LRPardo & Associates

ENVIRONMENTAL REPORT

Hydrogeological Site Investigation

Area "A"
280 Evans Road,
Cranbourne West VIC 3977

Prepared for:

Murphy Trust No. 1
C/- KLM Spatial

130479 Evans Road/3

28th November 2013

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EXECUTIVE SUMMARY

Murphy Trust No. 1 commissioned LRP&A to undertake a Hydrogeological Site Investigation of the property located at 280 Evans Road, Cranbourne West, Victoria.

The scope of works included the following:

- Auger two deeper bores for the installation of groundwater monitoring wells.
- Collecting a minimum of four samples from the groundwater and preserve for Vic EPA testing for potential contaminants.
- Preparing a Hydrogeological Site Investigation report that states the findings of the investigation.

A site history search carried out by Geoaquitards Environmental report no. RM239-M, dated 27/08/13, did not reveal any previous environmental issues at the site.

Having carried out the hydrogeological investigation and associated laboratory analysis, the results were reviewed with respect to contaminant levels and beneficial uses of the groundwater. Please see Appendix B for a summary of the test results and comparison with the GIL's. A few metals and metalloids namely, Chromium, Copper, Lead, Nickel and Zinc, exceeded the Groundwater Investigation Levels (GIL's) for the beneficial use of the groundwater as fresh water or drinking water. Laboratory results were also assessed with reference to the Australian and New Zealand Guidelines for Fresh and Marine Water Quality with respect to the beneficial uses of irrigation and livestock drinking. No exceedance of the trigger values was noted. An environmental management plan (EMP) will be required if the groundwater is expected to be used for any beneficial uses. However, an EMP would not be required if the groundwater is not intended to be used.

The piezometric watertable at the time of the investigation was between 0.47m and 1.42m below current surface level. A perched watertable at surface level was also identified. It is expected that groundwater will come into contact with services, pavement and building foundations during the development of the land. The groundwater may have an impact during construction and service life of the development, and consideration needs to be given as to how to best manage any potential impacts resulting from the groundwater.

With reference to LRP&A report no. 130479 Evans Rd/2, the land encompassed within the site is considered suitable for the permitted Industrial and Commercial use. The land encompassed within the site can be relied upon by Murphy Trust No. 1 as being 'fit for purpose' based on the current conditions as described by the current investigation.

HYDROGEOLOGICAL SITE INVESTIGATION

Project

130479 Evans Road / 3

Prepared for the benefit of:

Murphy Trust No. 1

C/- KLM Spatial

18 Mason Street

Dandenong VIC 3175

Prepared by

Peter Andrews

LR Pardo & Associates Pty Ltd (LRP&A)

Date

28th November 2013

COMMISSION

To carry out a Hydrogeological Site Investigation of the property located at 280 Evans Road, Cranbourne West, Victoria, in accordance with Australian Standards AS1726[1] and EPA 699[2], as requested and authorised by our Client herewith, Murphy Trust No. 1.

This report outlines the findings and recommendations of this Hydrogeological Site Investigation.

[1] AS1726-1993 *Geotechnical Site Investigation*, Incorporating Amendments 1 and 2 1994.
[2] EPA 699-2000 *Groundwater Sampling Guidelines.* Environmental Protection Authority, State Government of Victoria

1. INTRODUCTION

LR Pardo & Associates carried out a Hydrogeological Site Investigation on 17th October 2013 and 24th October 2013 at the property located at 280 Evans Road, Cranbourne West. During this site investigation 2 boreholes were augered to a depth of between 5.5m and 6m. Specialised laboratory tests were carried out on 2 water samples from each borehole with the aim to investigate the presence or otherwise of any potential contaminants in the groundwater.

The scope of works, as outlined in our proposal 130479 Evans Road/2.1 dated 10th September 2013 included the following:

- Auger two deeper bores for the installation of groundwater monitoring wells.
- Collecting a minimum of four samples from the groundwater and preserve for Vic EPA testing for potential contaminants.
- Preparing a Hydrogeological Site Investigation report that states the findings of the investigation.

This investigation aimed at identifying the presence or otherwise of potential contaminants and their concern to future occupants. Previously the site has been used for farming purposes. The land's intended use is for industrial/commercial development.

Laboratory testing was performed on samples obtained from the site at a NATA accredited laboratory.

To date LRP&A has been provided with the following documents and drawings:

- KLM Spatial Site Plan, reference no. 5959 Zones, dated 06/03/13, received 07/03/13.
- Geoaquitards Environmental Stage 1 Preliminary Site Investigation Report, report no. RM239-M, dated 13/07/13, received 29/07/13.
- KLM Spatial Plan of Survey, reference no. 5959DE1, dated 04/03/13, received 09/09/13.
- Geoaquitards Environmental Stage 1 Preliminary Site Investigation Report, report no. RM239-M, dated 27/08/13, received 12/09/13.
- MGT laboratory testing reports for Short EPA screens, report no. 397518-W, dated 08/11/2013, received 08/11/2013.

2. GENERAL INFORMATION

2.1 Site Description

The important features of the site are summarised in Table 1 below.

Table 1: General site information

Site Address	280, Evans Road, Cranbourne West VIC 3977
Site Area	24.5ha
Title Identification Details	Lot 4 PS 546430
Current Zoning	UGZ1 (Urban growth 1)
Local Government Area	City of Casey
Most Recent Site Use	Farming

2.2 Proposed Development

This investigation was conducted as part of the requirements to satisfy the City of Casey Planning Schemes as part of the submission of a planning permit application. It is anticipated that this parcel of land will become part of the Cranbourne West Precinct Structure Plan once developed. This possible development will most likely contain warehouses, roads and associated car parks.

2.3 Geology

Please refer to Geoaquitards Environmental report no. RM239-M, dated 27/08/13.

Augering uncovered the geology described in the Geoaquitards Environmental report, namely; Unnamed swamp and lake deposits, and Baxter Sandstone. Please see the borehole logs presented in Appendix A for further details.

2.4 Existing Borehole Search

Please refer to Geoaquitards Environmental report no. RM239-M, dated 27/08/13.

2.5 Groundwater

This investigation identified the shallowest aquifer for the purpose of measuring groundwater depths and sampling for laboratory testing.

Observations and groundwater sampling regimes are detailed below in Table 2. This is a piezometric watertable meaning it is under pressure.

Table 2: Groundwater well observations and sampling regime

Groundwater well	Date	Measured depth	Samples taken
GW1	24/10/13	0.47m	GW1-S1, GW1-S2
GW2	24/10/13	1.42m	GW2-S1, GW2-S2

In addition to the watertable identified above, a perched watertable exists at surface level.

Investigation of water contained within deeper aquifers was outside the scope of our work. Water from these aquifers is unlikely to have an impact on the sites proposed use for industrial/commercial use.

The Department of Minerals and Energy Groundwater Resources Victoria map indicates that the site has an aquifer lithology of Basalt, tuff and Scoria with a potential bore yield of >10l/s and a groundwater salinity of >1000mg/l total dissolved solids (TDS).

3. SITE HISTORY AND CONTAMINANTS OF POTENTIAL CONCERN

3.1 Historical Information Review

Please refer to Geoaquitards Environmental report no. RM239-M, dated 27/08/13.

3.2 Contaminants of Potential Concern (COPC)

Potential contaminants associated with previous site uses were considered to include:

- Heavy Metals,
- Total Recoverable Hydrocarbons (TRH),
- Benzene, Toluene, Ethyl benzene and Total Xylenes (BTEX),
- Polycyclic Aromatic Hydrocarbons (PAH), and
- Organochlorine (OC) and Organophosphate (OP) pesticides.

4. HYDROGEOLOGICAL SITE INVESTIGATION WORKS

4.1 General

Groundwater was assessed for its potential to be contaminated. The groundwater monitoring wells were installed using a truck mounted drill rig using a solid auger.

This site investigation was carried out as part of the City of Casey Planning Scheme requirements for land to be developed into commercial/industrial use. The monitoring wells identified that the piezometric watertable at the site rises to an approximate depth of between 0.47m and 1.42m below surface level at the time of the investigation. This aquifer is not intersected until a depth of approximately 2.5-4.0m below surface level. Therefore it is possible to install some building services and access roads/carparks without intersecting this aquifer. A perched watertable at surface level also exists. It should be emphasised that the presence of groundwater at this depth is likely to have an impact on the installation of building services and footings. If the perched watertable exists during the development of the land then it will most likely cause construction issues. Foundation excavation including basements is likely to require de-watering and shoring to prevent collapse of excavations and filling with water.

Once all possible uses of the groundwater monitoring well are exhausted it is recommended that the well be de-commissioned. LR Pardo & Associates can coordinate this process.

4.1.1 Water Sampling Methodology and Field Validation

Two water samples were taken from each groundwater monitoring well. All samples were taken one week following the installation of the wells. The first sample in each groundwater well was sampled without disturbing the water within that well. The second sample in each groundwater well was taken after the remaining water had been mixed considerable over the full depth of the groundwater well installation.

Whilst sampling on site all precautions were taken to avoid cross contamination and contact with human skin. The sampling protocol followed at each sampling location is detailed below:

1. Wash clean sampling tools with deionised water and mild detergent.
2. Use a set of new sterilised gloves each time.
3. Collect water using bailer.
4. Fill sampling bottles/containers.
5. Fasten lid (air-tight) and store in Esky with iced cooler blocks.
6. Deliver to analytical laboratory.

Sample storage was provided by Eurofins MGT, which consisted of sampling bottles/containers, Esky's and ice blocks. All water samples were stored on ice while on site, and during transit.

4.2 Regulatory Framework

4.2.1 Regulatory Framework for Groundwater Assessment

The protection of the beneficial uses is assessed with reference to the NEPM guidelines[3]. These guidelines provide for the following groundwater uses;

- Fresh Water,
- Marine Water,
- Drinking Water.

In addition the beneficial uses of irrigation and stock watering were also assessed with reference to the Australian and New Zealand Guidelines for Fresh and Marine Water Quality[4].

It is emphasised within the NEPM that GILs are not intended for use as default trigger or remediation target criteria, but are intended to prompt an appropriate site specific assessment when they are exceeded. However, it is considered reasonable in the first instance to use these investigation limits as default acceptance criteria, and only consider impacts more closely if they are exceeded.

It should be noted that a complete assessment of all relevant beneficial uses was outside the scope of this investigation. This investigations primary focus was on whether the presence of any identified contamination would effect the development of the site for industrial/commercial use. Both fresh water and drinking water were identified as

[3] NEPM, 1999 & 2013
[4] National Water Quality Management Strategy (2000). *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*, Volume 1, Paper no. 4

possible uses of the groundwater onsite. Please see Table 3 for the investigation levels of all GILs. For more information please see Appendix B.

Table 3: Groundwater-based investigation levels[5]

Substance		Groundwater Investigation Levels		
		Fresh Waters[A]	Marine Waters[A]	Drinking Water[B]
		(µg/L)	(µg/L)	(mg/L)
Metals and Metalloids				
Aluminium, Al pH>6.5		55	-	-
Antimony		-	-	0.003
Arsenic		24 as As(III) 13 as As(V)	-	0.01
Barium		-	-	2
Beryllium		-	-	0.06
Boron		370[C]	-	4
Cadmium	H	0.2	0.7[D]	0.002
Chromium, Cr (III)	H	-	27	-
Chromium, Cr (VI)		1[C]	4.4	0.05
Cobalt		-	1	-
Copper	H	1.4	1.3	2
Iron, (Total)		-	-	-
Lead	H	3.4	4.4	0.01
Manganese		1900[C]	-	0.5
Mercury (Total)		0.06[D]	0.1[D]	0.001
Molybdenum		-	-	0.05
Nickel	H	11	7	0.02
Selenium (Total)		5[D]	-	0.01
Silver		0.05	1.4	0.1
Tributyl tin (as Sn)		-	0.006[C]	-
Tributyl tin oxide		-	-	0.001
Uranium		-	-	0.017
Vanadium		-	100	-
Zinc	H	8[C]	15[C]	-
Non-metallic Inorganics				
Ammonia[E] (as NH_3-N at pH 8)		900[C]	910	-
Bromate		-	-	0.02
Chloride		-	-	-
Cyanide (as un-ionised Cn)		7	4	0.08
Fluoride		-	-	1.5
Hydrogen sulphide (un-ionised H_2S measured as S)		1	-	-
Iodide		-	-	0.5

[5] National Environment Protection Council (2013). *National Environment Protection (Assessment of Site Contamination) Measure*, 2013, Table 1a

Table 4: Groundwater-based investigation levels continued

Substance	Groundwater Investigation Levels		
	Fresh Waters[A]	Marine Waters[A]	Drinking Water[B]
	(µg/L)	(µg/L)	(mg/L)
Nitrate (as NO_3)	refer to guideline	refer to guideline	50
Nitrite (as NO_2)	refer to guideline	refer to guideline	3
Nitrogen	refer to guideline	refer to guideline	-
Phosphorus	refer to guideline	refer to guideline	-
Sulphate (as SO_4)	-	-	500
Organic alchohols/other organics			
Ethanol	1400	-	-
Ethylenediamine tetra-acetic acid (EDTA)	-	-	0.25
Formaldehyde	-	-	0.5
Nitrilotriacetic acid	-	-	0.2
Anilines			
Aniline	8	-	-
2,4-Dichloroaniline	7	-	-
3,4-Dichloroaniline	3	150	-
Chlorinated Alkanes			
Dichloromethane	-	-	0.004
Trichloromethane (chloroform)	-	-	0.003
Trihalomethanes (total)	-	-	0.25
Tetrachloromethane (carbon tetrachloride)	-	-	0.003
1,2-Dichloroethane	-	-	0.003
1,1,2-Trichloroethane	6500	1900	-
Hexachloroethane	290[D]	-	-
Chlorinated Alkenes			
Chloroethene (vinyl chloride)	-	-	0.0003
1,1-Dichloroethene	-	-	0.03
1,2-Dichoroethene	-	-	0.06
Tetrachloroethene (PCE) (Perchloroethene)	-	-	0.05
Chlorinated Benzenes			
Chlorobenzene	-	-	0.3
1,2- Dichlorobenzene	160	-	1.5
1,3- Dichlorobenzene	260	-	-

Table 4: Groundwater-based investigation levels continued (2)

Substance	Groundwater Investigation Levels		
	Fresh Waters[A]	Marine Waters[A]	Drinking Water[B]
	(µg/L)	(µg/L)	(mg/L)
1,4- Dichlorobenzene	60	-	0.04
1,2,3- Trichlorobenzene	3[D]	-	0.03 for individual or total trichlorobenzenes
1,2,4- Trichlorobenzene	85[D]	20[D]	
1,3,5-Trichlorobenzene	-	-	
Polychlorinated Biphenyls (PCBs)			
Aroclor 1242	0.3[D]	-	-
Aroclor 1254	0.01[D]	-	-
Other Chlorinated Compounds			
Epichlorohydrin	-	-	0.1
Hexachlorobutadiene	-	-	0.0007
Monochloramine	-	-	3
Monocyclic Aromatic Hydrocarbons			
Benzene	950	500[C]	0.001
Toluene	-	-	0.8
Ethylbenzene	-	-	0.3
Xylenes	350 (as o-xylene) 200 (as p-xylene)	-	0.6
Styrene (Vinyl benzene)	-	-	0.03
Polycyclic Aromatic Hydrocarbons (PAHs)			
Naphthalene	16	50[C]	-
Benzo[a]pyrene	-	-	0.00001
Phenols			
Phenol	320	400	-
2-Chlorophenol	340[C]	-	0.3
4-Chlorophenol	220	-	-
2,4-Dichlorophenol	120	-	0.2
2,4,6-Trichlorophenol	3[D]	-	0.02
2,3,4,6-Tetrachlorophenol	10[D]	-	-
Pentachlorophenol	3.6[D]	11[D]	0.01
2,4-Dinitrophenol	45	-	-
Phthalates			
Dimethylphthalate	3700	-	-
Diethylphthalate	1000	-	-
Dibutylphthalate	10[D]	-	-
Di(2-ethylhexyl) phthalate	-	-	0.01

Table 4: Groundwater-based investigation levels continued (3)

Substance	Groundwater Investigation Levels		
	Fresh Waters[A]	Marine Waters[A]	Drinking Water[B]
	(µg/L)	(µg/L)	(mg/L)
Pesticides			
Acephate	-	-	0.008
Aldicarb	-	-	0.004
Aldrin plus Dieldrin	-	-	0.0003
Ametryn	-	-	0.07
Amitraz	-	-	0.009
Amitrole	-	-	0.0009
Asulam	-	-	0.07
Atrazine	13	-	0.02
Azinphos-methyl	-	-	0.03
Benomyl	-	-	0.09
Bentazone	-	-	0.4
Bioresmethrin	-	-	0.1
Bromacil	-	-	0.4
Bromoxynil	-	-	0.01
Captan	-	-	0.4
Carbaryl	-	-	0.03
Carbendazim (Thiophanate-methyl)	-	-	0.09
Carbofuran	0.06	-	0.01
Carboxin	-	-	0.3
Carfentrazone-ethyl	-	-	0.1
Chlorantraniliprole	-	-	6
Chlordane	0.03[D]	-	0.002
Chlorfenvinphos	-	-	0.002
Chlorothalonil	-	-	0.05
Chlorpyrifos	0.01[D]	0.009[D]	0.01
Chlorsulfuron	-	-	0.2
Clopyralid	-	-	2
Cyfluthrin, Beta-cyfluthrin	-	-	0.05
Cypermethrin isomers	-	-	0.2
Cyprodinil	-	-	0.09
1,3-Dichloropropene	-	-	0.1
2,2-DPA	-	-	0.5
2,4-D [2,4-dichlorophenoxy acetic acid]	280	-	0.03
DDT	0.006[D]	-	0.009
Deltramethrin	-	-	0.04

Table 4: Groundwater-based investigation levels continued (4)

Substance	Groundwater Investigation Levels		
	Fresh Waters[A]	Marine Waters[A]	Drinking Water[B]
	(µg/L)	(µg/L)	(mg/L)
Diazinon	0.01	-	0.004
Dicamba	-	-	0.1
Dichloroprop	-	-	0.1
Dichlorvos	-	-	0.005
Dicofol	-	-	0.004
Diclofop-methyl	-	-	0.005
Dieldrin plus Aldrin	-	-	0.0003
Diflubenzuron	-	-	0.07
Dimethoate	0.15	-	0.007
Diquat	1.4	-	0.007
Disulfoton	-	-	0.004
Diuron	-	-	0.02
Endosulfan	0.03[D]	0.005[D]	0.02
Endothal	-	-	0.1
Endrin	0.01[D]	0.004[D]	-
EPTC	-	-	0.3
Esfenvalerate	-	-	0.03
Ethion	-	-	0.004
Ethoprophos	-	-	0.001
Etridiazole	-	-	0.1
Fenamiphos	-	-	0.0005
Fenarimol	-	-	0.04
Fenitrothion	0.2	-	0.007
Fenthion	-	-	0.007
Fenvalerate	-	-	0.06
Fipronil	-	-	0.0007
Flamprop-methyl	-	-	0.004
Fluometuron	-	-	0.07
Fluproponate	-	-	0.009
Glyphosate	370	-	1
Haloxyfop	-	-	0.001
Heptachlor	0.01[D]	-	-
Heptachlor epoxide	-	-	0.0003
Hexazinone	-	-	0.4
Imazapyr	-	-	9
Iprodione	-	-	0.1
Lindane (γ-HCH)	0.2	-	0.01

Table 4: Groundwater-based investigation levels continued (5)

Substance	Groundwater Investigation Levels		
	Fresh Waters[A]	Marine Waters[A]	Drinking Water[B]
	(µg/L)	(µg/L)	(mg/L)
Malathion	0.05	-	0.07
Mancozeb (as ETU, ethylene thiourea)	-	-	0.009
MCPA	-	-	0.04
Metaldehyde	-	-	0.02
Metham (as methylisothiocyanate, MITC)	-	-	0.001
Methidathion	-	-	0.006
Methiocarb	-	-	0.007
Methomyl	3.5		0.02
Methyl bromide	-	-	0.001
Metiram (as ETU, ethylene thiourea)	-	-	0.009
Metolachlor/s–Metolachlor	-	-	0.30
Metribuzin	-	-	0.07
Metsulfuron-methyl	-	-	0.04
Mevinphos	-	-	0.006
Molinate	3.4	-	0.004
Napropamide	-	-	0.4
Nicarbazin	-	-	1
Norflurazon	-	-	0.05
Omethoate	-	-	0.001
Oryzalin	-	-	0.4
Oxamyl	-	-	0.007
Paraquat	-	-	0.02
Parathion	0.004[C]	-	0.02
Parathion methyl	-	-	0.0007
Pebulate	-	-	0.03
Pendimethalin	-	-	0.4
Pentachlorophenol	-	-	0.01
Permethrin	-	-	0.2
Picloram	-	-	0.30
Piperonyl butoxide	-	-	0.6
Pirimicarb	-	-	0.007
Pirimiphos methyl	-	-	0.09
Polihexanide	-	-	0.7
Profenofos	-	-	0.0003

Table 4: Groundwater-based investigation levels continued (6)

Substance	Groundwater Investigation Levels		
	Fresh Waters[A]	Marine Waters[A]	Drinking Water[B]
	(µg/L)	(µg/L)	(mg/L)
Propachlor	-	-	0.07
Propanil	-	-	0.7
Propargite	-	-	0.007
Proparzine	-	-	0.05
Propiconazole	-	-	0.1
Propyzamide	-	-	0.07
Pyrasulfatole	-	-	0.04
Pyrazophos	-	-	0.02
Pyroxsulam	-	-	4
Quintozene	-	-	0.03
Simazine	3.2	-	0.02
Spirotetramat	-	-	0.2
Sulprofos	-	-	0.01
2,4,5-T	36	-	0.1
Tebuthiuron	2.2	-	-
Temephos	-	0.05[D]	0.4
Terbacil	-	-	0.2
Terbufos	-	-	0.0009
Terbuthylazine	-	-	0.01
Terbutryn	-	-	0.4
Thiobencarb	2.8	-	0.04
Thiometon	-	-	0.004
Thiram	0.01	-	0.007
Toltrazuril	-	-	0.004
Toxafene	0.1[D]	-	-
Triadimefon	-	-	0.09
Trichlorfon	-	-	0.007
Triclopyr	-	-	0.02
Trifluralin	2.6[D]	-	0.09
Vernolate	-	-	0.04
Surfactants			
Linear alkylbenzene sulfonates (LAS)	280	-	-
Alcohol ethoxylated sulfate (AES)	650	-	-
Alcohol ethoxylated surfactants (AE)	140	-	-

4.3 Quality of Analytical Data

National Association of Testing Authority (NATA) accredits laboratories on a parameter by parameter basis and the laboratories must provide quantitative evidence of their ability and competence to produce reliable results against recognised benchmarks (i.e. NATA proficiency programs, other national and international proficiency programs, and performance against certified reference materials). Accredited laboratories are able to demonstrate the ability to produce reliable, repeatable results for a range of parameters within a range of sample matrices.

Laboratories performing analyses for environmental purposes will normally base their methods on a range of guidelines and 'standard methods' including:

- National Environment Protection (Assessment of Site Contamination) Measure 2013;
- A guide to the Sampling and Analysis of Waters, Wastewater, Soil and Wastes - EPA Publication 441 (2000);
- Australian Standard 4482.1 (Guide to the sampling and investigation of potentially contaminated soil- Part 1: Non-volatile and semi-volatile compounds) & Australian Standard 4482.2 (Guide to the sampling and investigation of potentially contaminated soil- Part 2: Volatile substances);
- American Public Health Association (APHA), American Water Works Association and WPCF "Standard Methods for the Examination of Waters and Waste Waters" (Latest Publication);
- United States Environmental Protection Agency (US EPA) Test Methods for Evaluating Solid Waste, Laboratory Manual, Physical/Chemical Methods, SW846 (Latest Edition);
- US EPA Contract Laboratory Program for Organic (1999) and Inorganic (2002) Data Review;
- US EPA Guidance on Environmental Data Verification and Data Validation (2002);
- Other Publications (eg. ASTM) or accredited in house methods as may be developed and accredited for specific parameters.

Analysis of samples requires a number of important steps including sub-sampling, pre-treatment including digestion/extraction, and physical/chemical/biological measurement of specific parameters against relevant standard materials.

With regard to the specific issue of specified recoveries, the EPA and APHA methods nominate acceptable broad recovery ranges for both soils and waters. However, it must be emphasized that certain parameter recoveries can vary significantly depending on sample type and matrix. The 'APHA Standard Methods' provide a discussion at the end of most methods on precision and bias. Similarly the USEPA Methods SW-846 provides quantitative data for precision and accuracy for most methods.

The adoption of the general advisory ranges for specific recoveries has been used to screen laboratory data. Where recoveries are outside these ranges the data was assessed in relation to specific laboratory comments, published industry 'norms' for specific parameters and/or the likely impact on the interpretation of the meaning of the results. If significant doubt exists regarding a laboratories performance then data can be requested on their estimates of uncertainty of measurement, control chart information and proficiency program performance. Laboratories must maintain this information as a requirement of their NATA accreditation.

The following section outlines a consideration of the QC information provided as part of this preliminary environmental investigation.

4.3.1 Laboratory

Accuracy of laboratory QC results (laboratory control samples, matrix spikes and surrogates) is measured by percentage recovery (%R) of known additions. Acceptance targets for laboratory control samples and matrix spikes is generally between 70% and 130% recovery for organics and 80-120% recovery for metals (APHA 1992), however acceptable accuracy for certain methods may exceed these limits (USEPA 1986). Acceptance targets for surrogates are between 80% and 120% recovery for organics. It should be noted that matrix dependant QC methods (matrix spikes, surrogates) can be affected by the matrix; hence these %R results have been reviewed qualitatively.

Results were determined to be within the acceptable range.

5. DISCUSSION OF RESULTS AND RECOMMENDATIONS

Having carried out the site investigation and associated laboratory analysis, the results were reviewed with respect to contaminant levels and beneficial uses of the water. Please see Appendix B for a summary of the test results and comparison with the GIL's.

Some of the reported analytic concentrations exceeded the GIL's for use of groundwater for fresh water or drinking water use. Laboratory results were also assessed with reference to the Australian and New Zealand Guidelines for Fresh and Marine Water Quality[6] with respect to the beneficial uses of irrigation and livestock drinking. Exceedance of the trigger values was noted for Chromium, copper, lead, nickel and zinc with reference to GIL's only.

The piezometric watertable at the time of the investigation was between 0.47m and 1.42m below current surface level. There was also a perched watertable at surface level. It is expected that groundwater will come into contact with services, pavements and building foundations during the development of the land. The groundwater may have an impact during construction and service life of the development, and consideration needs to be given as to how to best manage any potential impacts resulting from the groundwater.

If the perched watertable exists during the development of the land then it will most likely cause construction issues. Foundation excavation including basements is likely to require de-watering and shoring to prevent collapse of excavations and filling with water. Alternatively the site could be filled and adequate subsurface drainage installed. An appropriate solution may take the form of a gravel blanket followed by a clay capping layer.

No beneficial uses of the groundwater are anticipated, nor any adverse effects of the development on the groundwater, provided no direct discharge of contaminants into the aquifer. An EMP will be required if the groundwater is expected to be used for any beneficial uses. However, an EMP would not be required if the groundwater is not intended to be used.

[6] National Water Quality Management Strategy (2000). *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*, Volume 1, Paper no. 4

Therefore with reference to LRP&A report no. 130479 Evans Rd/2, the land encompassed within the site is considered suitable for Industrial and Commercial use. The land encompassed within the site can be relied upon by Murphy Trust No. 1, as being 'fit for purpose' based on the current conditions as described by the current investigation.

A geotechnical investigation of the site is recommended prior to development, to further understand the engineering properties of the foundation material onsite.

6. REFERENCES

ANZECC & NHMRC (January 1992). *Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites*. Australian and New Zealand Environment & Conservation Council/National Health and Medical Research Council.

EPA (May 2004). *Classification of Wastes*, EPA Bulletin, Publication 448, EPA Victoria.

EPA (April 2000). *Groundwater Sampling Guidelines*, Publication 669, EPA Victoria.

National Environment Protection Council (1999). *National Environment Protection (Assessment of Site Contamination) Measure*, December 1999.

National Environment Protection Council (2013). *National Environment Protection (Assessment of Site Contamination) Measure*, 2013.

National Water Quality Management Strategy (2000). Australian and New Zealand Guidelines for Fresh and Marine Water Quality, October 2000, Volume 1, Paper no. 4, Australian and New Zealand Environmental and Conservation Council/Agriculture and Resource Management Council of Australia and New Zealand.

7. REPORT LIMITATIONS

a) This technical report has been prepared in good faith based on the information provided by our Client's representative, Ms Louise Lowe, Urban Planner for KLM Spatial, and in accordance with LRP&A quality system.

b) This report has been commissioned by and for the specific use of our Client Murphy Trust No. 1 for the 'Evans Road' project only, located at 280 Evans Road, Cranbourne West, Victoria. Therefore, no responsibility or liability to any third party is accepted for any damages, howsoever arising, from contents of this report or its use by any third party. Where such liability cannot be excluded it is reduced to the full extent lawful.

c) The use of this report **is not** appropriate where there have been any changes in the nature of the project or the conditions present during any field investigation or site inspection.

d) No responsibility or liability is accepted where any part of this report is used in isolation, out of context or without consideration of the total document.

e) If at a later time it is found that the information previously provided to LRP&A was incorrect, incomplete and/or if at the time of construction the soil conditions differ drastically from those initially reported, LRP&A **should be contacted immediately** and this report may need to be reviewed and amended if appropriate.

Should you require any further information regarding this report, please do not hesitate to contact the undersigned on (03) 9555 6995.

Prepared by

Peter J Andrews ***(BE [Civil, Hons], GradIEAust)***
Geotechnical Engineer
LR Pardo & Associates Pty Ltd

ENGINEERS AUSTRALIA
Professional Engineers
GRADUATE MEMBER

Reviewed and authorised by

Lucas R Pardo ***(BE [Civil], MIEAust, MAICD)***
Director / Senior Principal
LR Pardo & Associates Pty Ltd

ENGINEERS AUSTRALIA
Professional Engineers
MEMBER

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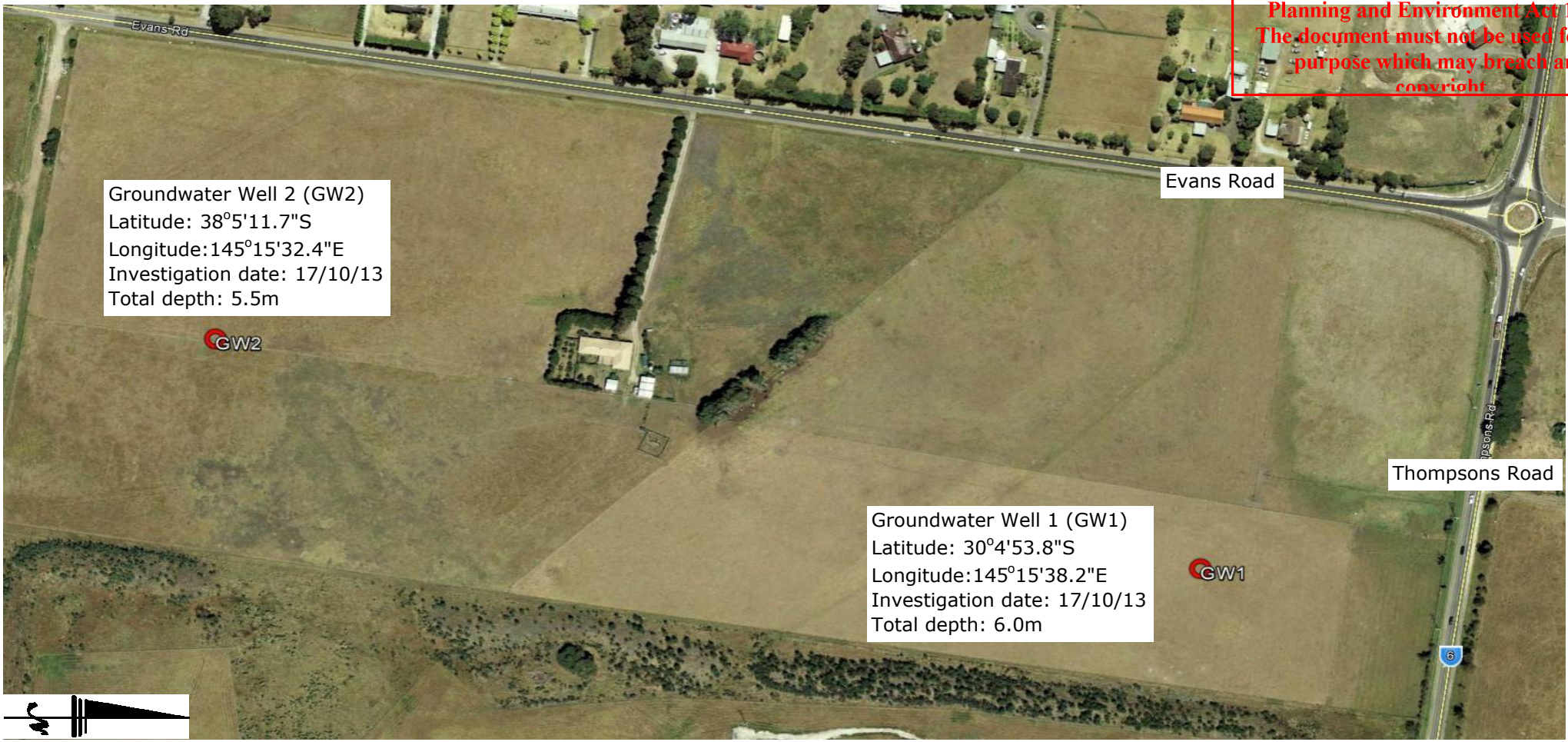
APPENDIX A

Monitoring Well Location and Borehole Log

Groundwater Monitoring Well Locations



This drawing shall be read in conjunction with LRP&A Report No. 130479 Evans Road/3.

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NOT TO SCALE

Source: Google Earth

Title Groundwater Monitoring Well Locations
Locality 280 Evans Road
Cranbourne West, Victoria

Dwg. No 130479/3 GW
Prepared PA 28/11/2013
Checked LP 2/12/2013

Hydrogeological Site Investigation
Investigation dates: 17/10/2013 & 24/10/2013

Project: 130479 Evans Road/3

Sheet No GW Loc

File 130479-3 BH Log.xls

LRPardo & Associates

BOREHOLE LOG

Client: **Murphy Trust No.1** Borehole No: **GW 1**
Project: 130479 Evans Rd/2 Date: 17/10/13
Borehole Location: See map Logged by: PA
Borehole Elevation: on surface Entered by: SMP

Method	Depth (metres)		Graphic Log	Material Description Type, Plasticity ,Colour, Particle characteristics	Soil Classification	Consistency / Density	Moisture	Other	Type	Test Results	Structure and additional observations
	0.5	0.47		Sandy CLAY Grey to black Medium plasticity	CI	S	M-W				
		0.60									Piezometric Watertable Geology: Quaternary unnamed swamp and lake deposits
	1.0			Silty CLAY Low to medium plasticity Mottled orange, brown and grey	CL-CI	St	M				
	1.5	1.80									
A	2.0			Clayey SILT Some Sand White to light grey Possibly weathered Rock	ML	VSt	D				
	2.5										
	3.0										
	3.5										
	4.0						W-Sat				
	4.5										
	5.0										
	5.5										
	6.0	6.00									
				Borehole 1 terminated at 6.00m							

Consistency/density:

VS	very soft	Fb	friable
S	soft	VL	very loose
F	firm	L	loose
St	stiff	MD	medium dense
VSt	very stiff	D	dense
H	hard	VD	very dense

samples/tests:

V	pilcon shear vane kPa
U63	undisturbed sample 63mm
DS	disturbed sample
PP	pocket penetrometer kPa
CT	samples for contamination test
N	standard penetration test

Penetration

1	no resistance
2	ranging
3	to
4	Refusal

method: A auger drilling; E Excavator; R roller/tricone; H Hammer drilling

moisture: D dry; W wet; M moist; Sat Saturated

Doc. No. LBH-001
Issued Date: 20/11/08

LRPardo & Associates

BOREHOLE LOG

Client: **Murphy Trust No.1** Borehole No: **GW 2**
Project: 130479 Evans Rd/2 Date: 17/10/13
Borehole Location: See map Logged by: PA
Borehole Elevation: on surface Entered by: SMP

Method	Depth (metres)		Graphic Log	Material Description Type, Plasticity ,Colour, Particle characteristics	Soil Classification	Consistency / Density	Moisture	Other	Type	Test Results	Structure and additional observations
	0.5	0.50		Silty Sandy CLAY Dark brown to black Medium plasticity	Cl	F	M				
	1.0			Silty CLAY Some Sand Mottled orange, brown and grey Medium plasticity	Cl	St	M				Geology: Quaternary unnamed swamp and lake deposits
		1.42									Piezometric Watertable
	1.5										
	2.0										
	2.5			Becoming wet at 2.50m			W				
A	3.0										
	3.5										
	4.0										
	4.5										
	5.0										
	5.5	5.50									
				Borehole 2 terminated at 5.50m							
	6.0										

Consistency/density:

VS	very soft	Fb	friable
S	soft	VL	very loose
F	firm	L	loose
St	stiff	MD	medium dense
VSt	very stiff	D	dense
H	hard	VD	very dense

samples/tests:

V	pilcon shear vane kPa
U63	undisturbed sample 63mm
DS	disturbed sample
PP	pocket penetrometer kPa
CT	samples for contamination test
N	standard penetration test

Penetration

1	no resistance
2	ranging
3	to
4	Refusal

method: A auger drilling; E Excavator; R roller/tricone; H Hammer drilling

moisture: D dry W wet M moist Sat Saturated

Doc. No. LBH-001
Issued Date: 20/11/08

LRPardo & Associates

APPENDIX B

Test Results Summary

Test Results Summary - Hydrogeological Investigation

SUBSTANCE	LOCATION								GROUNDWATER INVESTIGATION LEVELS		
	GW1 S1	GW1 S2	GW2 S1	GW2 S2					Fresh Waters	Drinking Water	Comment
Metals and Metalloids											
Arsenic (filtered)	0.002	0.004	< 0.001	0.009					**0.024**	**0.01**	Pass
Cadmium (filtered)	< 0.0002	< 0.0002	< 0.0002	< 0.0002					**0.0002**	**0.002**	Pass
Chromium (filtered)	< 0.001	0.019	< 0.001	0.021					**0.001**	**0.05**	*
Copper (filtered)	0.004	0.006	0.002	0.033					**0.0014**	**2**	*
Lead (filtered)	0.041	0.083	0.036	0.29					**0.003**	**0.01**	*
Mercury (filtered)	< 0.0001	< 0.0001	< 0.0001	0.0006					**0.0001**	**0.001**	Pass
Molybdenum (filtered)	0.007	0.005	< 0.005	< 0.005					**-**	**0.05**	Pass
Nickel (filtered)	0.008	0.009	0.006	0.089					**0.011**	**0.02**	*
Selenium (filtered)	0.003	0.003	0.001	0.003					**0.005**	**0.01**	Pass
Silver (filtered)	< 0.005	< 0.005	< 0.005	< 0.005					**0.00005**	**0.1**	Pass
Tin (filtered)	< 0.005	< 0.005	< 0.005	< 0.005					**-**	**0.001**	Pass
Zinc (filtered)	0.014	0.03	0.016	0.073					**0.008**	**-**	*
Non-metallic Inorganics											
Cyanide (total)	< 0.005	< 0.005	< 0.005	< 0.005					**0.007**	**0.08**	Pass
Fluoride	< 0.5	< 0.5	< 0.5	< 0.5					**-**	**2**	Pass
Organochlorine Pesticides											
4.4'-DDT	< 0.0001	< 0.0001	< 0.0001	< 0.0001					**6E-06**	**0.009**	Pass
Aldrin	< 0.0001	< 0.0001	< 0.0001	< 0.0001					**-**	**0.0003**	Pass
Chlordane	< 0.001	< 0.001	< 0.001	< 0.001					**0.00003**	**0.002**	Pass
Dieldrin	< 0.0001	< 0.0001	< 0.0001	< 0.0001					**-**	**0.0003**	Pass
Endosulfan I	< 0.0001	< 0.0001	< 0.0001	< 0.0001							Pass
Endosulfan II	< 0.0001	< 0.0001	< 0.0001	< 0.0001					**0.00003**	**0.02**	Pass
Endosulfan sulphate	< 0.0001	< 0.0001	< 0.0001	< 0.0001							Pass

* Further investigation recommended according to NEPM if groundwater is to be used for the beneficial uses of Fresh water or drinking water.

Please read in conjunction with LRP&A report no. 130479 Evans Rd/3.

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Title Test Results Summary

Locality 280 Evans Road, Cranbourne West, Victoria

Dwg. No 130479/3 TRS

Prepared PA 8/11/2013

Checked LP 22/11/2013

Hydrogeological Investigation

Project: 130479 Evans Rd/3

Sheet No Test 1 **File** 130479-3 Results Summary.xls

Test Results Summary - Hydrogeological Investigation

	LOCATION								GROUNDWATER INVESTIGATION LEVELS		
LOCATION	**GW1 S1**	**GW1 S2**	**GW2 S1**	**GW2 S2**					**Fresh Waters**	**Drinking Water**	**Comment**
Organochlorine Pesticides											
Endrin	< 0.0001	< 0.0001	< 0.0001	< 0.0001							Pass
Endrin aldehyde	< 0.0001	< 0.0001	< 0.0001	< 0.0001					**0.00001**	-	Pass
Endrin ketone	< 0.0001	< 0.0001	< 0.0001	< 0.0001							Pass
g-BHC (Lindane)	< 0.0001	< 0.0001	< 0.0001	< 0.0001					**0.0002**	**0.01**	Pass
Heptachlor	< 0.0001	< 0.0001	< 0.0001	< 0.0001					**0.00001**	-	Pass
Heptachlor epoxide	< 0.0001	< 0.0001	< 0.0001	< 0.0001					-	**0.0003**	Pass
Toxaphene	< 0.01	< 0.01	< 0.01	< 0.01					**0.0001**	-	Pass
Phenols (Halogenated)											
2.4.5-Trichlorophenol	< 0.01	< 0.01	< 0.01	< 0.01					**0.036**	**0.1**	Pass
2.4.6-Trichlorophenol	< 0.01	< 0.01	< 0.01	< 0.01					**0.003**	**0.02**	Pass
2.4-Dichlorophenol	< 0.003	< 0.003	< 0.003	< 0.003					**0.12**	**0.2**	Pass
2-Chlorophenol	< 0.003	< 0.003	< 0.003	< 0.003					**0.34**	**0.3**	Pass
Pentachlorophenol	< 0.01	< 0.01	< 0.01	< 0.01					**0.0036**	**0.01**	Pass
Tetrachlorophenols - Total	< 0.03	< 0.03	< 0.03	< 0.03					**0.01**	-	Pass
Phenols (non-Halogenated)											
2.4-Dinitrophenol	< 0.03	< 0.03	< 0.03	< 0.03					**0.045**	-	Pass
Phenol	< 0.003	< 0.003	< 0.003	< 0.003					**0.32**	-	Pass
Polychlorinated Biphenyls											
Aroclor-1242	< 0.001	< 0.001	< 0.001	< 0.001					**0.0003**	-	Pass
Aroclor-1248	< 0.001	< 0.001	< 0.001	< 0.001					**0.00001**	-	Pass
Aroclor-1254	< 0.001	< 0.001	< 0.001	< 0.001					**0.00001**	-	Pass
Polycyclic Aromatic Hydrocarbons											
Benzo(a)pyrene	< 0.001	< 0.001	< 0.001	< 0.001					-	**0.00001**	Pass
Naphthalene	< 0.001	< 0.001	< 0.001	< 0.001					**0.016**	-	Pass

Please read in conjunction with LRP&A report no. 130479 Evans Rd/3.

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Title Test Results Summary
Locality 280 Evans Road
Cranbourne West, Victoria

Dwg. No 130479/3 TRS
Prepared PA 8/11/2013
Checked LP 22/11/2013

Hydrogeological Investigation

Project: 130479 Evans Rd/3

Sheet No Test 2 **File** 130479-3 Results Summary.xls

Test Results Summary - Hydrogeological Investigation

	LOCATION								GROUNDWATER INVESTIGATION LEVELS		
LOCATION	**GW1 S1**	**GW1 S2**	**GW2 S1**	**GW2 S2**					**Fresh Waters**	**Drinking Water**	**Comment**
Volatile Organics											
1.1.2-Trichloroethane									**6.5**	**-**	
1.1-Dichloroethene									**-**	**0.03**	
1.2.4-Trichlorobenzene									**0.085**	**0.03**	
1.2-Dichlorobenzene									**0.16**	**1.5**	
1.2-Dichloroethane									**-**	**0.003**	
1.3-Dichlorobenzene									**0.26**	**-**	
1.4-Dichlorobenzene									**0.06**	**0.04**	
Benzene	< 0.001	< 0.001	< 0.001	< 0.001					**0.95**	**0.001**	Pass
Carbon Tetrachloride									**-**	**0.003**	
Chlorobenzene									**-**	**0.3**	
Chloroform									**-**	**0.003**	
Ethylbenzene	< 0.001	< 0.001	< 0.001	< 0.001					**-**	**0.3**	Pass
Hexachlorobutadiene									**-**	**0.0007**	
m&p-Xylenes	< 0.002	< 0.002	< 0.002	< 0.002					**0.2**	**-**	Pass
o-Xylene	< 0.001	< 0.001	< 0.001	< 0.001					**0.35**	**0.6**	Pass
Styrene									**-**	**0.03**	
Toluene	< 0.001	< 0.001	< 0.001	< 0.001					**-**	**0.8**	Pass
Vinyl chloride									**-**	**0.0003**	

Please read in conjunction with LRP&A report no. 130479 Evans Rd/3.

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Title Test Results Summary
Locality 280 Evans Road
Cranbourne West, Victoria

Dwg. No 130479/3 TRS
Prepared PA 8/11/2013
Checked LP 22/11/2013

Hydrogeological Investigation

Project: 130479 Evans Rd/3

Sheet No Test 3 **File** 130479-3 Results Summary.xls

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APPENDIX C

Laboratory Test Results

eurofins | mgt

Certificate of Analysis

NATA Accredited
Accreditation Number 1261
Site Number 1254

Accredited for compliance with ISO/IEC 17025. The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

L R Pardo & Associates
2 Alex Avenue
Moorabbin
VIC 3189

Attention: **Peter Andrews**

Report **397518-W**
Client Reference EVANS RD / 2 130479
Received Date Oct 24, 2013

Client Sample ID			**GW1 S1**	**GW1 S2**	**GW2 S1**	**GW2 S2**
Sample Matrix			**Water**	**Water**	**Water**	**Water**
Eurofins | mgt Sample No.			**M13-Oc19968**	**M13-Oc19969**	**M13-Oc19970**	**M13-Oc19971**
Date Sampled			**Oct 24, 2013**	**Oct 24, 2013**	**Oct 24, 2013**	**Oct 24, 2013**
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C10-C14	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH C15-C28	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C29-C36	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C10-36 (Total)	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
BTEX						
Benzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Toluene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002	< 0.002	< 0.002	< 0.002
o-Xylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Xylenes - Total	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
4-Bromofluorobenzene (surr.)	1	%	142	119	116	125
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C6-C10	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C6-C10 less BTEX (F1)[N04]	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH >C10-C16	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C10-C16 less Naphthalene (F2)[N01]	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C16-C34	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C34-C40	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
Polycyclic Aromatic Hydrocarbons						
Acenaphthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Acenaphthylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benz(a)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(a)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(b&j)fluoranthene[N07]	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(g.h.i)perylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(k)fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Chrysene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Dibenz(a.h)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluorene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Indeno(1.2.3-cd)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Naphthalene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001

Client Sample ID			GW1 S1	GW1 S2	GW2 S1	GW2 S2
Sample Matrix			Water	Water	Water	Water
Eurofins | mgt Sample No.			M13-Oc19968	M13-Oc19969	M13-Oc19970	M13-Oc19971
Date Sampled			Oct 24, 2013	Oct 24, 2013	Oct 24, 2013	Oct 24, 2013
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Phenanthrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Total PAH	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
2-Fluorobiphenyl (surr.)	1	%	51	60	70	56
p-Terphenyl-d14 (surr.)	1	%	51	60	70	52
Organochlorine Pesticides						
Chlordanes - Total	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
4.4'-DDD	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
4.4'-DDE	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
4.4'-DDT	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
a-BHC	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Aldrin	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
b-BHC	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
d-BHC	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Dieldrin	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Endosulfan I	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Endosulfan II	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Endosulfan sulphate	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Endrin	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Endrin aldehyde	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Endrin ketone	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
g-BHC (Lindane)	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Heptachlor	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Heptachlor epoxide	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Hexachlorobenzene	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Methoxychlor	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Toxaphene	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
Dibutylchlorendate (surr.)	1	%	80	67	69	65
Tetrachloro-m-xylene (surr.)	1	%	51	50	51	54
Polychlorinated Biphenyls						
Aroclor-1016	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Aroclor-1221	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Aroclor-1232	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Aroclor-1242	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Aroclor-1248	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Aroclor-1254	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Aroclor-1260	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Total PCB	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Dibutylchlorendate (surr.)	1	%	80	67	69	65
Tetrachloro-m-xylene (surr.)	1	%	51	50	51	54
Phenols (Halogenated)						
2-Chlorophenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
2.4-Dichlorophenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
2.4.5-Trichlorophenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
2.4.6-Trichlorophenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
2.6-Dichlorophenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
4-Chloro-3-methylphenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
Pentachlorophenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01

Client Sample ID			GW1 S1	GW1 S2	GW2 S1	GW2 S2
Sample Matrix			Water	Water	Water	Water
Eurofins | mgt Sample No.			M13-Oc19968	M13-Oc19969	M13-Oc19970	M13-Oc19971
Date Sampled			Oct 24, 2013	Oct 24, 2013	Oct 24, 2013	Oct 24, 2013
Test/Reference	LOR	Unit				
Phenols (Halogenated)						
Tetrachlorophenols - Total	0.03	mg/L	< 0.03	< 0.03	< 0.03	< 0.03
Total Halogenated Phenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
Phenols (non-Halogenated)						
2-Cyclohexyl-4.6-dinitrophenol	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
2-Methyl-4.6-dinitrophenol	0.03	mg/L	< 0.03	< 0.03	< 0.03	< 0.03
2-Methylphenol (o-Cresol)	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
2-Nitrophenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
2.4-Dimethylphenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
2.4-Dinitrophenol	0.03	mg/L	< 0.03	< 0.03	< 0.03	< 0.03
3&4-Methylphenol (m&p-Cresol)	0.006	mg/L	< 0.006	< 0.006	< 0.006	< 0.006
4-Nitrophenol	0.03	mg/L	< 0.03	< 0.03	< 0.03	< 0.03
Dinoseb	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
Phenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
Total Non-Halogenated Phenol	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
Phenol-d6 (surr.)	1	%	20	22	22	20
Cyanide (total)	0.005	mg/L	< 0.005	< 0.005	< 0.005	< 0.005
Fluoride	0.5	mg/L	< 0.5	< 0.5	< 0.5	< 0.5
Heavy Metals						
Arsenic	0.001	mg/L	0.002	0.004	< 0.001	0.009
Cadmium	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Chromium	0.001	mg/L	< 0.001	0.019	< 0.001	0.021
Copper	0.001	mg/L	0.004	0.006	0.002	0.033
Lead	0.001	mg/L	0.041	0.083	0.036	0.29
Mercury	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	0.0006
Molybdenum	0.005	mg/L	0.007	0.005	< 0.005	< 0.005
Nickel	0.001	mg/L	0.008	0.009	0.006	0.089
Selenium	0.001	mg/L	0.003	0.003	0.001	0.003
Silver	0.005	mg/L	< 0.005	< 0.005	< 0.005	< 0.005
Tin	0.005	mg/L	< 0.005	< 0.005	< 0.005	< 0.005
Zinc	0.001	mg/L	0.014	0.030	0.016	0.073

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results (regarding both quality and NATA accreditation).

Description	Testing Site	Extracted	Holding Time
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Melbourne	Oct 31, 2013	7 Day
- Method: TRH C6-C36 - MGT 100A			
BTEX	Melbourne	Oct 25, 2013	14 Day
- Method: USEPA 8260 - MGT 350A Monocyclic Aromatic Hydrocarbons and MGT 100A			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Oct 31, 2013	7 Day
- Method: LM-LTM-ORG2010			
Polycyclic Aromatic Hydrocarbons	Melbourne	Oct 31, 2013	7 Day
- Method: USEPA 8270 Polycyclic Aromatic Hydrocarbons			
Organochlorine Pesticides	Melbourne	Oct 31, 2013	7 Day
- Method: USEPA 8081 Organochlorine Pesticides			
Polychlorinated Biphenyls	Melbourne	Oct 31, 2013	7 Day
- Method: USEPA 8082 Polychlorinated Biphenyls			
Phenols (Halogenated)	Melbourne	Oct 31, 2013	7 Day
- Method: USEPA 8270 Phenols			
Phenols (non-Halogenated)	Melbourne	Oct 31, 2013	7 Day
- Method: USEPA 8270 Phenols			
Cyanide (total)	Melbourne	Oct 28, 2013	14 Day
- Method: USEPA 9010 Cyanide			
Fluoride	Melbourne	Oct 28, 2013	28 Day
- Method: LM-LTM-INO-4300 (Fluoride by Ion Chromatography)			
IWRG 621 Metals : Metals M12	Melbourne	Oct 25, 2013	28 Day
- Method: USEPA 6010/6020 Heavy Metals & USEPA 7470/71 Mercury			

Eurofins | mgt Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil results are reported on a dry basis, unless otherwise stated.
3. Actual PQLs are matrix dependant. Quoted PQLs may be raised where sample extracts are diluted due to interferences.
4. Results are uncorrected for matrix spikes or surrogate recoveries.
5. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
6. Samples were analysed on an 'as received' basis. 7. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the Sample Receipt Acknowledgment.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

****NOTE:** pH duplicates are reported as a range NOT as RPD

UNITS

mg/kg: milligrams per Kilogram

ug/l: micrograms per litre

ppb: Parts per billion

org/100ml: Organisms per 100 millilitres

MPN/100mL: Most Probable Number of organisms per 100 millilitres

mg/l: milligrams per litre

ppm: Parts per million

%: Percentage

NTU: Units

TERMS

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery
CRM	Certified Reference Material - reported as percent recovery
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands. In the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
Batch Duplicate	A second piece of analysis from a sample outside of the clients batch of samples but run within the laboratory batch of analysis.
Batch SPIKE	Spike recovery reported on a sample from outside of the clients batch of samples but run within the laboratory batch of analysis.
USEPA	United States Environment Protection Authority
APHA	American Public Health Association
ASLP	Australian Standard Leaching Procedure (AS4439.3)
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within

QC - ACCEPTANCE CRITERIA

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries : Recoveries must lie between 50-150% - Phenols 20-130%.

QC DATA GENERAL COMMENTS

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxophene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxophene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Arochlor 1260 in Matrix Spikes and LCS's.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPD's are calculated from raw analytical data thus it is possible to have two sets of data.

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	mg/L	< 0.02			0.02	Pass	
TRH C10-C14	mg/L	< 0.05			0.05	Pass	
TRH C15-C28	mg/L	< 0.1			0.1	Pass	
TRH C29-C36	mg/L	< 0.1			0.1	Pass	
Method Blank							
BTEX							
Benzene	mg/L	< 0.001			0.001	Pass	
Toluene	mg/L	< 0.001			0.001	Pass	
Ethylbenzene	mg/L	< 0.001			0.001	Pass	
m&p-Xylenes	mg/L	< 0.002			0.002	Pass	
o-Xylene	mg/L	< 0.001			0.001	Pass	
Xylenes - Total	mg/L	< 0.003			0.003	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	mg/L	< 0.02			0.02	Pass	
TRH C6-C10	mg/L	< 0.02			0.02	Pass	
TRH C6-C10 less BTEX (F1)	mg/L	< 0.02			0.02	Pass	
TRH >C10-C16	mg/L	< 0.05			0.05	Pass	
TRH >C16-C34	mg/L	< 0.1			0.1	Pass	
TRH >C34-C40	mg/L	< 0.1			0.1	Pass	
Method Blank							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	mg/L	< 0.001			0.001	Pass	
Acenaphthylene	mg/L	< 0.001			0.001	Pass	
Anthracene	mg/L	< 0.001			0.001	Pass	
Benz(a)anthracene	mg/L	< 0.001			0.001	Pass	
Benzo(a)pyrene	mg/L	< 0.001			0.001	Pass	
Benzo(b&j)fluoranthene	mg/L	< 0.001			0.001	Pass	
Benzo(g.h.i)perylene	mg/L	< 0.001			0.001	Pass	
Benzo(k)fluoranthene	mg/L	< 0.001			0.001	Pass	
Chrysene	mg/L	< 0.001			0.001	Pass	
Dibenz(a.h)anthracene	mg/L	< 0.001			0.001	Pass	
Fluoranthene	mg/L	< 0.001			0.001	Pass	
Fluorene	mg/L	< 0.001			0.001	Pass	
Indeno(1.2.3-cd)pyrene	mg/L	< 0.001			0.001	Pass	
Naphthalene	mg/L	< 0.001			0.001	Pass	
Phenanthrene	mg/L	< 0.001			0.001	Pass	
Pyrene	mg/L	< 0.001			0.001	Pass	
Method Blank							
Organochlorine Pesticides							
Chlordanes - Total	mg/L	< 0.001			0.001	Pass	
4.4'-DDD	mg/L	< 0.0001			0.0001	Pass	
4.4'-DDE	mg/L	< 0.0001			0.0001	Pass	
4.4'-DDT	mg/L	< 0.0001			0.0001	Pass	
a-BHC	mg/L	< 0.0001			0.0001	Pass	
Aldrin	mg/L	< 0.0001			0.0001	Pass	
b-BHC	mg/L	< 0.0001			0.0001	Pass	
d-BHC	mg/L	< 0.0001			0.0001	Pass	
Dieldrin	mg/L	< 0.0001			0.0001	Pass	
Endosulfan I	mg/L	< 0.0001			0.0001	Pass	
Endosulfan II	mg/L	< 0.0001			0.0001	Pass	
Endosulfan sulphate	mg/L	< 0.0001			0.0001	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Endrin	mg/L	< 0.0001			0.0001	Pass	
Endrin aldehyde	mg/L	< 0.0001			0.0001	Pass	
Endrin ketone	mg/L	< 0.0001			0.0001	Pass	
g-BHC (Lindane)	mg/L	< 0.0001			0.0001	Pass	
Heptachlor	mg/L	< 0.0001			0.0001	Pass	
Heptachlor epoxide	mg/L	< 0.0001			0.0001	Pass	
Hexachlorobenzene	mg/L	< 0.0001			0.0001	Pass	
Methoxychlor	mg/L	< 0.0001			0.0001	Pass	
Toxaphene	mg/L	< 0.01			0.01	Pass	
Method Blank							
Polychlorinated Biphenyls							
Aroclor-1016	mg/L	< 0.001			0.001	Pass	
Aroclor-1221	mg/L	< 0.001			0.001	Pass	
Aroclor-1232	mg/L	< 0.001			0.001	Pass	
Aroclor-1242	mg/L	< 0.001			0.001	Pass	
Aroclor-1248	mg/L	< 0.001			0.001	Pass	
Aroclor-1254	mg/L	< 0.001			0.001	Pass	
Aroclor-1260	mg/L	< 0.001			0.001	Pass	
Total PCB	mg/L	< 0.001			0.001	Pass	
Method Blank							
Phenols (Halogenated)							
2-Chlorophenol	mg/L	< 0.003			0.003	Pass	
2.4-Dichlorophenol	mg/L	< 0.003			0.003	Pass	
2.4.5-Trichlorophenol	mg/L	< 0.01			0.01	Pass	
2.4.6-Trichlorophenol	mg/L	< 0.01			0.01	Pass	
2.6-Dichlorophenol	mg/L	< 0.003			0.003	Pass	
4-Chloro-3-methylphenol	mg/L	< 0.01			0.01	Pass	
Pentachlorophenol	mg/L	< 0.01			0.01	Pass	
Tetrachlorophenols - Total	mg/L	< 0.03			0.03	Pass	
Method Blank							
Phenols (non-Halogenated)							
2-Cyclohexyl-4.6-dinitrophenol	mg/L	< 0.1			0.1	Pass	
2-Methyl-4.6-dinitrophenol	mg/L	< 0.03			0.03	Pass	
2-Methylphenol (o-Cresol)	mg/L	< 0.003			0.003	Pass	
2-Nitrophenol	mg/L	< 0.01			0.01	Pass	
2.4-Dimethylphenol	mg/L	< 0.003			0.003	Pass	
2.4-Dinitrophenol	mg/L	< 0.03			0.03	Pass	
3&4-Methylphenol (m&p-Cresol)	mg/L	< 0.006			0.006	Pass	
4-Nitrophenol	mg/L	< 0.03			0.03	Pass	
Dinoseb	mg/L	< 0.1			0.1	Pass	
Phenol	mg/L	< 0.003			0.003	Pass	
Method Blank							
Cyanide (total)	mg/L	< 0.005			0.005	Pass	
Fluoride	mg/L	< 0.5			0.5	Pass	
Method Blank							
Heavy Metals							
Arsenic	mg/L	< 0.001			0.001	Pass	
Cadmium	mg/L	< 0.0002			0.0002	Pass	
Chromium	mg/L	< 0.001			0.001	Pass	
Copper	mg/L	< 0.001			0.001	Pass	
Lead	mg/L	< 0.001			0.001	Pass	
Mercury	mg/L	< 0.0001			0.0001	Pass	
Molybdenum	mg/L	< 0.005			0.005	Pass	
Nickel	mg/L	< 0.001			0.001	Pass	
Selenium	mg/L	< 0.001			0.001	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Silver	mg/L	< 0.005			0.005	Pass	
Tin	mg/L	< 0.005			0.005	Pass	
Zinc	mg/L	< 0.001			0.001	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	%	123			70-130	Pass	
TRH C10-C14	%	100			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	125			70-130	Pass	
Toluene	%	119			70-130	Pass	
Ethylbenzene	%	114			70-130	Pass	
m&p-Xylenes	%	117			70-130	Pass	
Xylenes - Total	%	118			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
TRH C6-C10	%	123			70-130	Pass	
TRH >C10-C16	%	104			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	%	90			70-130	Pass	
Acenaphthylene	%	92			70-130	Pass	
Anthracene	%	92			70-130	Pass	
Benz(a)anthracene	%	93			70-130	Pass	
Benzo(a)pyrene	%	91			70-130	Pass	
Benzo(b&j)fluoranthene	%	101			70-130	Pass	
Benzo(g.h.i)perylene	%	89			70-130	Pass	
Benzo(k)fluoranthene	%	82			70-130	Pass	
Chrysene	%	88			70-130	Pass	
Dibenz(a.h)anthracene	%	91			70-130	Pass	
Fluoranthene	%	87			70-130	Pass	
Fluorene	%	90			70-130	Pass	
Indeno(1.2.3-cd)pyrene	%	88			70-130	Pass	
Naphthalene	%	88			70-130	Pass	
Phenanthrene	%	85			70-130	Pass	
Pyrene	%	90			70-130	Pass	
LCS - % Recovery							
Organochlorine Pesticides							
4.4'-DDD	%	80			70-130	Pass	
4.4'-DDE	%	72			70-130	Pass	
4.4'-DDT	%	82			70-130	Pass	
a-BHC	%	79			70-130	Pass	
Aldrin	%	72			70-130	Pass	
b-BHC	%	85			70-130	Pass	
d-BHC	%	76			70-130	Pass	
Dieldrin	%	80			70-130	Pass	
Endosulfan I	%	76			70-130	Pass	
Endosulfan II	%	74			70-130	Pass	
Endosulfan sulphate	%	81			70-130	Pass	
Endrin	%	114			70-130	Pass	
Endrin aldehyde	%	80			70-130	Pass	
Endrin ketone	%	80			70-130	Pass	
g-BHC (Lindane)	%	79			70-130	Pass	
Heptachlor	%	92			70-130	Pass	
Heptachlor epoxide	%	78			70-130	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Hexachlorobenzene	%	76			70-130	Pass	
Methoxychlor	%	104			70-130	Pass	
LCS - % Recovery							
Polychlorinated Biphenyls							
Aroclor-1260	%	102			70-130	Pass	
LCS - % Recovery							
Phenols (Halogenated)							
2-Chlorophenol	%	61			30-130	Pass	
2.4-Dichlorophenol	%	62			30-130	Pass	
2.4.5-Trichlorophenol	%	60			30-130	Pass	
2.4.6-Trichlorophenol	%	60			30-130	Pass	
2.6-Dichlorophenol	%	61			30-130	Pass	
4-Chloro-3-methylphenol	%	62			30-130	Pass	
Pentachlorophenol	%	48			30-130	Pass	
Tetrachlorophenols - Total	%	52			30-130	Pass	
LCS - % Recovery							
Phenols (non-Halogenated)							
2-Cyclohexyl-4.6-dinitrophenol	%	35			30-130	Pass	
2-Methyl-4.6-dinitrophenol	%	45			30-130	Pass	
2-Methylphenol (o-Cresol)	%	62			30-130	Pass	
2-Nitrophenol	%	65			30-130	Pass	
2.4-Dimethylphenol	%	63			30-130	Pass	
2.4-Dinitrophenol	%	32			30-130	Pass	
3&4-Methylphenol (m&p-Cresol)	%	61			30-130	Pass	
4-Nitrophenol	%	55			30-130	Pass	
Dinoseb	%	46			30-130	Pass	
Phenol	%	63			30-130	Pass	
LCS - % Recovery							
Cyanide (total)	%	95			70-130	Pass	
Fluoride	%	98			70-130	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic	%	102			80-120	Pass	
Cadmium	%	101			80-120	Pass	
Chromium	%	100			80-120	Pass	
Copper	%	101			80-120	Pass	
Lead	%	101			80-120	Pass	
Mercury	%	98			75-125	Pass	
Molybdenum	%	102			80-120	Pass	
Nickel	%	102			80-120	Pass	
Selenium	%	99			80-120	Pass	
Silver	%	98			80-120	Pass	
Tin	%	102			80-120	Pass	
Zinc	%	102			80-120	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1					
TRH C6-C9	M13-Oc22414	NCP	%	112			70-130	Pass	
Spike - % Recovery									
BTEX				Result 1					
Benzene	M13-Oc22414	NCP	%	123			70-130	Pass	
Toluene	M13-Oc22414	NCP	%	124			70-130	Pass	
Ethylbenzene	M13-Oc22414	NCP	%	124			70-130	Pass	
m&p-Xylenes	M13-Oc22414	NCP	%	120			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
o-Xylene	M13-Oc22414	NCP	%	121			70-130	Pass	
Xylenes - Total	M13-Oc22414	NCP	%	121			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
TRH C6-C10	M13-Oc22414	NCP	%	112			70-130	Pass	
Spike - % Recovery									
				Result 1					
Cyanide (total)	M13-Oc19976	NCP	%	95			70-130	Pass	
Fluoride	M13-Oc20861	NCP	%	97			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	M13-Oc19968	CP	%	92			75-125	Pass	
Cadmium	M13-Oc19968	CP	%	87			75-125	Pass	
Chromium	M13-Oc19968	CP	%	94			75-125	Pass	
Copper	M13-Oc19968	CP	%	85			75-125	Pass	
Lead	M13-Oc19968	CP	%	88			75-125	Pass	
Mercury	M13-Oc18888	NCP	%	90			70-130	Pass	
Molybdenum	M13-Oc19968	CP	%	98			75-125	Pass	
Nickel	M13-Oc19968	CP	%	85			75-125	Pass	
Selenium	M13-Oc19968	CP	%	89			75-125	Pass	
Silver	M13-Oc19968	CP	%	85			75-125	Pass	
Tin	M13-Oc19968	CP	%	94			75-125	Pass	
Zinc	M13-Oc19968	CP	%	85			75-125	Pass	
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons				Result 1					
Acenaphthene	M13-Oc19969	CP	%	96			70-130	Pass	
Acenaphthylene	M13-Oc19969	CP	%	99			70-130	Pass	
Anthracene	M13-Oc19969	CP	%	94			70-130	Pass	
Benz(a)anthracene	M13-Oc19969	CP	%	107			70-130	Pass	
Benzo(a)pyrene	M13-Oc19969	CP	%	103			70-130	Pass	
Benzo(b&j)fluoranthene	M13-Oc19969	CP	%	103			70-130	Pass	
Benzo(g.h.i)perylene	M13-Oc19969	CP	%	110			70-130	Pass	
Benzo(k)fluoranthene	M13-Oc19969	CP	%	99			70-130	Pass	
Chrysene	M13-Oc19969	CP	%	95			70-130	Pass	
Dibenz(a.h)anthracene	M13-Oc19969	CP	%	122			70-130	Pass	
Fluoranthene	M13-Oc19969	CP	%	95			70-130	Pass	
Fluorene	M13-Oc19969	CP	%	99			70-130	Pass	
Indeno(1.2.3-cd)pyrene	M13-Oc19969	CP	%	113			70-130	Pass	
Naphthalene	M13-Oc19969	CP	%	90			70-130	Pass	
Phenanthrene	M13-Oc19969	CP	%	100			70-130	Pass	
Pyrene	M13-Oc19969	CP	%	97			70-130	Pass	
Spike - % Recovery									
Phenols (Halogenated)				Result 1					
2-Chlorophenol	M13-Oc19969	CP	%	87			30-130	Pass	
2.4-Dichlorophenol	M13-Oc19969	CP	%	96			30-130	Pass	
2.4.5-Trichlorophenol	M13-Oc19969	CP	%	103			30-130	Pass	
2.4.6-Trichlorophenol	M13-Oc19969	CP	%	101			30-130	Pass	
2.6-Dichlorophenol	M13-Oc19969	CP	%	98			30-130	Pass	
4-Chloro-3-methylphenol	M13-Oc19969	CP	%	96			30-130	Pass	
Pentachlorophenol	M13-Oc19969	CP	%	102			30-130	Pass	
Tetrachlorophenols - Total	M13-Oc19969	CP	%	97			30-130	Pass	
Spike - % Recovery									
Phenols (non-Halogenated)				Result 1					
2-Cyclohexyl-4.6-dinitrophenol	M13-Oc19969	CP	%	110			30-130	Pass	
2-Methyl-4.6-dinitrophenol	M13-Oc19969	CP	%	128			30-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
2-Methylphenol (o-Cresol)	M13-Oc19969	CP	%	78			30-130	Pass	
2-Nitrophenol	M13-Oc19969	CP	%	109			30-130	Pass	
2.4-Dimethylphenol	M13-Oc19969	CP	%	87			30-130	Pass	
2.4-Dinitrophenol	M13-Oc19969	CP	%	120			30-130	Pass	
3&4-Methylphenol (m&p-Cresol)	M13-Oc19969	CP	%	69			30-130	Pass	
4-Nitrophenol	M13-Oc19969	CP	%	33			30-130	Pass	
Dinoseb	M13-Oc19969	CP	%	108			30-130	Pass	
Phenol	M13-Oc19969	CP	%	65			30-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1					
TRH C10-C14	M13-Oc19970	CP	%	91			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
TRH >C10-C16	M13-Oc19970	CP	%	94			70-130	Pass	
Spike - % Recovery									
Organochlorine Pesticides				Result 1					
4.4'-DDD	M13-Oc19970	CP	%	113			70-130	Pass	
4.4'-DDE	M13-Oc19970	CP	%	106			70-130	Pass	
4.4'-DDT	M13-Oc19970	CP	%	126			70-130	Pass	
a-BHC	M13-Oc19970	CP	%	99			70-130	Pass	
Aldrin	M13-Oc19970	CP	%	98			70-130	Pass	
b-BHC	M13-Oc19970	CP	%	110			70-130	Pass	
d-BHC	M13-Oc19970	CP	%	118			70-130	Pass	
Dieldrin	M13-Oc19970	CP	%	112			70-130	Pass	
Endosulfan I	M13-Oc19970	CP	%	105			70-130	Pass	
Endosulfan II	M13-Oc19970	CP	%	115			70-130	Pass	
Endosulfan sulphate	M13-Oc19970	CP	%	125			70-130	Pass	
Endrin	M13-Oc19970	CP	%	128			70-130	Pass	
Endrin aldehyde	M13-Oc19970	CP	%	93			70-130	Pass	
Endrin ketone	M13-Oc19970	CP	%	122			70-130	Pass	
g-BHC (Lindane)	M13-Oc19970	CP	%	103			70-130	Pass	
Heptachlor	M13-Oc19970	CP	%	116			70-130	Pass	
Heptachlor epoxide	M13-Oc19970	CP	%	104			70-130	Pass	
Hexachlorobenzene	M13-Oc19970	CP	%	116			70-130	Pass	
Methoxychlor	M13-Oc19970	CP	%	120			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C6-C9	M13-Oc22413	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
TRH C10-C14	M13-Oc19968	CP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
TRH C15-C28	M13-Oc19968	CP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
TRH C29-C36	M13-Oc19968	CP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	M13-Oc22413	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Toluene	M13-Oc22413	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Ethylbenzene	M13-Oc22413	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
m&p-Xylenes	M13-Oc22413	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
o-Xylene	M13-Oc22413	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Xylenes - Total	M13-Oc22413	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
Naphthalene	M13-Oc22413	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
TRH C6-C10	M13-Oc22413	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	

Duplicate								
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD		
TRH C6-C10 less BTEX (F1)	M13-Oc22413	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass
TRH >C10-C16	M13-Oc19968	CP	mg/L	< 0.05	< 0.05	<1	30%	Pass
TRH >C16-C34	M13-Oc19968	CP	mg/L	< 0.1	< 0.1	<1	30%	Pass
TRH >C34-C40	M13-Oc19968	CP	mg/L	< 0.1	< 0.1	<1	30%	Pass
Duplicate								
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD		
Acenaphthene	M13-Oc19968	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Acenaphthylene	M13-Oc19968	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Anthracene	M13-Oc19968	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Benz(a)anthracene	M13-Oc19968	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Benzo(a)pyrene	M13-Oc19968	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Benzo(b&j)fluoranthene	M13-Oc19968	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Benzo(g.h.i)perylene	M13-Oc19968	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Benzo(k)fluoranthene	M13-Oc19968	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Chrysene	M13-Oc19968	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Dibenz(a.h)anthracene	M13-Oc19968	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Fluoranthene	M13-Oc19968	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Fluorene	M13-Oc19968	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Indeno(1.2.3-cd)pyrene	M13-Oc19968	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Naphthalene	M13-Oc19968	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Phenanthrene	M13-Oc19968	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Pyrene	M13-Oc19968	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Duplicate								
Organochlorine Pesticides				Result 1	Result 2	RPD		
Chlordanes - Total	M13-Oc19968	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
4.4'-DDD	M13-Oc19968	CP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass
4.4'-DDE	M13-Oc19968	CP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass
4.4'-DDT	M13-Oc19968	CP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass
a-BHC	M13-Oc19968	CP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass
Aldrin	M13-Oc19968	CP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass
b-BHC	M13-Oc19968	CP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass
d-BHC	M13-Oc19968	CP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass
Dieldrin	M13-Oc19968	CP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass
Endosulfan I	M13-Oc19968	CP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass
Endosulfan II	M13-Oc19968	CP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass
Endosulfan sulphate	M13-Oc19968	CP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass
Endrin	M13-Oc19968	CP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass
Endrin aldehyde	M13-Oc19968	CP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass
Endrin ketone	M13-Oc19968	CP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass
g-BHC (Lindane)	M13-Oc19968	CP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass
Heptachlor	M13-Oc19968	CP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass
Heptachlor epoxide	M13-Oc19968	CP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass
Hexachlorobenzene	M13-Oc19968	CP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass
Methoxychlor	M13-Oc19968	CP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass
Toxaphene	M13-Oc19968	CP	mg/L	< 0.01	< 0.01	<1	30%	Pass
Duplicate								
Polychlorinated Biphenyls				Result 1	Result 2	RPD		
Aroclor-1016	M13-Oc19968	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Aroclor-1221	M13-Oc19968	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Aroclor-1232	M13-Oc19968	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Aroclor-1242	M13-Oc19968	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Aroclor-1248	M13-Oc19968	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Aroclor-1254	M13-Oc19968	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Aroclor-1260	M13-Oc19968	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass

Duplicate									
Polychlorinated Biphenyls				Result 1	Result 2	RPD			
Total PCB	M13-Oc19968	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Duplicate									
Phenols (Halogenated)				Result 1	Result 2	RPD			
2-Chlorophenol	M13-Oc19968	CP	mg/L	< 0.003	< 0.003	<1	30%	Pass	
2.4-Dichlorophenol	M13-Oc19968	CP	mg/L	< 0.003	< 0.003	<1	30%	Pass	
2.4.5-Trichlorophenol	M13-Oc19968	CP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
2.4.6-Trichlorophenol	M13-Oc19968	CP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
2.6-Dichlorophenol	M13-Oc19968	CP	mg/L	< 0.003	< 0.003	<1	30%	Pass	
4-Chloro-3-methylphenol	M13-Oc19968	CP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
Pentachlorophenol	M13-Oc19968	CP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
Tetrachlorophenols - Total	M13-Oc19968	CP	mg/L	< 0.03	< 0.03	<1	30%	Pass	
Duplicate									
Phenols (non-Halogenated)				Result 1	Result 2	RPD			
2-Cyclohexyl-4.6-dinitrophenol	M13-Oc19968	CP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
2-Methyl-4.6-dinitrophenol	M13-Oc19968	CP	mg/L	< 0.03	< 0.03	<1	30%	Pass	
2-Methylphenol (o-Cresol)	M13-Oc19968	CP	mg/L	< 0.003	< 0.003	<1	30%	Pass	
2-Nitrophenol	M13-Oc19968	CP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
2.4-Dimethylphenol	M13-Oc19968	CP	mg/L	< 0.003	< 0.003	<1	30%	Pass	
2.4-Dinitrophenol	M13-Oc19968	CP	mg/L	< 0.03	< 0.03	<1	30%	Pass	
3&4-Methylphenol (m&p-Cresol)	M13-Oc19968	CP	mg/L	< 0.006	< 0.006	<1	30%	Pass	
4-Nitrophenol	M13-Oc19968	CP	mg/L	< 0.03	< 0.03	<1	30%	Pass	
Dinoseb	M13-Oc19968	CP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
Phenol	M13-Oc19968	CP	mg/L	< 0.003	< 0.003	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Cyanide (total)	M13-Oc19976	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Fluoride	M13-Oc20861	NCP	mg/L	0.50	0.50	<1	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	M13-Oc19968	CP	mg/L	0.002	0.002	3.4	30%	Pass	
Cadmium	M13-Oc19968	CP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
Chromium	M13-Oc19968	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Copper	M13-Oc19968	CP	mg/L	0.004	0.004	3.3	30%	Pass	
Lead	M13-Oc19968	CP	mg/L	0.041	0.040	2.7	30%	Pass	
Mercury	M13-Oc18888	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Molybdenum	M13-Oc19968	CP	mg/L	0.007	0.007	<1	30%	Pass	
Nickel	M13-Oc19968	CP	mg/L	0.008	0.008	3.1	30%	Pass	
Selenium	M13-Oc19968	CP	mg/L	0.003	0.003	12	30%	Pass	
Silver	M13-Oc19968	CP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Tin	M13-Oc19968	CP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Zinc	M13-Oc19968	CP	mg/L	0.014	0.014	<1	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Organic samples had Teflon liners	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs
Q15	The RPD reported passes Eurofins | mgt's Acceptance Criteria as stipulated in SOP 05. Refer to Glossary Page of this report for further details

Authorised By

Andrew Thexton	Client Services
Carroll Lee	Senior Analyst-Volatile (VIC)
Emily Rosenberg	Senior Analyst-Metal (VIC)
Huong Le	Senior Analyst-Inorganic (VIC)
Stacey Jenkins	Senior Analyst-Organic (VIC)

Glenn Jackson

Laboratory Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Uncertainty data is available on request

APPENDIX D

Site Inspection Photographs

280 EVANS ROAD, CRANBOURNE WEST - Hydrogeological Investigation

Photo 1: Augering GW1.

Photo 2: Casing GW1 and packing with sand.

Photo 5: Typical dry material from GW1.

Photo 3: Typical Clay material from GW2.

Photo 4: Casing GW2.

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Title Photographs
Locality 280 Evans Road
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Dwg. No 130479/3 Photos
Prepared by PA 28/11/2013
Checked LP 2/12/2013

Hydrogeological Investigation
Investigation date: 17/10/2013

Project: 130479 Evans Rd/3

Sheet No Photo 1 **File** 130479 - 3 Photos.xls