported by the landowner to be up to 1.0 m in parts.

The information obtained during the intrusive investigations at 9 Rose Lane and the site history research enabled an approximate cross profile of both 5 Rose Lane and 9 Rose Lane to be drawn up. This is included as Figure 15 below.

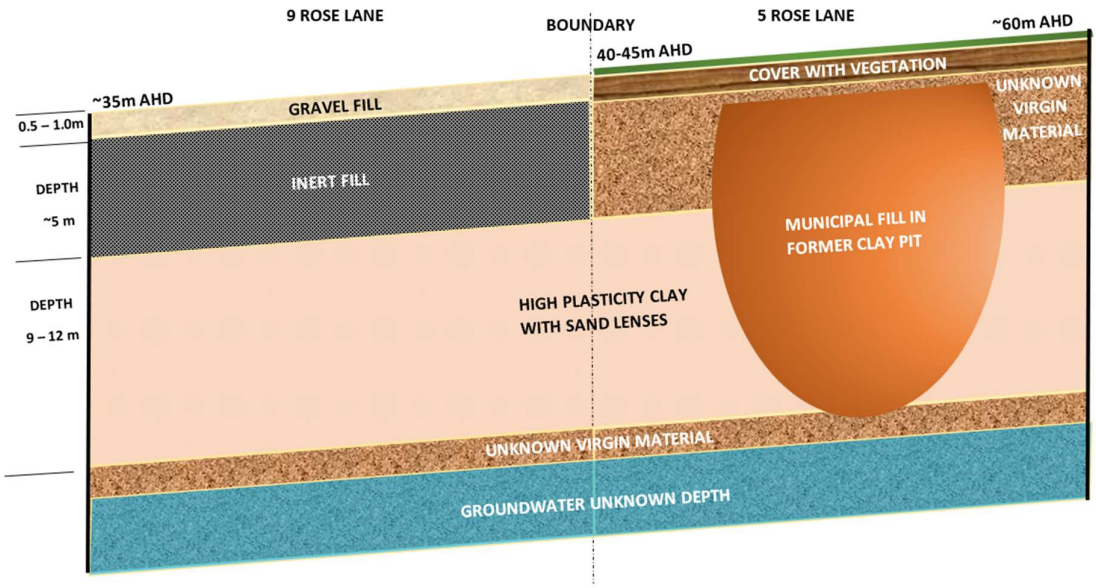


Figure 15: Cross profile of 5 and 9 Rose Lane based on field work and site history information

Table 3: Soil Results compared to Commercial D Land Use Screening Levels and Disposal Criteria

Sample Details and Results (mg/kg)													Criteria	
Sample Date													**NEPASCM**	**IB 105 L1**
Sample ID (mbgs)	SB3 - 0.5	SB3 - 0.3	MW1-1.5	MW1-1.5B	MW1-2.7	MW1-2.8	MW1-4.5	SB1-0.5	SB1-0.8	SB2-0.25	SB2-0.5	VB2-0.5	**HIL-D**	
Metals (mg/kg)														
Arsenic	<5	<5	<5	8	<5	<5	<5	<5	<5	<5	<5	<5	3000	20
Barium	90	100	40	120	190	70	130	140	130	100	140	170		300
Beryllium	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	2	500	2
Cadmium	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	800	3
Chromium	34	25	28	28	15	10	22	35	24	24	29	68	3,000	50
Cobalt	53	20	12	13	9	5	9	11	11	26	25	48	4,000	100
Copper	61	37	34	76	26	16	20	115	69	60	69	46	250,000	100
Lead	20	17	23	587	299	16	36	137	77	29	21	<5	1,500	300
Manganese	604	166	159	309	552	566	315	211	214	402	197	878	40,000	500
Nickel	50	23	14	17	15	10	15	16	16	16	19	134	4,000	60
Vanadium	178	95	141	143	48	36	61	126	92	172	242	55		
Zinc	97	58	34	164	603	100	242	434	137	52	24	56	400,000	200
Mercury	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	4,000	1

Sample Details and Results (mg/kg)										Criteria	
Sample Date										**NEPASCM**	**IB 105 L1**
Sample ID (mbgs)	VB4-1.5	VB4-1.6	VB2-2.0	VB2-1.5	VB3-1.3	VB1-0.5	VB1-1.0m	VB1-1.5m	VB1-2.0m	**HIL-D**	
Metals (mg/kg)											
Arsenic	13	<5	<5	5	<5	<5	<5	<5	<5	3000	20
Barium	370	110	30	120	70	210	80	30	30		300
Beryllium	<1	<1	<1	<1	<1	2	<1	<1	<1	500	2
Cadmium	2	<1	<1	<1	<1	<1	<1	<1	<5	800	3
Chromium	48	18	43	27	32	118	26	18	33	3,000	50
Cobalt	18	18	2	11	10	59	16	4	6	4,000	100
Copper	186	27	34	67	51	37	45	17	34	250,000	100
Lead	474	36	18	169	69	<5	51	43	29	1,500	300
Manganese	354	243	64	231	187	1040	257	45	105	40,000	500
Nickel	34	19	6	17	26	126	14	4	6	4,000	60
Vanadium	97	60	198	110	103	93	132	150	187		
Zinc	1380	187	41	262	66	43	96	21	40	400,000	200
Mercury	0.2	<0.1	<0.1	0.2	0.2	<0.1	<0.1	0.1	<0.1	4,000	1

Table 4: Soil Results

Criteria					
Sample Date				HIL/HSL-D		IB 105 L1
Sample ID/mbgs	MW1-2.8	SB1-0.5	VB4-1.5	0-1	1-2	
TPH (mg/kg)						
C6 - C9 Fraction	<10	<10	<10			65
C10 - C36 Fraction (sum)	<50	<50	<50			1,000
TRH (mg/kg)						
C6 - C10 Fraction minus BTEX (F1)	<10	<10	<10	260	370	
>C16 - C34 Fraction F3	**110**	**110**	**150**			
>C34 - C40 Fraction F4	<100	<100	<100			
>C10 - C16 Fraction minus Naphthalene (F2)	<50	<50	<50	110	240	
BTEXN (mg/kg)						
Benzene	<0.2	<0.2	<0.2	3	3	1
Toluene	<0.5	<0.5	<0.5	NL	NL	1
Ethylbenzene	<0.5	<0.5	<0.5	NL	NL	3
meta- & para-Xylene	<0.5	<0.5	<0.5			
ortho-Xylene	<0.5	<0.5	<0.5			
Total Xylenes	<0.5	<0.5	<0.5	230	NL	14
Sum of BTEX	<0.5	<0.5	<0.5			
Polycyclic Aromatic Hydrocarbons						
Sum of PAHs	-	**4.8**	-	4,000		20

Table Notes

1. Only samples that returned results above the LOR have been displayed in the table. All other results for TRH, BTEXN, PAH were below the LOR.

Table 5: Gas Clam and Gas Detector (GA5000) Results Summary Tables

Attended In bore Measurements with GA5000			Monitoring Location				
Parameter	**Unit**	**Ambient**	**MW1**	**MW1**	**VB1**	**VB1**	**VB3**
	Date	24-08-2021	24-08-2021	27-08-2021	26-08-21	27-08-2021	24-08-2021
PID	ppm	0.0	3.4	3.2	1.9	2.0	0.7
CH4	%	0.0	0.0	0.9	8.0	8.3	8.7
CO2	%	0.2	0.2	12.6	16.8	17.6	16.9
O2	%	20.5	2.0	3.8	0.8	0.0	0.0
CO	ppm	1.0	1.0	22	1	1	3.0
H2S	ppm	0	0	1	0	0	3.0
Barometric Press	mb	1019	1019	1020	1021	1020	1018

Monitoring Location	VB3	Gas Clam Measurements							
Date	Time	Parameters							
24/08/2021	Time	CH4 %	CO2%	O2 %	H2S ppm	CO ppm	Bore press	Atm press mb	Temp oC
Max value	13.09-16.41	9.1	20.6	10.1	0	23.5	992	989	17.1
Min value	13.09-16.41	4	9.2	0	0	0.1	991	988	13.4
25/08/2021	8:57	0.1	0.4	21	0	0	997	994	9.2
25/08/2021	16:51	3.3	7.1	11	0	0	995	992	9.1

Monitoring Location	VB1	Gas Clam Measurements						
Date /Time	Parameters							
26/08/2021 9.46-12.46	CH4 %	CO2 %	O2 %	H2S ppm	CO ppm	Bore press	Atm press mb	Temp oC
Min value	8.6	20.1	0	0	0	995	992	9.6
Max Value	9.6	22	0.5	0	2.7	996	993	12

Monitoring Location	MW1	Gas Clam Measurements						
Date /Time	Parameters							
27/08/2021 11.54-16.34	CH4 %	CO2 %	O2 %	H2S ppm	CO ppm	Bore press	Atm press mb	Temp oC
Min value	8.6	20.1	0	0	0	995	992	9.6
Max Value	9.6	22	0.5	0	2.7	996	993	12

Monitoring Location	MW1	Gas Clam Measurements						
Date /Time	Parameters							
27/08/2021 to 29/08/2021 16.54 to 8.15	CH4 %	CO2 %	O2 %	H2S ppm	CO ppm	Bore press	Atm press mb	Temp oC
Min value	0.5	12.2	2.7	0	1.3	985	983	8.7
Max Value	1.2	16.1	7.7	0	7.8	993	990	9.1

Comparison of In Ground Results against Assessment Criteria						
	CH4 % v/v	CO2 % v/v	O2 % v/v	H2S ppm	CO ppm	VOC ppm
Guideline NSW	<5%	<3	NA	<10 TWA	<10	NA - indicator
Result range Min	0.0	9.2	0.0	0.0	0.0	0.0
Max	9.6	22	11.0	1.0	23.5	3.4

Reference/Results	CH4 % v/v	CO2 % v/v	CO % v/v
Typical Landfill	20 to 65	15 to 40	0 to 5
Typical Natural Background Concentrations Underground	0.002 up to 90.0 (i.e., wetland, waterlogged soils)	0.035 to 20	0.0005
9 Rose Lane Result (max)	9.6	22	0.0023
Landfill typical adjacent land	0.01 to 0.1	2.0 to 3.5	0.002 to 1.28
VIC EPA Action Levels	<1% v/v <5% v/v lower explosive limit	<2% v/v	<0.003
	The result is less than a typical landfill scenario but higher conc's in comparison to other landfills and higher than Vic EPA recommended action levels. CH4 oxidises to CO2 through bacterial action	May be higher due to elevated methane concentrations. Slightly higher than natural background levels. Higher in comparison to other landfills.	The result is on the low end of what may be from a landfill and slightly higher than general background concentration.

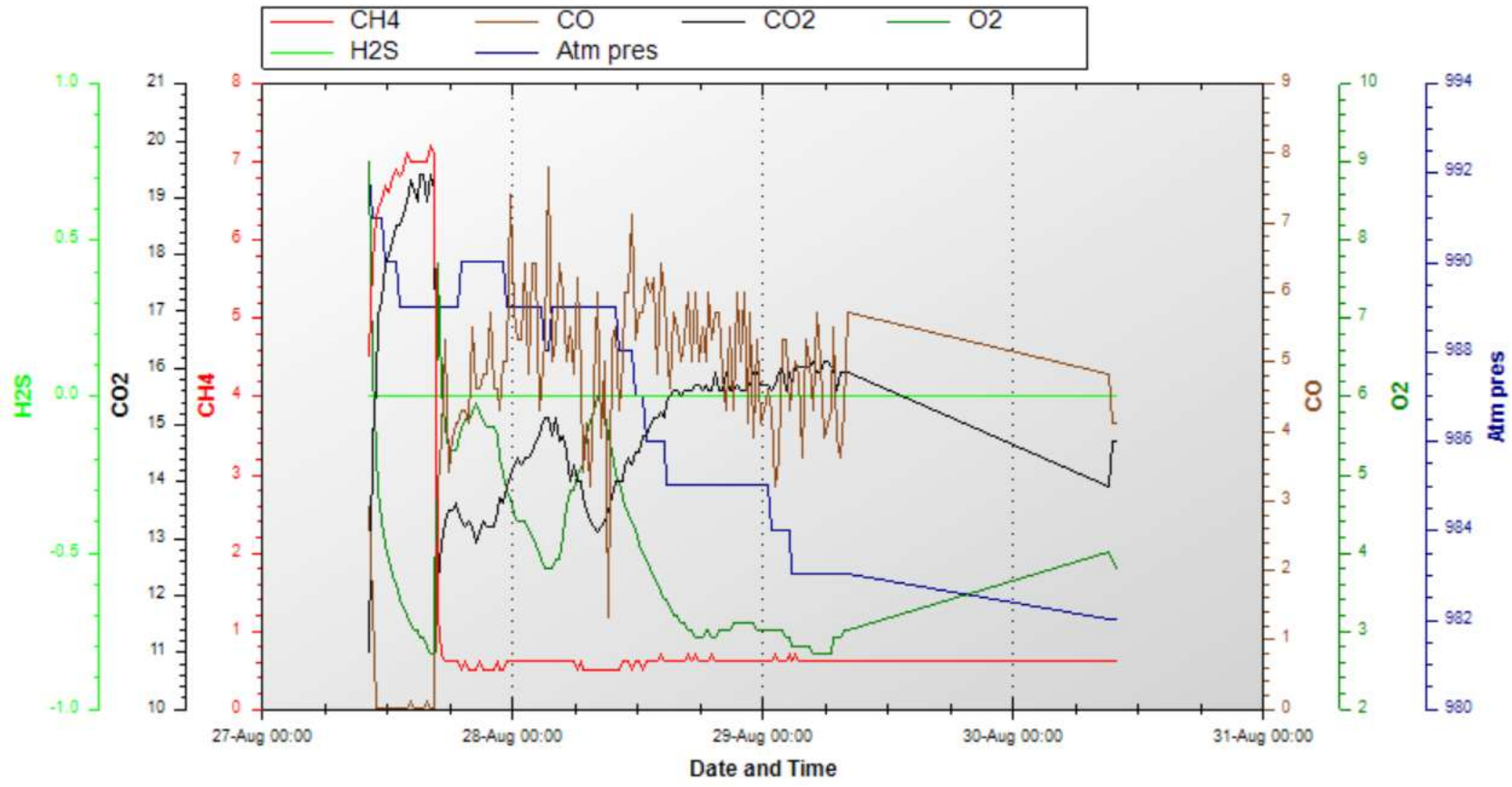


Figure 16: All Gas Clam Results for 27 to 29 August

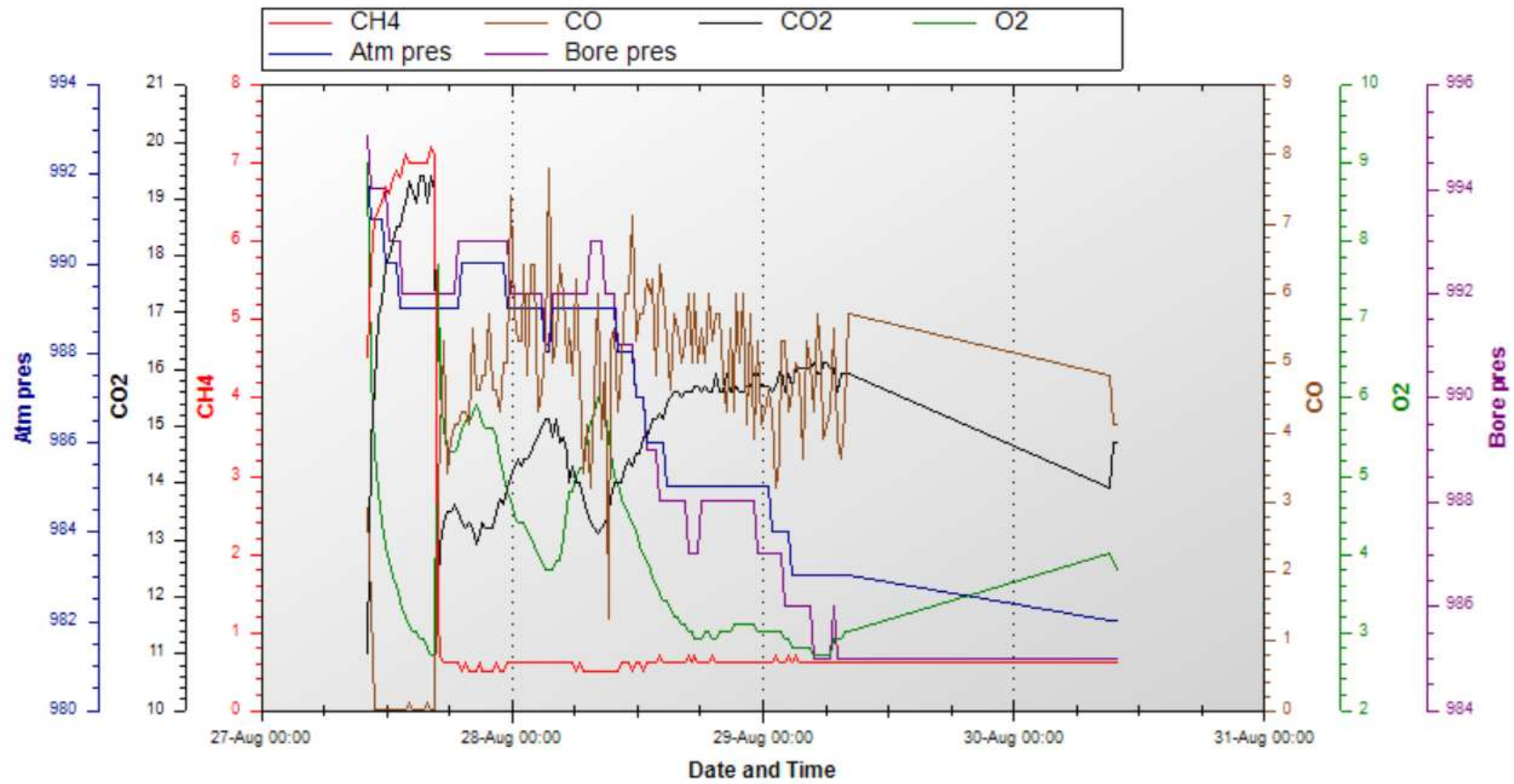


Figure 17: All Gas Clam results - H2S excluded

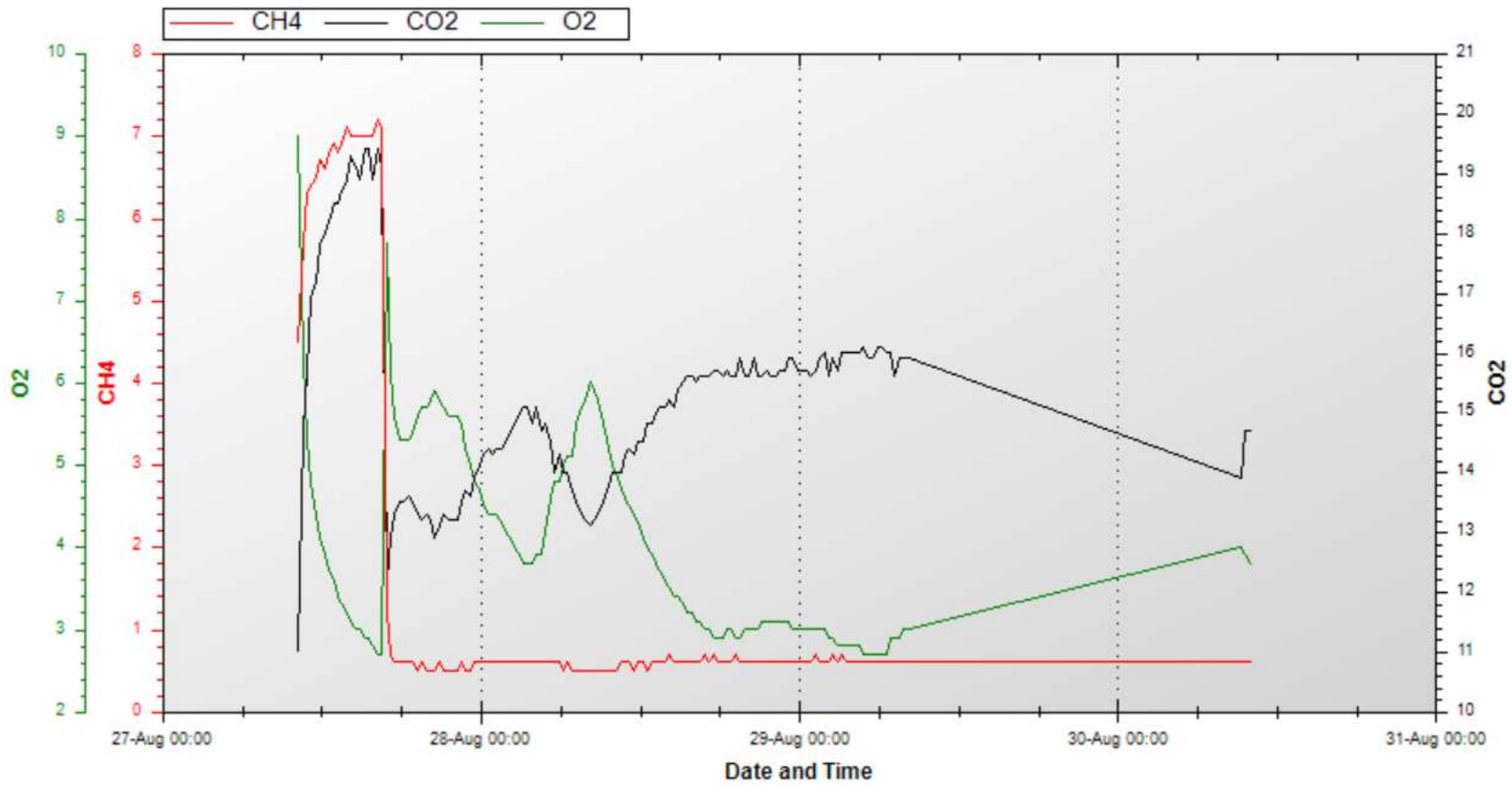


Figure 18: Gas Clam Results for CH4, CO2 and O2

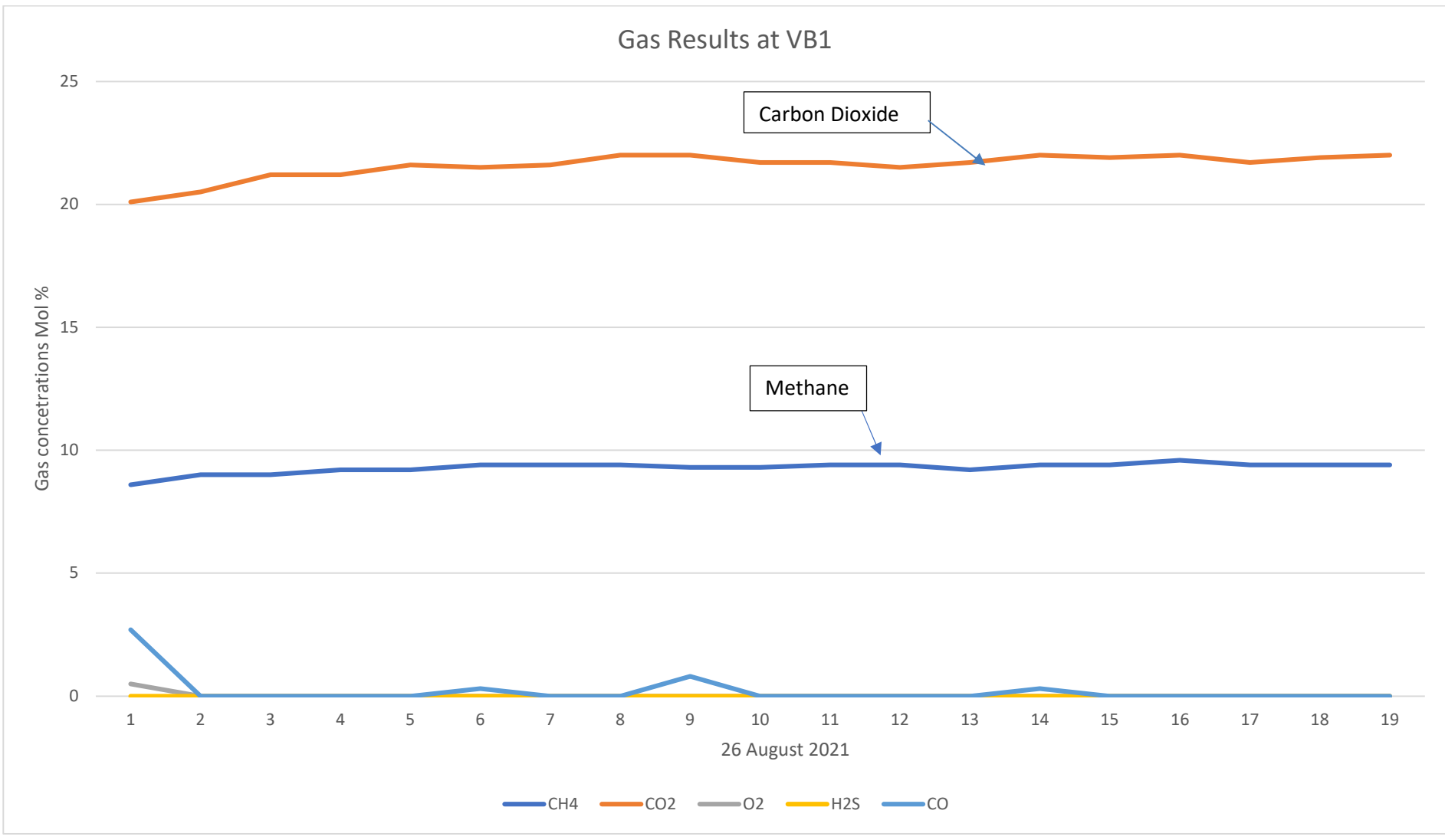


Figure 19: Gas Clam Results from vapour bore VB1 26 August 2021 9.46 to 12.46am

Table 6: Canister Sample Results

		Monitoring Location – Vapour Bore			Expected Result
Compound	Unit	MW1	MW1-B	VB3	
Methane	% v/v (Mol%)	0.147	0.146	9.08	0.01 to 0.1
	mg/m3	961	955	59,400	
Carbon Dioxide	% v/v (Mol%)	13.2	13.1	16.4	2.0 to 3.5
	mg/m3	237,000	236,000	295,000	
Oxygen	% v/v (Mol%)	2.20	2.19	0.87	NA
	mg/m3	28,700	28,600	11,300	

Table Notes

1. Carbon Monoxide results below the LOR
2. Petroleum hydrocarbon results TPH/TRH including BTEXN all below the LOR
3. Volatile Gases (Suite EP101 by USEPA Method TO15r) all results below the LOR
4. Refer to Laboratory Report in Appendix EN2108379

7.4 Follow-up Gas Monitoring results

The results from follow-up gas monitoring are included in the section below.

Date: 13/09/2022
Job number: 7928
Sample number: 1

Gas	VB1	VB2	VB3	VB4	MW1	VB5	VB6	VB7	VB8	VB9
Time										
CH4	off set to next sample day due to flow rate									
CO2										
O2										
CO										
H2S										
Gas sample time										
Bal %										
Relative mb										
Flow Rate										

Gas	BS1	BS2	BS3	BS4	BS5	BS6	BS7	BS8	BS9	BS10	BS11	BS12	BS13
Time	13:48	13:55	14:02	14:09	14:16	14:22	14:29	14:35	14:42	14:47	14:52	14:56	15:02
CH4	0	0	0	0	0	0	0	0	0	0	0	0	0
CO2	0.1	0.1	0	0	0	0	0	0	0	0	0	0	0
O2	21	20.7	20.3	20.5	20.6	20.9	21.2	21.4	21.3	21.2	21.3	21.6	21.8
CO	0	0	0	0	0	1	1	1	1	1	1	0	1
H2S	0	0	0	0	0	0	0	0	0	0	0	0	0
Gas sample time	4m	4m	4m	4m	3m	3m	3m	3m	3m	3m	3m	3m	3m
Bal %	78.9	79.3	79.6	79.4	79.3	79.1	78.7	78.5	78.6	78.8	78.7	78.3	78.2
Relative mb	0.07	0.03	0.03	-0.02	0.07	0	0.01	0.03	-0.03	0	0	-0.02	-0.02
Flow Rate	-0.7	-0.8	-0.9	-0.9	-1	-1.1	-1.1	-1.1	-1.2	-1.2	-1.3	-1.2	-1.2

Figure 20: Gas monitoring – 13/9/2022

Date: 15/09/22
Job number: 7928
Sample number: 2

Gas	VB1	VB2	VB3	VB4	MW1	VB5	VB6	VB7	VB8	VB9
Time	14:45	14:50	14:56	5:15	15:05	13:31	13:49	13:59	14:18	14:36
CH4	12.6	9.9	9.6	7.9	7.3	0	3.9	0	0.3	0
CO2	21.3	24.6	18.4	14.6	13.1	0.1	7.3	13.5	14	1.9
O2	0	0	0	0	13	21.7	0	2.7	0	13.8
CO	1	1	1	1	1	0	9	1	9	3
H2S	0	0	0	0	0	0	0	0	0	0
Gas sample time	1	1	1		1	1	1	1	1	1
Bal %	66.3	66	73.9	77.8	78.2	66.5	89	83.8	85.8	84.8
Relative mb	0.03	1.03	0.17	0.1	7.56	4.8	0.09	0.19	-	-32.8
Flow Rate	0	0	0	0	0	-0.1	-0.01	-0.01	0	-9.6
total	102.2	102.5	103.9	101.3	113.6	89.3	110.2	102	110.1	104.5

Gas	BS1	BS2	BS3	BS4	BS5	BS6	BS7	BS8	BS9	BS10	BS11	BS12	BS13
Time	3:22	3:25	3:27	3:30	3:32	3:34	3:37	3:39	3:43	3:45	3:47	3:51	3:49
CH4	0	0	0	0	0	0	0	0	0	0	0	0	0
CO2	0.1	0.1	0	0.1	0	0	0	0	0	0	0	0	0
O2	22.1	22.2	22.2	22.2	22.2	22.3	22.3	22.3	22.3	22.4	22.4	22.5	22.4
CO	0	0	0	0	0.1	0	0	0.1	0	0	0.1	0.1	0.1
H2S	0	0	0	0	0	0	0	0	0	0	0	0	0
Gas sample time													
Bal %													
Relative mb													
Flow Rate													
total													

first lot of samples, highest recording was taken and not at 30/90 seconds. Better sampling was implemented next sampling day, note variation in bal may be due to change in % while noting observations at 30 seconds. However, even at 90 seconds where samples were recorded on the machine, bal % didn't always equal 100

Figure 21: Gas monitoring – 15/9/2022

Date: 20/09/22
Job number: 7928
Sample number: 3

Gas	VB1		VB2		VB3		VB4		MW1		VB5		VB6		VB7		VB8		VB9	
Time	13:35		13:40		13:47		14:03		13:52		12:38		12:46		12:48		12:55		13:01	
sample time 30/90	30	90	30	90	30	90	30	90	30	90	30	90	30	90	30	90	30	90	30	90
CH4	10.5	12.9	10	10.2	10.8	1.8	9.9	9.4	0.1	0	0	0	1.2	1.2	0	0	0.7	0.6	0	0
CO2	16.6	21.3	25.1	25.2	17.1	17.2	13.6	13.9	14.8	14.8	7.8	7.1	10.1	8.7	13.7	12.9	13.5	13.1	1.5	0.3
O2	3.5	0	0	0	0	0	0	0	0.2	0	1.8	3.1	0	0	1.8	3.4	0.4	0.6	15.6	18.8
CO	0	0	0	0	0	0	0	0	6	6	0	0	1	1	0	0	1	1	1	0
H2S	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
Gas sample time																				
Bal %	69.1	66.3	65	65	72.2	72.2	76.3	76.3	86.1	86.1	90.4	89.7	89.9	88.8	83.6	83.7	82.7	85.7	83.1	81
Relative mb	3.9		0.29		0		-4.58		0.1		0.12		-0.2		0.07		0.07		-11.3	
Flow Rate	0.1		0.1		0.1		0.1		0.1		0.1		0.1		0.1		0.1		-3.5	

Gas	BS1	BS2	BS3	BS4	BS5	BS6	BS7	BS8	BS9	BS10	BS11	BS12	BS13
Time	3:22	3:25	3:27	3:30	3:32	3:34	3:37	3:39	3:43	3:45	3:47	3:51	3:49
CH4	0	0	0	0	0	0	0	0	0	0	0	0	0
CO2	0.1	0.1	0	0.1	0	0	0	0	0	0	0	0	0
O2	22.1	22.2	22.2	22.2	22.2	22.3	22.3	22.3	22.3	22.4	22.4	22.5	22.4
CO	0	0	0	0	0.1	0	0	0.1	0	0	0.1	0.1	0.1
H2S	0	0	0	0	0	0	0	0	0	0	0	0	0
Gas sample time													
Bal %													
Relative mb													
Flow Rate													

Figure 22: Gas monitoring – 20/9/2022

Date: 23/09/22
Job number: 7928
Sample number: 4

Gas	VB1		VB2		VB3		VB4		MW1		VB5		VB6		VB7		VB8		VB9	
Time	12:28		12:34		12:38		12:34		12:48		11:40		11:46		11:54		12:03		12:11	
sample time 30/90	30	90	30	90	30	90	30	90	30	90	30	90	30	90	30	90	30	90	30	90
CH4	13	12.9	10.6	10.7	10.7	10.8	9.1	9.1	0	0	0	0	4	4.6	0	0	0.7	0.7	0	
CO2	21.7	21.7	24.8	25	16.8	17	14.6	14.6	13.5	13.5	8.7	8.7	5.5	6.4	15.5	15.6	14.7	14.7	2.5	
O2	0	0	0	0	0	0	0	0	0	0	0	0	0.4	0	0	0	0	0	16.2	
CO	0	0	0	0	0	0	0	0	5	5	0	0	1	1	0	0	1	1	2	
H2S	1	1	1	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	
Gas sample time																			81.3	
Bal %	65.7	65.7	65	65	72.5	72.5	76.6	76.6	86.5	86.5	91.3	91.3	90	89.5	84.5	48.4	84.7	84.7	460.5	
Relative mb	0.15		0.21		0		0.03		1.93		0.32		0		4.84		-0.2			
Flow Rate	0		0		0		0		0.06		0		0.1		0		0		0	
																			water logged	

Gas	BS1	BS2	BS3	BS4	BS5	BS6	BS7	BS8	BS9	BS10	BS11	BS12	BS13
Time	12:56	12:58	12:59	13:02	13:05	13:07	13:10	13:13	13:16	13:20	13:22	13:24	13:27
CH4	0												
CO2	0												
O2	20.9	20.9	20.9	20.9	20.8	20.8	20.8	20.8	20.9	20.9	20.9	20.7	20.8
CO	0	0	0	0	0	0	0	0	0	0	0	0	0
H2S	0	0	0	0	0	0	0	0	0	0	0	0	0
Gas sample time													
Bal %	79.1	79.1	79.1	79.1	79.1	79.2	79.2	79.2	79.1	79.1	79.1	79.3	79.3
Relative mb													
Flow Rate													
total	100	100	100	100	99.9	100	100	100	100	100	100	100	100.1

Figure 23: Gas monitoring – 23/9/2022

Date: 27/09/22
Job number: 7928
Sample number: 5

Gas	VB1		VB2		VB3		VB4		MW1		VB5		VB6		VB7		VB8		VB9	
Time	13:28		0.563194		13:37		14:42		13:47		12:57		13:06		13:12					
sample time 30/90	30	90	30	90	30	90	30	90	30	90	30	90	30	90	30	90	30	90		
CH4	13.3	13.3	10.3	10.3	10.8	10.8	9.1	9.1	0.1	0.1	0	0	0.2	0.1	0	0	0.8	0.8		
CO2	22.1	22.2	25.5	25.2	17.1	17.14	14.9	14.9	13.6	13.8	8.5	8.6	1.3	1.1	16	15.9	14.9	15		
O2	0	0	0	0	0	0	0	0	0	0	0.4	0.2	11.5	13.5	0	0	0	0		
CO	0	0	0	0	0	0	0	0	5	5	0	0	0	0	0	0	1	1		
H2S	1	1	1	1	0	0	0	0	0	0	0	0	0	1	1	1	1	1		
Gas sample time																				
Bal %	65	65	64.8	64.8	72.3	72.3	76.3	76.3	86.3	86.2	91.1	91.2	86	85.4	84	84.1	84.4	84.4		
Relative mb	0.15		0.05		0.03		0.03		-0.22		0		-0.14		0.07	1.23				
Flow Rate	0		0		0		0		0		0		0		0		0			
																			water logged	
																			couldn't sample	

Figure 24: Gas monitoring – 27/9/2022

8 Discussion of Soil Sampling Results

Results are presented below for soil sampling investigations.

8.1 Soil Sampling Results - Discussion

Soil sampling was undertaken at eight locations (see Figure 25) in both the north and south of the site to obtain a representation of the contamination status of soil and fill material at the site. Three locations in the south were dedicated soil bores (SB1-3), and five locations in the north of the site were developed as vapour bores (MW1, VB1-4), and soil sampling was undertaken concurrently with bore development.

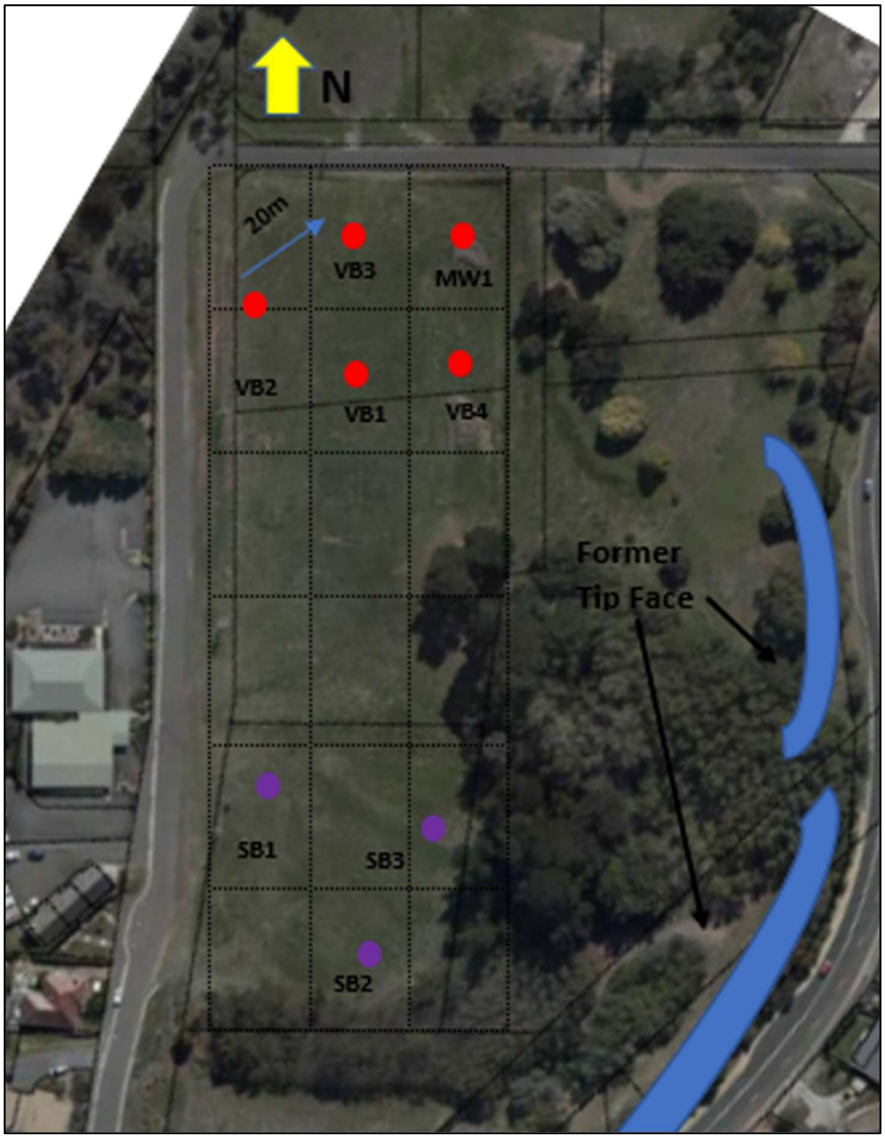


Figure 25: Soil Sampling locations

8.2 Comparison of Results to Guidelines

The following soil samples were taken, as per Table 7.

Table 7: Soil sampling locations and depths

Location	*Depths*
MW1	1.5m, 2.7m, 2.8m, 4.5m
VB1	0.5m, 1.0m, 1.5m, 2.0m
VB2	0.5m, 1.5m, 2.0m
VB3	1.3m
VB4	1.5m, 1.6m
SB1	0.5m, 0.8m
SB2	0.25m, 0.5m
SB3	0.3m, 0.5m

Results of sampling are provided above and compared with Health Investigation Levels (HILs) Commercial 'D' provided in the National Environmental Protection (Assessment of Site Contamination) Measure 1999, as amended April 11, 2013 (NEPASCM). Additional NEPASCM reference material considered in the assessment include CRC CARE Technical Report No. 10 "Health Screening Levels (HSLs) for Petroleum Hydrocarbons in Soil and Groundwater Part 2: Application Document".

Soil samples were collected using a new pair of disposable gloves for each sample and immediately placed in ALS supplied analyte jars, individually labelled, placed in eskies with freezer packs and dispatched for overnight delivery to the laboratory with accompanying chain of custody document.

Results for all soil samples were below the HILs and HSLs, so further sampling and investigation of soil across the site is not required and the soil poses a low risk to future site users and during excavation of soils at the site.

8.3 Comparison of Results to Soil Disposal Guidelines

Soil sample results indicate that soil on the site is likely to meet Level 2 and Level 3 classification for offsite disposal. Soil to be excavated will be required to be stockpiled onsite and tested in accordance with *Tasmanian Bulletin 105 Classification and Management of Contaminated Soil for Disposal (IB105).* Soil must not be taken offsite without prior EPA written approval.

8.4 Groundwater

As mentioned above, groundwater was not encountered to a depth of 8m during drilling at the site. As there is high plasticity clay from around 5m below ground level, it is likely that groundwater is confined to beneath the clay layer at considerable depth. It is possible that perched groundwater might be present at times at the interface between

the clay and inert fill intermittently, while rainwater drains away to the west under gravity. Given the depth to groundwater, it is unlikely to pose a risk to users of the site, and will not be extracted for use, due to the availability of TasWater services at the site.

9 Discussion of Gas Monitoring Results

9.1 Initial assessment

Ambient air, surface concentrations of gases were generally low, and concentrations did not indicate the presence of potential underground landfill gases being released to the atmosphere. Volatile gas readings were taken using a photoionisation detection meter, and these readings were all 0.0 ppm as were measurements for methane, and hydrogen sulphide. Oxygen concentrations in ambient air were as expected at 20.5% and carbon dioxide was 0.2%. Carbon monoxide concentrations in ambient surface air were 1.0 ppm (0.0001%) which is consistent with general background air concentrations.

9.2 Weather conditions – follow-up gas monitoring

The following section outlines the weather conditions during the follow-up gas monitoring events. The Bureau of Meteorology station data used was from Launceston (Ti Tree Bend), Number 91237. Each monitoring event was undertaken around mid-day onwards. Some of the events were on days following rainfall in the previous 2 – 3 days, which would potentially make for worst case conditions, due to the piston effect of excess water that may be sitting above the clay layer, causing increased gas pressure in the ground.

Date	*Sample Date*	*Rain (mm)*	*Maximum temperature (°C)*
10/09/2022		5	14.9
11/09/2022		1	16.1
12/09/2022		0	14.1
13/09/2022	13/09/2022	0	14.7
14/09/2022		0	14.9
15/09/2022	15/09/2022	0	14.6
16/09/2022		0.6	14.2
17/09/2022		15.6	14.9
18/09/2022		8.8	15
19/09/2022		0.6	17.8
20/09/2022	20/09/2022	0	16.1
21/09/2022		0	21.5
22/09/2022		0	22.2
23/09/2022	23/09/2022	0.2	18.9
24/09/2022		2.4	14.1
25/09/2022		0	15.4

26/09/2022		0.2	15.3
27/09/2022	27/09/2022	2	18.1

Table 8: Weather details during gas monitoring period

9.3 Surface Readings

Surface readings were taken using a GA5000, and locations were chosen to cover an approximate grid across the development area. Readings were taken for approximately two to three minutes at each location for each monitoring event.

Follow-up assessment

The follow up surface emission monitoring (four events) all indicated the following:

- Methane readings at all locations were consistently measured at 0 ppm
- Carbon dioxide readings at all locations were consistently measured at 0 or 0.1 ppm
- Oxygen readings at all locations were measured at between 20.3 and 22.5 %
- Carbon monoxide readings at all locations were measured at 0 or 1 ppm
- Hydrogen sulphide readings at all locations were consistently measured at 0 ppm.

9.4 Gas wells - Methodology

Gas well readings were taken using a GA5000, and all locations were installed with Tri-Gas caps and allowed to settle for at least two days before monitoring on each occasion. The TriCap-GAS caps have a quick connect gas fitting and dust cap installed on the top, enabling gas in the well to be monitored with a gas instrument without removing the cap and avoiding the uncontrolled escape of gas from the monitoring well. Readings were taken for approximately five minutes at each location for each monitoring event.

9.5 Carbon Monoxide

Readings during follow-up assessment across ten locations (VB1 – 9 and MW1) yielded readings for carbon monoxide between 0 ppm and 9 ppm.

9.6 Carbon Dioxide

Initial assessment

Underground concentrations were higher than expected. The underground concentrations of 200,000 ppm (20 %) are possibly indicative of biodegradation of onsite sources (petroleum and inert materials) or the adjacent landfill at 5 Rose Lane, or the former convict cemetery to the south.

Follow-up assessment

Readings during follow-up assessment across ten locations (VB1 – 9 and MW1) yielded a low reading for carbon dioxide of 0 ppm and the highest reading was 9 ppm.

9.7 Methane

Initial Assessment

Like the elevated carbon dioxide concentrations, methane underground concentrations were elevated above what would be considered normal background levels. Methane concentrations were detected in all vapour bores with a maximum result of 9.6 % v/v in vapour bore VB1 and 9.1 % v/v in vapour bore VB3.

Canister sample results for methane were higher than expected in VB3 at 9.08 % v/v or 59,400 mg/m3. Conversion of methane results from mg/m3 to ppm is as follows:

24.45 (Conversion factor) x 59,400 (Result mg/m3) / 16.04 (MW) = 90,544 ppm

Follow-up assessment

Readings during follow-up assessment across ten locations (VB1 – 9 and MW1) yielded a low reading for methane of 0 % v/v and the highest reading was 13.3% v/v.

9.8 Hydrogen Sulphide

Initial Assessment

Hydrogen Sulphide was only detected in vapour bore 'MW1' during testing of the bore with Gas Detector GA5000 and the result was very low at 1.0 ppm. The Gas Clam results for the bore on the same day did not detect H_2S. ES&D requested H_2S analysis in our chain of custody (COC) for canister samples however laboratory malfunction and pending repairs would have delayed results a further two weeks and given low detections in previous gas clam results the H_2S test request was cancelled.

Follow-up assessment

Readings during follow-up assessment across ten locations (VB1 – 9 and MW1) yielded a low reading for hydrogen sulphide of 0 ppm and the highest reading was 1 ppm.

9.9 Summary

Our assessment found elevated carbon dioxide and methane gas concentrations, indicating that there is bacterial action underground which is creating the release of methane and consequently carbon dioxide. Whilst the concentrations are on the lower end of the scale they cannot be dismissed as likely to be from naturally occurring activity and further

mitigation is required to ensure that a future gas migration issue into future buildings is avoided.

There is not likely to be a leachate collection system from the landfill due to the age of the landfill closure (1960s). However, there is an intricate sub-surface collection system under the southernmost lot of 9 Rose Lane which discharges to the main stormwater system. Although we do not have specific information on the landfill activity – such as total waste materials, number of years filled and tonnage and putrescible and inert waste stream types and ratios - we can presume that the landfill was a small landfill with only a small number of operational years and tonnages. In addition, the landfill is located at a higher elevation than the subject site and although leachate may flow under the subject site, we have considered groundwater depth to be favourable to reducing potential exposure.

The age of the landfill, which has been closed for around 60 years and the small size of the landfill presents a low risk of volatile and hazardous gases being emitted from the former landfill. However, it should not be assumed that a landfill will not produce significant methane (and other gases) just because it is old (NSW guidelines). The Victorian Landfill Rehabilitation Guidelines[1] recommend a 500 metre buffer distance to the nearest building or structure from closed landfills (refer to Table 8.2, p56 in the guidelines). The development at 9 Rose Lane is within the buffer zone recommended, so management of this risk is required.

10 Preliminary Conceptual Site Model

A preliminary conceptual site model was developed based on site history information, onsite findings, and testing results. The preliminary conceptual site model is explained in the following section. Soil and groundwater risk has been dealt with separately to the risk associated with bulk ground gases.

10.1 Soil Exposure Pathways

The potential for direct contact and ingestion of contaminants in soil was considered with reference to the soil results. Concentrations of metals and petroleum hydrocarbons are below acceptable health screening levels for direct contact and ingestion pathways for recreational use and Commercial D land use scenario under the NEPASCM. So, the exposure risk relating to soil at the site is low. In addition, excavation at the site will be minimal in relation to the proposed development and limited to within the fill layer, further reducing the risk.

10.2 Groundwater Exposure Pathways

Direct contact and ingestion of contaminated groundwater was considered in the assessment of potential exposure. Groundwater was not intersected in the borehole up to 8 metres below

[1] EPA Victoria, 2015, *Siting, Design, Operation and Rehabilitation of Landfills*

the existing ground surface. As groundwater will not be extracted and is at a depth not likely to be encountered by site users the direct contact and ingestion risks are eliminated.

A preliminary conceptual site model relating to soil and groundwater is presented in Table 8. The CSM confirms low risk relating to direct exposure soil and groundwater at the site.

Table 9: Preliminary Conceptual Site Model – Soil and Groundwater

Contamination Source	COPC	Pathway	Receptor
OFFSITE Former landfill at 5 Rose Lane closed in the early 1960s	• Aromatic and aliphatic hydrocarbons • Heavy metals • Methane and Landfill gases – carbon monoxide, hydrogen sulphide.	**Dermal contact of soil –** Low detections of petroleum compounds **do not** pose an unacceptable risk of direct contact with soil and ingestion of contaminants in soil. **Direct contact and ingestion of groundwater** – Depth to groundwater and the provision of drinking water to the site means this is a low risk.	• Commercial Land Users • Construction workers
ONSITE Past Land Use activity – BRICKWORKS and land filling with inert waste materials up to the 1960s.	• Low levels of petroleum hydrocarbons • Metals • Foreign materials – i.e. glass, brick.	**Dermal contact of soil –** Low detections of petroleum compounds **do not** pose an unacceptable risk of direct contact with soil and ingestion of contaminants in soil. **Direct contact and ingestion of groundwater** – Depth to groundwater and the provision of drinking water to the site means this is a low risk.	• Commercial Land Users • Construction workers

10.3 Gas Exposure Pathways

Given that gases were identified in gas monitoring wells at levels above background, the risk relating to bulk ground gases needs further consideration.

Ground gases can migrate from a source (the landfill at 5 Rose Lane and/or the convict cemetery) to a potential receptor either in the gas phase or dissolved in groundwater. In the gas phase, the two mechanisms of migration are advection and diffusion. In addition, many ground gases are soluble in groundwater and can migrate with flowing groundwater or leachate. All three transport modes are considered below.

10.3.1 Gas Phase Transport – Advection and Diffusion

As per Figure 26, advection and diffusion are most likely to occur through the soil profile layer above the high plasticity clay at 5 Rose Lane (former landfill / source) into the fill layer at 9 Rose Lane above the clay. This also applies to the gases from the old convict cemetery to the south, but for simplicity the conceptual side model (CSM) has mainly referred to the former landfill as the likely major source. Gas could then reach the surface at 9 Rose Lane, presenting a potential exposure pathway. This potential transport route has been directly assessed by the monitoring of gases in the sub-surface in vapour bores installed at depths of 2.0 to 8.0 metres. Whilst volatile compounds were not detected in the canister samples the presence of methane and carbon dioxide at elevated concentrations indicates a potential risk of the migration of ground gas into future buildings.

The CSM estimates that this transport route is the path of least resistance for ground gases and is likely to be the greatest contributor to gas levels at the surface of 9 Rose Lane. The gas permeability of the inert fill above the clay layer at 9 Rose Lane is expected to be high. The concentrations of gas within 5 Rose Lane where the landfill is situated would be higher than 9 Rose Lane, with likely (source) concentrations as follows:

- Methane levels between 20 – 65% (v/v) within the filled area, and
- Carbon dioxide levels between 15 – 57% within the filled area.

It is likely that diffusion of gases from the source at 5 Rose Lane would be the primary mechanism for the transfer of bulk ground gases to the inert fill layer at 9 Rose Lane, due to the concentration gradient between the two areas.

The following are factors that would affect advection and diffusion of gases into the atmosphere from within the inert fill layer at 9 Rose Lane:

1. Increases in gas pressure in the inert fill layer would currently be caused by temporary perched groundwater after rainfall at the interface between the fill layer and the clay at a depth of around 5m below the surface, increasing advection into the atmosphere above the site.

2. A drop in barometric pressure, which would cause a temporary pressure differential between atmosphere and the ground, could increase the advection of gases into the atmosphere until equilibrium is achieved.

3. Rainfall would currently drain rapidly through the gravel fill layer in the first 0.5 – 1.0m and through the inert fill layer of the profile at 9 Rose Lane. So, the piston effect caused by ground saturation would currently be minimal.

4. Once the impervious area is increased at the site, including intermittent landscaping areas that hold more water in the root zone near the surface level, the mechanism mentioned in point 3 would increase. However, the mechanism described in point 1 above would also decrease, as less water would percolate down through the fill layer from rain events, as the rain falling on impervious areas will be drained away into the stormwater system, and more water will be held in landscaped areas.

5. The addition of buildings at the site could have the effect of reducing air pressure at ground level and increase the advection of ground gases into the atmosphere. The footprint of the buildings and other impervious areas will also decrease the surface area that ground gases are released over and could increase the concentrations at the surface level. The proposed development shows that buildings will occupy a footprint of about 25% of the current surface area of the site, so this impact should be minimal.

6. Given that surface measurements did not detect bulk ground gases, but gases were detected in monitoring wells, it appears there are ground gases present in the fill material at 9 Rose Lane, but not a strong transport mechanism for these gases to make it to the surface. It will be important to ensure that service trenches and pits do not provide a conduit for release of ground gases to the surface, and potential accumulation within these trenches and pits.

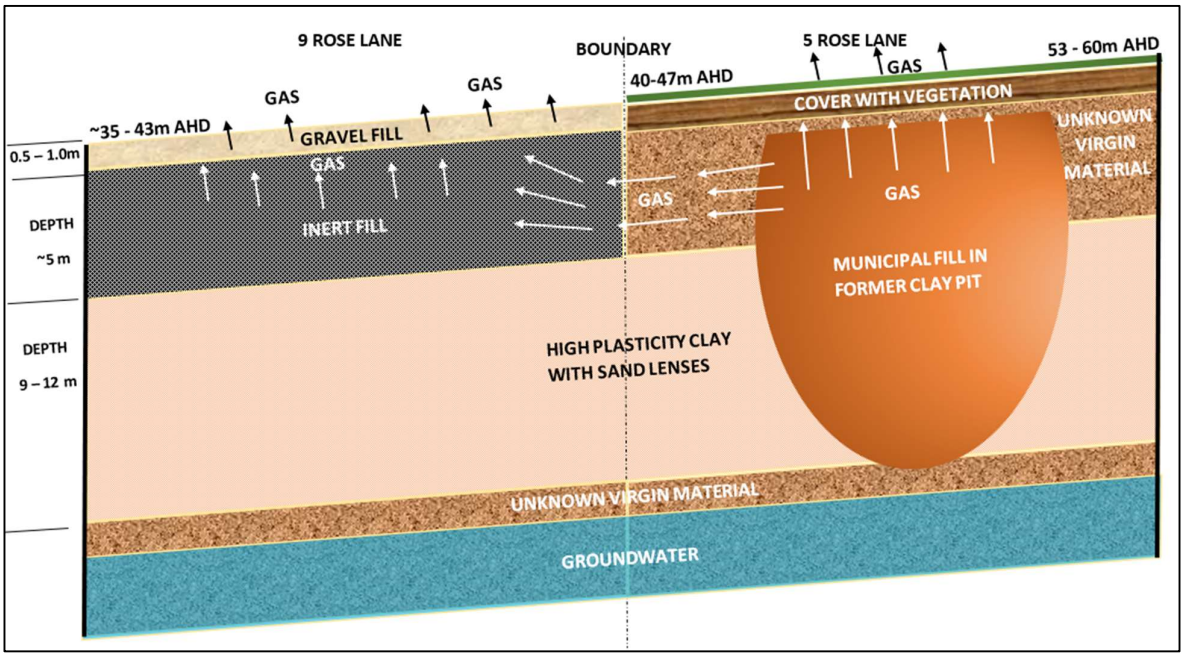


Figure 26: Conceptual Site Model – Advection and diffusion

10.3.2 Liquid and Dissolved Phase Transport – Leachate and Groundwater

The potential for groundwater to be contaminated with landfill leachate was considered when assessing the potential exposure of future building occupiers to ground gases.

Groundwater is expected to be at a depth greater than 8 metres and is overlain by 5 metres of loose gravel, sandy fill materials and moderate to high density clay (orange mottled and grey clay) from 5.3 to at least 8.0 metres and likely as deep as 14 – 15 m below the ground level, based on site history information. Laboratory analysis of the grey clay indicated a 51% clay content and soil particle density of 2.53 g/m3. The high plasticity grey clay is not likely to be easily penetrable and is likely to hold any gases coming off the leachate/groundwater at depth under the ground. This mechanism is unlikely to yield significant amounts of gas that is then able to reach the ground surface.

Perched groundwater from rainfall at the interface between the clay and inert fill is likely to be intermittent, as this water will likely run through the fill layer across the clay surface and off site to the west, due to the natural slope at the site. Given that the rate of exsolution of gases from groundwater is slow, this mechanism is unlikely to yield a significant amount of gas available to make it to the surface of the development site.

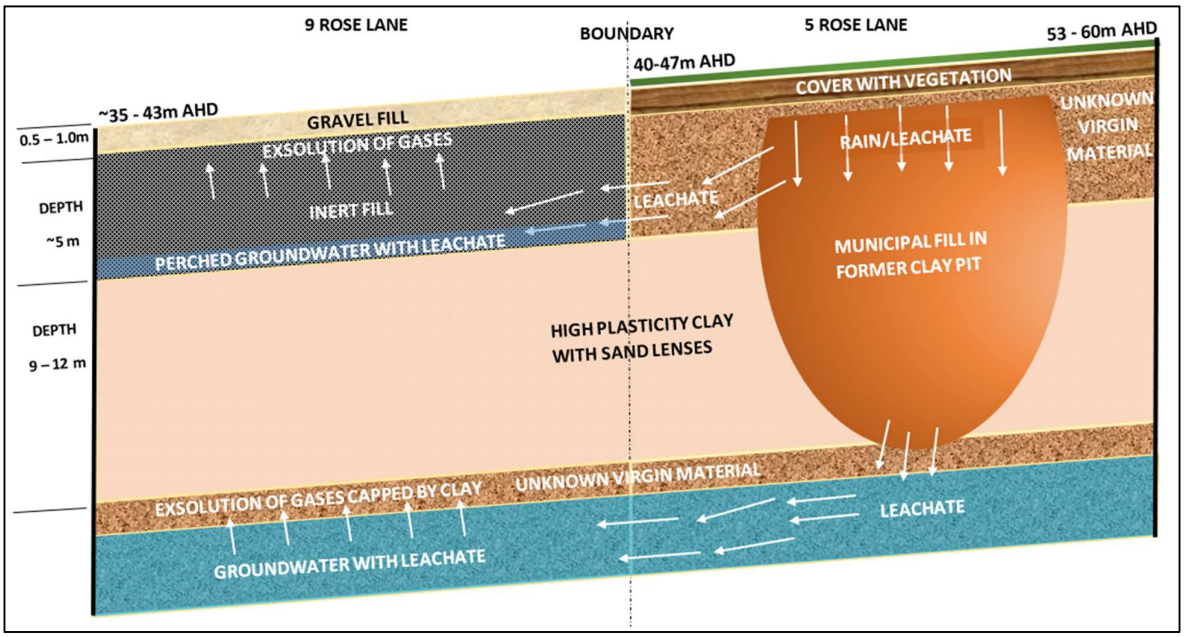


Figure 27: Conceptual Site Model – Leachate and Groundwater

10.4 Risk Assessment

Given the findings relating to bulk ground gases during investigations at the site, a Level 1 (qualitative) risk assessment is considered adequate. The matrix below has been used to determine the risk associated with the identified hazards posed by ground gases. Table 9 lists the hazards and assigns a risk level to each.

		Consequence			
		Severe	Medium	Mild	Minor
Probability	Highly likely	Very high risk	High risk	Moderate risk	Moderate/low risk
	Likely	High risk	Moderate risk	Moderate/ low risk	Low risk
	Low likelihood	Moderate risk	Moderate/ low risk	Low risk	Very low risk
	Unlikely	Moderate/low risk	Low risk	Very low risk	Very low risk

Figure 28: Risk matrix for level 1 risk assessment (NSW Guidelines)

Table 10: Risk Assessment

Hazard	*Probability*	*Consequence*	*Risk Level*
Ambient exposure to hazardous ground gases increased by building footprint (25% of current surface area)	Low	Medium	Moderate/low
Increase in gas pressure in the inert layer caused by temporary perched groundwater at the fill/clay interface, leading to increase in gas levels at the surface	Low	Medium	Moderate/low
Drop in barometric pressure leads to increased advection of gases into atmosphere	Low	Medium	Moderate/low
Piston effect caused by ground saturation after rainfall, once development is finished – exposure to gases in air	Unlikely	Medium	Moderate/low
Accumulation of gases under building slabs and release of gases into buildings through penetrations in slab (i.e., for services), or through the slab itself	Likely	Severe	High
Ignition sources either inside or outside the buildings cause an explosion due to explosive ambient gas levels	Unlikely	Severe	Moderate/low
Exposure to gases in pits and service trenches by site users and service personnel during maintenance	Likely	Medium	Moderate

11 Council Planning Scheme Compliance

The following Clauses of the City of *Launceston Interim Planning Scheme 2015 - Potentially Contaminated Land Code* have been considered in the assessment:

- Clause E2.5.1 (P1) – Use Standard
- Clause E2.6.2 (P1) – Excavation

11.1 Clause E2.5.1 (P1)

The Clause states:

> "Land is suitable for the intended use, having regard to:
>
> (a) an environmental site assessment that demonstrates there is no evidence the land is contaminated; or
>
> (b) an environmental site assessment that demonstrates that the level of contamination does not present a risk to human health or the environment; or
>
> (c) a plan to manage contamination and associated risk to human health or the environment that includes:
>
> (i) an environmental site assessment;
>
> (ii) any specific remediation and protection measures required to be implemented before any use commences; and
>
> (iii) a statement that the land is suitable for the intended use."

11.1.1 Assessment against Clause E2.5.1 (P1)

ES&D have completed an assessment of the land which has included soil analysis, attended gas measurements and gas clam measurements and canister samples. Whilst volatile gas results did not indicate an exceedance of hydrocarbons and other gases specified in the *National Environmental Protection (Assessment of Site Contamination) Measure 1999* as amended 2013 (NEPASCM), there were elevated concentrations of methane and carbon dioxide detected in below ground vapour bores.

Due to the proximity of the site to the former landfill and convict cemetery further assessment of these concentrations should be considered by a vapour consultant to understand if these concentrations pose a risk of vapour intrusion into future buildings and if so, what mitigation measures are to be incorporated into the design of the buildings. Our conclusion is that the land is suitable for future commercial development with review of gas results by vapour

consultant and building design mitigation recommendations by vapour consultant, in accordance with the NSW guidelines. During our initial interaction with the vapour consultant, the consultant recommended further sampling be undertaken to inform the design process, which was completed, and the results are included above. A letter from the Vapour Consultant has also been included in Appendix C, summary as follows:

- Based on the ground gas monitoring results reported within the es&d ESA (2022) – this report, the ground gas risks to the proposed development are considered to be indicative of a low Characteristic Situation 2 (CS2) site.
- In response to the potential ground gas risks, we are currently considering several potentially suitable ground gas mitigation measures for the proposed development.
- Based on the current ground gas risk profile, it is envisaged the measures will comprise a proprietary gas membrane and under slab pressure relief venting system.

11.2 Clause E2.6.2 (P1)

The Clause states:

> "Excavation does not adversely impact on health and the environment, having regard to:
>
> (a) an environmental site assessment that demonstrates there is no evidence the land is contaminated; or
>
> (b) an environmental site assessment that demonstrates that the level of contamination does not present a risk to human health or the environment; or
>
> (c) a plan to manage contamination and associated risk to human health and the environment that includes:
>
> (i) an environmental site assessment;
>
> (ii) any specific remediation and protection measures required to be implemented before excavation commences; and
>
> (iii) a statement that the excavation does not adversely impact on human health or the environment."

11.2.1 Assessment against Clause E2.6.2 (P1)

Excavation does not pose an unacceptable risk to the public or the environment provide that the following management measures are implemented:

1. Construction workers, including trench workers working with the soil wear appropriate personal protective equipment (PPE) to prevent contact with the soil and

2. All excavated soil intended to be disposed offsite shall be stockpiled onsite and tested and approval sought from EPA Tasmania for disposal if the soil does not meet Level 1 classification in accordance with the *Environmental Management and Pollution Control (Waste Management) Regulations 2020* and *Tasmanian EPA Bulletin 105 Classification and Management of Contaminated Soil for Disposal (IB105).*

12 Conclusions and Recommendations

The onsite measurements, data logging with gas clam and canister sample results indicate the presence of elevated methane and carbon dioxide concentrations under the ground at the location of the proposed commercial buildings. Our preliminary assessment indicates that the source of the elevated concentrations is likely to be the former landfill at 5 Rose Lane.

Soil sample results indicate that the soil on the site does not pose a direct contact, inhalation, or ingestion risk to future land users. Elevated concentrations of metals are likely to classify the soil as mostly Level 2 and a smaller portion classified as Level 3 for disposal. Classification of the soil prior to disposal is required in accordance with *Environmental Management and Pollution Control (Waste Management) Regulations 2020* and *Tasmanian EPA Bulletin 105 Classification and Management of Contaminated Soil for Disposal (IB105).*

As a CEnvP, I confirm that the planning requirement is met under LUPA with the statement that "**the development can proceed as risk is acceptable**". As a management measure, The Environmental Engineer (vapour specialist) will certify that their design will secure the long-term occupation of the development, including specifying any post construction gas monitoring. A letter from the Vapour Consultant is attached in the Appendices.

This assessment has been completed in accordance with the *National Environmental Protection (Assessment of Site Contamination) Measure 1999* as amended 2013 (NEPASCM).

Yours sincerely,

Rod Cooper BSc., CEnvP Site Contamination

Principal Consultant ES&D

References

Launceston Interim Planning Scheme 2015

Land Information System Tasmania (The ListMap), www.thelist.tas.gov.au

Department of Primary Industries, Parks, Water and Environment (DPIPWE) Groundwater Information Access Portal: http://wrt.tas.gov.au/groundwater-info/,

McCLENAGHAN, M.P. and VICARY, M.J. 2010. Digital Geological Atlas 1:25 000 Scale Series.

Australian Heritage Database, http://www.environment.gov.au/cgi-bin/ahdb/search.pl, accessed 16/7/20

Trove, https://trove.nla.gov.au/

Appendices

Appendix A: Laboratory Results Certificates

CERTIFICATE OF ANALYSIS

Work Order	: **EM2116487**	Page	: 1 of 24
Client	: **ENVIRONMENTAL SERVICE AND DESIGN PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: CARMEL PARKER	Contact	: Shirley LeCornu
Address	: Level 1 49-51 Elizabeth Street Launceston 7250	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: ----	Telephone	: +6138549 9630
Project	: 7928	Date Samples Received	: 19-Aug-2021 11:10
Order number	: 7928	Date Analysis Commenced	: 23-Aug-2021
C-O-C number	: ----	Issue Date	: 27-Aug-2021 13:12
Sampler	: CP		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 30		
No. of samples analysed	: 24		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Aleksandar Vujkovic	Laboratory Technician	Newcastle - Inorganics, Mayfield West, NSW
Dilani Fernando	Senior Inorganic Chemist	Melbourne Inorganics, Springvale, VIC
Nancy Wang	2IC Organic Chemist	Melbourne Inorganics, Springvale, VIC
Nancy Wang	2IC Organic Chemist	Melbourne Organics, Springvale, VIC
Nikki Stepniewski	Senior Inorganic Instrument Chemist	Melbourne Inorganics, Springvale, VIC

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) per the NEPM (2013) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.
- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- EP074: Where reported, Total Trihalomethanes is the sum of the reported concentrations of all Trihalomethanes at or above the LOR.
- EP074: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- EP074: Where reported, Sum of chlorinated hydrocarbons includes carbon tetrachloride, chlorobenzene, chloroform, 1,2-dichlorobenzene, 1,4-dichlorobenzene, 1,2-dichloroethane, 1,1-dichloroethene, cis-1,2-dichlorothene, trans-1,2-dichlorothene, 1,1,1,2-tetrachloroethane, 1,1,2,2-tetrachloroethane, 1,2,4-trichlorobenzene, 1,1,1-trichloroethane, 1,1,2-trichloroethane, trichloroethene, vinyl chloride, hexachlorobutadiene and methylene chloride.
- EP074: Where reported, Total Trimethylbenzenes is the sum of the reported concentrations of 1.2.3-Trimethylbenzene, 1.2.4-Trimethylbenzene and 1.3.5-Trimethylbenzene at or above the LOR.
- EP075(SIM): Where reported, Total Cresol is the sum of the reported concentrations of 2-Methylphenol and 3- & 4-Methylphenol at or above the LOR.
- EG005T:EM2116487 #30 has been diluted prior to cadmium analysis due to sample matrix. LOR value has been raised accordingly.
- EP075: Where reported, 'Sum of PAH' is the sum of the USEPA 16 priority PAHs
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	SB3 - 0.5	SB3 - 0.3	MW1-1.5	MW1-1.5B	MW1-2.7
			Sampling date / time	17-Aug-2021 13:13	17-Aug-2021 13:11	17-Aug-2021 11:38	17-Aug-2021 11:38	17-Aug-2021 11:49
Compound	CAS Number	LOR	Unit	EM2116487-001	EM2116487-002	EM2116487-003	EM2116487-004	EM2116487-006
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	17.3	23.3	17.0	13.3	18.9
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	<5	<5	8	<5
Barium	7440-39-3	10	mg/kg	90	100	40	120	190
Beryllium	7440-41-7	1	mg/kg	<1	<1	<1	<1	<1
Boron	7440-42-8	50	mg/kg	<50	<50	<50	<50	<50
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	34	25	28	28	15
Cobalt	7440-48-4	2	mg/kg	53	20	12	13	9
Copper	7440-50-8	5	mg/kg	61	37	34	76	26
Lead	7439-92-1	5	mg/kg	20	17	23	587	299
Manganese	7439-96-5	5	mg/kg	604	166	159	309	552
Nickel	7440-02-0	2	mg/kg	50	23	14	17	15
Selenium	7782-49-2	5	mg/kg	<5	<5	<5	<5	<5
Vanadium	7440-62-2	5	mg/kg	178	95	141	143	48
Zinc	7440-66-6	5	mg/kg	97	58	34	164	603
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	----	----	----
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	----	----	----
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	----	----	----
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	----	----	----
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	----	----	----
Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	----	----	----
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	----	----	----
Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	----	----	----
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	----	----	----
Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	----	----	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	----	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	----	----	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	SB3 - 0.5	SB3 - 0.3	MW1-1.5	MW1-1.5B	MW1-2.7
			Sampling date / time	17-Aug-2021 13:13	17-Aug-2021 13:11	17-Aug-2021 11:38	17-Aug-2021 11:38	17-Aug-2021 11:49
Compound	CAS Number	LOR	Unit	EM2116487-001	EM2116487-002	EM2116487-003	EM2116487-004	EM2116487-006
				Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	----	----	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	**0.6**	**0.6**	----	----	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	**1.2**	**1.2**	----	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	<10	<10	<10	<10	<10
C10 - C14 Fraction	----	50	mg/kg	<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg	<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	<10	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg	<10	<10	<10	<10	<10
>C10 - C16 Fraction	----	50	mg/kg	<50	<50	<50	<50	<50
>C16 - C34 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	<50	<50	<50	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg	<50	<50	<50	<50	<50
EP080: BTEXN								
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of BTEX	----	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
^ Total Xylenes	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg	<1	<1	<1	<1	<1
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.5	%	**90.9**	**92.7**	----	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%	**88.2**	**90.4**	----	----	----
2.4.6-Tribromophenol	118-79-6	0.5	%	**69.4**	**75.1**	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	SB3 - 0.5	SB3 - 0.3	MW1-1.5	MW1-1.5B	MW1-2.7
			Sampling date / time	17-Aug-2021 13:13	17-Aug-2021 13:11	17-Aug-2021 11:38	17-Aug-2021 11:38	17-Aug-2021 11:49
Compound	CAS Number	LOR	Unit	EM2116487-001	EM2116487-002	EM2116487-003	EM2116487-004	EM2116487-006
				Result	Result	Result	Result	Result
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	102	105	----	----	----
Anthracene-d10	1719-06-8	0.5	%	104	106	----	----	----
4-Terphenyl-d14	1718-51-0	0.5	%	101	105	----	----	----
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.2	%	90.6	92.2	86.5	79.8	83.0
Toluene-D8	2037-26-5	0.2	%	94.2	94.8	93.0	84.1	86.4
4-Bromofluorobenzene	460-00-4	0.2	%	106	103	105	93.2	97.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	MW1-2.8	MW1-4.5	SB1-0.5	SB1-0.8	SB2-0.25
			Sampling date / time	17-Aug-2021 11:49	17-Aug-2021 11:56	17-Aug-2021 13:32	17-Aug-2021 01:33	17-Aug-2021 13:26
Compound	CAS Number	LOR	Unit	EM2116487-007	EM2116487-009	EM2116487-012	EM2116487-013	EM2116487-014
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	12.6	19.2	23.0	22.9	19.2
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	<5	<5	<5	<5
Barium	7440-39-3	10	mg/kg	70	130	140	130	100
Beryllium	7440-41-7	1	mg/kg	<1	<1	<1	<1	<1
Boron	7440-42-8	50	mg/kg	<50	<50	<50	<50	<50
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	10	22	35	24	24
Cobalt	7440-48-4	2	mg/kg	5	9	11	11	26
Copper	7440-50-8	5	mg/kg	16	20	115	69	60
Lead	7439-92-1	5	mg/kg	16	36	137	77	29
Manganese	7439-96-5	5	mg/kg	566	315	211	214	402
Nickel	7440-02-0	2	mg/kg	10	15	16	16	16
Selenium	7782-49-2	5	mg/kg	<5	<5	<5	<5	<5
Vanadium	7440-62-2	5	mg/kg	36	61	126	92	172
Zinc	7440-66-6	5	mg/kg	100	242	434	137	52
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.1	<0.1	<0.1
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	----	----	<0.5	----	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg	----	----	<0.5	----	<0.5
Acenaphthene	83-32-9	0.5	mg/kg	----	----	<0.5	----	<0.5
Fluorene	86-73-7	0.5	mg/kg	----	----	<0.5	----	<0.5
Phenanthrene	85-01-8	0.5	mg/kg	----	----	<0.5	----	<0.5
Anthracene	120-12-7	0.5	mg/kg	----	----	<0.5	----	<0.5
Fluoranthene	206-44-0	0.5	mg/kg	----	----	0.8	----	<0.5
Pyrene	129-00-0	0.5	mg/kg	----	----	1.0	----	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg	----	----	0.8	----	<0.5
Chrysene	218-01-9	0.5	mg/kg	----	----	0.6	----	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	----	----	0.8	----	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	----	----	<0.5	----	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg	----	----	0.8	----	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	----	----	<0.5	----	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	----	----	<0.5	----	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	MW1-2.8	MW1-4.5	SB1-0.5	SB1-0.8	SB2-0.25
			Sampling date / time	17-Aug-2021 11:49	17-Aug-2021 11:56	17-Aug-2021 13:32	17-Aug-2021 01:33	17-Aug-2021 13:26
Compound	CAS Number	LOR	Unit	EM2116487-007	EM2116487-009	EM2116487-012	EM2116487-013	EM2116487-014
				Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	----	----	<0.5	----	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	----	----	**4.8**	----	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	----	----	**1.0**	----	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	----	----	**1.3**	----	**0.6**
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	----	----	**1.6**	----	**1.2**
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	<10	<10	<10	<10	<10
C10 - C14 Fraction	----	50	mg/kg	<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg	<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	<10	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg	<10	<10	<10	<10	<10
>C10 - C16 Fraction	----	50	mg/kg	<50	<50	<50	<50	<50
>C16 - C34 Fraction	----	100	mg/kg	**110**	<100	**110**	<100	<100
>C34 - C40 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg	**110**	<50	**110**	<50	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg	<50	<50	<50	<50	<50
EP080: BTEXN								
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of BTEX	----	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
^ Total Xylenes	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg	<1	<1	<1	<1	<1
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.5	%	----	----	**94.8**	----	**87.2**
2-Chlorophenol-D4	93951-73-6	0.5	%	----	----	**93.2**	----	**86.4**
2.4.6-Tribromophenol	118-79-6	0.5	%	----	----	**82.2**	----	**76.6**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	MW1-2.8	MW1-4.5	SB1-0.5	SB1-0.8	SB2-0.25
			Sampling date / time	17-Aug-2021 11:49	17-Aug-2021 11:56	17-Aug-2021 13:32	17-Aug-2021 01:33	17-Aug-2021 13:26
Compound	CAS Number	LOR	Unit	EM2116487-007	EM2116487-009	EM2116487-012	EM2116487-013	EM2116487-014
				Result	Result	Result	Result	Result
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	----	----	109	----	102
Anthracene-d10	1719-06-8	0.5	%	----	----	107	----	103
4-Terphenyl-d14	1718-51-0	0.5	%	----	----	105	----	102
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.2	%	83.3	86.5	79.2	84.8	84.8
Toluene-D8	2037-26-5	0.2	%	85.7	89.2	84.6	89.4	91.1
4-Bromofluorobenzene	460-00-4	0.2	%	95.2	95.6	92.5	96.6	97.4

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	SB2-0.5	VB2-0.5	VB2-1.5	VB2-2.0	VB3-0.3
			Sampling date / time	17-Aug-2021 01:26	17-Aug-2021 09:15	17-Aug-2021 09:19	17-Aug-2021 09:35	17-Aug-2021 10:43
Compound	CAS Number	LOR	Unit	EM2116487-015	EM2116487-016	EM2116487-017	EM2116487-018	EM2116487-019
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	**26.4**	**16.4**	**19.3**	**23.6**	**28.7**
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	<5	**5**	<5	----
Barium	7440-39-3	10	mg/kg	**140**	**170**	**120**	**30**	----
Beryllium	7440-41-7	1	mg/kg	<1	**2**	<1	<1	----
Boron	7440-42-8	50	mg/kg	<50	<50	<50	<50	----
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	----
Chromium	7440-47-3	2	mg/kg	**29**	**68**	**27**	**43**	----
Cobalt	7440-48-4	2	mg/kg	**25**	**48**	**11**	**2**	----
Copper	7440-50-8	5	mg/kg	**69**	**46**	**67**	**34**	----
Lead	7439-92-1	5	mg/kg	**21**	<5	**169**	**18**	----
Manganese	7439-96-5	5	mg/kg	**197**	**878**	**231**	**64**	----
Nickel	7440-02-0	2	mg/kg	**19**	**134**	**17**	**6**	----
Selenium	7782-49-2	5	mg/kg	<5	<5	<5	<5	----
Vanadium	7440-62-2	5	mg/kg	**242**	**55**	**110**	**198**	----
Zinc	7440-66-6	5	mg/kg	**24**	**56**	**262**	**41**	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	**0.2**	<0.1	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	----	----	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	----	----	<0.5
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	----	----	<0.5
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	----	----	<0.5
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	----	----	<0.5
Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	----	----	<0.5
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	----	----	<0.5
Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	----	----	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	----	----	<0.5
Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	----	----	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	----	----	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	----	----	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	----	----	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	----	----	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	----	----	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	SB2-0.5	VB2-0.5	VB2-1.5	VB2-2.0	VB3-0.3
			Sampling date / time	17-Aug-2021 01:26	17-Aug-2021 09:15	17-Aug-2021 09:19	17-Aug-2021 09:35	17-Aug-2021 10:43
Compound	CAS Number	LOR	Unit	EM2116487-015	EM2116487-016	EM2116487-017	EM2116487-018	EM2116487-019
				Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	----	----	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	----	----	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	----	----	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	**0.6**	**0.6**	----	----	**0.6**
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	**1.2**	**1.2**	----	----	**1.2**
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	<10	<10	<10	<10	<10
C10 - C14 Fraction	----	50	mg/kg	<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg	<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	<10	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg	<10	<10	<10	<10	<10
>C10 - C16 Fraction	----	50	mg/kg	<50	<50	<50	<50	<50
>C16 - C34 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	<50	<50	<50	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg	<50	<50	<50	<50	<50
EP080: BTEXN								
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of BTEX	----	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
^ Total Xylenes	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg	<1	<1	<1	<1	<1
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.5	%	**86.2**	**90.1**	----	----	**93.2**
2-Chlorophenol-D4	93951-73-6	0.5	%	**84.3**	**88.8**	----	----	**94.2**
2.4.6-Tribromophenol	118-79-6	0.5	%	**67.9**	**70.1**	----	----	**80.7**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	SB2-0.5	VB2-0.5	VB2-1.5	VB2-2.0	VB3-0.3
			Sampling date / time	17-Aug-2021 01:26	17-Aug-2021 09:15	17-Aug-2021 09:19	17-Aug-2021 09:35	17-Aug-2021 10:43
Compound	CAS Number	LOR	Unit	EM2116487-015	EM2116487-016	EM2116487-017	EM2116487-018	EM2116487-019
				Result	Result	Result	Result	Result
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	99.6	101	----	----	108
Anthracene-d10	1719-06-8	0.5	%	103	106	----	----	110
4-Terphenyl-d14	1718-51-0	0.5	%	99.8	101	----	----	106
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.2	%	86.9	81.6	79.8	71.8	80.8
Toluene-D8	2037-26-5	0.2	%	88.8	81.6	78.8	74.7	76.2
4-Bromofluorobenzene	460-00-4	0.2	%	99.1	83.9	77.6	75.2	77.7

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	VB3-1.3	VB4-1.0	VB4-1.6	VB4-1.5	Composite 1
			Sampling date / time	17-Aug-2021 10:45	17-Aug-2021 11:55	17-Aug-2021 12:05	17-Aug-2021 11:58	17-Aug-2021 00:00
Compound	CAS Number	LOR	Unit	EM2116487-020	EM2116487-021	EM2116487-022	EM2116487-023	EM2116487-024
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	19.8	18.2	17.4	15.0	----
EA150: Soil Classification based on Particle Size								
Clay (<2 µm)	----	1	%	----	----	----	----	51
EA152: Soil Particle Density								
Soil Particle Density (Clay/Silt/Sand)	----	0.01	g/cm3	----	----	----	----	2.53
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	----	<5	13	----
Barium	7440-39-3	10	mg/kg	70	----	110	370	----
Beryllium	7440-41-7	1	mg/kg	<1	----	<1	<1	----
Boron	7440-42-8	50	mg/kg	<50	----	<50	<50	----
Cadmium	7440-43-9	1	mg/kg	<1	----	<1	2	----
Chromium	7440-47-3	2	mg/kg	32	----	18	48	----
Cobalt	7440-48-4	2	mg/kg	10	----	18	18	----
Copper	7440-50-8	5	mg/kg	51	----	27	186	----
Lead	7439-92-1	5	mg/kg	69	----	36	474	----
Manganese	7439-96-5	5	mg/kg	187	----	243	354	----
Nickel	7440-02-0	2	mg/kg	26	----	19	34	----
Selenium	7782-49-2	5	mg/kg	<5	----	<5	<5	----
Vanadium	7440-62-2	5	mg/kg	103	----	60	97	----
Zinc	7440-66-6	5	mg/kg	66	----	187	1380	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	0.2	----	<0.1	0.2	----
EP074A: Monocyclic Aromatic Hydrocarbons								
Benzene	71-43-2	0.2	mg/kg	<0.2	----	----	----	----
Toluene	108-88-3	0.5	mg/kg	<0.5	----	----	----	----
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	----	----	----	----
Styrene	100-42-5	0.5	mg/kg	<0.5	----	----	----	----
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	----	----	----	----
Isopropylbenzene	98-82-8	0.5	mg/kg	<0.5	----	----	----	----
n-Propylbenzene	103-65-1	0.5	mg/kg	<0.5	----	----	----	----
1.3.5-Trimethylbenzene	108-67-8	0.5	mg/kg	<0.5	----	----	----	----
sec-Butylbenzene	135-98-8	0.5	mg/kg	<0.5	----	----	----	----
1.2.4-Trimethylbenzene	95-63-6	0.5	mg/kg	<0.5	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	VB3-1.3	VB4-1.0	VB4-1.6	VB4-1.5	Composite 1
			Sampling date / time	17-Aug-2021 10:45	17-Aug-2021 11:55	17-Aug-2021 12:05	17-Aug-2021 11:58	17-Aug-2021 00:00
Compound	CAS Number	LOR	Unit	EM2116487-020	EM2116487-021	EM2116487-022	EM2116487-023	EM2116487-024
				Result	Result	Result	Result	Result
EP074A: Monocyclic Aromatic Hydrocarbons - Continued								
tert-Butylbenzene	98-06-6	0.5	mg/kg	<0.5	----	----	----	----
p-Isopropyltoluene	99-87-6	0.5	mg/kg	<0.5	----	----	----	----
n-Butylbenzene	104-51-8	0.5	mg/kg	<0.5	----	----	----	----
EP074B: Oxygenated Compounds								
Vinyl Acetate	108-05-4	5	mg/kg	<5	----	----	----	----
2-Butanone (MEK)	78-93-3	5	mg/kg	<5	----	----	----	----
4-Methyl-2-pentanone (MIBK)	108-10-1	5	mg/kg	<5	----	----	----	----
2-Hexanone (MBK)	591-78-6	5	mg/kg	<5	----	----	----	----
EP074C: Sulfonated Compounds								
Carbon disulfide	75-15-0	0.5	mg/kg	<0.5	----	----	----	----
EP074D: Fumigants								
2.2-Dichloropropane	594-20-7	0.5	mg/kg	<0.5	----	----	----	----
1.2-Dichloropropane	78-87-5	0.5	mg/kg	<0.5	----	----	----	----
cis-1.3-Dichloropropylene	10061-01-5	0.5	mg/kg	<0.5	----	----	----	----
trans-1.3-Dichloropropylene	10061-02-6	0.5	mg/kg	<0.5	----	----	----	----
1.2-Dibromoethane (EDB)	106-93-4	0.5	mg/kg	<0.5	----	----	----	----
EP074E: Halogenated Aliphatic Compounds								
Dichlorodifluoromethane	75-71-8	5	mg/kg	<5	----	----	----	----
Chloromethane	74-87-3	5	mg/kg	<5	----	----	----	----
Vinyl chloride	75-01-4	5	mg/kg	<5	----	----	----	----
Bromomethane	74-83-9	5	mg/kg	<5	----	----	----	----
Chloroethane	75-00-3	5	mg/kg	<5	----	----	----	----
Trichlorofluoromethane	75-69-4	5	mg/kg	<5	----	----	----	----
1.1-Dichloroethene	75-35-4	0.5	mg/kg	<0.5	----	----	----	----
Iodomethane	74-88-4	0.5	mg/kg	<0.5	----	----	----	----
trans-1.2-Dichloroethene	156-60-5	0.5	mg/kg	<0.5	----	----	----	----
1.1-Dichloroethane	75-34-3	0.5	mg/kg	<0.5	----	----	----	----
cis-1.2-Dichloroethene	156-59-2	0.5	mg/kg	<0.5	----	----	----	----
1.1.1-Trichloroethane	71-55-6	0.5	mg/kg	<0.5	----	----	----	----
1.1-Dichloropropylene	563-58-6	0.5	mg/kg	<0.5	----	----	----	----
Carbon Tetrachloride	56-23-5	0.5	mg/kg	<0.5	----	----	----	----
1.2-Dichloroethane	107-06-2	0.5	mg/kg	<0.5	----	----	----	----
Trichloroethene	79-01-6	0.5	mg/kg	<0.5	----	----	----	----
Dibromomethane	74-95-3	0.5	mg/kg	<0.5	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	VB3-1.3	VB4-1.0	VB4-1.6	VB4-1.5	Composite 1
			Sampling date / time	17-Aug-2021 10:45	17-Aug-2021 11:55	17-Aug-2021 12:05	17-Aug-2021 11:58	17-Aug-2021 00:00
Compound	CAS Number	LOR	Unit	EM2116487-020	EM2116487-021	EM2116487-022	EM2116487-023	EM2116487-024
				Result	Result	Result	Result	Result
EP074E: Halogenated Aliphatic Compounds - Continued								
1.1.2-Trichloroethane	79-00-5	0.5	mg/kg	<0.5	----	----	----	----
1.3-Dichloropropane	142-28-9	0.5	mg/kg	<0.5	----	----	----	----
Tetrachloroethene	127-18-4	0.5	mg/kg	<0.5	----	----	----	----
1.1.1.2-Tetrachloroethane	630-20-6	0.5	mg/kg	<0.5	----	----	----	----
trans-1.4-Dichloro-2-butene	110-57-6	0.5	mg/kg	<0.5	----	----	----	----
cis-1.4-Dichloro-2-butene	1476-11-5	0.5	mg/kg	<0.5	----	----	----	----
1.1.2.2-Tetrachloroethane	79-34-5	0.5	mg/kg	<0.5	----	----	----	----
1.2.3-Trichloropropane	96-18-4	0.5	mg/kg	<0.5	----	----	----	----
Pentachloroethane	76-01-7	0.5	mg/kg	<0.5	----	----	----	----
1.2-Dibromo-3-chloropropane	96-12-8	0.5	mg/kg	<0.5	----	----	----	----
EP074F: Halogenated Aromatic Compounds								
Chlorobenzene	108-90-7	0.5	mg/kg	<0.5	----	----	----	----
Bromobenzene	108-86-1	0.5	mg/kg	<0.5	----	----	----	----
2-Chlorotoluene	95-49-8	0.5	mg/kg	<0.5	----	----	----	----
4-Chlorotoluene	106-43-4	0.5	mg/kg	<0.5	----	----	----	----
1.2.3-Trichlorobenzene	87-61-6	0.5	mg/kg	<0.5	----	----	----	----
EP074G: Trihalomethanes								
Chloroform	67-66-3	0.5	mg/kg	<0.5	----	----	----	----
Bromodichloromethane	75-27-4	0.5	mg/kg	<0.5	----	----	----	----
Dibromochloromethane	124-48-1	0.5	mg/kg	<0.5	----	----	----	----
Bromoform	75-25-2	0.5	mg/kg	<0.5	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	----	<0.5	----	----	----
Acenaphthylene	208-96-8	0.5	mg/kg	----	<0.5	----	----	----
Acenaphthene	83-32-9	0.5	mg/kg	----	<0.5	----	----	----
Fluorene	86-73-7	0.5	mg/kg	----	<0.5	----	----	----
Phenanthrene	85-01-8	0.5	mg/kg	----	<0.5	----	----	----
Anthracene	120-12-7	0.5	mg/kg	----	<0.5	----	----	----
Fluoranthene	206-44-0	0.5	mg/kg	----	<0.5	----	----	----
Pyrene	129-00-0	0.5	mg/kg	----	<0.5	----	----	----
Benz(a)anthracene	56-55-3	0.5	mg/kg	----	<0.5	----	----	----
Chrysene	218-01-9	0.5	mg/kg	----	<0.5	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	----	<0.5	----	----	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	----	<0.5	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	VB3-1.3	VB4-1.0	VB4-1.6	VB4-1.5	Composite 1
			Sampling date / time	17-Aug-2021 10:45	17-Aug-2021 11:55	17-Aug-2021 12:05	17-Aug-2021 11:58	17-Aug-2021 00:00
Compound	CAS Number	LOR	Unit	EM2116487-020	EM2116487-021	EM2116487-022	EM2116487-023	EM2116487-024
				Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
Benzo(a)pyrene	50-32-8	0.5	mg/kg	----	<0.5	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	----	<0.5	----	----	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	----	<0.5	----	----	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	----	<0.5	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	----	<0.5	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	----	<0.5	----	----	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	----	**0.6**	----	----	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	----	**1.2**	----	----	----
EP075A: Phenolic Compounds								
Phenol	108-95-2	0.5	mg/kg	<0.5	----	----	----	----
2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	----	----	----	----
2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	----	----	----	----
3- & 4-Methylphenol	1319-77-3	0.5	mg/kg	<0.5	----	----	----	----
2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	----	----	----	----
2.4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	----	----	----	----
2.4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	----	----	----	----
2.6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	----	----	----	----
4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	----	----	----	----
2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	----	----	----	----
2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	----	----	----	----
Pentachlorophenol	87-86-5	1	mg/kg	<1	----	----	----	----
EP075B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	----	----	----	----
2-Methylnaphthalene	91-57-6	0.5	mg/kg	<0.5	----	----	----	----
2-Chloronaphthalene	91-58-7	0.5	mg/kg	<0.5	----	----	----	----
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	----	----	----	----
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	----	----	----	----
Fluorene	86-73-7	0.5	mg/kg	<0.5	----	----	----	----
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	----	----	----	----
Anthracene	120-12-7	0.5	mg/kg	<0.5	----	----	----	----
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	----	----	----	----
Pyrene	129-00-0	0.5	mg/kg	<0.5	----	----	----	----
N-2-Fluorenyl Acetamide	53-96-3	0.5	mg/kg	<0.5	----	----	----	----
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	VB3-1.3	VB4-1.0	VB4-1.6	VB4-1.5	Composite 1
			Sampling date / time	17-Aug-2021 10:45	17-Aug-2021 11:55	17-Aug-2021 12:05	17-Aug-2021 11:58	17-Aug-2021 00:00
Compound	CAS Number	LOR	Unit	EM2116487-020	EM2116487-021	EM2116487-022	EM2116487-023	EM2116487-024
				Result	Result	Result	Result	Result
EP075B: Polynuclear Aromatic Hydrocarbons - Continued								
Chrysene	218-01-9	0.5	mg/kg	<0.5	----	----	----	----
Benzo(b+j) & Benzo(k)fluoranthene	205-99-2 207-08-9	1	mg/kg	<1	----	----	----	----
7.12-Dimethylbenz(a)anthracene	57-97-6	0.5	mg/kg	<0.5	----	----	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	----	----	----	----
3-Methylcholanthrene	56-49-5	0.5	mg/kg	<0.5	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	----	----	----	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	----	----	----	----
^ Sum of PAHs	----	0.5	mg/kg	<0.5	----	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	----	----	----	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	**0.6**	----	----	----	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	**1.2**	----	----	----	----
EP075C: Phthalate Esters								
Dimethyl phthalate	131-11-3	0.5	mg/kg	<0.5	----	----	----	----
Diethyl phthalate	84-66-2	0.5	mg/kg	<0.5	----	----	----	----
Di-n-butyl phthalate	84-74-2	0.5	mg/kg	<0.5	----	----	----	----
Butyl benzyl phthalate	85-68-7	0.5	mg/kg	<0.5	----	----	----	----
bis(2-ethylhexyl) phthalate	117-81-7	5.0	mg/kg	<5.0	----	----	----	----
Di-n-octylphthalate	117-84-0	0.5	mg/kg	<0.5	----	----	----	----
EP075D: Nitrosamines								
N-Nitrosomethylethylamine	10595-95-6	0.5	mg/kg	<0.5	----	----	----	----
N-Nitrosodiethylamine	55-18-5	0.5	mg/kg	<0.5	----	----	----	----
N-Nitrosopyrrolidine	930-55-2	1.0	mg/kg	<1.0	----	----	----	----
N-Nitrosomorpholine	59-89-2	0.5	mg/kg	<0.5	----	----	----	----
N-Nitrosodi-n-propylamine	621-64-7	0.5	mg/kg	<0.5	----	----	----	----
N-Nitrosopiperidine	100-75-4	0.5	mg/kg	<0.5	----	----	----	----
N-Nitrosodibutylamine	924-16-3	0.5	mg/kg	<0.5	----	----	----	----
N-Nitrosodiphenyl & Diphenylamine	86-30-6 122-39-4	1.0	mg/kg	<1.0	----	----	----	----
Methapyrilene	91-80-5	0.5	mg/kg	<0.5	----	----	----	----
EP075E: Nitroaromatics and Ketones								
2-Picoline	109-06-8	0.5	mg/kg	<0.5	----	----	----	----
Acetophenone	98-86-2	0.5	mg/kg	<0.5	----	----	----	----
Nitrobenzene	98-95-3	0.5	mg/kg	<0.5	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	VB3-1.3	VB4-1.0	VB4-1.6	VB4-1.5	Composite 1
			Sampling date / time	17-Aug-2021 10:45	17-Aug-2021 11:55	17-Aug-2021 12:05	17-Aug-2021 11:58	17-Aug-2021 00:00
Compound	CAS Number	LOR	Unit	EM2116487-020	EM2116487-021	EM2116487-022	EM2116487-023	EM2116487-024
				Result	Result	Result	Result	Result
EP075E: Nitroaromatics and Ketones - Continued								
Isophorone	78-59-1	0.5	mg/kg	<0.5	----	----	----	----
2.6-Dinitrotoluene	606-20-2	1.0	mg/kg	<1.0	----	----	----	----
2.4-Dinitrotoluene	121-14-2	1.0	mg/kg	<1.0	----	----	----	----
1-Naphthylamine	134-32-7	0.5	mg/kg	<0.5	----	----	----	----
4-Nitroquinoline-N-oxide	56-57-5	0.5	mg/kg	<0.5	----	----	----	----
5-Nitro-o-toluidine	99-55-8	0.5	mg/kg	<0.5	----	----	----	----
Azobenzene	103-33-3	1	mg/kg	<1	----	----	----	----
1.3.5-Trinitrobenzene	99-35-4	0.5	mg/kg	<0.5	----	----	----	----
Phenacetin	62-44-2	0.5	mg/kg	<0.5	----	----	----	----
4-Aminobiphenyl	92-67-1	0.5	mg/kg	<0.5	----	----	----	----
Pentachloronitrobenzene	82-68-8	0.5	mg/kg	<0.5	----	----	----	----
Pronamide	23950-58-5	0.5	mg/kg	<0.5	----	----	----	----
Dimethylaminoazobenzene	60-11-7	0.5	mg/kg	<0.5	----	----	----	----
Chlorobenzilate	510-15-6	0.5	mg/kg	<0.5	----	----	----	----
EP075F: Haloethers								
Bis(2-chloroethyl) ether	111-44-4	0.5	mg/kg	<0.5	----	----	----	----
Bis(2-chloroethoxy) methane	111-91-1	0.5	mg/kg	<0.5	----	----	----	----
4-Chlorophenyl phenyl ether	7005-72-3	0.5	mg/kg	<0.5	----	----	----	----
4-Bromophenyl phenyl ether	101-55-3	0.5	mg/kg	<0.5	----	----	----	----
EP075G: Chlorinated Hydrocarbons								
1.3-Dichlorobenzene	541-73-1	0.5	mg/kg	<0.5	----	----	----	----
1.4-Dichlorobenzene	106-46-7	0.5	mg/kg	<0.5	----	----	----	----
1.2-Dichlorobenzene	95-50-1	0.5	mg/kg	<0.5	----	----	----	----
Hexachloroethane	67-72-1	0.5	mg/kg	<0.5	----	----	----	----
1.2.4-Trichlorobenzene	120-82-1	0.5	mg/kg	<0.5	----	----	----	----
Hexachloropropylene	1888-71-7	0.5	mg/kg	<0.5	----	----	----	----
Hexachlorobutadiene	87-68-3	0.5	mg/kg	<0.5	----	----	----	----
Hexachlorocyclopentadiene	77-47-4	2.5	mg/kg	<2.5	----	----	----	----
Pentachlorobenzene	608-93-5	0.5	mg/kg	<0.5	----	----	----	----
Hexachlorobenzene (HCB)	118-74-1	1.0	mg/kg	<1.0	----	----	----	----
EP075H: Anilines and Benzidines								
Aniline	62-53-3	0.5	mg/kg	<0.5	----	----	----	----
4-Chloroaniline	106-47-8	0.5	mg/kg	<0.5	----	----	----	----
2-Nitroaniline	88-74-4	1.0	mg/kg	<1.0	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	VB3-1.3	VB4-1.0	VB4-1.6	VB4-1.5	Composite 1
			Sampling date / time	17-Aug-2021 10:45	17-Aug-2021 11:55	17-Aug-2021 12:05	17-Aug-2021 11:58	17-Aug-2021 00:00
Compound	CAS Number	LOR	Unit	EM2116487-020	EM2116487-021	EM2116487-022	EM2116487-023	EM2116487-024
				Result	Result	Result	Result	Result
EP075H: Anilines and Benzidines - Continued								
3-Nitroaniline	99-09-2	1.0	mg/kg	<1.0	----	----	----	----
Dibenzofuran	132-64-9	0.5	mg/kg	<0.5	----	----	----	----
4-Nitroaniline	100-01-6	0.5	mg/kg	<0.5	----	----	----	----
Carbazole	86-74-8	0.5	mg/kg	<0.5	----	----	----	----
3.3`-Dichlorobenzidine	91-94-1	0.5	mg/kg	<0.5	----	----	----	----
EP075I: Organochlorine Pesticides								
alpha-BHC	319-84-6	0.5	mg/kg	<0.5	----	----	----	----
beta-BHC	319-85-7	0.5	mg/kg	<0.5	----	----	----	----
gamma-BHC	58-89-9	0.5	mg/kg	<0.5	----	----	----	----
delta-BHC	319-86-8	0.5	mg/kg	<0.5	----	----	----	----
Heptachlor	76-44-8	0.5	mg/kg	<0.5	----	----	----	----
Aldrin	309-00-2	0.5	mg/kg	<0.5	----	----	----	----
Heptachlor epoxide	1024-57-3	0.5	mg/kg	<0.5	----	----	----	----
alpha-Endosulfan	959-98-8	0.5	mg/kg	<0.5	----	----	----	----
4.4`-DDE	72-55-9	0.5	mg/kg	<0.5	----	----	----	----
Dieldrin	60-57-1	0.5	mg/kg	<0.5	----	----	----	----
Endrin	72-20-8	0.5	mg/kg	<0.5	----	----	----	----
beta-Endosulfan	33213-65-9	0.5	mg/kg	<0.5	----	----	----	----
4.4`-DDD	72-54-8	0.5	mg/kg	<0.5	----	----	----	----
Endosulfan sulfate	1031-07-8	0.5	mg/kg	<0.5	----	----	----	----
4.4`-DDT	50-29-3	1.0	mg/kg	<1.0	----	----	----	----
EP075J: Organophosphorus Pesticides								
Dichlorvos	62-73-7	0.5	mg/kg	<0.5	----	----	----	----
Dimethoate	60-51-5	0.5	mg/kg	<0.5	----	----	----	----
Diazinon	333-41-5	0.5	mg/kg	<0.5	----	----	----	----
Chlorpyrifos-methyl	5598-13-0	0.5	mg/kg	<0.5	----	----	----	----
Malathion	121-75-5	0.5	mg/kg	<0.5	----	----	----	----
Fenthion	55-38-9	0.5	mg/kg	<0.5	----	----	----	----
Chlorpyrifos	2921-88-2	0.5	mg/kg	<0.5	----	----	----	----
Pirimphos-ethyl	23505-41-1	0.5	mg/kg	<0.5	----	----	----	----
Chlorfenvinphos	470-90-6	0.5	mg/kg	<0.5	----	----	----	----
Prothiofos	34643-46-4	0.5	mg/kg	<0.5	----	----	----	----
Ethion	563-12-2	0.5	mg/kg	<0.5	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons								

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	VB3-1.3	VB4-1.0	VB4-1.6	VB4-1.5	Composite 1
			Sampling date / time	17-Aug-2021 10:45	17-Aug-2021 11:55	17-Aug-2021 12:05	17-Aug-2021 11:58	17-Aug-2021 00:00
Compound	CAS Number	LOR	Unit	EM2116487-020	EM2116487-021	EM2116487-022	EM2116487-023	EM2116487-024
				Result	Result	Result	Result	Result
EP080/071: Total Petroleum Hydrocarbons - Continued								
C6 - C9 Fraction	----	10	mg/kg	----	<10	<10	<10	----
C10 - C14 Fraction	----	50	mg/kg	----	<50	<50	<50	----
C15 - C28 Fraction	----	100	mg/kg	----	<100	<100	<100	----
C29 - C36 Fraction	----	100	mg/kg	----	<100	<100	<100	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg	----	<50	<50	<50	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	10	mg/kg	----	<10	<10	<10	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg	----	<10	<10	<10	----
>C10 - C16 Fraction	----	50	mg/kg	----	<50	<50	<50	----
>C16 - C34 Fraction	----	100	mg/kg	----	<100	<100	**150**	----
>C34 - C40 Fraction	----	100	mg/kg	----	<100	<100	<100	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg	----	<50	<50	**150**	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg	----	<50	<50	<50	----
EP080: BTEXN								
Benzene	71-43-2	0.2	mg/kg	----	<0.2	<0.2	<0.2	----
Toluene	108-88-3	0.5	mg/kg	----	<0.5	<0.5	<0.5	----
Ethylbenzene	100-41-4	0.5	mg/kg	----	<0.5	<0.5	<0.5	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	----	<0.5	<0.5	<0.5	----
ortho-Xylene	95-47-6	0.5	mg/kg	----	<0.5	<0.5	<0.5	----
^ Sum of BTEX	----	0.2	mg/kg	----	<0.2	<0.2	<0.2	----
^ Total Xylenes	----	0.5	mg/kg	----	<0.5	<0.5	<0.5	----
Naphthalene	91-20-3	1	mg/kg	----	<1	<1	<1	----
EP074S: VOC Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.5	%	**65.6**	----	----	----	----
Toluene-D8	2037-26-5	0.5	%	**77.3**	----	----	----	----
4-Bromofluorobenzene	460-00-4	0.5	%	**84.8**	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.5	%	----	**88.0**	----	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%	----	**86.1**	----	----	----
2.4.6-Tribromophenol	118-79-6	0.5	%	----	**77.2**	----	----	----
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	----	**98.8**	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	VB3-1.3	VB4-1.0	VB4-1.6	VB4-1.5	Composite 1
			Sampling date / time	17-Aug-2021 10:45	17-Aug-2021 11:55	17-Aug-2021 12:05	17-Aug-2021 11:58	17-Aug-2021 00:00
Compound	CAS Number	LOR	Unit	EM2116487-020	EM2116487-021	EM2116487-022	EM2116487-023	EM2116487-024
				Result	Result	Result	Result	Result
EP075(SIM)T: PAH Surrogates - Continued								
Anthracene-d10	1719-06-8	0.5	%	----	101	----	----	----
4-Terphenyl-d14	1718-51-0	0.5	%	----	98.9	----	----	----
EP075S: Acid Extractable Surrogates								
2-Fluorophenol	367-12-4	0.5	%	96.0	----	----	----	----
Phenol-d6	13127-88-3	0.5	%	92.8	----	----	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%	85.3	----	----	----	----
2.4.6-Tribromophenol	118-79-6	0.5	%	77.3	----	----	----	----
EP075T: Base/Neutral Extractable Surrogates								
Nitrobenzene-D5	4165-60-0	0.5	%	90.7	----	----	----	----
1.2-Dichlorobenzene-D4	2199-69-1	0.5	%	89.9	----	----	----	----
2-Fluorobiphenyl	321-60-8	0.5	%	95.0	----	----	----	----
Anthracene-d10	1719-06-8	0.5	%	94.0	----	----	----	----
4-Terphenyl-d14	1718-51-0	0.5	%	84.7	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.2	%	----	77.5	75.6	76.8	----
Toluene-D8	2037-26-5	0.2	%	----	80.1	75.6	76.5	----
4-Bromofluorobenzene	460-00-4	0.2	%	----	78.0	72.4	78.7	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	VB1-0.5	VB1-1.0m	VB1-1.5m	VB1-2.0m	----
			Sampling date / time	25-Aug-2021 00:00	25-Aug-2021 00:00	25-Aug-2021 00:00	25-Aug-2021 00:00	----
Compound	CAS Number	LOR	Unit	EM2116487-027	EM2116487-028	EM2116487-029	EM2116487-030	--------
				Result	Result	Result	Result	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	28.7	21.6	11.9	13.5	----
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	<5	<5	<5	----
Barium	7440-39-3	10	mg/kg	210	80	30	30	----
Beryllium	7440-41-7	1	mg/kg	2	<1	<1	<1	----
Boron	7440-42-8	50	mg/kg	<50	<50	<50	<50	----
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<5	----
Chromium	7440-47-3	2	mg/kg	118	26	18	33	----
Cobalt	7440-48-4	2	mg/kg	59	16	4	6	----
Copper	7440-50-8	5	mg/kg	37	45	17	34	----
Lead	7439-92-1	5	mg/kg	<5	51	43	29	----
Manganese	7439-96-5	5	mg/kg	1040	257	45	105	----
Nickel	7440-02-0	2	mg/kg	126	14	4	6	----
Selenium	7782-49-2	5	mg/kg	<5	<5	<5	<5	----
Vanadium	7440-62-2	5	mg/kg	93	132	150	187	----
Zinc	7440-66-6	5	mg/kg	43	96	21	40	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.1	<0.1	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	----	----	----	----
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	----	----	----	----
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	----	----	----	----
Fluorene	86-73-7	0.5	mg/kg	<0.5	----	----	----	----
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	----	----	----	----
Anthracene	120-12-7	0.5	mg/kg	<0.5	----	----	----	----
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	----	----	----	----
Pyrene	129-00-0	0.5	mg/kg	<0.5	----	----	----	----
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	----	----	----	----
Chrysene	218-01-9	0.5	mg/kg	<0.5	----	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	----	----	----	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	----	----	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	VB1-0.5	VB1-1.0m	VB1-1.5m	VB1-2.0m	----
			Sampling date / time	25-Aug-2021 00:00	25-Aug-2021 00:00	25-Aug-2021 00:00	25-Aug-2021 00:00	----
Compound	CAS Number	LOR	Unit	EM2116487-027	EM2116487-028	EM2116487-029	EM2116487-030	--------
				Result	Result	Result	Result	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	----	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	----	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	----	----	----	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	**0.6**	----	----	----	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	**1.2**	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	<10	<10	<10	<10	----
C10 - C14 Fraction	----	50	mg/kg	<50	<50	<50	<50	----
C15 - C28 Fraction	----	100	mg/kg	<100	<100	<100	<100	----
C29 - C36 Fraction	----	100	mg/kg	<100	<100	<100	<100	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg	<50	<50	<50	<50	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	<10	<10	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg	<10	<10	<10	<10	----
>C10 - C16 Fraction	----	50	mg/kg	<50	<50	<50	<50	----
>C16 - C34 Fraction	----	100	mg/kg	<100	<100	<100	<100	----
>C34 - C40 Fraction	----	100	mg/kg	<100	<100	<100	<100	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	<50	<50	<50	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg	<50	<50	<50	<50	----
EP080: BTEXN								
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	----
Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	----
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	----
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	----
^ Sum of BTEX	----	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	----
^ Total Xylenes	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	----
Naphthalene	91-20-3	1	mg/kg	<1	<1	<1	<1	----
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.5	%	**88.6**	----	----	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%	**87.7**	----	----	----	----
2.4.6-Tribromophenol	118-79-6	0.5	%	**78.3**	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	VB1-0.5	VB1-1.0m	VB1-1.5m	VB1-2.0m	----
			Sampling date / time	25-Aug-2021 00:00	25-Aug-2021 00:00	25-Aug-2021 00:00	25-Aug-2021 00:00	----
Compound	CAS Number	LOR	Unit	EM2116487-027	EM2116487-028	EM2116487-029	EM2116487-030	--------
				Result	Result	Result	Result	----
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	106	----	----	----	----
Anthracene-d10	1719-06-8	0.5	%	108	----	----	----	----
4-Terphenyl-d14	1718-51-0	0.5	%	104	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.2	%	100	97.3	109	90.5	----
Toluene-D8	2037-26-5	0.2	%	87.8	83.0	95.1	78.5	----
4-Bromofluorobenzene	460-00-4	0.2	%	78.3	76.4	85.7	72.6	----

Surrogate Control Limits

Sub-Matrix: SOIL		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP074S: VOC Surrogates			
1.2-Dichloroethane-D4	17060-07-0	62	122
Toluene-D8	2037-26-5	64	120
4-Bromofluorobenzene	460-00-4	66	124
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	54	125
2-Chlorophenol-D4	93951-73-6	65	123
2.4.6-Tribromophenol	118-79-6	34	122
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	61	125
Anthracene-d10	1719-06-8	62	130
4-Terphenyl-d14	1718-51-0	67	133
EP075S: Acid Extractable Surrogates			
2-Fluorophenol	367-12-4	54	134
Phenol-d6	13127-88-3	62	122
2-Chlorophenol-D4	93951-73-6	52	127
2.4.6-Tribromophenol	118-79-6	38	133
EP075T: Base/Neutral Extractable Surrogates			
Nitrobenzene-D5	4165-60-0	67	128
1.2-Dichlorobenzene-D4	2199-69-1	63	108
2-Fluorobiphenyl	321-60-8	70	127
Anthracene-d10	1719-06-8	58	138
4-Terphenyl-d14	1718-51-0	50	138
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	51	125
Toluene-D8	2037-26-5	55	125
4-Bromofluorobenzene	460-00-4	56	124

Inter-Laboratory Testing

Analysis conducted by ALS Newcastle, NATA accreditation no. 825, site no. 1656 (Chemistry) 9854 (Biology).

(SOIL) EA150: Soil Classification based on Particle Size

(SOIL) EA152: Soil Particle Density

QUALITY CONTROL REPORT

Work Order	: **EM2116487**	Page	: 1 of 24
Client	: **ENVIRONMENTAL SERVICE AND DESIGN PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: CARMEL PARKER	Contact	: Shirley LeCornu
Address	: Level 1 49-51 Elizabeth Street Launceston 7250	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: ----	Telephone	: +6138549 9630
Project	: 7928	Date Samples Received	: 19-Aug-2021
Order number	: 7928	Date Analysis Commenced	: 23-Aug-2021
C-O-C number	: ----	Issue Date	: 27-Aug-2021
Sampler	: CP		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 30		
No. of samples analysed	: 24		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Aleksandar Vujkovic	Laboratory Technician	Newcastle - Inorganics, Mayfield West, NSW
Dilani Fernando	Senior Inorganic Chemist	Melbourne Inorganics, Springvale, VIC
Nancy Wang	2IC Organic Chemist	Melbourne Inorganics, Springvale, VIC
Nancy Wang	2IC Organic Chemist	Melbourne Organics, Springvale, VIC
Nikki Stepniewski	Senior Inorganic Instrument Chemist	Melbourne Inorganics, Springvale, VIC

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EG005(ED093)T: Total Metals by ICP-AES (QC Lot: 3860237)									
EM2115405-001	Anonymous	EG005T: Beryllium	7440-41-7	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Barium	7440-39-3	10	mg/kg	120	120	0.0	0% - 50%
		EG005T: Chromium	7440-47-3	2	mg/kg	34	34	0.0	0% - 50%
		EG005T: Cobalt	7440-48-4	2	mg/kg	8	8	0.0	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	17	17	0.0	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	18	18	0.0	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	7	7	0.0	No Limit
		EG005T: Manganese	7439-96-5	5	mg/kg	263	247	6.2	0% - 20%
		EG005T: Selenium	7782-49-2	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Vanadium	7440-62-2	5	mg/kg	43	42	0.0	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	25	27	7.7	No Limit
		EG005T: Boron	7440-42-8	50	mg/kg	<50	<50	0.0	No Limit
EM2115405-028	Anonymous	EG005T: Beryllium	7440-41-7	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Barium	7440-39-3	10	mg/kg	100	110	0.0	0% - 50%
		EG005T: Chromium	7440-47-3	2	mg/kg	28	29	0.0	0% - 50%
		EG005T: Cobalt	7440-48-4	2	mg/kg	7	7	0.0	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	16	16	0.0	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	17	17	0.0	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	10	10	0.0	No Limit
		EG005T: Manganese	7439-96-5	5	mg/kg	201	199	0.9	0% - 20%

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EG005(ED093)T: Total Metals by ICP-AES (QC Lot: 3860237) - continued									
EM2115405-028	Anonymous	EG005T: Selenium	7782-49-2	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Vanadium	7440-62-2	5	mg/kg	40	41	0.0	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	68	54	22.4	0% - 50%
		EG005T: Boron	7440-42-8	50	mg/kg	<50	<50	0.0	No Limit
EG005(ED093)T: Total Metals by ICP-AES (QC Lot: 3860239)									
EM2116487-015	SB2-0.5	EG005T: Beryllium	7440-41-7	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Barium	7440-39-3	10	mg/kg	140	130	0.0	0% - 50%
		EG005T: Chromium	7440-47-3	2	mg/kg	29	22	28.3	0% - 50%
		EG005T: Cobalt	7440-48-4	2	mg/kg	25	28	9.7	0% - 50%
		EG005T: Nickel	7440-02-0	2	mg/kg	19	17	9.7	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	69	69	0.0	0% - 50%
		EG005T: Lead	7439-92-1	5	mg/kg	21	18	13.4	No Limit
		EG005T: Manganese	7439-96-5	5	mg/kg	197	187	5.3	0% - 20%
		EG005T: Selenium	7782-49-2	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Vanadium	7440-62-2	5	mg/kg	242	211	13.5	0% - 20%
		EG005T: Zinc	7440-66-6	5	mg/kg	24	24	0.0	No Limit
		EG005T: Boron	7440-42-8	50	mg/kg	<50	<50	0.0	No Limit
EM2116568-003	Anonymous	EG005T: Beryllium	7440-41-7	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Barium	7440-39-3	10	mg/kg	70	80	0.0	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	18	19	0.0	No Limit
		EG005T: Cobalt	7440-48-4	2	mg/kg	8	8	0.0	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	10	11	0.0	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	6	6	0.0	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	12	12	0.0	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	28	32	11.7	No Limit
		EG005T: Manganese	7439-96-5	5	mg/kg	225	234	3.7	0% - 20%
		EG005T: Selenium	7782-49-2	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Vanadium	7440-62-2	5	mg/kg	25	25	0.0	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	46	43	7.3	No Limit
		EG005T: Boron	7440-42-8	50	mg/kg	<50	<50	0.0	No Limit
EG005(ED093)T: Total Metals by ICP-AES (QC Lot: 3866187)									
EM2116487-027	VB1-0.5	EG005T: Beryllium	7440-41-7	1	mg/kg	2	2	0.0	No Limit
		EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Barium	7440-39-3	10	mg/kg	210	230	7.9	0% - 20%
		EG005T: Chromium	7440-47-3	2	mg/kg	118	120	1.4	0% - 20%
		EG005T: Cobalt	7440-48-4	2	mg/kg	59	64	7.8	0% - 20%
		EG005T: Nickel	7440-02-0	2	mg/kg	126	131	4.4	0% - 20%

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EG005(ED093)T: Total Metals by ICP-AES (QC Lot: 3866187) - continued									
EM2116487-027	VB1-0.5	EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	37	42	12.5	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Manganese	7439-96-5	5	mg/kg	1040	1210	15.0	0% - 20%
		EG005T: Selenium	7782-49-2	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Vanadium	7440-62-2	5	mg/kg	93	109	15.9	0% - 20%
		EG005T: Zinc	7440-66-6	5	mg/kg	43	47	9.5	No Limit
		EG005T: Boron	7440-42-8	50	mg/kg	<50	<50	0.0	No Limit
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 3860065)									
EM2116487-001	SB3 - 0.5	EA055: Moisture Content	----	0.1	%	17.3	18.0	3.8	0% - 50%
EM2116487-015	SB2-0.5	EA055: Moisture Content	----	0.1	%	26.4	23.5	11.6	0% - 20%
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 3866192)									
EM2116487-029	VB1-1.5m	EA055: Moisture Content	----	0.1	%	11.9	11.7	1.8	0% - 50%
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 3860236)									
EM2115405-001	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EM2115405-028	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 3860238)									
EM2116487-015	SB2-0.5	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EM2116568-003	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 3866188)									
EM2116487-027	VB1-0.5	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EP074A: Monocyclic Aromatic Hydrocarbons (QC Lot: 3859788)									
EM2116319-001	Anonymous	EP074: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP074: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: Styrene	100-42-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: Isopropylbenzene	98-82-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: n-Propylbenzene	103-65-1	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: 1.3.5-Trimethylbenzene	108-67-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: sec-Butylbenzene	135-98-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: 1.2.4-Trimethylbenzene	95-63-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: tert-Butylbenzene	98-06-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: p-Isopropyltoluene	99-87-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: n-Butylbenzene	104-51-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EM2116568-003	Anonymous	EP074: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP074: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP074A: Monocyclic Aromatic Hydrocarbons (QC Lot: 3859788) - continued									
EM2116568-003	Anonymous	EP074: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: Styrene	100-42-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: Isopropylbenzene	98-82-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: n-Propylbenzene	103-65-1	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: 1.3.5-Trimethylbenzene	108-67-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: sec-Butylbenzene	135-98-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: 1.2.4-Trimethylbenzene	95-63-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: tert-Butylbenzene	98-06-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: p-Isopropyltoluene	99-87-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: n-Butylbenzene	104-51-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EP074B: Oxygenated Compounds (QC Lot: 3859788)									
EM2116319-001	Anonymous	EP074: Vinyl Acetate	108-05-4	5	mg/kg	<5	<5	0.0	No Limit
		EP074: 2-Butanone (MEK)	78-93-3	5	mg/kg	<5	<5	0.0	No Limit
		EP074: 4-Methyl-2-pentanone (MIBK)	108-10-1	5	mg/kg	<5	<5	0.0	No Limit
		EP074: 2-Hexanone (MBK)	591-78-6	5	mg/kg	<5	<5	0.0	No Limit
EM2116568-003	Anonymous	EP074: Vinyl Acetate	108-05-4	5	mg/kg	<5	<5	0.0	No Limit
		EP074: 2-Butanone (MEK)	78-93-3	5	mg/kg	<5	<5	0.0	No Limit
		EP074: 4-Methyl-2-pentanone (MIBK)	108-10-1	5	mg/kg	<5	<5	0.0	No Limit
		EP074: 2-Hexanone (MBK)	591-78-6	5	mg/kg	<5	<5	0.0	No Limit
EP074C: Sulfonated Compounds (QC Lot: 3859788)									
EM2116319-001	Anonymous	EP074: Carbon disulfide	75-15-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EM2116568-003	Anonymous	EP074: Carbon disulfide	75-15-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EP074D: Fumigants (QC Lot: 3859788)									
EM2116319-001	Anonymous	EP074: 2.2-Dichloropropane	594-20-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: 1.2-Dichloropropane	78-87-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: cis-1.3-Dichloropropylene	10061-01-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: trans-1.3-Dichloropropylene	10061-02-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: 1.2-Dibromoethane (EDB)	106-93-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EM2116568-003	Anonymous	EP074: 2.2-Dichloropropane	594-20-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: 1.2-Dichloropropane	78-87-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: cis-1.3-Dichloropropylene	10061-01-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: trans-1.3-Dichloropropylene	10061-02-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: 1.2-Dibromoethane (EDB)	106-93-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EP074E: Halogenated Aliphatic Compounds (QC Lot: 3859788)									
EM2116319-001	Anonymous	EP074: 1.1-Dichloroethene	75-35-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: Iodomethane	74-88-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP074E: Halogenated Aliphatic Compounds (QC Lot: 3859788) - continued									
EM2116319-001	Anonymous	EP074: trans-1.2-Dichloroethene	156-60-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: 1.1-Dichloroethane	75-34-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: cis-1.2-Dichloroethene	156-59-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: 1.1.1-Trichloroethane	71-55-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: 1.1-Dichloropropylene	563-58-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: Carbon Tetrachloride	56-23-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: 1.2-Dichloroethane	107-06-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: Trichloroethene	79-01-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: Dibromomethane	74-95-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: 1.1.2-Trichloroethane	79-00-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: 1.3-Dichloropropane	142-28-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: Tetrachloroethene	127-18-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: 1.1.1.2-Tetrachloroethane	630-20-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: trans-1.4-Dichloro-2-butene	110-57-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: cis-1.4-Dichloro-2-butene	1476-11-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: 1.1.2.2-Tetrachloroethane	79-34-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: 1.2.3-Trichloropropane	96-18-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: Pentachloroethane	76-01-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: 1.2-Dibromo-3-chloropropane	96-12-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: Dichlorodifluoromethane	75-71-8	5	mg/kg	<5	<5	0.0	No Limit
		EP074: Chloromethane	74-87-3	5	mg/kg	<5	<5	0.0	No Limit
		EP074: Vinyl chloride	75-01-4	5	mg/kg	<5	<5	0.0	No Limit
		EP074: Bromomethane	74-83-9	5	mg/kg	<5	<5	0.0	No Limit
		EP074: Chloroethane	75-00-3	5	mg/kg	<5	<5	0.0	No Limit
		EP074: Trichlorofluoromethane	75-69-4	5	mg/kg	<5	<5	0.0	No Limit
EM2116568-003	Anonymous	EP074: 1.1-Dichloroethene	75-35-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: Iodomethane	74-88-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: trans-1.2-Dichloroethene	156-60-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: 1.1-Dichloroethane	75-34-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: cis-1.2-Dichloroethene	156-59-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: 1.1.1-Trichloroethane	71-55-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: 1.1-Dichloropropylene	563-58-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: Carbon Tetrachloride	56-23-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: 1.2-Dichloroethane	107-06-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: Trichloroethene	79-01-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: Dibromomethane	74-95-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: 1.1.2-Trichloroethane	79-00-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: 1.3-Dichloropropane	142-28-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: Tetrachloroethene	127-18-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: 1.1.1.2-Tetrachloroethane	630-20-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP074E: Halogenated Aliphatic Compounds (QC Lot: 3859788) - continued									
EM2116568-003	Anonymous	EP074: trans-1.4-Dichloro-2-butene	110-57-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: cis-1.4-Dichloro-2-butene	1476-11-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: 1.1.2.2-Tetrachloroethane	79-34-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: 1.2.3-Trichloropropane	96-18-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: Pentachloroethane	76-01-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: 1.2-Dibromo-3-chloropropane	96-12-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: Dichlorodifluoromethane	75-71-8	5	mg/kg	<5	<5	0.0	No Limit
		EP074: Chloromethane	74-87-3	5	mg/kg	<5	<5	0.0	No Limit
		EP074: Vinyl chloride	75-01-4	5	mg/kg	<5	<5	0.0	No Limit
		EP074: Bromomethane	74-83-9	5	mg/kg	<5	<5	0.0	No Limit
		EP074: Chloroethane	75-00-3	5	mg/kg	<5	<5	0.0	No Limit
		EP074: Trichlorofluoromethane	75-69-4	5	mg/kg	<5	<5	0.0	No Limit
EP074F: Halogenated Aromatic Compounds (QC Lot: 3859788)									
EM2116319-001	Anonymous	EP074: Chlorobenzene	108-90-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: Bromobenzene	108-86-1	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: 2-Chlorotoluene	95-49-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: 4-Chlorotoluene	106-43-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: 1.2.3-Trichlorobenzene	87-61-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EM2116568-003	Anonymous	EP074: Chlorobenzene	108-90-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: Bromobenzene	108-86-1	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: 2-Chlorotoluene	95-49-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: 4-Chlorotoluene	106-43-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: 1.2.3-Trichlorobenzene	87-61-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EP074G: Trihalomethanes (QC Lot: 3859788)									
EM2116319-001	Anonymous	EP074: Chloroform	67-66-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: Bromodichloromethane	75-27-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: Dibromochloromethane	124-48-1	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: Bromoform	75-25-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EM2116568-003	Anonymous	EP074: Chloroform	67-66-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: Bromodichloromethane	75-27-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: Dibromochloromethane	124-48-1	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: Bromoform	75-25-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 3860896)									
EM2116487-001	SB3 - 0.5	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 3860896) - continued									
EM2116487-001	SB3 - 0.5	EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 3866193)									
EM2116487-027	VB1-0.5	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EP075A: Phenolic Compounds (QC Lot: 3860898)									
EM2116487-020	VB3-1.3	EP075: Phenol	108-95-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 3- & 4-Methylphenol	1319-77-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 2.4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 2.4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 2.6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP075A: Phenolic Compounds (QC Lot: 3860898) - continued									
EM2116487-020	VB3-1.3	EP075: Pentachlorophenol	87-86-5	1	mg/kg	<1	<1	0.0	No Limit
EP075B: Polynuclear Aromatic Hydrocarbons (QC Lot: 3860898)									
EM2116487-020	VB3-1.3	EP075: Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 2-Methylnaphthalene	91-57-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 2-Chloronaphthalene	91-58-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: N-2-Fluorenyl Acetamide	53-96-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 7.12-Dimethylbenz(a)anthracene	57-97-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 3-Methylcholanthrene	56-49-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Sum of PAHs	----	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Benzo(b+j) & Benzo(k)fluoranthene	205-99-2 207-08-9	1	mg/kg	<1	<1	0.0	No Limit
EP075C: Phthalate Esters (QC Lot: 3860898)									
EM2116487-020	VB3-1.3	EP075: Dimethyl phthalate	131-11-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Diethyl phthalate	84-66-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Di-n-butyl phthalate	84-74-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Butyl benzyl phthalate	85-68-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: bis(2-ethylhexyl) phthalate	117-81-7	0.5	mg/kg	<5.0	<5.0	0.0	No Limit
		EP075: Di-n-octylphthalate	117-84-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EP075D: Nitrosamines (QC Lot: 3860898)									
EM2116487-020	VB3-1.3	EP075: N-Nitrosomethylethylamine	10595-95-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: N-Nitrosodiethylamine	55-18-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: N-Nitrosopyrrolidine	930-55-2	0.5	mg/kg	<1.0	<1.0	0.0	No Limit
		EP075: N-Nitrosomorpholine	59-89-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: N-Nitrosodi-n-propylamine	621-64-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: N-Nitrosopiperidine	100-75-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: N-Nitrosodibutylamine	924-16-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP075D: Nitrosamines (QC Lot: 3860898) - continued									
EM2116487-020	VB3-1.3	EP075: N-Nitrosodiphenyl & Diphenylamine	86-30-6 122-39-4	0.5	mg/kg	<1.0	<1.0	0.0	No Limit
		EP075: Methapyrilene	91-80-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EP075E: Nitroaromatics and Ketones (QC Lot: 3860898)									
EM2116487-020	VB3-1.3	EP075: 2-Picoline	109-06-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Acetophenone	98-86-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Nitrobenzene	98-95-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Isophorone	78-59-1	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 2.6-Dinitrotoluene	606-20-2	0.5	mg/kg	<1.0	<1.0	0.0	No Limit
		EP075: 2.4-Dinitrotoluene	121-14-2	0.5	mg/kg	<1.0	<1.0	0.0	No Limit
		EP075: 1-Naphthylamine	134-32-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 4-Nitroquinoline-N-oxide	56-57-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 5-Nitro-o-toluidine	99-55-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 1.3.5-Trinitrobenzene	99-35-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Phenacetin	62-44-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 4-Aminobiphenyl	92-67-1	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Pentachloronitrobenzene	82-68-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Pronamide	23950-58-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Dimethylaminoazobenzene	60-11-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Chlorobenzilate	510-15-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Azobenzene	103-33-3	1	mg/kg	<1	<1	0.0	No Limit
EP075F: Haloethers (QC Lot: 3860898)									
EM2116487-020	VB3-1.3	EP075: Bis(2-chloroethyl) ether	111-44-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Bis(2-chloroethoxy) methane	111-91-1	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 4-Chlorophenyl phenyl ether	7005-72-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 4-Bromophenyl phenyl ether	101-55-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EP075G: Chlorinated Hydrocarbons (QC Lot: 3860898)									
EM2116487-020	VB3-1.3	EP075: 1.3-Dichlorobenzene	541-73-1	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 1.4-Dichlorobenzene	106-46-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 1.2-Dichlorobenzene	95-50-1	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Hexachloroethane	67-72-1	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 1.2.4-Trichlorobenzene	120-82-1	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Hexachloropropylene	1888-71-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Hexachlorobutadiene	87-68-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Pentachlorobenzene	608-93-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Hexachlorobenzene (HCB)	118-74-1	0.5	mg/kg	<1.0	<1.0	0.0	No Limit
		EP075: Hexachlorocyclopentadiene	77-47-4	2.5	mg/kg	<2.5	<2.5	0.0	No Limit
EP075H: Anilines and Benzidines (QC Lot: 3860898)									
EM2116487-020	VB3-1.3	EP075: Aniline	62-53-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 4-Chloroaniline	106-47-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP075H: Anilines and Benzidines (QC Lot: 3860898) - continued									
EM2116487-020	VB3-1.3	EP075: 2-Nitroaniline	88-74-4	0.5	mg/kg	<1.0	<1.0	0.0	No Limit
		EP075: 3-Nitroaniline	99-09-2	0.5	mg/kg	<1.0	<1.0	0.0	No Limit
		EP075: Dibenzofuran	132-64-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 4-Nitroaniline	100-01-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Carbazole	86-74-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 3.3`-Dichlorobenzidine	91-94-1	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EP075I: Organochlorine Pesticides (QC Lot: 3860898)									
EM2116487-020	VB3-1.3	EP075: alpha-BHC	319-84-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: beta-BHC	319-85-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: gamma-BHC	58-89-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: delta-BHC	319-86-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Heptachlor	76-44-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Aldrin	309-00-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Heptachlor epoxide	1024-57-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: alpha-Endosulfan	959-98-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 4.4`-DDE	72-55-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Dieldrin	60-57-1	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Endrin	72-20-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: beta-Endosulfan	33213-65-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 4.4`-DDD	72-54-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Endosulfan sulfate	1031-07-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 4.4`-DDT	50-29-3	0.5	mg/kg	<1.0	<1.0	0.0	No Limit
EP075J: Organophosphorus Pesticides (QC Lot: 3860898)									
EM2116487-020	VB3-1.3	EP075: Dichlorvos	62-73-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Dimethoate	60-51-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Diazinon	333-41-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Chlorpyrifos-methyl	5598-13-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Malathion	121-75-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Fenthion	55-38-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Chlorpyrifos	2921-88-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Pirimphos-ethyl	23505-41-1	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Chlorfenvinphos	470-90-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Prothiofos	34643-46-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Ethion	563-12-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 3859862)									
EM2116487-001	SB3 - 0.5	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.0	No Limit
EM2116487-015	SB2-0.5	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 3860897)									
EM2116487-015	SB2-0.5	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 3860897) - continued									
EM2116487-015	SB2-0.5	EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
		EP071: C10 - C36 Fraction (sum)	----	50	mg/kg	<50	<50	0.0	No Limit
EM2116487-001	SB3 - 0.5	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
		EP071: C10 - C36 Fraction (sum)	----	50	mg/kg	<50	<50	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 3866194)									
EM2116487-027	VB1-0.5	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
		EP071: C10 - C36 Fraction (sum)	----	50	mg/kg	<50	<50	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 3866195)									
EM2116487-027	VB1-0.5	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 3859862)									
EM2116487-001	SB3 - 0.5	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.0	No Limit
EM2116487-015	SB2-0.5	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 3860897)									
EM2116487-015	SB2-0.5	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
		EP071: >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	<50	0.0	No Limit
EM2116487-001	SB3 - 0.5	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
		EP071: >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	<50	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 3866194)									
EM2116487-027	VB1-0.5	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
		EP071: >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	<50	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 3866195)									
EM2116487-027	VB1-0.5	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.0	No Limit
EP080: BTEXN (QC Lot: 3859862)									
EM2116487-001	SB3 - 0.5	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP080: BTEXN (QC Lot: 3859862) - continued									
EM2116487-001	SB3 - 0.5	EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.0	No Limit
EM2116487-015	SB2-0.5	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.0	No Limit
EP080: BTEXN (QC Lot: 3866195)									
EM2116487-027	VB1-0.5	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.0	No Limit

Method Blank (MB) and Laboratory Control Sample (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 3860237)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	123 mg/kg	103	70.0	130
EG005T: Barium	7440-39-3	10	mg/kg	<10	99.3 mg/kg	94.0	70.0	130
EG005T: Beryllium	7440-41-7	1	mg/kg	<1	0.67 mg/kg	95.4	70.0	130
EG005T: Boron	7440-42-8	50	mg/kg	<50	----	----	----	----
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	1.23 mg/kg	65.1	50.0	130
EG005T: Chromium	7440-47-3	2	mg/kg	<2	20.2 mg/kg	99.6	70.0	130
EG005T: Cobalt	7440-48-4	2	mg/kg	<2	11.2 mg/kg	91.4	70.0	130
EG005T: Copper	7440-50-8	5	mg/kg	<5	55.9 mg/kg	96.6	70.0	130
EG005T: Lead	7439-92-1	5	mg/kg	<5	62.4 mg/kg	95.4	70.0	130
EG005T: Manganese	7439-96-5	5	mg/kg	<5	590 mg/kg	94.7	70.0	130
EG005T: Nickel	7440-02-0	2	mg/kg	<2	15.4 mg/kg	97.0	70.0	130
EG005T: Selenium	7782-49-2	5	mg/kg	<5	----	----	----	----
EG005T: Vanadium	7440-62-2	5	mg/kg	<5	61.3 mg/kg	97.9	70.0	130
EG005T: Zinc	7440-66-6	5	mg/kg	<5	162 mg/kg	77.0	70.0	130
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 3860239)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	123 mg/kg	99.1	70.0	130
EG005T: Barium	7440-39-3	10	mg/kg	<10	99.3 mg/kg	93.6	70.0	130
EG005T: Beryllium	7440-41-7	1	mg/kg	<1	0.67 mg/kg	99.0	70.0	130
EG005T: Boron	7440-42-8	50	mg/kg	<50	----	----	----	----
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	1.23 mg/kg	62.2	50.0	130
EG005T: Chromium	7440-47-3	2	mg/kg	<2	20.2 mg/kg	100	70.0	130
EG005T: Cobalt	7440-48-4	2	mg/kg	<2	11.2 mg/kg	91.4	70.0	130
EG005T: Copper	7440-50-8	5	mg/kg	<5	55.9 mg/kg	94.9	70.0	130
EG005T: Lead	7439-92-1	5	mg/kg	<5	62.4 mg/kg	93.3	70.0	130
EG005T: Manganese	7439-96-5	5	mg/kg	<5	590 mg/kg	93.6	70.0	130
EG005T: Nickel	7440-02-0	2	mg/kg	<2	15.4 mg/kg	97.4	70.0	130
EG005T: Selenium	7782-49-2	5	mg/kg	<5	----	----	----	----
EG005T: Vanadium	7440-62-2	5	mg/kg	<5	61.3 mg/kg	96.4	70.0	130
EG005T: Zinc	7440-66-6	5	mg/kg	<5	162 mg/kg	78.4	70.0	130
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 3866187)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	123 mg/kg	101	70.0	130
EG005T: Barium	7440-39-3	10	mg/kg	<10	99.3 mg/kg	94.8	70.0	130
EG005T: Beryllium	7440-41-7	1	mg/kg	<1	0.67 mg/kg	100	70.0	130
EG005T: Boron	7440-42-8	50	mg/kg	<50	----	----	----	----

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 3866187) - continued								
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	1.23 mg/kg	59.7	50.0	130
EG005T: Chromium	7440-47-3	2	mg/kg	<2	20.2 mg/kg	105	70.0	130
EG005T: Cobalt	7440-48-4	2	mg/kg	<2	11.2 mg/kg	91.2	70.0	130
EG005T: Copper	7440-50-8	5	mg/kg	<5	55.9 mg/kg	94.7	70.0	130
EG005T: Lead	7439-92-1	5	mg/kg	<5	62.4 mg/kg	93.8	70.0	130
EG005T: Manganese	7439-96-5	5	mg/kg	<5	590 mg/kg	90.9	70.0	130
EG005T: Nickel	7440-02-0	2	mg/kg	<2	15.4 mg/kg	100	70.0	130
EG005T: Selenium	7782-49-2	5	mg/kg	<5	----	----	----	----
EG005T: Vanadium	7440-62-2	5	mg/kg	<5	61.3 mg/kg	98.4	70.0	130
EG005T: Zinc	7440-66-6	5	mg/kg	<5	162 mg/kg	74.1	70.0	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 3860236)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	0.64 mg/kg	90.6	70.0	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 3860238)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	0.64 mg/kg	89.1	70.0	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 3866188)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	0.64 mg/kg	92.2	70.0	130
EP074A: Monocyclic Aromatic Hydrocarbons (QCLot: 3859788)								
EP074: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	96.4	66.4	121
EP074: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	93.6	70.6	116
EP074: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	95.0	70.4	117
EP074: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	2 mg/kg	96.1	70.0	119
EP074: Styrene	100-42-5	0.5	mg/kg	<0.5	1 mg/kg	94.1	70.8	115
EP074: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	99.4	72.6	120
EP074: Isopropylbenzene	98-82-8	0.5	mg/kg	<0.5	1 mg/kg	93.3	68.6	116
EP074: n-Propylbenzene	103-65-1	0.5	mg/kg	<0.5	1 mg/kg	76.9	59.8	113
EP074: 1.3.5-Trimethylbenzene	108-67-8	0.5	mg/kg	<0.5	1 mg/kg	81.7	63.4	112
EP074: sec-Butylbenzene	135-98-8	0.5	mg/kg	<0.5	1 mg/kg	83.3	61.5	114
EP074: 1.2.4-Trimethylbenzene	95-63-6	0.5	mg/kg	<0.5	1 mg/kg	82.0	63.1	112
EP074: tert-Butylbenzene	98-06-6	0.5	mg/kg	<0.5	1 mg/kg	83.5	63.6	113
EP074: p-Isopropyltoluene	99-87-6	0.5	mg/kg	<0.5	1 mg/kg	85.8	60.8	114
EP074: n-Butylbenzene	104-51-8	0.5	mg/kg	<0.5	1 mg/kg	76.3	54.9	113
EP074B: Oxygenated Compounds (QCLot: 3859788)								
EP074: Vinyl Acetate	108-05-4	5	mg/kg	<5	10 mg/kg	96.2	51.4	128
EP074: 2-Butanone (MEK)	78-93-3	5	mg/kg	<5	10 mg/kg	92.9	61.2	128
EP074: 4-Methyl-2-pentanone (MIBK)	108-10-1	5	mg/kg	<5	10 mg/kg	94.6	63.2	137
EP074: 2-Hexanone (MBK)	591-78-6	5	mg/kg	<5	10 mg/kg	87.9	65.0	130
EP074C: Sulfonated Compounds (QCLot: 3859788)								

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EP074C: Sulfonated Compounds (QCLot: 3859788) - continued								
EP074: Carbon disulfide	75-15-0	0.5	mg/kg	<0.5	1 mg/kg	87.9	48.5	132
EP074D: Fumigants (QCLot: 3859788)								
EP074: 2.2-Dichloropropane	594-20-7	0.5	mg/kg	<0.5	1 mg/kg	85.1	61.4	116
EP074: 1.2-Dichloropropane	78-87-5	0.5	mg/kg	<0.5	1 mg/kg	90.2	70.1	116
EP074: cis-1.3-Dichloropropylene	10061-01-5	0.5	mg/kg	<0.5	1 mg/kg	85.2	61.7	112
EP074: trans-1.3-Dichloropropylene	10061-02-6	0.5	mg/kg	<0.5	1 mg/kg	82.5	63.8	110
EP074: 1.2-Dibromoethane (EDB)	106-93-4	0.5	mg/kg	<0.5	1 mg/kg	85.4	67.0	114
EP074E: Halogenated Aliphatic Compounds (QCLot: 3859788)								
EP074: Dichlorodifluoromethane	75-71-8	5	mg/kg	<5	10 mg/kg	69.9	26.0	137
EP074: Chloromethane	74-87-3	5	mg/kg	<5	10 mg/kg	86.2	49.4	140
EP074: Vinyl chloride	75-01-4	5	mg/kg	<5	10 mg/kg	81.8	46.0	138
EP074: Bromomethane	74-83-9	5	mg/kg	<5	10 mg/kg	89.2	39.1	127
EP074: Chloroethane	75-00-3	5	mg/kg	<5	10 mg/kg	81.2	59.2	128
EP074: Trichlorofluoromethane	75-69-4	5	mg/kg	<5	10 mg/kg	86.6	60.1	124
EP074: 1.1-Dichloroethene	75-35-4	0.5	mg/kg	<0.5	1 mg/kg	87.6	55.2	122
EP074: Iodomethane	74-88-4	0.5	mg/kg	<0.5	1 mg/kg	71.4	47.0	125
EP074: trans-1.2-Dichloroethene	156-60-5	0.5	mg/kg	<0.5	1 mg/kg	90.1	63.6	120
EP074: 1.1-Dichloroethane	75-34-3	0.5	mg/kg	<0.5	1 mg/kg	94.4	64.5	120
EP074: cis-1.2-Dichloroethene	156-59-2	0.5	mg/kg	<0.5	1 mg/kg	96.4	67.5	121
EP074: 1.1.1-Trichloroethane	71-55-6	0.5	mg/kg	<0.5	1 mg/kg	89.3	57.0	117
EP074: 1.1-Dichloropropylene	563-58-6	0.5	mg/kg	<0.5	1 mg/kg	90.1	60.3	120
EP074: Carbon Tetrachloride	56-23-5	0.5	mg/kg	<0.5	1 mg/kg	85.1	57.7	113
EP074: 1.2-Dichloroethane	107-06-2	0.5	mg/kg	<0.5	1 mg/kg	90.2	68.9	117
EP074: Trichloroethene	79-01-6	0.5	mg/kg	<0.5	1 mg/kg	94.3	65.5	119
EP074: Dibromomethane	74-95-3	0.5	mg/kg	<0.5	1 mg/kg	87.5	68.4	115
EP074: 1.1.2-Trichloroethane	79-00-5	0.5	mg/kg	<0.5	1 mg/kg	94.6	69.8	118
EP074: 1.3-Dichloropropane	142-28-9	0.5	mg/kg	<0.5	1 mg/kg	94.7	70.6	118
EP074: Tetrachloroethene	127-18-4	0.5	mg/kg	<0.5	1 mg/kg	86.4	65.6	117
EP074: 1.1.1.2-Tetrachloroethane	630-20-6	0.5	mg/kg	<0.5	1 mg/kg	85.7	62.8	106
EP074: trans-1.4-Dichloro-2-butene	110-57-6	0.5	mg/kg	<0.5	1 mg/kg	81.1	58.9	117
EP074: cis-1.4-Dichloro-2-butene	1476-11-5	0.5	mg/kg	<0.5	1 mg/kg	68.4	57.8	110
EP074: 1.1.2.2-Tetrachloroethane	79-34-5	0.5	mg/kg	<0.5	1 mg/kg	103	72.3	127
EP074: 1.2.3-Trichloropropane	96-18-4	0.5	mg/kg	<0.5	1 mg/kg	90.9	69.0	123
EP074: Pentachloroethane	76-01-7	0.5	mg/kg	<0.5	1 mg/kg	78.7	59.0	100
EP074: 1.2-Dibromo-3-chloropropane	96-12-8	0.5	mg/kg	<0.5	1 mg/kg	76.0	60.8	111
EP074F: Halogenated Aromatic Compounds (QCLot: 3859788)								
EP074: Chlorobenzene	108-90-7	0.5	mg/kg	<0.5	1 mg/kg	95.7	72.5	115
EP074: Bromobenzene	108-86-1	0.5	mg/kg	<0.5	1 mg/kg	84.1	69.2	112

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EP074F: Halogenated Aromatic Compounds (QCLot: 3859788) - continued								
EP074: 2-Chlorotoluene	95-49-8	0.5	mg/kg	<0.5	1 mg/kg	83.4	65.9	114
EP074: 4-Chlorotoluene	106-43-4	0.5	mg/kg	<0.5	1 mg/kg	83.5	65.4	113
EP074: 1.2.3-Trichlorobenzene	87-61-6	0.5	mg/kg	<0.5	1 mg/kg	89.1	59.3	123
EP074G: Trihalomethanes (QCLot: 3859788)								
EP074: Chloroform	67-66-3	0.5	mg/kg	<0.5	1 mg/kg	94.2	67.5	119
EP074: Bromodichloromethane	75-27-4	0.5	mg/kg	<0.5	1 mg/kg	92.1	57.8	117
EP074: Dibromochloromethane	124-48-1	0.5	mg/kg	<0.5	1 mg/kg	86.0	60.3	108
EP074: Bromoform	75-25-2	0.5	mg/kg	<0.5	1 mg/kg	81.9	55.7	108
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 3860896)								
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	3 mg/kg	109	85.7	123
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	3 mg/kg	110	81.0	123
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	3 mg/kg	106	83.6	120
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	3 mg/kg	102	81.3	126
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	3 mg/kg	104	79.4	123
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	3 mg/kg	109	81.7	127
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	3 mg/kg	104	78.3	124
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	3 mg/kg	108	79.9	128
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	3 mg/kg	101	76.9	123
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	3 mg/kg	106	80.9	130
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	3 mg/kg	92.8	70.0	121
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	3 mg/kg	114	80.4	130
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	3 mg/kg	107	70.2	123
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	3 mg/kg	89.1	67.9	122
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	3 mg/kg	90.5	65.8	123
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	3 mg/kg	95.9	65.8	127
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 3866193)								
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	3 mg/kg	109	85.7	123
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	3 mg/kg	110	81.0	123
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	3 mg/kg	106	83.6	120
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	3 mg/kg	102	81.3	126
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	3 mg/kg	104	79.4	123
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	3 mg/kg	109	81.7	127
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	3 mg/kg	104	78.3	124
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	3 mg/kg	108	79.9	128
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	3 mg/kg	101	76.9	123
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	3 mg/kg	106	80.9	130

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 3866193) - continued								
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	3 mg/kg	92.8	70.0	121
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	3 mg/kg	114	80.4	130
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	3 mg/kg	107	70.2	123
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	3 mg/kg	89.1	67.9	122
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	3 mg/kg	90.5	65.8	123
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	3 mg/kg	95.9	65.8	127
EP075A: Phenolic Compounds (QCLot: 3860898)								
EP075: Phenol	108-95-2	0.5	mg/kg	<0.5	1.5 mg/kg	107	75.1	127
EP075: 2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	1.5 mg/kg	107	77.7	123
EP075: 2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	1.5 mg/kg	111	72.1	127
EP075: 3- & 4-Methylphenol	1319-77-3	0.5	mg/kg	<0.5	1.5 mg/kg	108	73.1	127
EP075: 2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	1.5 mg/kg	103	64.0	126
EP075: 2.4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	1.5 mg/kg	106	74.4	126
EP075: 2.4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	1.5 mg/kg	102	69.2	123
EP075: 2.6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	1.5 mg/kg	101	76.2	122
EP075: 4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	1.5 mg/kg	99.4	68.9	124
EP075: 2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	1.5 mg/kg	101	65.5	123
EP075: 2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	1.5 mg/kg	105	61.0	123
EP075: Pentachlorophenol	87-86-5	1	mg/kg	<1	1.5 mg/kg	90.8	43.1	131
EP075B: Polynuclear Aromatic Hydrocarbons (QCLot: 3860898)								
EP075: Naphthalene	91-20-3	0.5	mg/kg	<0.5	1.5 mg/kg	106	78.7	126
EP075: 2-Methylnaphthalene	91-57-6	0.5	mg/kg	<0.5	1.5 mg/kg	103	77.5	126
EP075: 2-Chloronaphthalene	91-58-7	0.5	mg/kg	<0.5	1.5 mg/kg	102	74.7	126
EP075: Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	1.5 mg/kg	106	77.2	126
EP075: Acenaphthene	83-32-9	0.5	mg/kg	<0.5	1.5 mg/kg	105	75.7	126
EP075: Fluorene	86-73-7	0.5	mg/kg	<0.5	1.5 mg/kg	103	78.6	126
EP075: Phenanthrene	85-01-8	0.5	mg/kg	<0.5	1.5 mg/kg	98.4	78.1	128
EP075: Anthracene	120-12-7	0.5	mg/kg	<0.5	1.5 mg/kg	97.9	77.1	130
EP075: Fluoranthene	206-44-0	0.5	mg/kg	<0.5	1.5 mg/kg	94.8	76.2	132
EP075: Pyrene	129-00-0	0.5	mg/kg	<0.5	1.5 mg/kg	95.3	70.7	135
EP075: N-2-Fluorenyl Acetamide	53-96-3	0.5	mg/kg	<0.5	1.5 mg/kg	85.3	63.8	134
EP075: Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	1.5 mg/kg	87.2	75.1	133
EP075: Chrysene	218-01-9	0.5	mg/kg	<0.5	1.5 mg/kg	96.3	76.2	132
EP075: Benzo(b+j) & Benzo(k)fluoranthene	205-99-2 207-08-9	1	mg/kg	<1	3 mg/kg	95.2	76.5	128
EP075: 7.12-Dimethylbenz(a)anthracene	57-97-6	0.5	mg/kg	<0.5	1.5 mg/kg	95.2	75.7	134
EP075: Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	1.5 mg/kg	97.0	72.4	128
EP075: 3-Methylcholanthrene	56-49-5	0.5	mg/kg	<0.5	1.5 mg/kg	92.8	70.6	130

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EP075B: Polynuclear Aromatic Hydrocarbons (QCLot: 3860898) - continued								
EP075: Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	1.5 mg/kg	98.0	68.7	123
EP075: Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	1.5 mg/kg	98.5	69.7	123
EP075: Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	1.5 mg/kg	96.0	67.3	125
EP075: Sum of PAHs	----	0.5	mg/kg	<0.5	----	----	----	----
EP075C: Phthalate Esters (QCLot: 3860898)								
EP075: Dimethyl phthalate	131-11-3	0.5	mg/kg	<0.5	1.5 mg/kg	103	74.6	125
EP075: Diethyl phthalate	84-66-2	0.5	mg/kg	<0.5	1.5 mg/kg	98.6	76.7	126
EP075: Di-n-butyl phthalate	84-74-2	0.5	mg/kg	<0.5	1.5 mg/kg	95.0	76.0	132
EP075: Butyl benzyl phthalate	85-68-7	0.5	mg/kg	<0.5	1.5 mg/kg	93.1	74.1	134
EP075: bis(2-ethylhexyl) phthalate	117-81-7	0.5	mg/kg	<0.5	1.5 mg/kg	96.4	74.1	122
EP075: Di-n-octylphthalate	117-84-0	0.5	mg/kg	<0.5	1.5 mg/kg	94.9	73.5	130
EP075D: Nitrosamines (QCLot: 3860898)								
EP075: N-Nitrosomethylethylamine	10595-95-6	0.5	mg/kg	<0.5	1.5 mg/kg	104	65.0	136
EP075: N-Nitrosodiethylamine	55-18-5	0.5	mg/kg	<0.5	1.5 mg/kg	98.8	68.8	130
EP075: N-Nitrosopyrrolidine	930-55-2	0.5	mg/kg	<0.5	1.5 mg/kg	99.9	67.7	126
EP075: N-Nitrosomorpholine	59-89-2	0.5	mg/kg	<0.5	1.5 mg/kg	106	69.3	130
EP075: N-Nitrosodi-n-propylamine	621-64-7	0.5	mg/kg	<0.5	1.5 mg/kg	107	70.8	130
EP075: N-Nitrosopiperidine	100-75-4	0.5	mg/kg	<0.5	1.5 mg/kg	96.7	73.3	128
EP075: N-Nitrosodibutylamine	924-16-3	0.5	mg/kg	<0.5	1.5 mg/kg	113	60.6	136
EP075: N-Nitrosodiphenyl & Diphenylamine	86-30-6 122-39-4	0.5	mg/kg	<0.5	1.5 mg/kg	102	74.0	125
EP075: Methapyrilene	91-80-5	0.5	mg/kg	<0.5	1.5 mg/kg	17.8	10.0	115
EP075E: Nitroaromatics and Ketones (QCLot: 3860898)								
EP075: 2-Picoline	109-06-8	0.5	mg/kg	<0.5	1.5 mg/kg	90.9	54.0	131
EP075: Acetophenone	98-86-2	0.5	mg/kg	<0.5	1.5 mg/kg	108	76.6	125
EP075: Nitrobenzene	98-95-3	0.5	mg/kg	<0.5	1.5 mg/kg	106	75.7	125
EP075: Isophorone	78-59-1	0.5	mg/kg	<0.5	1.5 mg/kg	104	76.8	126
EP075: 2.6-Dinitrotoluene	606-20-2	0.5	mg/kg	<0.5	1.5 mg/kg	98.4	70.5	124
EP075: 2.4-Dinitrotoluene	121-14-2	0.5	mg/kg	<0.5	1.5 mg/kg	97.2	68.3	124
EP075: 1-Naphthylamine	134-32-7	0.5	mg/kg	<0.5	1.5 mg/kg	# 118	10.0	107
EP075: 4-Nitroquinoline-N-oxide	56-57-5	0.5	mg/kg	<0.5	1.5 mg/kg	38.2	10.0	134
EP075: 5-Nitro-o-toluidine	99-55-8	0.5	mg/kg	<0.5	1.5 mg/kg	83.3	56.8	132
EP075: Azobenzene	103-33-3	1	mg/kg	<1	1.5 mg/kg	99.1	74.4	125
EP075: 1.3.5-Trinitrobenzene	99-35-4	0.5	mg/kg	<0.5	1.5 mg/kg	75.4	37.9	132
EP075: Phenacetin	62-44-2	0.5	mg/kg	<0.5	1.5 mg/kg	96.6	69.7	128
EP075: 4-Aminobiphenyl	92-67-1	0.5	mg/kg	<0.5	1.5 mg/kg	126	25.6	130
EP075: Pentachloronitrobenzene	82-68-8	0.5	mg/kg	<0.5	1.5 mg/kg	98.0	74.9	127
EP075: Pronamide	23950-58-5	0.5	mg/kg	<0.5	1.5 mg/kg	93.9	77.2	132

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EP075E: Nitroaromatics and Ketones (QCLot: 3860898) - continued								
EP075: Dimethylaminoazobenzene	60-11-7	0.5	mg/kg	<0.5	1.5 mg/kg	84.2	71.4	132
EP075: Chlorobenzilate	510-15-6	0.5	mg/kg	<0.5	1.5 mg/kg	89.5	73.4	131
EP075F: Haloethers (QCLot: 3860898)								
EP075: Bis(2-chloroethyl) ether	111-44-4	0.5	mg/kg	<0.5	1.5 mg/kg	104	74.0	131
EP075: Bis(2-chloroethoxy) methane	111-91-1	0.5	mg/kg	<0.5	1.5 mg/kg	109	75.2	127
EP075: 4-Chlorophenyl phenyl ether	7005-72-3	0.5	mg/kg	<0.5	1.5 mg/kg	101	77.0	126
EP075: 4-Bromophenyl phenyl ether	101-55-3	0.5	mg/kg	<0.5	1.5 mg/kg	104	73.9	125
EP075G: Chlorinated Hydrocarbons (QCLot: 3860898)								
EP075: 1.3-Dichlorobenzene	541-73-1	0.5	mg/kg	<0.5	1.5 mg/kg	105	77.9	123
EP075: 1.4-Dichlorobenzene	106-46-7	0.5	mg/kg	<0.5	1.5 mg/kg	104	77.3	124
EP075: 1.2-Dichlorobenzene	95-50-1	0.5	mg/kg	<0.5	1.5 mg/kg	107	76.8	125
EP075: Hexachloroethane	67-72-1	0.5	mg/kg	<0.5	1.5 mg/kg	110	73.1	125
EP075: 1.2.4-Trichlorobenzene	120-82-1	0.5	mg/kg	<0.5	1.5 mg/kg	110	72.8	125
EP075: Hexachloropropylene	1888-71-7	0.5	mg/kg	<0.5	1.5 mg/kg	101	64.5	131
EP075: Hexachlorobutadiene	87-68-3	0.5	mg/kg	<0.5	1.5 mg/kg	101	75.8	127
EP075: Hexachlorocyclopentadiene	77-47-4	2.5	mg/kg	<2.5	1.5 mg/kg	43.6	10.0	128
EP075: Pentachlorobenzene	608-93-5	0.5	mg/kg	<0.5	1.5 mg/kg	102	76.7	125
EP075: Hexachlorobenzene (HCB)	118-74-1	0.5	mg/kg	<0.5	1.5 mg/kg	92.0	75.1	128
EP075H: Anilines and Benzidines (QCLot: 3860898)								
EP075: Aniline	62-53-3	0.5	mg/kg	<0.5	1.5 mg/kg	110	40.2	131
EP075: 4-Chloroaniline	106-47-8	0.5	mg/kg	<0.5	1.5 mg/kg	81.6	10.0	114
EP075: 2-Nitroaniline	88-74-4	0.5	mg/kg	<0.5	1.5 mg/kg	101	65.9	122
EP075: 3-Nitroaniline	99-09-2	0.5	mg/kg	<0.5	1.5 mg/kg	77.3	40.6	137
EP075: Dibenzofuran	132-64-9	0.5	mg/kg	<0.5	1.5 mg/kg	100	78.0	126
EP075: 4-Nitroaniline	100-01-6	0.5	mg/kg	<0.5	1.5 mg/kg	103	54.4	137
EP075: Carbazole	86-74-8	0.5	mg/kg	<0.5	1.5 mg/kg	96.4	67.3	134
EP075: 3.3`-Dichlorobenzidine	91-94-1	0.5	mg/kg	<0.5	1.5 mg/kg	77.4	72.6	130
EP075I: Organochlorine Pesticides (QCLot: 3860898)								
EP075: alpha-BHC	319-84-6	0.5	mg/kg	<0.5	1.5 mg/kg	100	76.6	127
EP075: beta-BHC	319-85-7	0.5	mg/kg	<0.5	1.5 mg/kg	99.9	72.5	132
EP075: gamma-BHC	58-89-9	0.5	mg/kg	<0.5	1.5 mg/kg	98.8	75.3	129
EP075: delta-BHC	319-86-8	0.5	mg/kg	<0.5	1.5 mg/kg	93.9	72.1	133
EP075: Heptachlor	76-44-8	0.5	mg/kg	<0.5	1.5 mg/kg	91.2	71.5	131
EP075: Aldrin	309-00-2	0.5	mg/kg	<0.5	1.5 mg/kg	92.7	74.7	132
EP075: Heptachlor epoxide	1024-57-3	0.5	mg/kg	<0.5	1.5 mg/kg	92.3	73.1	132
EP075: alpha-Endosulfan	959-98-8	0.5	mg/kg	<0.5	1.5 mg/kg	103	72.8	132
EP075: 4.4`-DDE	72-55-9	0.5	mg/kg	<0.5	1.5 mg/kg	88.6	76.1	129
EP075: Dieldrin	60-57-1	0.5	mg/kg	<0.5	1.5 mg/kg	94.2	74.7	133

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EP075I: Organochlorine Pesticides (QCLot: 3860898) - continued								
EP075: Endrin	72-20-8	0.5	mg/kg	<0.5	1.5 mg/kg	94.9	70.4	129
EP075: beta-Endosulfan	33213-65-9	0.5	mg/kg	<0.5	1.5 mg/kg	95.8	72.1	129
EP075: 4.4`-DDD	72-54-8	0.5	mg/kg	<0.5	1.5 mg/kg	89.6	75.0	130
EP075: Endosulfan sulfate	1031-07-8	0.5	mg/kg	<0.5	1.5 mg/kg	90.6	67.2	137
EP075: 4.4`-DDT	50-29-3	0.5	mg/kg	<0.5	1.5 mg/kg	104	57.5	136
EP075J: Organophosphorus Pesticides (QCLot: 3860898)								
EP075: Dichlorvos	62-73-7	0.5	mg/kg	<0.5	1.5 mg/kg	92.4	65.4	123
EP075: Dimethoate	60-51-5	0.5	mg/kg	<0.5	1.5 mg/kg	83.2	49.2	138
EP075: Diazinon	333-41-5	0.5	mg/kg	<0.5	1.5 mg/kg	99.7	75.8	132
EP075: Chlorpyrifos-methyl	5598-13-0	0.5	mg/kg	<0.5	1.5 mg/kg	87.5	70.9	129
EP075: Malathion	121-75-5	0.5	mg/kg	<0.5	1.5 mg/kg	90.2	67.9	134
EP075: Fenthion	55-38-9	0.5	mg/kg	<0.5	1.5 mg/kg	92.0	73.2	131
EP075: Chlorpyrifos	2921-88-2	0.5	mg/kg	<0.5	1.5 mg/kg	95.1	76.3	130
EP075: Pirimphos-ethyl	23505-41-1	0.5	mg/kg	<0.5	1.5 mg/kg	99.6	74.5	133
EP075: Chlorfenvinphos	470-90-6	0.5	mg/kg	<0.5	1.5 mg/kg	78.3	55.3	131
EP075: Prothiofos	34643-46-4	0.5	mg/kg	<0.5	1.5 mg/kg	93.9	75.2	130
EP075: Ethion	563-12-2	0.5	mg/kg	<0.5	1.5 mg/kg	94.8	76.5	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3859862)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	36 mg/kg	114	58.6	131
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3860897)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	840 mg/kg	97.9	75.0	128
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	2900 mg/kg	98.0	82.0	123
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	1490 mg/kg	91.5	82.4	121
EP071: C10 - C36 Fraction (sum)	----	50	mg/kg	<50	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3866194)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	840 mg/kg	94.9	75.0	128
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	2900 mg/kg	94.0	82.0	123
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	1490 mg/kg	94.0	82.4	121
EP071: C10 - C36 Fraction (sum)	----	50	mg/kg	<50	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3866195)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	36 mg/kg	99.0	58.6	131
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3859862)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	45 mg/kg	110	59.3	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3860897)								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	1110 mg/kg	100	77.0	130
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	3900 mg/kg	92.3	81.5	120
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	290 mg/kg	93.4	73.3	137
EP071: >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	----	----	----	----

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3866194)								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	1110 mg/kg	108	77.0	130
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	3900 mg/kg	89.3	81.5	120
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	290 mg/kg	94.6	73.3	137
EP071: >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3866195)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	45 mg/kg	104	59.3	128
EP080: BTEXN (QCLot: 3859862)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	2 mg/kg	107	61.6	117
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	2 mg/kg	112	65.8	125
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	2 mg/kg	114	65.8	124
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	4 mg/kg	119	64.8	134
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	2 mg/kg	118	68.7	132
EP080: Naphthalene	91-20-3	1	mg/kg	<1	0.5 mg/kg	90.0	61.8	123
EP080: BTEXN (QCLot: 3866195)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	2 mg/kg	103	61.6	117
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	2 mg/kg	104	65.8	125
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	2 mg/kg	104	65.8	124
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	4 mg/kg	105	64.8	134
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	2 mg/kg	106	68.7	132
EP080: Naphthalene	91-20-3	1	mg/kg	<1	0.5 mg/kg	91.7	61.8	123

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
				Concentration	MS	Low	High
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 3860237)							
EM2115405-002	Anonymous	EG005T: Arsenic	7440-38-2	50 mg/kg	102	78.0	124
		EG005T: Cadmium	7440-43-9	50 mg/kg	96.4	79.7	116
		EG005T: Chromium	7440-47-3	50 mg/kg	97.5	79.0	121
		EG005T: Copper	7440-50-8	250 mg/kg	106	80.0	120
		EG005T: Lead	7439-92-1	250 mg/kg	99.6	80.0	120
		EG005T: Nickel	7440-02-0	50 mg/kg	96.5	78.0	120
		EG005T: Zinc	7440-66-6	250 mg/kg	91.8	80.0	120

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 3860239)							
EM2116487-016	VB2-0.5	EG005T: Arsenic	7440-38-2	50 mg/kg	96.7	78.0	124
		EG005T: Cadmium	7440-43-9	50 mg/kg	92.4	79.7	116
		EG005T: Chromium	7440-47-3	50 mg/kg	92.2	79.0	121
		EG005T: Copper	7440-50-8	250 mg/kg	103	80.0	120
		EG005T: Lead	7439-92-1	250 mg/kg	94.4	80.0	120
		EG005T: Nickel	7440-02-0	50 mg/kg	91.1	78.0	120
		EG005T: Zinc	7440-66-6	250 mg/kg	87.5	80.0	120
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 3866187)							
EM2116487-028	VB1-1.0m	EG005T: Arsenic	7440-38-2	50 mg/kg	93.1	78.0	124
		EG005T: Cadmium	7440-43-9	50 mg/kg	96.3	79.7	116
		EG005T: Chromium	7440-47-3	50 mg/kg	99.7	79.0	121
		EG005T: Copper	7440-50-8	250 mg/kg	102	80.0	120
		EG005T: Lead	7439-92-1	250 mg/kg	95.8	80.0	120
		EG005T: Nickel	7440-02-0	50 mg/kg	94.5	78.0	120
		EG005T: Zinc	7440-66-6	250 mg/kg	86.0	80.0	120
EG035T: Total Recoverable Mercury by FIMS (QCLot: 3860236)							
EM2115405-002	Anonymous	EG035T: Mercury	7439-97-6	0.5 mg/kg	97.8	76.0	116
EG035T: Total Recoverable Mercury by FIMS (QCLot: 3860238)							
EM2116487-016	VB2-0.5	EG035T: Mercury	7439-97-6	0.5 mg/kg	105	76.0	116
EG035T: Total Recoverable Mercury by FIMS (QCLot: 3866188)							
EM2116487-028	VB1-1.0m	EG035T: Mercury	7439-97-6	0.5 mg/kg	102	76.0	116
EP074A: Monocyclic Aromatic Hydrocarbons (QCLot: 3859788)							
EM2116319-012	Anonymous	EP074: Benzene	71-43-2	2 mg/kg	104	51.0	137
		EP074: Toluene	108-88-3	2 mg/kg	85.9	54.0	141
EP074E: Halogenated Aliphatic Compounds (QCLot: 3859788)							
EM2116319-012	Anonymous	EP074: 1.1-Dichloroethene	75-35-4	2 mg/kg	90.7	29.0	141
		EP074: Trichloroethene	79-01-6	2 mg/kg	85.4	50.0	126
EP074F: Halogenated Aromatic Compounds (QCLot: 3859788)							
EM2116319-012	Anonymous	EP074: Chlorobenzene	108-90-7	2 mg/kg	90.0	65.0	133
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 3860896)							
EM2116487-002	SB3 - 0.3	EP075(SIM): Acenaphthene	83-32-9	3 mg/kg	87.6	77.2	116
		EP075(SIM): Pyrene	129-00-0	3 mg/kg	94.9	65.5	136
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3859862)							
EM2116487-002	SB3 - 0.3	EP080: C6 - C9 Fraction	----	28 mg/kg	99.5	33.4	124
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3860897)							
EM2116487-002	SB3 - 0.3						

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3860897) - continued							
EM2116487-002	SB3 - 0.3	EP071: C10 - C14 Fraction	----	840 mg/kg	98.5	71.2	125
		EP071: C15 - C28 Fraction	----	2900 mg/kg	97.3	75.6	122
		EP071: C29 - C36 Fraction	----	1490 mg/kg	90.8	78.0	120
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3866194)							
EM2116487-028	VB1-1.0m	EP071: C10 - C14 Fraction	----	840 mg/kg	91.1	71.2	125
		EP071: C15 - C28 Fraction	----	2900 mg/kg	89.9	75.6	122
		EP071: C29 - C36 Fraction	----	1490 mg/kg	91.1	78.0	120
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3866195)							
EM2116487-028	VB1-1.0m	EP080: C6 - C9 Fraction	----	28 mg/kg	74.0	33.4	124
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3859862)							
EM2116487-002	SB3 - 0.3	EP080: C6 - C10 Fraction	C6_C10	33 mg/kg	94.5	30.8	120
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3860897)							
EM2116487-002	SB3 - 0.3	EP071: >C10 - C16 Fraction	----	1110 mg/kg	100	72.2	128
		EP071: >C16 - C34 Fraction	----	3900 mg/kg	91.5	76.5	119
		EP071: >C34 - C40 Fraction	----	290 mg/kg	94.1	66.8	138
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3866194)							
EM2116487-028	VB1-1.0m	EP071: >C10 - C16 Fraction	----	1110 mg/kg	103	72.2	128
		EP071: >C16 - C34 Fraction	----	3900 mg/kg	85.7	76.5	119
		EP071: >C34 - C40 Fraction	----	290 mg/kg	97.8	66.8	138
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3866195)							
EM2116487-028	VB1-1.0m	EP080: C6 - C10 Fraction	C6_C10	33 mg/kg	68.0	30.8	120
EP080: BTEXN (QCLot: 3859862)							
EM2116487-002	SB3 - 0.3	EP080: Benzene	71-43-2	2 mg/kg	108	54.4	127
		EP080: Toluene	108-88-3	2 mg/kg	108	57.1	131
EP080: BTEXN (QCLot: 3866195)							
EM2116487-028	VB1-1.0m	EP080: Benzene	71-43-2	2 mg/kg	80.1	54.4	127
		EP080: Toluene	108-88-3	2 mg/kg	83.1	57.1	131

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EM2116487**	Page	: 1 of 9
Client	: **ENVIRONMENTAL SERVICE AND DESIGN PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: CARMEL PARKER	Telephone	: +6138549 9630
Project	: 7928	Date Samples Received	: 19-Aug-2021
Site	: ----	Issue Date	: 27-Aug-2021
Sampler	: CP	No. of samples received	: 30
Order number	: 7928	No. of samples analysed	: 24

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Matrix Spike outliers occur.**
- **Laboratory Control outliers exist - please see following pages for full details.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **NO Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

- **Quality Control Sample Frequency Outliers exist - please see following pages for full details.**

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Laboratory Control Spike (LCS) Recoveries							
EP075E: Nitroaromatics and Ketones	QC-3860898-001	----	**1-Naphthylamine**	134-32-7	118 %	10.0-107%	**Recovery greater than upper control limit**

Outliers : Frequency of Quality Control Samples

Matrix: **SOIL**

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
Method	QC	Regular	Actual	Expected	
Matrix Spikes (MS)					
Semivolatile Organic Compounds	0	1	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / *Container* / Client Sample ID(s)	*Sample Date*	*Extraction / Preparation*			*Analysis*		
		Date extracted	*Due for extraction*	*Evaluation*	*Date analysed*	*Due for analysis*	*Evaluation*
EA055: Moisture Content (Dried @ 105-110°C)							
Soil Glass Jar - Unpreserved (EA055)							
SB3 - 0.5, SB3 - 0.3, MW1-1.5, MW1-1.5B, MW1-2.7, MW1-2.8, MW1-4.5, SB1-0.5, SB1-0.8, SB2-0.25, SB2-0.5, VB2-0.5, VB2-1.5, VB2-2.0, VB3-0.3, VB3-1.3, VB4-1.0, VB4-1.6, VB4-1.5	**17-Aug-2021**	**----**	----	----	**23-Aug-2021**	31-Aug-2021	✓
Soil Glass Jar - Unpreserved (EA055)							
VB1-0.5, VB1-1.0m, VB1-1.5m, VB1-2.0m	**25-Aug-2021**	**----**	----	----	**25-Aug-2021**	08-Sep-2021	✓
EA150: Soil Classification based on Particle Size							
Snap Lock Bag (EA150H)							
Composite 1	**17-Aug-2021**	**----**	----	----	**27-Aug-2021**	13-Feb-2022	✓

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA152: Soil Particle Density								
Snap Lock Bag (EA152)								
Composite 1		**17-Aug-2021**	**----**	----	----	**27-Aug-2021**	13-Feb-2022	✓
EG005(ED093)T: Total Metals by ICP-AES								
Soil Glass Jar - Unpreserved (EG005T)								
SB3 - 0.5,	SB3 - 0.3,	**17-Aug-2021**	**24-Aug-2021**	13-Feb-2022	✓	**25-Aug-2021**	13-Feb-2022	✓
MW1-1.5,	MW1-1.5B,							
MW1-2.7,	MW1-2.8,							
MW1-4.5,	SB1-0.5,							
SB1-0.8,	SB2-0.25,							
SB2-0.5,	VB2-0.5,							
VB2-1.5,	VB2-2.0,							
VB3-1.3,	VB4-1.6,							
VB4-1.5								
Soil Glass Jar - Unpreserved (EG005T)								
VB1-0.5,	VB1-1.0m,	**25-Aug-2021**	**25-Aug-2021**	21-Feb-2022	✓	**26-Aug-2021**	21-Feb-2022	✓
VB1-1.5m,	VB1-2.0m							
EG035T: Total Recoverable Mercury by FIMS								
Soil Glass Jar - Unpreserved (EG035T)								
SB3 - 0.5,	SB3 - 0.3,	**17-Aug-2021**	**24-Aug-2021**	14-Sep-2021	✓	**25-Aug-2021**	14-Sep-2021	✓
MW1-1.5,	MW1-1.5B,							
MW1-2.7,	MW1-2.8,							
MW1-4.5,	SB1-0.5,							
SB1-0.8,	SB2-0.25,							
SB2-0.5,	VB2-0.5,							
VB2-1.5,	VB2-2.0,							
VB3-1.3,	VB4-1.6,							
VB4-1.5								
Soil Glass Jar - Unpreserved (EG035T)								
VB1-0.5,	VB1-1.0m,	**25-Aug-2021**	**25-Aug-2021**	22-Sep-2021	✓	**26-Aug-2021**	22-Sep-2021	✓
VB1-1.5m,	VB1-2.0m							
EP074A: Monocyclic Aromatic Hydrocarbons								
Soil Glass Jar - Unpreserved (EP074)								
VB3-1.3		**17-Aug-2021**	**23-Aug-2021**	24-Aug-2021	✓	**23-Aug-2021**	24-Aug-2021	✓
EP074B: Oxygenated Compounds								
Soil Glass Jar - Unpreserved (EP074)								
VB3-1.3		**17-Aug-2021**	**23-Aug-2021**	24-Aug-2021	✓	**23-Aug-2021**	24-Aug-2021	✓
EP074C: Sulfonated Compounds								
Soil Glass Jar - Unpreserved (EP074)								
VB3-1.3		**17-Aug-2021**	**23-Aug-2021**	24-Aug-2021	✓	**23-Aug-2021**	24-Aug-2021	✓

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP074D: Fumigants							
Soil Glass Jar - Unpreserved (EP074)							
VB3-1.3	**17-Aug-2021**	**23-Aug-2021**	24-Aug-2021	✓	**23-Aug-2021**	24-Aug-2021	✓
EP074E: Halogenated Aliphatic Compounds							
Soil Glass Jar - Unpreserved (EP074)							
VB3-1.3	**17-Aug-2021**	**23-Aug-2021**	24-Aug-2021	✓	**23-Aug-2021**	24-Aug-2021	✓
EP074F: Halogenated Aromatic Compounds							
Soil Glass Jar - Unpreserved (EP074)							
VB3-1.3	**17-Aug-2021**	**23-Aug-2021**	24-Aug-2021	✓	**23-Aug-2021**	24-Aug-2021	✓
EP074G: Trihalomethanes							
Soil Glass Jar - Unpreserved (EP074)							
VB3-1.3	**17-Aug-2021**	**23-Aug-2021**	24-Aug-2021	✓	**23-Aug-2021**	24-Aug-2021	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Soil Glass Jar - Unpreserved (EP075(SIM))							
SB3 - 0.5, SB3 - 0.3, SB1-0.5, SB2-0.25, SB2-0.5, VB2-0.5, VB3-0.3, VB4-1.0	**17-Aug-2021**	**24-Aug-2021**	31-Aug-2021	✓	**24-Aug-2021**	03-Oct-2021	✓
Soil Glass Jar - Unpreserved (EP075(SIM))							
VB1-0.5	**25-Aug-2021**	**25-Aug-2021**	08-Sep-2021	✓	**26-Aug-2021**	04-Oct-2021	✓
EP075A: Phenolic Compounds							
Soil Glass Jar - Unpreserved (EP075)							
VB3-1.3	**17-Aug-2021**	**24-Aug-2021**	31-Aug-2021	✓	**24-Aug-2021**	03-Oct-2021	✓
EP075B: Polynuclear Aromatic Hydrocarbons							
Soil Glass Jar - Unpreserved (EP075)							
VB3-1.3	**17-Aug-2021**	**24-Aug-2021**	31-Aug-2021	✓	**24-Aug-2021**	03-Oct-2021	✓
EP075C: Phthalate Esters							
Soil Glass Jar - Unpreserved (EP075)							
VB3-1.3	**17-Aug-2021**	**24-Aug-2021**	31-Aug-2021	✓	**24-Aug-2021**	03-Oct-2021	✓
EP075D: Nitrosamines							
Soil Glass Jar - Unpreserved (EP075)							
VB3-1.3	**17-Aug-2021**	**24-Aug-2021**	31-Aug-2021	✓	**24-Aug-2021**	03-Oct-2021	✓
EP075E: Nitroaromatics and Ketones							
Soil Glass Jar - Unpreserved (EP075)							
VB3-1.3	**17-Aug-2021**	**24-Aug-2021**	31-Aug-2021	✓	**24-Aug-2021**	03-Oct-2021	✓
EP075F: Haloethers							
Soil Glass Jar - Unpreserved (EP075)							
VB3-1.3	**17-Aug-2021**	**24-Aug-2021**	31-Aug-2021	✓	**24-Aug-2021**	03-Oct-2021	✓
EP075G: Chlorinated Hydrocarbons							
Soil Glass Jar - Unpreserved (EP075)							
VB3-1.3	**17-Aug-2021**	**24-Aug-2021**	31-Aug-2021	✓	**24-Aug-2021**	03-Oct-2021	✓

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP075H: Anilines and Benzidines							
Soil Glass Jar - Unpreserved (EP075)							
VB3-1.3	**17-Aug-2021**	**24-Aug-2021**	31-Aug-2021	✓	**24-Aug-2021**	03-Oct-2021	✓
EP075I: Organochlorine Pesticides							
Soil Glass Jar - Unpreserved (EP075)							
VB3-1.3	**17-Aug-2021**	**24-Aug-2021**	31-Aug-2021	✓	**24-Aug-2021**	03-Oct-2021	✓
EP075J: Organophosphorus Pesticides							
Soil Glass Jar - Unpreserved (EP075)							
VB3-1.3	**17-Aug-2021**	**24-Aug-2021**	31-Aug-2021	✓	**24-Aug-2021**	03-Oct-2021	✓
EP080/071: Total Petroleum Hydrocarbons							
Soil Glass Jar - Unpreserved (EP080)							
SB3 - 0.5, SB3 - 0.3, MW1-1.5, MW1-1.5B, MW1-2.7, MW1-2.8, MW1-4.5, SB1-0.5, SB1-0.8, SB2-0.25, SB2-0.5, VB2-0.5, VB2-1.5, VB2-2.0, VB3-0.3, VB4-1.0, VB4-1.6, VB4-1.5	**17-Aug-2021**	**23-Aug-2021**	31-Aug-2021	✓	**24-Aug-2021**	31-Aug-2021	✓
Soil Glass Jar - Unpreserved (EP071)							
SB3 - 0.5, SB3 - 0.3, MW1-1.5, MW1-1.5B, MW1-2.7, MW1-2.8, MW1-4.5, SB1-0.5, SB1-0.8, SB2-0.25, SB2-0.5, VB2-0.5, VB2-1.5, VB2-2.0, VB3-0.3, VB4-1.0, VB4-1.6, VB4-1.5	**17-Aug-2021**	**24-Aug-2021**	31-Aug-2021	✓	**24-Aug-2021**	03-Oct-2021	✓
Soil Glass Jar - Unpreserved (EP080)							
VB1-0.5, VB1-1.0m, VB1-1.5m, VB2-2.0m	**25-Aug-2021**	**25-Aug-2021**	08-Sep-2021	✓	**25-Aug-2021**	08-Sep-2021	✓
Soil Glass Jar - Unpreserved (EP071)							
VB1-0.5, VB1-1.0m, VB1-1.5m, VB2-2.0m	**25-Aug-2021**	**25-Aug-2021**	08-Sep-2021	✓	**26-Aug-2021**	04-Oct-2021	✓

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Soil Glass Jar - Unpreserved (EP080)							
SB3 - 0.5, MW1-1.5, MW1-2.7, MW1-4.5, SB1-0.8, SB2-0.5, VB2-1.5, VB3-0.3, VB4-1.6, SB3 - 0.3, MW1-1.5B, MW1-2.8, SB1-0.5, SB2-0.25, VB2-0.5, VB2-2.0, VB4-1.0, VB4-1.5	**17-Aug-2021**	**23-Aug-2021**	31-Aug-2021	✓	**24-Aug-2021**	31-Aug-2021	✓
Soil Glass Jar - Unpreserved (EP071)							
SB3 - 0.5, MW1-1.5, MW1-2.7, MW1-4.5, SB1-0.8, SB2-0.5, VB2-1.5, VB3-0.3, VB4-1.6, SB3 - 0.3, MW1-1.5B, MW1-2.8, SB1-0.5, SB2-0.25, VB2-0.5, VB2-2.0, VB4-1.0, VB4-1.5	**17-Aug-2021**	**24-Aug-2021**	31-Aug-2021	✓	**24-Aug-2021**	03-Oct-2021	✓
Soil Glass Jar - Unpreserved (EP080)							
VB1-0.5, VB1-1.5m, VB1-1.0m, VB1-2.0m	**25-Aug-2021**	**25-Aug-2021**	08-Sep-2021	✓	**25-Aug-2021**	08-Sep-2021	✓
Soil Glass Jar - Unpreserved (EP071)							
VB1-0.5, VB1-1.5m, VB1-1.0m, VB1-2.0m	**25-Aug-2021**	**25-Aug-2021**	08-Sep-2021	✓	**26-Aug-2021**	04-Oct-2021	✓
EP080: BTEXN							
Soil Glass Jar - Unpreserved (EP080)							
SB3 - 0.5, MW1-1.5, MW1-2.7, MW1-4.5, SB1-0.8, SB2-0.5, VB2-1.5, VB3-0.3, VB4-1.6, SB3 - 0.3, MW1-1.5B, MW1-2.8, SB1-0.5, SB2-0.25, VB2-0.5, VB2-2.0, VB4-1.0, VB4-1.5	**17-Aug-2021**	**23-Aug-2021**	31-Aug-2021	✓	**24-Aug-2021**	31-Aug-2021	✓
Soil Glass Jar - Unpreserved (EP080)							
VB1-0.5, VB1-1.5m, VB1-1.0m, VB1-2.0m	**25-Aug-2021**	**25-Aug-2021**	08-Sep-2021	✓	**25-Aug-2021**	08-Sep-2021	✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Moisture Content	EA055	3	24	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	2	9	**22.22**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Semivolatile Organic Compounds	EP075	1	1	**100.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	5	42	**11.90**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	5	42	**11.90**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	3	22	**13.64**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	3	24	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Organic Compounds	EP074	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
PAH/Phenols (SIM)	EP075(SIM)	2	9	**22.22**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Semivolatile Organic Compounds	EP075	1	1	**100.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	3	42	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	3	42	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	22	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	24	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Organic Compounds	EP074	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
PAH/Phenols (SIM)	EP075(SIM)	2	9	**22.22**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Semivolatile Organic Compounds	EP075	1	1	**100.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	3	42	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	3	42	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	22	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	24	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Organic Compounds	EP074	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
PAH/Phenols (SIM)	EP075(SIM)	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Semivolatile Organic Compounds	EP075	0	1	**0.00**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	3	42	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	3	42	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	22	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	24	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Organic Compounds	EP074	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Moisture Content	EA055	SOIL	In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 105-110 degrees C. This method is compliant with NEPM Schedule B(3).
Particle Size Analysis by Hydrometer	EA150H	SOIL	Particle Size Analysis by Hydrometer according to AS1289.3.6.3
Soil Particle Density	EA152	SOIL	Soil Particle Density by AS 1289.3.5.1: Methods of testing soils for engineering purposes - Soil classification tests - Determination of the soil particle density of a soil - Standard method
Total Metals by ICP-AES	EG005T	SOIL	In house: Referenced to APHA 3120; USEPA SW 846 - 6010. Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM Schedule B(3)
Total Mercury by FIMS	EG035T	SOIL	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2) (Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. Ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3)
TRH - Semivolatile Fraction	EP071	SOIL	In house: Referenced to USEPA SW 846 - 8015 Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C40. Compliant with NEPM Schedule B(3).
Volatile Organic Compounds	EP074	SOIL	In house: Referenced to USEPA SW 846 - 8260 Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM Schedule B(3).
Semivolatile Organic Compounds	EP075	SOIL	In house: Referenced to USEPA SW 846 - 8270 Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This technique is compliant with NEPM Schedule B(3).
PAH/Phenols (SIM)	EP075(SIM)	SOIL	In house: Referenced to USEPA SW 846 - 8270. Extracts are analysed by Capillary GC/MS in Selective Ion Mode (SIM) and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM Schedule B(3)
TRH Volatiles/BTEX	EP080	SOIL	In house: Referenced to USEPA SW 846 - 8260. Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. Compliant with NEPM Schedule B(3) amended.

Preparation Methods	Method	Matrix	Method Descriptions
Sample Compositing	EN020	SOIL	Equal weights of each original soil are taken, then mixed and homogenised. The combined mixture is labelled as a new sample.
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	In house: Referenced to USEPA 200.2. Hot Block Acid Digestion 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge, sediments, and soils. This method is compliant with NEPM Schedule B(3).

Preparation Methods	Method	Matrix	Method Descriptions
Methanolic Extraction of Soils for Purge and Trap	ORG16	SOIL	In house: Referenced to USEPA SW 846 - 5030A. 5g of solid is shaken with surrogate and 10mL methanol prior to analysis by Purge and Trap - GC/MS.
Tumbler Extraction of Solids	ORG17	SOIL	In house: Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 30mL 1:1 DCM/Acetone by end over end tumble. The solvent is decanted, dehydrated and concentrated (by KD) to the desired volume for analysis.

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EN2108379**	Page	: 1 of 9
Client	: **ENVIRONMENTAL SERVICE AND DESIGN PTY LTD**	Laboratory	: Environmental Division Newcastle
Contact	: CARMEL PARKER	Contact	: Gregory Gommers
Address	: Level 1 49-51 Elizabeth Street Launceston 7250	Address	: 5/585 Maitland Road Mayfield West NSW Australia 2304
Telephone	: ----	Telephone	: +61 2 4014 2500
Project	: 7928	Date Samples Received	: 24-Sep-2021 09:00
Order number	: 7928	Date Analysis Commenced	: 24-Sep-2021
C-O-C number	: ----	Issue Date	: 06-Oct-2021 13:40
Sampler	: CARMEL PARKER		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 3		
No. of samples analysed	: 3		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Dale Semple	Analyst	Newcastle - Organics, Mayfield West, NSW
Daniel Junek	Senior Air Analyst	Newcastle - Organics, Mayfield West, NSW
Daniel Junek	Senior Air Analyst	Newcastle, Mayfield West, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- EP251 conducted by ALS Brisbane, NATA Site No. 818.
- EP101: ALS is unable to report results for ethanol during the COVID-19 pandemic due to elevated background levels from laboratory disinfection procedures.
- EP101, EP103: Results reported in mg/m³ are calculated from PPMV results based on a temperature of 25°C and atmospheric pressure of 101.3 kPa.
- CAN-001: Results for Pressure - As Received are measured under controlled conditions using calibrated laboratory gauges. These results are expressed as an Absolute Pressure. Equivalent gauge pressures may be calculated by subtracting the Pressure - Laboratory Atmosphere taken at the time of measurement.
- CAN-001: Results for Pressure - Gauge as Received are obtained from uncalibrated field gauges and are indicative only. These results may not precisely match calibrated gauge readings and may vary from field measurements due to changes in temperature and pressure
- EP104: Results reported in mg/m³ are calculated from Mol% results based on a temperature of 25°C and atmospheric pressure of 101.3 kPa
- EP104: Sample canisters were received at sub-ambient pressures and required dilution in the laboratory prior to analysis. LOR values have been adjusted accordingly

Analytical Results

Sub-Matrix: SOIL GAS (Matrix: AIR)			Sample ID	MW1 C869_S245	MW1-B C832_S245	VB3 C1020_S034	----	----
			Sampling date / time	22-Sep-2021 16:45	22-Sep-2021 16:45	23-Sep-2021 12:13	----	----
Compound	CAS Number	LOR	Unit	EN2108379-001	EN2108379-002	EN2108379-003	--------	--------
				Result	Result	Result	----	----
EP101: VOCs by USEPA Method TO15 (Calculated Concentration)								
Freon 12	75-71-8	0.250	mg/m³	----	----	<0.250	----	----
Chloromethane	74-87-3	0.100	mg/m³	----	----	<0.100	----	----
Freon 114	76-14-2	0.350	mg/m³	----	----	<0.350	----	----
Vinyl chloride	75-01-4	0.0051	mg/m³	<0.0051	<0.0051	<0.0051	----	----
Bromomethane	74-83-9	0.190	mg/m³	----	----	<0.190	----	----
Chloroethane	75-00-3	0.130	mg/m³	----	----	<0.130	----	----
Freon 11	75-69-4	0.280	mg/m³	----	----	<0.280	----	----
1.1-Dichloroethene	75-35-4	0.200	mg/m³	----	----	<0.200	----	----
Dichloromethane	75-09-2	0.170	mg/m³	----	----	<0.170	----	----
Freon 113	76-13-1	0.380	mg/m³	----	----	<0.380	----	----
1.1-Dichloroethane	75-34-3	0.200	mg/m³	----	----	<0.200	----	----
cis-1.2-Dichloroethene	156-59-2	0.0200	mg/m³	<0.0200	<0.0200	<0.0200	----	----
Chloroform	67-66-3	0.240	mg/m³	----	----	<0.240	----	----
1.2-Dichloroethane	107-06-2	0.200	mg/m³	----	----	<0.200	----	----
1.1.1-Trichloroethane	71-55-6	0.270	mg/m³	<0.270	<0.270	<0.270	----	----
Benzene	71-43-2	0.100	mg/m³	<0.100	<0.100	<0.100	----	----
Carbon Tetrachloride	56-23-5	0.310	mg/m³	----	----	<0.310	----	----
1.2-Dichloropropane	78-87-5	0.230	mg/m³	----	----	<0.230	----	----
Trichloroethene	79-01-6	0.0054	mg/m³	<0.0054	<0.0054	<0.0054	----	----
cis-1.3-Dichloropropylene	10061-01-5	0.230	mg/m³	----	----	<0.230	----	----
trans-1.3-Dichloropropene	10061-02-6	0.230	mg/m³	----	----	<0.230	----	----
1.1.2-Trichloroethane	79-00-5	0.270	mg/m³	----	----	<0.270	----	----
Toluene	108-88-3	0.190	mg/m³	<0.190	<0.190	<0.190	----	----
1.2-Dibromoethane (EDB)	106-93-4	0.380	mg/m³	----	----	<0.380	----	----
Tetrachloroethene	127-18-4	0.340	mg/m³	<0.340	<0.340	<0.340	----	----
Chlorobenzene	108-90-7	0.230	mg/m³	----	----	<0.230	----	----
Ethylbenzene	100-41-4	0.220	mg/m³	<0.220	<0.220	<0.220	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.430	mg/m³	<0.430	<0.430	<0.430	----	----
Styrene	100-42-5	0.210	mg/m³	----	----	<0.210	----	----
1.1.2.2-Tetrachloroethane	79-34-5	0.340	mg/m³	----	----	<0.340	----	----
ortho-Xylene	95-47-6	0.220	mg/m³	<0.220	<0.220	<0.220	----	----
4-Ethyltoluene	622-96-8	0.240	mg/m³	----	----	<0.240	----	----
Total Xylenes	----	0.650	mg/m³	----	----	<0.650	----	----
1.3.5-Trimethylbenzene	108-67-8	0.240	mg/m³	----	----	<0.240	----	----

Analytical Results

Sub-Matrix: SOIL GAS (Matrix: AIR)			Sample ID	MW1 C869_S245	MW1-B C832_S245	VB3 C1020_S034	----	----
			Sampling date / time	22-Sep-2021 16:45	22-Sep-2021 16:45	23-Sep-2021 12:13	----	----
Compound	CAS Number	LOR	Unit	EN2108379-001	EN2108379-002	EN2108379-003	--------	--------
				Result	Result	Result	----	----
EP101: VOCs by USEPA Method TO15 (Calculated Concentration) - Continued								
1.2.4-Trimethylbenzene	95-63-6	0.240	mg/m³	----	----	<0.240	----	----
1.3-Dichlorobenzene	541-73-1	0.300	mg/m³	----	----	<0.300	----	----
Benzylchloride	100-44-7	0.260	mg/m³	----	----	<0.260	----	----
1.4-Dichlorobenzene	106-46-7	0.300	mg/m³	----	----	<0.300	----	----
1.2-Dichlorobenzene	95-50-1	0.300	mg/m³	----	----	<0.300	----	----
1.2.4-Trichlorobenzene	120-82-1	0.370	mg/m³	----	----	<0.370	----	----
Hexachlorobutadiene	87-68-3	0.530	mg/m³	----	----	<0.530	----	----
Acetone	67-64-1	0.120	mg/m³	----	----	<0.120	----	----
Bromodichloromethane	75-27-4	0.340	mg/m³	----	----	<0.340	----	----
1.3-Butadiene	106-99-0	0.110	mg/m³	----	----	<0.110	----	----
Carbon disulfide	75-15-0	0.160	mg/m³	----	----	<0.160	----	----
2-Chlorotoluene	95-49-8	0.260	mg/m³	----	----	<0.260	----	----
1-Chloro-2-propene (Allyl chloride)	107-05-1	0.160	mg/m³	----	----	<0.160	----	----
Cyclohexane	110-82-7	0.170	mg/m³	----	----	<0.170	----	----
Dibromochloromethane	124-48-1	0.430	mg/m³	----	----	<0.430	----	----
1.4-Dioxane	123-91-1	0.180	mg/m³	----	----	<0.180	----	----
Ethylacetate	9002-89-5	0.180	mg/m³	----	----	<0.180	----	----
trans-1.2-Dichloroethene	156-60-5	0.200	mg/m³	----	----	<0.200	----	----
Heptane	142-82-5	0.200	mg/m³	----	----	<0.200	----	----
Hexane	110-54-3	0.180	mg/m³	----	----	<0.180	----	----
Isooctane	540-84-1	0.230	mg/m³	----	----	<0.230	----	----
Isopropyl Alcohol	67-63-0	0.120	mg/m³	<0.120	<0.120	<0.120	----	----
2-Butanone (MEK)	78-93-3	0.150	mg/m³	----	----	<0.150	----	----
Methyl iso-Butyl ketone	108-10-1	0.200	mg/m³	----	----	<0.200	----	----
2-Hexanone (MBK)	591-78-6	0.200	mg/m³	----	----	<0.200	----	----
Propene	115-07-1	0.0900	mg/m³	----	----	<0.0900	----	----
Methyl tert-Butyl Ether (MTBE)	1634-04-4	0.180	mg/m³	----	----	<0.180	----	----
Tetrahydrofuran	109-99-9	0.150	mg/m³	----	----	<0.150	----	----
Bromoform	75-25-2	0.520	mg/m³	----	----	<0.520	----	----
Vinyl Acetate	108-05-4	0.180	mg/m³	----	----	<0.180	----	----
Vinyl bromide	593-60-2	0.220	mg/m³	----	----	<0.220	----	----
Acetonitrile	75-05-8	0.0800	mg/m³	----	----	<0.0800	----	----
Acrolein	107-02-8	0.110	mg/m³	----	----	<0.110	----	----
Acrylonitrile	107-13-1	0.110	mg/m³	----	----	<0.110	----	----

Analytical Results

Sub-Matrix: SOIL GAS (Matrix: AIR)			Sample ID	MW1 C869_S245	MW1-B C832_S245	VB3 C1020_S034	----	----
			Sampling date / time	22-Sep-2021 16:45	22-Sep-2021 16:45	23-Sep-2021 12:13	----	----
Compound	CAS Number	LOR	Unit	EN2108379-001	EN2108379-002	EN2108379-003	--------	--------
				Result	Result	Result	----	----
EP101: VOCs by USEPA Method TO15 (Calculated Concentration) - Continued								
tert-Butyl alcohol	75-65-0	0.150	mg/m³	----	----	<0.150	----	----
2-Chloro-1.3-butadiene	126-99-8	0.180	mg/m³	----	----	<0.180	----	----
Di-isopropyl Ether	108-20-3	0.210	mg/m³	----	----	<0.210	----	----
Ethyl tert-Butyl Ether (ETBE)	637-92-3	0.210	mg/m³	----	----	<0.210	----	----
tert-Amyl Methyl Ether (TAME)	994-05-8	0.210	mg/m³	----	----	<0.210	----	----
Methyl Methacrylate	80-62-6	0.210	mg/m³	----	----	<0.210	----	----
1.1.1.2-Tetrachloroethane	630-20-6	0.340	mg/m³	----	----	<0.340	----	----
Isopropylbenzene	98-82-8	0.250	mg/m³	----	----	<0.250	----	----
n-Propylbenzene	103-65-1	0.250	mg/m³	----	----	<0.250	----	----
tert-Butylbenzene	98-06-6	0.270	mg/m³	----	----	<0.270	----	----
sec-Butylbenzene	135-98-8	0.270	mg/m³	----	----	<0.270	----	----
2-isopropyltoluene	527-84-4	0.270	mg/m³	----	----	<0.270	----	----
n-Butylbenzene	104-51-8	0.270	mg/m³	----	----	<0.270	----	----
Naphthalene	91-20-3	0.100	mg/m³	<0.100	<0.100	<0.100	----	----
EP101: VOCs by USEPA Method TO15r								
Freon 12	75-71-8	0.0500	ppmv	----	----	<0.0500	----	----
Chloromethane	74-87-3	0.0500	ppmv	----	----	<0.0500	----	----
Freon 114	76-14-2	0.0500	ppmv	----	----	<0.0500	----	----
Vinyl chloride	75-01-4	0.0020	ppmv	<0.0020	<0.0020	<0.0020	----	----
Bromomethane	74-83-9	0.0500	ppmv	----	----	<0.0500	----	----
Chloroethane	75-00-3	0.0500	ppmv	----	----	<0.0500	----	----
Freon 11	75-69-4	0.0500	ppmv	----	----	<0.0500	----	----
1.1-Dichloroethene	75-35-4	0.0500	ppmv	----	----	<0.0500	----	----
Dichloromethane	75-09-2	0.0500	ppmv	----	----	<0.0500	----	----
Freon 113	76-13-1	0.0500	ppmv	----	----	<0.0500	----	----
1.1-Dichloroethane	75-34-3	0.0500	ppmv	----	----	<0.0500	----	----
cis-1.2-Dichloroethene	156-59-2	0.0050	ppmv	<0.0050	<0.0050	<0.0050	----	----
Chloroform	67-66-3	0.0500	ppmv	----	----	<0.0500	----	----
1.2-Dichloroethane	107-06-2	0.0500	ppmv	----	----	<0.0500	----	----
1.1.1-Trichloroethane	71-55-6	0.0500	ppmv	<0.0500	<0.0500	<0.0500	----	----
Benzene	71-43-2	0.0300	ppmv	<0.0300	<0.0300	<0.0300	----	----
Carbon Tetrachloride	56-23-5	0.0500	ppmv	----	----	<0.0500	----	----
1.2-Dichloropropane	78-87-5	0.0500	ppmv	----	----	<0.0500	----	----
Trichloroethene	79-01-6	0.0010	ppmv	<0.0010	<0.0010	<0.0010	----	----

Analytical Results

Sub-Matrix: SOIL GAS (Matrix: AIR)			Sample ID	MW1 C869_S245	MW1-B C832_S245	VB3 C1020_S034	----	----
			Sampling date / time	22-Sep-2021 16:45	22-Sep-2021 16:45	23-Sep-2021 12:13	----	----
Compound	CAS Number	LOR	Unit	EN2108379-001	EN2108379-002	EN2108379-003	--------	--------
				Result	Result	Result	----	----
EP101: VOCs by USEPA Method TO15r - Continued								
cis-1.3-Dichloropropylene	10061-01-5	0.0500	ppmv	----	----	<0.0500	----	----
trans-1.3-Dichloropropene	10061-02-6	0.0500	ppmv	----	----	<0.0500	----	----
1.1.2-Trichloroethane	79-00-5	0.0500	ppmv	----	----	<0.0500	----	----
Toluene	108-88-3	0.0500	ppmv	<0.0500	<0.0500	<0.0500	----	----
1.2-Dibromoethane (EDB)	106-93-4	0.0500	ppmv	----	----	<0.0500	----	----
Tetrachloroethene	127-18-4	0.0500	ppmv	<0.0500	<0.0500	<0.0500	----	----
Chlorobenzene	108-90-7	0.0500	ppmv	----	----	<0.0500	----	----
Ethylbenzene	100-41-4	0.0500	ppmv	<0.0500	<0.0500	<0.0500	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.100	ppmv	<0.100	<0.100	<0.100	----	----
Styrene	100-42-5	0.0500	ppmv	----	----	<0.0500	----	----
1.1.2.2-Tetrachloroethane	79-34-5	0.0500	ppmv	----	----	<0.0500	----	----
ortho-Xylene	95-47-6	0.0500	ppmv	<0.0500	<0.0500	<0.0500	----	----
4-Ethyltoluene	622-96-8	0.0500	ppmv	----	----	<0.0500	----	----
1.3.5-Trimethylbenzene	108-67-8	0.0500	ppmv	----	----	<0.0500	----	----
1.2.4-Trimethylbenzene	95-63-6	0.0500	ppmv	----	----	<0.0500	----	----
1.3-Dichlorobenzene	541-73-1	0.0500	ppmv	----	----	<0.0500	----	----
Benzylchloride	100-44-7	0.0500	ppmv	----	----	<0.0500	----	----
1.4-Dichlorobenzene	106-46-7	0.0500	ppmv	----	----	<0.0500	----	----
1.2-Dichlorobenzene	95-50-1	0.0500	ppmv	----	----	<0.0500	----	----
1.2.4-Trichlorobenzene	120-82-1	0.0500	ppmv	----	----	<0.0500	----	----
Hexachlorobutadiene	87-68-3	0.0500	ppmv	----	----	<0.0500	----	----
Acetone	67-64-1	0.0500	ppmv	----	----	<0.0500	----	----
Bromodichloromethane	75-27-4	0.0500	ppmv	----	----	<0.0500	----	----
1.3-Butadiene	106-99-0	0.0500	ppmv	----	----	<0.0500	----	----
Carbon disulfide	75-15-0	0.0500	ppmv	----	----	<0.0500	----	----
2-Chlorotoluene	95-49-8	0.0500	ppmv	----	----	<0.0500	----	----
1-Chloro-2-propene (Allyl chloride)	107-05-1	0.0500	ppmv	----	----	<0.0500	----	----
Cyclohexane	110-82-7	0.0500	ppmv	----	----	<0.0500	----	----
Dibromochloromethane	124-48-1	0.0500	ppmv	----	----	<0.0500	----	----
1.4-Dioxane	123-91-1	0.0500	ppmv	----	----	<0.0500	----	----
Ethylacetate	9002-89-5	0.0500	ppmv	----	----	<0.0500	----	----
trans-1.2-Dichloroethene	156-60-5	0.0500	ppmv	----	----	<0.0500	----	----
Heptane	142-82-5	0.0500	ppmv	----	----	<0.0500	----	----
Hexane	110-54-3	0.0500	ppmv	----	----	<0.0500	----	----

Analytical Results

Sub-Matrix: SOIL GAS (Matrix: AIR)			Sample ID	MW1 C869_S245	MW1-B C832_S245	VB3 C1020_S034	----	----
			Sampling date / time	22-Sep-2021 16:45	22-Sep-2021 16:45	23-Sep-2021 12:13	----	----
Compound	CAS Number	LOR	Unit	EN2108379-001	EN2108379-002	EN2108379-003	--------	--------
				Result	Result	Result	----	----
EP101: VOCs by USEPA Method TO15r - Continued								
Isooctane	540-84-1	0.0500	ppmv	----	----	<0.0500	----	----
Isopropyl Alcohol	67-63-0	0.0500	ppmv	<0.0500	<0.0500	<0.0500	----	----
2-Butanone (MEK)	78-93-3	0.0500	ppmv	----	----	<0.0500	----	----
Methyl iso-Butyl ketone	108-10-1	0.0500	ppmv	----	----	<0.0500	----	----
2-Hexanone (MBK)	591-78-6	0.0500	ppmv	----	----	<0.0500	----	----
Propene	115-07-1	0.0500	ppmv	----	----	<0.0500	----	----
Methyl tert-Butyl Ether (MTBE)	1634-04-4	0.0500	ppmv	----	----	<0.0500	----	----
Tetrahydrofuran	109-99-9	0.0500	ppmv	----	----	<0.0500	----	----
Bromoform	75-25-2	0.0500	ppmv	----	----	<0.0500	----	----
Vinyl Acetate	108-05-4	0.0500	ppmv	----	----	<0.0500	----	----
Vinyl bromide	593-60-2	0.0500	ppmv	----	----	<0.0500	----	----
Acetonitrile	75-05-8	0.0500	ppmv	----	----	<0.0500	----	----
Acrolein	107-02-8	0.0500	ppmv	----	----	<0.0500	----	----
Acrylonitrile	107-13-1	0.0500	ppmv	----	----	<0.0500	----	----
tert-Butyl alcohol	75-65-0	0.0500	ppmv	----	----	<0.0500	----	----
2-Chloro-1.3-butadiene	126-99-8	0.0500	ppmv	----	----	<0.0500	----	----
Di-isopropyl Ether	108-20-3	0.0500	ppmv	----	----	<0.0500	----	----
Ethyl tert-Butyl Ether (ETBE)	637-92-3	0.0500	ppmv	----	----	<0.0500	----	----
tert-Amyl Methyl Ether (TAME)	994-05-8	0.0500	ppmv	----	----	<0.0500	----	----
Methyl Methacrylate	80-62-6	0.0500	ppmv	----	----	<0.0500	----	----
1.1.1.2-Tetrachloroethane	630-20-6	0.0500	ppmv	----	----	<0.0500	----	----
Isopropylbenzene	98-82-8	0.0500	ppmv	----	----	<0.0500	----	----
n-Propylbenzene	103-65-1	0.0500	ppmv	----	----	<0.0500	----	----
tert-Butylbenzene	98-06-6	0.0500	ppmv	----	----	<0.0500	----	----
sec-Butylbenzene	135-98-8	0.0500	ppmv	----	----	<0.0500	----	----
2-isopropyltoluene	527-84-4	0.0500	ppmv	----	----	<0.0500	----	----
n-Butylbenzene	104-51-8	0.0500	ppmv	----	----	<0.0500	----	----
Naphthalene	91-20-3	0.0190	ppmv	<0.0190	<0.0190	<0.0190	----	----
EP103: Petroleum Hydrocarbons in Gaseous Samples								
C6 - C9 Fraction	----	5.00	ppmv	<5.00	<5.00	<5.00	----	----
C10 - C14 Fraction	----	5.00	ppmv	<5.00	<5.00	<5.00	----	----
EP103: Petroleum Hydrocarbons in Gaseous Samples (Calc Conc)								
C6 - C9 Fraction	----	20.0	mg/m³	<20.0	<20.0	<20.0	----	----
C10 - C14 Fraction	----	35.0	mg/m³	<35.0	<35.0	<35.0	----	----

Analytical Results

Sub-Matrix: SOIL GAS (Matrix: AIR)				Sample ID	MW1 C869_S245	MW1-B C832_S245	VB3 C1020_S034	----	----
				Sampling date / time	22-Sep-2021 16:45	22-Sep-2021 16:45	23-Sep-2021 12:13	----	----
Compound	CAS Number	LOR	Unit		EN2108379-001	EN2108379-002	EN2108379-003	--------	--------
					Result	Result	Result	----	----
EP103: Total Recoverable Hydrocarbons - NEPM 2013									
C6 - C10 Fraction	C6_C10	5.00	ppmv		<5.00	<5.00	<5.00	----	----
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	5.00	ppmv		<5.00	<5.00	<5.00	----	----
>C10 - C16 Fraction	----	5.00	ppmv		<5.00	<5.00	<5.00	----	----
>C10 - C16 Fraction minus Naphthalene (F2)	----	5.00	ppmv		<5.00	<5.00	<5.00	----	----
EP103: Total Recoverable Hydrocarbons - NEPM 2013 (Calc Conc)									
C6 - C10 Fraction	C6_C10	20.0	mg/m³		<20.0	<20.0	<20.0	----	----
C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20.0	mg/m³		<20.0	<20.0	<20.0	----	----
>C10 - C16 Fraction	----	40.0	mg/m³		<40.0	<40.0	<40.0	----	----
>C10 - C16 Fraction minus Naphthalene (F2)	----	40.0	mg/m³		<40.0	<40.0	<40.0	----	----
EP104: Light Hydrocarbons									
Methane	74-82-8	0.005	Mol %		**0.147**	**0.146**	**9.08**	----	----
EP104: Light Hydrocarbons (Calc Conc)									
Methane	74-82-8	33	mg/m³		**961**	**955**	**59400**	----	----
EP104: Permanent Gases									
Carbon Dioxide	124-38-9	0.005	Mol %		**13.2**	**13.1**	**16.4**	----	----
Carbon Monoxide	630-08-0	0.005	Mol %		<0.012	<0.012	<0.010	----	----
Oxygen	7782-44-7	0.10	Mol %		**2.20**	**2.19**	**0.87**	----	----
EP104: Permanent Gases (Calc Conc)									
Carbon Dioxide	124-38-9	90	mg/m³		**237000**	**236000**	**295000**	----	----
Carbon Monoxide	630-08-0	60	mg/m³		<150	<150	<120	----	----
Oxygen	7782-44-7	1310	mg/m³		**28700**	**28600**	**11300**	----	----
Sampling Quality Assurance									
Pressure - As received	PRESSURE	0.1	kPaa		**67.8**	**68.0**	**95.7**	----	----
Pressure - Laboratory Atmosphere	----	0.1	kPaa		**101**	**101**	**101**	----	----
Temperature as Received	----	0.1	°C		**19.0**	**19.0**	**19.0**	----	----
Vacuum - As received	----	0.03	Inches Hg		**9.83**	**9.80**	**1.59**	----	----
USEPA Air Toxics Method TO15r Surrogates									
4-Bromofluorobenzene	460-00-4	0.5	%		**106**	**105**	**106**	----	----

Surrogate Control Limits

Sub-Matrix: **SOIL GAS**		Recovery Limits (%)	
Compound	*CAS Number*	*Low*	*High*
USEPA Air Toxics Method TO15r Surrogates			
4-Bromofluorobenzene	460-00-4	60	140

QUALITY CONTROL REPORT

Work Order	: **EN2108379**	Page	: 1 of 7
Client	: **ENVIRONMENTAL SERVICE AND DESIGN PTY LTD**	Laboratory	: Environmental Division Newcastle
Contact	: CARMEL PARKER	Contact	: Gregory Gommers
Address	: Level 1 49-51 Elizabeth Street Launceston 7250	Address	: 5/585 Maitland Road Mayfield West NSW Australia 2304
Telephone	: ----	Telephone	: +61 2 4014 2500
Project	: 7928	Date Samples Received	: 24-Sep-2021
Order number	: 7928	Date Analysis Commenced	: 24-Sep-2021
C-O-C number	: ----	Issue Date	: 06-Oct-2021
Sampler	: CARMEL PARKER		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 3		
No. of samples analysed	: 3		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB), Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report ; Recovery and Acceptance Limits
- Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Dale Semple	Analyst	Newcastle - Organics, Mayfield West, NSW
Daniel Junek	Senior Air Analyst	Newcastle - Organics, Mayfield West, NSW
Daniel Junek	Senior Air Analyst	Newcastle, Mayfield West, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **AIR**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP101: VOCs by USEPA Method TO15r (QC Lot: 3922359)									
EN2108379-001	MW1 C869_S245	EP101-15X: Freon 12	75-71-8	0.5	ppbv	<0.0500 ppmv	<50.0	0.0	No Limit
		EP101-15X: Chloromethane	74-87-3	0.5	ppbv	<0.0500 ppmv	<50.0	0.0	No Limit
		EP101-15X: Freon 114	76-14-2	0.5	ppbv	<0.0500 ppmv	<50.0	0.0	No Limit
		EP101-15X: Vinyl chloride	75-01-4	0.5	ppbv	<0.0020 ppmv	<2.0	0.0	No Limit
		EP101-15X: Bromomethane	74-83-9	0.5	ppbv	<0.0500 ppmv	<50.0	0.0	No Limit
		EP101-15X: Chloroethane	75-00-3	0.5	ppbv	<0.0500 ppmv	<50.0	0.0	No Limit
		EP101-15X: Freon 11	75-69-4	0.5	ppbv	<0.0500 ppmv	<50.0	0.0	No Limit
		EP101-15X: 1.1-Dichloroethene	75-35-4	0.5	ppbv	<0.0500 ppmv	<50.0	0.0	No Limit
		EP101-15X: Dichloromethane	75-09-2	0.5	ppbv	<0.0500 ppmv	<50.0	0.0	No Limit
		EP101-15X: Freon 113	76-13-1	0.5	ppbv	<0.0500 ppmv	<50.0	0.0	No Limit
		EP101-15X: 1.1-Dichloroethane	75-34-3	0.5	ppbv	<0.0500 ppmv	<50.0	0.0	No Limit
		EP101-15X: cis-1.2-Dichloroethene	156-59-2	0.5	ppbv	<0.0050 ppmv	<5.0	0.0	No Limit
		EP101-15X: Chloroform	67-66-3	0.5	ppbv	<0.0500 ppmv	<50.0	0.0	No Limit
		EP101-15X: 1.2-Dichloroethane	107-06-2	0.5	ppbv	<0.0500 ppmv	<50.0	0.0	No Limit
		EP101-15X: 1.1.1-Trichloroethane	71-55-6	0.5	ppbv	<0.0500 ppmv	<50.0	0.0	No Limit
		EP101-15X: Benzene	71-43-2	0.5	ppbv	<0.0300 ppmv	<30.0	0.0	No Limit
		EP101-15X: Carbon Tetrachloride	56-23-5	0.5	ppbv	<0.0500 ppmv	<50.0	0.0	No Limit
		EP101-15X: 1.2-Dichloropropane	78-87-5	0.5	ppbv	<0.0500 ppmv	<50.0	0.0	No Limit
		EP101-15X: Trichloroethene	79-01-6	0.5	ppbv	<0.0010 ppmv	<1.0	0.0	No Limit
		EP101-15X: cis-1.3-Dichloropropylene	10061-01-5	0.5	ppbv	<0.0500 ppmv	<50.0	0.0	No Limit
		EP101-15X: trans-1.3-Dichloropropene	10061-02-6	0.5	ppbv	<0.0500 ppmv	<50.0	0.0	No Limit
		EP101-15X: 1.1.2-Trichloroethane	79-00-5	0.5	ppbv	<0.0500 ppmv	<50.0	0.0	No Limit
		EP101-15X: Toluene	108-88-3	0.5	ppbv	<0.0500 ppmv	<50.0	0.0	No Limit
		EP101-15X: 1.2-Dibromoethane (EDB)	106-93-4	0.5	ppbv	<0.0500 ppmv	<50.0	0.0	No Limit

Sub-Matrix: **AIR**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP101: VOCs by USEPA Method TO15r (QC Lot: 3922359) - continued									
EN2108379-001	MW1 C869_S245	EP101-15X: Tetrachloroethene	127-18-4	0.5	ppbv	<0.0500 ppmv	<50.0	0.0	No Limit
		EP101-15X: Chlorobenzene	108-90-7	0.5	ppbv	<0.0500 ppmv	<50.0	0.0	No Limit
		EP101-15X: Ethylbenzene	100-41-4	0.5	ppbv	<0.0500 ppmv	<50.0	0.0	No Limit
		EP101-15X: Styrene	100-42-5	0.5	ppbv	<0.0500 ppmv	<50.0	0.0	No Limit
		EP101-15X: 1.1.2.2-Tetrachloroethane	79-34-5	0.5	ppbv	<0.0500 ppmv	<50.0	0.0	No Limit
		EP101-15X: ortho-Xylene	95-47-6	0.5	ppbv	<0.0500 ppmv	<50.0	0.0	No Limit
		EP101-15X: 4-Ethyltoluene	622-96-8	0.5	ppbv	<0.0500 ppmv	<50.0	0.0	No Limit
		EP101-15X: 1.3.5-Trimethylbenzene	108-67-8	0.5	ppbv	<0.0500 ppmv	<50.0	0.0	No Limit
		EP101-15X: 1.2.4-Trimethylbenzene	95-63-6	0.5	ppbv	<0.0500 ppmv	<50.0	0.0	No Limit
		EP101-15X: 1.3-Dichlorobenzene	541-73-1	0.5	ppbv	<0.0500 ppmv	<50.0	0.0	No Limit
		EP101-15X: Benzylchloride	100-44-7	0.5	ppbv	<0.0500 ppmv	<50.0	0.0	No Limit
		EP101-15X: 1.4-Dichlorobenzene	106-46-7	0.5	ppbv	<0.0500 ppmv	<50.0	0.0	No Limit
		EP101-15X: 1.2-Dichlorobenzene	95-50-1	0.5	ppbv	<0.0500 ppmv	<50.0	0.0	No Limit
		EP101-15X: 1.2.4-Trichlorobenzene	120-82-1	0.5	ppbv	<0.0500 ppmv	<50.0	0.0	No Limit
		EP101-15X: Hexachlorobutadiene	87-68-3	0.5	ppbv	<0.0500 ppmv	<50.0	0.0	No Limit
		EP101-15X: Acetone	67-64-1	0.5	ppbv	0.246 ppmv	247	0.5	No Limit
		EP101-15X: Bromodichloromethane	75-27-4	0.5	ppbv	<0.0500 ppmv	<50.0	0.0	No Limit
		EP101-15X: 1.3-Butadiene	106-99-0	0.5	ppbv	<0.0500 ppmv	<50.0	0.0	No Limit
		EP101-15X: Carbon disulfide	75-15-0	0.5	ppbv	<0.0500 ppmv	<50.0	0.0	No Limit
		EP101-15X: 2-Chlorotoluene	95-49-8	0.5	ppbv	<0.0500 ppmv	<50.0	0.0	No Limit
		EP101-15X: 1-Chloro-2-propene (Allyl chloride)	107-05-1	0.5	ppbv	<0.0500 ppmv	<50.0	0.0	No Limit
		EP101-15X: Cyclohexane	110-82-7	0.5	ppbv	<0.0500 ppmv	<50.0	0.0	No Limit
		EP101-15X: Dibromochloromethane	124-48-1	0.5	ppbv	<0.0500 ppmv	<50.0	0.0	No Limit
		EP101-15X: 1.4-Dioxane	123-91-1	0.5	ppbv	<0.0500 ppmv	<50.0	0.0	No Limit
		EP101-15X: Ethylacetate	9002-89-5	0.5	ppbv	<0.0500 ppmv	<50.0	0.0	No Limit
		EP101-15X: trans-1.2-Dichloroethene	156-60-5	0.5	ppbv	<0.0500 ppmv	<50.0	0.0	No Limit
		EP101-15X: Heptane	142-82-5	0.5	ppbv	<0.0500 ppmv	<50.0	0.0	No Limit
		EP101-15X: Hexane	110-54-3	0.5	ppbv	<0.0500 ppmv	<50.0	0.0	No Limit
		EP101-15X: Isooctane	540-84-1	0.5	ppbv	<0.0500 ppmv	<50.0	0.0	No Limit
		EP101-15X: Isopropyl Alcohol	67-63-0	0.5	ppbv	<0.0500 ppmv	<50.0	0.0	No Limit
		EP101-15X: 2-Butanone (MEK)	78-93-3	0.5	ppbv	<0.0500 ppmv	<50.0	0.0	No Limit
		EP101-15X: Methyl iso-Butyl ketone	108-10-1	0.5	ppbv	<0.0500 ppmv	<50.0	0.0	No Limit
		EP101-15X: 2-Hexanone (MBK)	591-78-6	0.5	ppbv	<0.0500 ppmv	<50.0	0.0	No Limit
		EP101-15X: Propene	115-07-1	0.5	ppbv	0.0630 ppmv	64.3	2.0	No Limit
		EP101-15X: Methyl tert-Butyl Ether (MTBE)	1634-04-4	0.5	ppbv	<0.0500 ppmv	<50.0	0.0	No Limit
		EP101-15X: Tetrahydrofuran	109-99-9	0.5	ppbv	<0.0500 ppmv	<50.0	0.0	No Limit
		EP101-15X: Bromoform	75-25-2	0.5	ppbv	<0.0500 ppmv	<50.0	0.0	No Limit
		EP101-15X: Vinyl Acetate	108-05-4	0.5	ppbv	<0.0500 ppmv	<50.0	0.0	No Limit
		EP101-15X: Vinyl bromide	593-60-2	0.5	ppbv	<0.0500 ppmv	<50.0	0.0	No Limit
		EP101-15X: Acetonitrile	75-05-8	0.5	ppbv	<0.0500 ppmv	<50.0	0.0	No Limit

Sub-Matrix: **AIR**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP101: VOCs by USEPA Method TO15r (QC Lot: 3922359) - continued									
EN2108379-001	MW1 C869_S245	EP101-15X: Acrolein	107-02-8	0.5	ppbv	<0.0500 ppmv	<50.0	0.0	No Limit
		EP101-15X: Acrylonitrile	107-13-1	0.5	ppbv	<0.0500 ppmv	<50.0	0.0	No Limit
		EP101-15X: tert-Butyl alcohol	75-65-0	0.5	ppbv	<0.0500 ppmv	<50.0	0.0	No Limit
		EP101-15X: 2-Chloro-1.3-butadiene	126-99-8	0.5	ppbv	<0.0500 ppmv	<50.0	0.0	No Limit
		EP101-15X: Di-isopropyl Ether	108-20-3	0.5	ppbv	<0.0500 ppmv	<50.0	0.0	No Limit
		EP101-15X: Ethyl tert-Butyl Ether (ETBE)	637-92-3	0.5	ppbv	<0.0500 ppmv	<50.0	0.0	No Limit
		EP101-15X: tert-Amyl Methyl Ether (TAME)	994-05-8	0.5	ppbv	<0.0500 ppmv	<50.0	0.0	No Limit
		EP101-15X: Methyl Methacrylate	80-62-6	0.5	ppbv	<0.0500 ppmv	<50.0	0.0	No Limit
		EP101-15X: 1.1.1.2-Tetrachloroethane	630-20-6	0.5	ppbv	<0.0500 ppmv	<50.0	0.0	No Limit
		EP101-15X: Isopropylbenzene	98-82-8	0.5	ppbv	<0.0500 ppmv	<50.0	0.0	No Limit
		EP101-15X: n-Propylbenzene	103-65-1	0.5	ppbv	<0.0500 ppmv	<50.0	0.0	No Limit
		EP101-15X: tert-Butylbenzene	98-06-6	0.5	ppbv	<0.0500 ppmv	<50.0	0.0	No Limit
		EP101-15X: sec-Butylbenzene	135-98-8	0.5	ppbv	<0.0500 ppmv	<50.0	0.0	No Limit
		EP101-15X: 2-isopropyltoluene	527-84-4	0.5	ppbv	<0.0500 ppmv	<50.0	0.0	No Limit
		EP101-15X: n-Butylbenzene	104-51-8	0.5	ppbv	<0.0500 ppmv	<50.0	0.0	No Limit
		EP101-15X: Naphthalene	91-20-3	0.5	ppbv	<0.0190 ppmv	<19.0	0.0	No Limit
		EP101-15X: meta- & para-Xylene	108-38-3 106-42-3	1	ppbv	<0.100 ppmv	<100	0.0	No Limit
EP103: Petroleum Hydrocarbons in Gaseous Samples (QC Lot: 3922360)									
EN2108379-001	MW1 C869_S245	EP103-PC: C6 - C9 Fraction	----	50	ppbv	<5.00 ppmv	<5000	0.0	No Limit
		EP103-PC: C10 - C14 Fraction	----	50	ppbv	<5.00 ppmv	<5000	0.0	No Limit
EP103: Total Recoverable Hydrocarbons - NEPM 2013 (QC Lot: 3922360)									
EN2108379-001	MW1 C869_S245	EP103-PC: C6 - C10 Fraction	C6_C10	50	ppbv	<5.00 ppmv	<5000	0.0	No Limit
		EP103-PC: >C10 - C16 Fraction	----	50	ppbv	<5.00 ppmv	<5000	0.0	No Limit
EP104: Light Hydrocarbons (QC Lot: 3920798)									
EN2108183-001	Anonymous	EP104: Methane	74-82-8	0.005	Mol %	<0.010	<0.010	0.0	No Limit
EN2108292-001	Anonymous	EP104: Methane	74-82-8	0.005	Mol %	0.605	0.607	0.3	0% - 20%
EP104: Permanent Gases (QC Lot: 3920798)									
EN2108183-001	Anonymous	EP104: Carbon Dioxide	124-38-9	0.005	Mol %	2.04	2.05	0.1	0% - 20%
		EP104: Carbon Monoxide	630-08-0	0.005	Mol %	<0.010	<0.010	0.0	No Limit
		EP104: Oxygen	7782-44-7	0.1	Mol %	8.91	8.93	0.2	0% - 20%
EN2108292-001	Anonymous	EP104: Carbon Dioxide	124-38-9	0.005	Mol %	0.101	0.100	1.2	0% - 50%
		EP104: Carbon Monoxide	630-08-0	0.005	Mol %	<0.010	<0.010	0.0	No Limit
		EP104: Oxygen	7782-44-7	0.1	Mol %	15.8	15.9	0.2	0% - 20%

Method Blank (MB), Laboratory Control Sample (LCS) and Laboratory Control Sample Duplicate (DCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control terms Laboratory Control Sample (LCS) and Laboratory Control Sample Duplicate (DCS) refers to certified reference materials, or known interference free matrices spiked with target analytes. The purpose of these QC parameters are to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS and DCS.

Sub-Matrix: **AIR**

		Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike	Spike Recovery (%)		Recovery Limits (%)		RPDs (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	DCS	Low	High	Value	Control Limit
EP101: VOCs by USEPA Method TO15r (QCLot: 3922359)											
EP101-15X: Freon 12	75-71-8	0.5	ppbv	<0.5	10 ppbv	101	101	84.5	116	20	----
EP101-15X: Chloromethane	74-87-3	0.5	ppbv	<0.5	10 ppbv	101	97.2	74.5	130	20	----
EP101-15X: Freon 114	76-14-2	0.5	ppbv	<0.5	10 ppbv	103	103	86.1	120	20	----
EP101-15X: Vinyl chloride	75-01-4	0.5	ppbv	<0.5	10 ppbv	96.1	96.5	81.4	121	20	----
EP101-15X: Bromomethane	74-83-9	0.5	ppbv	<0.5	10 ppbv	105	105	83.2	122	20	----
EP101-15X: Chloroethane	75-00-3	0.5	ppbv	<0.5	10 ppbv	97.1	97.4	82.9	122	20	----
EP101-15X: Freon 11	75-69-4	0.5	ppbv	<0.5	10 ppbv	103	103	82.1	118	20	----
EP101-15X: 1.1-Dichloroethene	75-35-4	0.5	ppbv	<0.5	10 ppbv	99.9	100	81.8	123	20	----
EP101-15X: Dichloromethane	75-09-2	0.5	ppbv	<0.5	10 ppbv	94.5	93.0	71.6	129	20	----
EP101-15X: Freon 113	76-13-1	0.5	ppbv	<0.5	10 ppbv	107	106	75.5	130	20	----
EP101-15X: 1.1-Dichloroethane	75-34-3	0.5	ppbv	<0.5	10 ppbv	95.3	95.7	82.6	124	20	----
EP101-15X: cis-1.2-Dichloroethene	156-59-2	0.5	ppbv	<0.5	10 ppbv	97.5	97.7	81.9	120	20	----
EP101-15X: Chloroform	67-66-3	0.5	ppbv	<0.5	10 ppbv	98.6	98.2	86.2	115	20	----
EP101-15X: 1.2-Dichloroethane	107-06-2	0.5	ppbv	<0.5	10 ppbv	92.8	92.6	80.3	114	20	----
EP101-15X: 1.1.1-Trichloroethane	71-55-6	0.5	ppbv	<0.5	10 ppbv	96.3	96.5	77.6	128	20	----
EP101-15X: Benzene	71-43-2	0.5	ppbv	<0.5	10 ppbv	92.1	92.2	82.8	119	20	----
EP101-15X: Carbon Tetrachloride	56-23-5	0.5	ppbv	<0.5	10 ppbv	99.9	99.4	75.5	129	20	----
EP101-15X: 1.2-Dichloropropane	78-87-5	0.5	ppbv	<0.5	10 ppbv	91.8	91.8	80.8	122	20	----
EP101-15X: Trichloroethene	79-01-6	0.5	ppbv	<0.5	10 ppbv	101	100	80.0	120	20	----
EP101-15X: cis-1.3-Dichloropropylene	10061-01-5	0.5	ppbv	<0.5	10 ppbv	88.3	88.4	77.7	120	20	----
EP101-15X: trans-1.3-Dichloropropene	10061-02-6	0.5	ppbv	<0.5	10 ppbv	81.3	82.6	70.1	123	20	----
EP101-15X: 1.1.2-Trichloroethane	79-00-5	0.5	ppbv	<0.5	10 ppbv	107	106	78.5	130	20	----
EP101-15X: Toluene	108-88-3	0.5	ppbv	<0.5	10 ppbv	95.2	96.0	76.5	130	20	----
EP101-15X: 1.2-Dibromoethane (EDB)	106-93-4	0.5	ppbv	<0.5	10 ppbv	102	102	72.0	130	20	----
EP101-15X: Tetrachloroethene	127-18-4	0.5	ppbv	<0.5	10 ppbv	108	106	70.3	130	20	----
EP101-15X: Chlorobenzene	108-90-7	0.5	ppbv	<0.5	10 ppbv	105	104	72.9	129	20	----
EP101-15X: Ethylbenzene	100-41-4	0.5	ppbv	<0.5	10 ppbv	96.4	96.9	73.4	123	20	----
EP101-15X: meta- & para-Xylene	108-38-3 106-42-3	1	ppbv	<1.0	20 ppbv	97.9	98.2	77.2	122	20	----
EP101-15X: Styrene	100-42-5	0.5	ppbv	<0.5	10 ppbv	91.7	92.3	70.0	130	20	----
EP101-15X: 1.1.2.2-Tetrachloroethane	79-34-5	0.5	ppbv	<0.5	10 ppbv	108	107	74.9	119	20	----
EP101-15X: ortho-Xylene	95-47-6	0.5	ppbv	<0.5	10 ppbv	100.0	99.4	72.1	122	20	----
EP101-15X: 4-Ethyltoluene	622-96-8	0.5	ppbv	<0.5	10 ppbv	110	110	70.0	130	20	----

Sub-Matrix: **AIR**

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike	Spike Recovery (%)		Recovery Limits (%)		RPDs (%)	
		LOR	Unit	Result	Concentration	LCS	DCS	Low	High	Value	Control Limit
EP101: VOCs by USEPA Method TO15r (QCLot: 3922359) - continued											
EP101-15X: 1.3.5-Trimethylbenzene	108-67-8	0.5	ppbv	<0.5	10 ppbv	105	104	70.0	126	20	----
EP101-15X: 1.2.4-Trimethylbenzene	95-63-6	0.5	ppbv	<0.5	10 ppbv	101	101	70.0	121	20	----
EP101-15X: 1.3-Dichlorobenzene	541-73-1	0.5	ppbv	<0.5	10 ppbv	107	106	70.0	123	20	----
EP101-15X: Benzylchloride	100-44-7	0.5	ppbv	<0.5	10 ppbv	89.8	90.4	70.0	130	20	----
EP101-15X: 1.4-Dichlorobenzene	106-46-7	0.5	ppbv	<0.5	10 ppbv	106	106	70.0	122	20	----
EP101-15X: 1.2-Dichlorobenzene	95-50-1	0.5	ppbv	<0.5	10 ppbv	106	106	70.0	125	20	----
EP101-15X: 1.2.4-Trichlorobenzene	120-82-1	0.5	ppbv	<0.5	10 ppbv	111	111	70.0	127	20	----
EP101-15X: Hexachlorobutadiene	87-68-3	0.5	ppbv	<0.5	10 ppbv	112	110	70.0	130	20	----
EP101-15X: Acetone	67-64-1	0.5	ppbv	<0.5	10 ppbv	108	105	70.0	130	20	----
EP101-15X: Bromodichloromethane	75-27-4	0.5	ppbv	<0.5	10 ppbv	99.8	99.6	80.7	118	20	----
EP101-15X: 1.3-Butadiene	106-99-0	0.5	ppbv	<0.5	10 ppbv	88.3	89.7	75.3	125	20	----
EP101-15X: Carbon disulfide	75-15-0	0.5	ppbv	<0.5	10 ppbv	102	101	83.1	117	20	----
EP101-15X: 2-Chlorotoluene	95-49-8	0.5	ppbv	<0.5	10 ppbv	105	105	70.0	126	20	----
EP101-15X: 1-Chloro-2-propene (Allyl chloride)	107-05-1	0.5	ppbv	<0.5	10 ppbv	83.6	84.2	73.7	129	20	----
EP101-15X: Cyclohexane	110-82-7	0.5	ppbv	<0.5	10 ppbv	100	99.9	78.1	126	20	----
EP101-15X: Dibromochloromethane	124-48-1	0.5	ppbv	<0.5	10 ppbv	108	107	70.0	130	20	----
EP101-15X: 1.4-Dioxane	123-91-1	0.5	ppbv	<0.5	10 ppbv	87.5	88.4	70.8	119	20	----
EP101-15X: Ethylacetate	9002-89-5	0.5	ppbv	<0.5	10 ppbv	79.8	80.4	74.8	128	20	----
EP101-15X: trans-1.2-Dichloroethene	156-60-5	0.5	ppbv	<0.5	10 ppbv	93.9	93.9	78.0	120	20	----
EP101-15X: Heptane	142-82-5	0.5	ppbv	<0.5	10 ppbv	96.8	97.3	76.8	127	20	----
EP101-15X: Hexane	110-54-3	0.5	ppbv	<0.5	10 ppbv	95.5	95.7	79.4	123	20	----
EP101-15X: Isooctane	540-84-1	0.5	ppbv	<0.5	10 ppbv	93.9	93.8	77.7	124	20	----
EP101-15X: Isopropyl Alcohol	67-63-0	0.5	ppbv	<0.5	10 ppbv	78.2	81.1	70.0	126	20	----
EP101-15X: 2-Butanone (MEK)	78-93-3	0.5	ppbv	<0.5	10 ppbv	88.7	89.6	75.6	122	20	----
EP101-15X: Methyl iso-Butyl ketone	108-10-1	0.5	ppbv	<0.5	10 ppbv	79.0	80.2	70.0	121	20	----
EP101-15X: 2-Hexanone (MBK)	591-78-6	0.5	ppbv	<0.5	10 ppbv	77.6	78.6	70.0	127	20	----
EP101-15X: Propene	115-07-1	0.5	ppbv	<0.5	10 ppbv	89.5	90.2	70.0	130	20	----
EP101-15X: Methyl tert-Butyl Ether (MTBE)	1634-04-4	0.5	ppbv	<0.5	10 ppbv	84.0	85.6	70.1	130	20	----
EP101-15X: Tetrahydrofuran	109-99-9	0.5	ppbv	<0.5	10 ppbv	86.3	87.2	70.5	121	20	----
EP101-15X: Bromoform	75-25-2	0.5	ppbv	<0.5	10 ppbv	102	101	70.0	130	20	----
EP101-15X: Vinyl Acetate	108-05-4	0.5	ppbv	<0.5	10 ppbv	75.7	76.8	70.0	130	20	----
EP101-15X: Vinyl bromide	593-60-2	0.5	ppbv	<0.5	10 ppbv	101	102	78.8	122	20	----
EP101-15X: Acetonitrile	75-05-8	0.5	ppbv	<0.5	10 ppbv	80.7	81.1	70.0	130	20	----
EP101-15X: Acrolein	107-02-8	0.5	ppbv	<0.5	10 ppbv	70.8	70.7	70.0	130	20	----
EP101-15X: Acrylonitrile	107-13-1	0.5	ppbv	<0.5	10 ppbv	86.3	86.7	73.5	129	20	----
EP101-15X: tert-Butyl alcohol	75-65-0	0.5	ppbv	<0.5	10 ppbv	84.2	85.0	70.0	130	20	----
EP101-15X: 2-Chloro-1.3-butadiene	126-99-8	0.5	ppbv	<0.5	10 ppbv	83.4	84.3	77.4	118	20	----
EP101-15X: Di-isopropyl Ether	108-20-3	0.5	ppbv	<0.5	10 ppbv	87.0	87.8	73.0	128	20	----
EP101-15X: Ethyl tert-Butyl Ether (ETBE)	637-92-3	0.5	ppbv	<0.5	10 ppbv	81.0	83.0	76.1	124	20	----
EP101-15X: tert-Amyl Methyl Ether (TAME)	994-05-8	0.5	ppbv	<0.5	10 ppbv	79.7	81.1	72.9	128	20	----

Sub-Matrix: **AIR**

		Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike	Spike Recovery (%)		Recovery Limits (%)		RPDs (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	DCS	Low	High	Value	Control Limit
EP101: VOCs by USEPA Method TO15r (QCLot: 3922359) - continued											
EP101-15X: Methyl Methacrylate	80-62-6	0.5	ppbv	<0.5	10 ppbv	83.7	84.4	70.5	123	20	----
EP101-15X: 1.1.1.2-Tetrachloroethane	630-20-6	0.5	ppbv	<0.5	10 ppbv	108	106	71.4	130	20	----
EP101-15X: Isopropylbenzene	98-82-8	0.5	ppbv	<0.5	10 ppbv	106	105	70.2	125	20	----
EP101-15X: n-Propylbenzene	103-65-1	0.5	ppbv	<0.5	10 ppbv	104	104	70.0	130	20	----
EP101-15X: tert-Butylbenzene	98-06-6	0.5	ppbv	<0.5	10 ppbv	107	106	70.0	130	20	----
EP101-15X: sec-Butylbenzene	135-98-8	0.5	ppbv	<0.5	10 ppbv	108	108	70.0	125	20	----
EP101-15X: 2-isopropyltoluene	527-84-4	0.5	ppbv	<0.5	10 ppbv	105	105	70.0	130	20	----
EP101-15X: n-Butylbenzene	104-51-8	0.5	ppbv	<0.5	10 ppbv	104	104	70.0	130	20	----
EP101-15X: Naphthalene	91-20-3	0.5	ppbv	<0.5	10 ppbv	70.7	73.4	70.0	130	20	----
EP103: Petroleum Hydrocarbons in Gaseous Samples (QCLot: 3922360)											
EP103-PC: C6 - C9 Fraction	----	50	ppbv	<50	2800 ppbv	88.6	88.4	70.0	130	25	25
EP103-PC: C10 - C14 Fraction	----	50	ppbv	<50	1200 ppbv	88.7	88.6	70.0	130	25	25
EP103: Total Recoverable Hydrocarbons - NEPM 2013 (QCLot: 3922360)											
EP103-PC: C6 - C10 Fraction	C6_C10	50	ppbv	<50	3000 ppbv	88.3	88.0	70.0	130	25	25
EP103-PC: >C10 - C16 Fraction	----	50	ppbv	<50	500 ppbv	86.1	86.2	70.0	130	25	25
EP104: Light Hydrocarbons (QCLot: 3920798)											
EP104: Methane	74-82-8	0.005	Mol %	<0.005	0.105 Mol %	102	102	90.0	110	25	25
				<0.005	8.515 Mol %	99.3	99.3	90.0	110	25	25
EP104: Permanent Gases (QCLot: 3920798)											
EP104: Carbon Dioxide	124-38-9	0.005	Mol %	<0.005	5.266 Mol %	101	101	90.0	110	25	25
EP104: Carbon Monoxide	630-08-0	0.005	Mol %	<0.005	----	----	----	----	----	----	----
EP104: Oxygen	7782-44-7	0.1	Mol %	<0.10	9.312 Mol %	96.7	97.4	90.0	110	25	25

- **No Matrix Spike (MS) or Matrix Spike Duplicate (MSD) Results are required to be reported.**

Appendix B: Field Sheets

Project No: 7928

Address: 9 Rose Lane Sth Ltn.

Investigation Date: 17-08-21

FIELD LOG

GPS Ref / Photo (P)	S.Point	Depth mbgs	Sample ID & Depth	Material Description	Observations (odour, staining, colour)	Consistency (VL to VD)	M (D,M,W)	PID (ppm)
	SB3	0-0.2	SB3-0.3 1:11	Grass cover, wet loam, to 0.2;	No odour	L	M-W	0.0
			SB3-0.5 1:13					
		0.2-0.5		Yellow clay with brick, black staining, glass	HC odour?	L	M	0.0
	#1		~~SB3~~					
		0.5-1.3		" + coal, aggregate	No odour/ staining evident	M	M	0.0
	Nat	1.3-1.5		yellow clay - no foreign material possibly natural.	"	M	M	0.0
	SB2	0-0.2		grass cover then yellow clay, plant roots	No odour/s	M	M	0.0
	Disturbed	0.2-0.4	SB2-0.25 1:26	Bricks, coal mixed with brown clay	"	M	M	0.0
	#2	0.4-0.7	0.5 1:26.	black stain/organic? brown clay	stain?	M	M	0.0
		0.7-1.2		yellow clay with some black coal	No odour/s	M	M	0.0
	Nat	1.2-1.5		natural? yellow clay	No odour/s	~~D~~	M	0.0
	SB1	0-0.4		Grass cover, plant roots, yellow clay	No odour/s	M	M	0.0
		0.4-1.3		fragments concrete, brick, coal mixed with sandy yellow clay.	"	M	M	0.0
				Fill				
		1.3-1.5		Tree roots, plastic, geotech fabric, sawdust?	"	M-L	D.	0.0

Date: 16-08-21
Address: 9 Rose Place
Staff: C Parker.

Job Number: 7928

FIELD LOG

GPS Ref / Photo (P)	S.Point	Depth mbgs	Sample ID & Depth	Material Description	Observations (odour, staining, colour)	Consistency (VL to VD)	M (D,M,W)	PID (ppm)
		0-1.5		recent clean fill (compacted gravel)	No odour	L	D	
	MW1	1.5-2.7	MW1-1.5m 11:38	Dense clay (yellow) with grey stain to 2.0	Slight HC od	L-M	D	
			MW1-1.5B 11 Fill	then brick fragments, sandy	@ ~1.5 to 2m.			
			2.5 11:41	Broken bricks, coal, pebbles, crumbly sand to 2.7	No odour/s	L	D	
		2.7-3.9	2.7 11:49	crumbly sand mixed with brick	No odour/s	L	D.	
			2.8 11:49	fragments, coal, pebbles.				
			3.0 11:50					
		3.9-5.1		Same as 2.7 to 3.9 - fill material, crumbly	No odour	L	D	
			4.5m 11:56	yellow sand mixed with coal, brick	black stain?			
				fragments (small), some black stain? (coal)				
		5.1-6.3	5.9m 12:08	coal, red rock, brick, black gravel to 5.3m	No odour	L	D-M	
			6.3m 12:10	then natural orange then grey clay to	black stain.			
				6.3m. wet at 5.3 then dry to				
				6.3m. Solid auger from 6.3m				

Date: 16-8-21
Address: 9 Rose Lane
Staff: C Parker.

Job Number: 7928

FIELD LOG

GPS Ref / Photo (P)	S.Point	Depth mbgs	Sample ID & Depth	Material Description	Observations (odour, staining, colour)	Consistency (VL to VD)	M (D,M,W)	PID (ppm)
	VB1	0-1.5		fresh gravel to 0.3 then sandy gravel, some	No odour/s	L	D	0.0
			VB1 - 0.5 2:27	yellow clay with brick fragments				
			VB1 - 1.0 2:31	black (coal) to 1.5 m.				
		1.5-2.0	VB1 - 1.5 1:38	orange mottled clay from 1.5 to 1.8	No odour/s	L-M	D	0.0
			VB1 - 2.0 1:40	From 1.8 to 2.0m crumbly clayey gravel with red brick fragments				

Hydrogeology borehole log

J. 7928

VB2

Date 17-8-21

Coordinates
Datum
RL
Inclination
Bearing

Drill type
Equipment
Drill fluid(s)

Hole started
Hole finished
Drilled by T. Geo.
Logged by C Parker
Checked by

Bit type/size	Lift	Water	Notes (Samples, tests; PID = photo-ionisation detector; mbg = metres below ground; mbtc = metres below top of casing)	Weather'g (Slight / Mod / High / Soil)	Metres RL	Metres Depth	Graphic log	Materials (Soil/rock type, colour, plasticity or particle characteristics, secondary and minor components)	Groundwater quality: EC (µS/cm)	pH	ORP (mV)	DO mg/L	T (°C)	PID (ppm)	Completion details: Casing / Screen / Sand / Gravel / Bent / Cement / Soil	Structure, geology and interpretation
			VB2-0.5 9:15		0.5			aggregate over stiff brown clay disturbed								
								stiff brown clay disturbed								
					1.0			aggregate, black stain, HC odour, swarf, glass, mixed with yellow clay gravel						1.0		
			VB2-1.5 9:19		1.5											
			VB2-2.0m 9:35		2.0		W	Soft brown clay								
								gravelly sand with HC odour & black stain								Brick & rock.
					2.5											
					2.7			stiff yellow clay mixed with bricks. rock. to 2.7m						2.7		

fill

Hydrogeology borehole log

J..7928.....

VB3

Coordinates
Datum
RL
Inclination
Bearing

Drill type
Equipment
Drill fluid(s)

Hole started
Hole finished
Drilled by T. Geo
Logged by C Parker
Checked by

Bit type/size	Lift	Water	Notes (Samples, tests; PID = photo-ionisation detector; mbg = metres below ground; mbtc = metres below top of casing)	Weathering: Slight / Mod / High / Soil	Metres: RL / Depth	Graphic log	Materials (Soil/rock type, colour, plasticity or particle characteristics, secondary and minor components)	Groundwater quality: EC (µS/cm)	pH	ORP (mV)	DO mg/L	T (°C)	PID (ppm)	Completion details: Casing / Screen / Gravel / Seal / Cover	Structure, geology and interpretation
			VB3-0.3 10:43		0.5		Gravel (fresh) Soft brown clay with black stain – HC odour Gravel/rock brown clay								
			VB3-1.3 10:45		1.0 1.5		Brown clay sandy gravel with black stain. Brown clay. yellow clay with brick								
General VOC screen.			strong solvent? odour to 2.7 Black stain.		2.0 2.5 2.7		rock/gravel/sand black stain clay/brick glass, black stain								

Tree roots.

Fill

0–0.3 concrete
0.3–1.0 solid screen + Bentonite (wet).
1.0–2.7 slotted screen + Coarse SAND.

Hydrogeology borehole log

J..7928.....

VB4

Date - 17-08-2021

Coordinates
Datum
RL
Inclination
Bearing

Drill type
Equipment
Drill fluid(s)

Hole started
Hole finished
Drilled by
Logged by C Parker.
Checked by

Bit type/size	Lift	Water	Notes (Samples, tests; PID = photo-ionisation detector; mbg = metres below ground; mbtc = metres below top of casing)	Weathering: Slight / Mod / High / Soil	Metres RL	Metres Depth	Graphic log	Materials (Soil/rock type, colour, plasticity or particle characteristics, secondary and minor components)	Groundwater quality: EC (µS/cm)	pH	ORP (mV)	DO mg/L	T (°C)	PID (ppm)	Completion details: Casing / Screen / Gravel / Bent / Seal / Cover	Structure, geology and interpretation
			VB4-1.0			0.5		aggregate from clay (brown)								fill
			VB4-1.5			1.0		aggregate, smart rock, gravel brick. black stain glass HC odour (slight) 1 to 1.5								
			VB4-1.6 12:05			1.5										
						2.0		Brick mixed with clay glass, coal? fluid staining lots of brick.								
						2.5										
						2.7		stiff yellow clay from 2.5 to 2.7 (natural)								

Hydrogeology borehole log

J..7928.....

MW1

Date 16-8-21

Coordinates
Datum
RL
Inclination
Bearing

Drill type
Equipment
Drill fluid(s)

~~Hole started~~ 16-8-21
~~Hole finished~~
Drilled by T. Geo
Logged by
Checked by

Bit type/size	Lift	Water	Notes (Samples, tests; PID = photo-ionisation detector; mbg = metres below ground; mbtc = metres below top of casing)	Weathering: Slight / Mod / High / Soil	Metres: RL / Depth	Graphic log	Materials (Soil/rock type, colour, plasticity or particle characteristics, secondary and minor components)	Groundwater quality: EC (µS/cm)	pH	ORP (mV)	DO mg/L	T (°C)	PID (ppm)	Completion details: Casing / Screen / Gravel / Seal	Structure, geology and interpretation
			MW1-1.5 11:38		0.6		Recent fill clean gravel compacted								Well
			MW1-1.5B 11:38		1.0		yellow clay mixed with brick, pebbles								
			MW1-2.5 11:41		1.5		Crushed brick crumbly sand (yellow) mixed with coal, pebbles, fine powdered sand (historic fill) to 5.3m								
			MW1-2.7 11:49		2.0										
			" 2.8 11:49												
			MW1-3.0 11:50		3.0										
			MW1-4.5 11:56		4.0										
			MW1-5.9-12:08		5.0		Natural from ~~5.3~~ 5.3m = 6.3 - orange. Orange #0 Clay then grey stiff Clay from 6.3 to ~~8.0~~ 8.0m - grey								
			MW1-6.3 12:10		6.0										
					7.0										
			dry at base		8.0										
					~~9.0~~										

Solid Screen to 6m

Slotted screen 6-8m

Hydrogeology borehole log

J. 7928

VB2

Date 17-8-21

Coordinates
Datum
RL
Inclination
Bearing

Drill type
Equipment
Drill fluid(s)

Hole started
Hole finished
Drilled by T. Geo.
Logged by C Parker
Checked by

Bit type/size	Lift	Water	Notes (Samples, tests; PID = photo-ionisation detector; mbg = metres below ground; mbtc = metres below top of casing)	Weather'g (Slight / Mod / High / Soil)	Metres RL	Metres Depth	Graphic log	Materials (Soil/rock type, colour, plasticity or particle characteristics, secondary and minor components)	Groundwater quality: EC (µS/cm)	pH	ORP (mV)	DO mg/L	T (°C)	PID (ppm)	Completion details: Casing / Screen / Sand / Gravel / Bent / Cement / Soil	Structure, geology and interpretation
			VB2-0.5 9:15		0.5			aggregate over stiff brown clay disturbed								
								stiff brown clay disturbed								
					1.0			aggregate, black stain, HC odour, swarf, glass, mixed with yellow clay gravel						1.0		
			VB2-1.5 9:19		1.5											
			VB2-2.0m 9:35		2.0		W	Soft brown clay								
								gravelly sand with HC odour & black stain								Brick & rock.
					2.5											
					2.7			stiff yellow clay mixed with bricks. rock. to 2.7m						2.7		

fill

Hydrogeology borehole log

J..7928.....

VB3

Coordinates
Datum
RL
Inclination
Bearing

Drill type
Equipment
Drill fluid(s)

Hole started
Hole finished
Drilled by T. Geo
Logged by C Parker
Checked by

Bit type/size	Lift	Water	Notes (Samples, tests; PID = photo-ionisation detector; mbg = metres below ground; mbtc = metres below top of casing)	Weathering: Slight / Mod / High / Soil	Metres: RL / Depth	Graphic log	Materials (Soil/rock type, colour, plasticity or particle characteristics, secondary and minor components)	Groundwater quality: EC (µS/cm)	pH	ORP (mV)	DO mg/L	T (°C)	PID (ppm)	Completion details: Casing / Screen / Gravel / Seal / Cover	Structure, geology and interpretation
			VB3-0.3 10:43		0.5		Gravel (fresh) Soft brown clay with black stain – HC odour Gravel/rock brown clay								
			VB3-1.3 10:45		1.0 1.5		Brown clay sandy gravel with black stain. Brown clay. yellow clay with brick								
General VOC screen.			strong solvent? odour to 2.7 Black stain.		2.0 2.5 2.7		rock/gravel/sand black stain clay/brick glass, black stain								

Tree roots.

Fill

0–0.3 concrete
0.3–1.0 solid screen + Bentonite (wet).
1.0–2.7 slotted screen + Coarse SAND.

Hydrogeology borehole log

J..7928.....

MW1

Date 16-8-21

Coordinates
Datum
RL
Inclination
Bearing

Drill type
Equipment
Drill fluid(s)

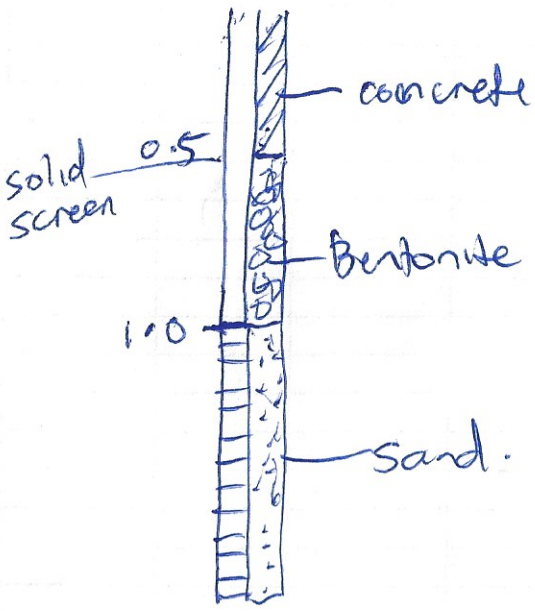
~~Hole started~~ 16-8-21
~~Hole finished~~
Drilled by T. Geo
Logged by
Checked by

Bit type/size	Lift	Water	Notes (Samples, tests; PID = photo-ionisation detector; mbg = metres below ground; mbtc = metres below top of casing)	Weathering: Slight / Mod / High / Soil	Metres: RL / Depth	Graphic log	Materials (Soil/rock type, colour, plasticity or particle characteristics, secondary and minor components)	Groundwater quality: EC (µS/cm)	pH	ORP (mV)	DO mg/L	T (°C)	PID (ppm)	Completion details: Casing / Screen / Gravel / Seal	Structure, geology and interpretation
			MW1-1.5 11:38		0.6		Recent fill clean gravel compacted								Well
			MW1-1.5B 11:38		1.0		yellow clay mixed with brick, pebbles								
			MW1-2.5 11:41		1.5		Crushed brick crumbly sand (yellow) mixed with coal, pebbles, fine powdered sand (historic fill) to 5.3m								
			MW1-2.7 11:49		2.0										
			" 2.8 11:49												
			MW1-3.0 11:50		3.0										
			MW1-4.5 11:56		4.0										
			MW1-5.9-12:08		5.0		Natural from ~~5.3~~ 5.3m = 6.3 - orange. Orange #0 Clay then grey stiff Clay from 6.3 to ~~8.0~~ 8.0m - grey								
			MW1-6.3 12:10		6.0										
					7.0										
			dry at base		8.0										
					~~9.0~~										

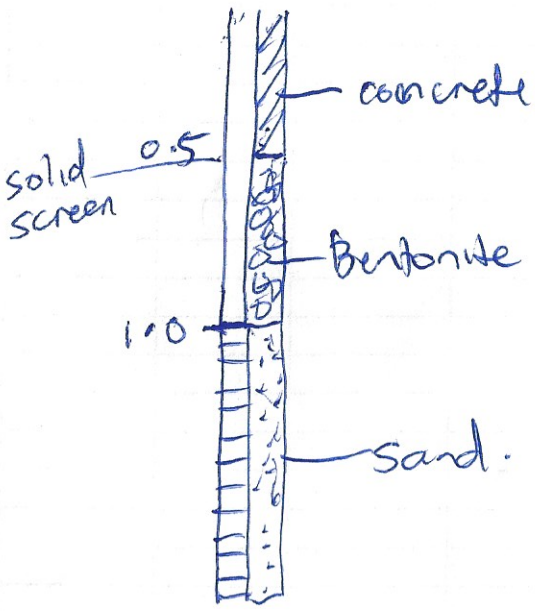
Solid Screen to 6m

Slotted screen 6-8m

VB1



VB1



Soil Gas Sampling Field Sheet- Outdoor Vapour Bore

Project Number: 7928 Sampling Date: 22-09-21

Site Address: 9 Rose Lane Vapour ~~Pin~~ Bore ID: MW1 Sampler: C Parker

Weather Conditions for Past 4 days Prior to Sampling			
	Temp °C	Barometric Pressure hPa	Rainfall mm
Date: 22-09-21	2.1 to 20.2	1019.0	0.0mm
Date: 21-09-21	2.3 to 13.6	1018.3	0.0 mm
Date: 20-09-21	5.3 to 13.5	1000.3	4.4 mm
Date: 19-09-21	4.2 to 14.3	1005.2	3.0 mm.

Surface Seal Test (Pin Seal)	
Method Bore	(Pass) / Fail Pump Test.

Pre- Sample Shut In Test (Sampling Lines)			
Train Lines	T1	T2	T3
Start Pressure (cm Hg)	-17	-17	-17
End Pressure (cm Hg)	-17	-17	-17
Pressure Test Duration	30 sec	30 sec	30 sec

Ambient Air – Gas Concentrations			
VOC 0.0	CO2 Not Taken	O2 Not Taken	LEL (CH4) Not Taken.

Pre Sample - Gas in Vapour Bore			
VOC 2.9 increasing. ppm	CO2 Not Taken	O2 Not Taken	LEL (CH4) Not Taken.

Purge of Sample Line Purge of Bore			
Method (circle) Syringe or Pump	Vol removed in ml 2,000mL (2L)	Flow Rate ml/min 200mL/min.	Purge Time sec/min 10min
Leak Test /Tracer Gas – Isobutylene in Sample			

Sample Equipment Serial Numbers		
	Canister Serial No	Flow Controller Serial No
Primary MW1	869	245
Duplicate MW1-B	832	245

Sampling Time and Pressure			
Start Time 1:55		Finish Time 4:45	
Start Pressure (cm Hg) -30		Finish Pressure (cm Hg) -10	
Flow Rate 12mL/min		Volume Collected	

Post Sample - Shut In Test (Sampling Lines)			
Train Lines	T1	T2	T3
Start Pressure (cm Hg)	-17	-17	-17
End Pressure (cm Hg)	-17	-17	-17
Pressure Test Duration	sec 30	30 sec	30 sec

Post Sample - Gas in Pin Line			
VOC 1.5 ppm	CO2 NA	O2 NA	LEL (CH4) NA.

NOTES

Soil Gas Sampling Field Sheet Outdoor Vapour Bore

Project Number: 7928 Sampling Date: 23-09-21

Site Address: 9 Rose Lane Vapour ~~Pin~~ Bore ID: VB3 Sampler: C Parker

Weather Conditions for Past 4 days Prior to Sampling			
	Temp °C	Barometric Pressure hPa	Rainfall mm
Date: 23	8.2 to 15.5	1008.3	0.0
Date: 22	2.1 to 20.2	1019.0	0.0
Date: 21	2.3 to 13.6	1018.3	0.0
Date: 20	5.3 to 13.5	1000.3	4.4

Surface Seal Test (Pin Seal)			
Method		(Pass) / Fail Pump Test	

Pre- Sample Shut In Test (Sampling Lines)			
Train Lines	T1	T2	T3
Start Pressure (cm Hg)	-17	-17	-17
End Pressure (cm Hg)	-17	-17	-17
Pressure Test Duration	30 sec	30 sec	30 sec

Ambient Air – Gas Concentrations			
VOC ~~0.4~~ 0.0	CO2 —	O2 —	LEL (CH4) —

Pre Sample - Gas in Pin Line			
VOC 1.4	CO2 —	O2 —	LEL (CH4) —

Purge of Sample Line			
Method (circle) Syringe or Pump	Vol removed in ml ~~2~~ 1,000mL	Flow Rate ml/min 200mL/min	Purge Time sec/min 5 min.
Leak Test /Tracer Gas – Isobutylene in Sample			

Sample Equipment Serial Numbers		
	Canister Serial No	Flow Controller Serial No
Primary	1020	034
Duplicate	NA	NA

Sampling Time and Pressure			
Start Time 10:21		Finish Time 12:13	
Start Pressure (cm Hg) -30		Finish Pressure (cm Hg) -4	
Flow Rate 12mL/min.		Volume Collected	

Post Sample - Shut In Test (Sampling Lines)			
Train Lines	T1	T2	T3
Start Pressure (cm Hg)	-17	-17	-17
End Pressure (cm Hg)	-17	-17	-17
Pressure Test Duration	sec 30	30 sec	30 sec

Post Sample - Gas in Pin Line			
VOC 0.6	CO2 —	O2 —	LEL (CH4) —

NOTES

Hydrogeology borehole log

J..7928.....

VB4

Date - 17-08-2021

Coordinates
Datum
RL
Inclination
Bearing

Drill type
Equipment
Drill fluid(s)

Hole started
Hole finished
Drilled by
Logged by C Parker.
Checked by

Bit type/size	Lift	Water	Notes (Samples, tests; PID = photo-ionisation detector; mbg = metres below ground; mbtc = metres below top of casing)	Weathering: Slight / Mod / High / Soil	Metres RL	Metres Depth	Graphic log	Materials (Soil/rock type, colour, plasticity or particle characteristics, secondary and minor components)	Groundwater quality: EC (µS/cm)	pH	ORP (mV)	DO mg/L	T (°C)	PID (ppm)	Completion details: Casing / Screen / Gravel / Bent / Seal / Cover	Structure, geology and interpretation
			VB4-1.0			0.5		aggregate from clay (brown)								fill
			VB4-1.5			1.0		aggregate, smart rock, gravel brick. black stain glass HC odour (slight) 1 to 1.5								
			VB4-1.6 12:05			1.5										
						2.0		Brick mixed with clay glass, coal? fluid staining lots of brick.								
						2.5										
						2.7		stiff yellow clay from 2.5 to 2.7 (natural)								

Appendix C: Letter from Vapour Consultant

29 November 2022

Ref: 222026-Launceston-LTR1.1

Errol Stewart
OSLP Pty Ltd
Level 1, 117 Cimitiere Street
Launceston TAS 7250
Email: errol@jmc.com.au

Cc: Royce Aldred, Environmental Service & Design Pty Ltd, raldred@esandd.com.au

Re: PROPOSED DEVELOPMENT AT 5 & 9 ROSE LANE, SOUTH LAUNCESTON – BUILDING GROUND GAS PROTECTION

1. TRANSMITTAL

Core Environmental Projects Pty Ltd (Core-EP) (formerly The Environmental Protection Group (Aust) Pty Ltd (EPG)) have been appointed by OSLP Pty Ltd to prepare a ground gas mitigation design for the proposed development at 5 Rose Lane and 9 Rose Land, South Launceston (the site)

The purpose of this letter is to respond to the development application advice prepared by City of Launceston (the Council) (file no. DA0439/2022, dated 18 October 2022) in relation to ground gas building protection matters. This letter does not provide the ground gas mitigation design for the development above.

Our high-level appreciation of the project is summarised below:

- The site is currently vacant. Historical activities at the site included brick manufacturing between the 1900s and 1960s.
- The adjacent Council-owned land to the east is upslope and was historically used as a clay quarry. The resultant quarry void was subject to landfill operations (inert and municipal), which continued until the late 1960s/ early 1970s.
- Land to the south of the site (also upslope) was a convict cemetery.
- The site elevation is approximately 35m AHD and slopes downwards from east to west. Westbury Road, located to the east of the site and subject landfill, has a surface elevation of approximately 60m AHD.
- The proposed site development comprises six (6) commercial tenancies and associated car parking. The provided structural drawings for the development (prepared by rare., dated 16.05.2022) show the ground floor construction will comprise a 150mm thick waffle pod slab supported on bored piers.
- Environmental investigations at the site have identified fill materials up to 5m below ground level, comprising **crushed rock, brick glass, coal, plastic and sawdust**.

- An assessment report has been prepared by Environmental Service & Design Pty Ltd (es&d), titled 'Environmental Site Assessment, 9 Rose Lane South Launceston' (file 7928, version: final v4, dated: October 2022).

- The es&d ESA (2022) reported methane and carbon dioxide concentrations up to 13.3%%v/v (VB1 on 27 September 2022) and 25.5%v/v (VB2 on 27 September 2022) at the site. the reported borehole flow rates are variable and, on occasion, notably negative borehole flow rates were reported, which Core-EP consider to be an artifact of the piston effect (commonly observed when gas bores are installed with the slotted section across wet soil conditions).

Based on the ground gas monitoring results reported within the es&d ESA (2022), the ground gas risks to the proposed development are considered to be indicative of a low Characteristic Situation 2 (CS2) site.

In response to the potential ground gas risks, we are currently considering several potentially suitable ground gas mitigation measures for the proposed development. Based on the current ground gas risk profile, it is envisaged the measures will comprise a proprietary gas membrane and under slab pressure relief venting system. In summary, the measures would comprise three (3) lines of redundancy, being (top down):

- A structural barrier.

- A proprietary gas membrane.

- A pressure relief venting.

Such systems are commonly installed in Victoria and New South Wales at sites with similar ground gas risk profiles (i.e., Low risk) and at developments with similar structural designs (i.e., suspended waffle pod slabs).

The gas membrane would be continuous beneath the waffle pod slab, beneath indoor areas. The membrane laps and detailing would be seamed by a method recognised and approved by a membrane manufacturer (heat-welded, spray-applied), which will be determined once the gas membrane is selected during detailed design.

The gas membrane would be sealed around all incoming service penetrations, forming an 'air tight' seal around each penetration, and thereby mitigating the potential for gas intrusion via this potential pathway.

The pressure relief system would work in conjunction with the gas membrane by discouraging the potential accumulation of ground gas beneath the gas membrane, as well as, providing a preferential pathway for gas (if present) away from overlying indoor areas.

In addition to the concept above, during the proposed detailed design phase, we intend on assessing the need for additional pathway intervention measures including, but not limited to, service trench plugs (where preferential pathways may exist or be created via development) and lateral migration interception.

The design process is currently ongoing, and we expect to provide additional information in due course, including appropriate drawings, calculations and material selection. Further, as per the NSW ground gas guidance (2020), a comprehensive Construction Quality Assurance (CQA) Plan will be prepared, prior to construction. The CQA Plan will provide key milestones (i.e., hold points and witness points), which will need to be verified by a suitably experienced independent party during construction to ensure the ground gas protection measures are installed as intended.

We trust the above is sufficient for your purposes; however, should you have any queries or require further information, please do not hesitate to contact the undersigned.

Yours faithfully,

For and on behalf of
Core Environmental Projects Pty Ltd

James Lucas
Technical Director
Tel 0427 897 585