

ENVIRONMENTAL AUDIT REPORT

**151-153 Church Street,
Geelong West, Victoria**

Vic EPA CARMS REF 68842-1

**Prepared for
Mobil Oil Australia Pty Ltd**

Date: 21 December 2012



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EXECUTIVE SUMMARY

This is an environmental audit report for the former Mobil Service Station site at 151-153 Church Street, Geelong West, Victoria (corner of Shannon Avenue and Church Street), which has been completed by Mr. Steven Kirsanovs of Kirs Environmental Pty Ltd, in his capacity as an environmental auditor (contaminated land) appointed by the EPA pursuant to the *Environment Protection Act 1970*. The audit details and outcomes are summarised in Tables 1 and 2 on the following pages.

Table 1. Summary of audit information

EPA file reference no.	68842-1
Auditor	Steven Jon Kirsanovs
Auditor term of appointment	02/11/2011 to 25/11/2013
Name of person requesting certificate	Mr Stewart Frater (Mobil Oil Australia Pty Ltd)
Relationship to premises/location	Nominated representative for Mobil (previous site owner)
Date of request	10/01/2011
Date EPA notified of audit	11/01/2011
Completion date of the audit	21/12/2012
Reason for Audit	Voluntary
Current land use zoning	Residential 1
EPA Region	South West
Municipality	Greater Geelong
Dominant – Lot on plan	Lot 1 on Title Plan 382065X, Volume 8666 Folio 665
Additional – Lot on plan(s)	
Site/Premises Name	-
o Building / complex sub-unit No	-
o Street / Lot – Lower No	151
o Street / Lot – Upper No	153
o Street Name	Church
o Street type (road, court etc.)	Street
o Street suffix (North, south etc.)	-
o Suburb	Geelong West
o Postcode	3218
GIS Coordinate of Site centroid	(from Vic Land Channel interactive mapping tool)
Longitude / Northing (GDA 94)	5776299 N
Latitude / Easting (GDA 94)	266730 E
Site Area (hectares)	0.19
Members and categories of support team utilised	Jackie Wright (Health Risk Assessment)
Outcome of the audit	Statement of Environmental Audit
Further work or requirements	Refer to the Statement of Environmental Audit conditions. The main further works or requirements are as follows:- - o Vapour mitigation measures to be installed in any future buildings that include basements or cellars (except for buildings with basement areas that are not enclosed). - o Groundwater not to be extracted for stock watering, primary contact recreation, or industrial use. - o Ongoing groundwater monitoring required.

	o OH&S Plan required for future development that involves excavations greater than 2.5m depth.
Nature and extent of continuing risk	Potential unacceptable risks remain for the following scenarios:- - o Basements or cellars on site if not provided with vapour mitigation measures. - o Extraction and use of groundwater. - o Deep excavation works if not carried out in accordance with an OH&S Management Plan

Table 2. Physical Site Information

Site Aquifer Information	Tertiary Age sediments comprising Moorabool Viaduct Formation over Fyansford Formation / Batesford Limestone Formation
Average Depth to Groundwater	7-10m
Groundwater segment	C
Groundwater flow direction	North east
Past use/site history	Residential pre 1960's, service station 1960's to 1997, vacant since 1997.
Surrounding land use	North:- Commercial (hair dresser directly opposite and fitness centre north west) and residential properties. East:- Residential South:- Residential West:- Convenience store / retail fuel outlet and residential properties.
Proposed future use	Not known, but zoning (Residential 1) permits residential and commercial uses.

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Soil Results (2004 Grid Sampling and Validation)
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1. INTRODUCTION

This is an environmental audit report of the site at 151-153 Church Street, Geelong West (corner of Shannon Avenue and Church Street). The audit has been completed by Mr. Steven Kirsanovs of Kirsa Environmental Pty Ltd (AEC) in his capacity as an environmental auditor (contaminated land) appointed by Environment Protection Authority (EPA) pursuant to the *Environment Protection Act 1970*.

The site is a rectangular shaped block of approximately 1,900 square metres area. The legal description is Lot 1 on Title Plan 382065X – Certificate of Title Volume 8666 Folio 665. The current site owner is listed as Dags Wash Pty Ltd, who have recently acquired the site from Mobil Oil Australia Ltd. Copies of the current title and plan are attached in Appendix A. The site is located in a 'Residential 1' zone under the Greater Geelong Planning Scheme.

The initial request to issue a Certificate of Environmental Audit was provided by Stuart Frater (authorised representative of Mobil, the site owner at the time), and the auditor accepted the engagement on 10 January 2011. In January 2012 the Auditor ceased employment at AEC Environmental and commenced operations at a new business (Kirsa Environmental). The environmental audit was completed under a new contractual arrangement between Kirsa Environmental and Mobil.

The audit was commissioned by Mobil on a voluntary basis, as they intended to divest the site with confirmation the site is in a condition suitable for use consistent with the current Residential 1 zoning. It is understood that the new owner intends to develop the site for commercial use as a car wash and coffee shop. The City of Greater Geelong website has been checked and indicates an application has been received (Ref 528/2010) for "use and development of the land for a car wash and take away food premises (Drive-thru Coffee Bar), and alternation of access to a Road Zone". Proposed development plans were not made available. The proposed development falls within the 'commercial' category of land use outlined in the current auditor guidelines (Vic EPA Publication 759.1 September 2007).

The environmental audit was undertaken in accordance with Part IXD of the Environment Protection Act 1970 (the Act), and specifically Sections 53W and 53X which relate to an audit of the condition of a segment of the environment (the relevant segment being the site, as defined elsewhere). The audit is an independent review of the information relating to the condition of the site, and the potential for adverse impacts on beneficial uses of the site. The relevant legislation, guidelines and standards current at the time of the audit are summarised in Section 8 of this audit report.

2. AUDIT DETAILS

2.1 Documentation

The audit of the condition of the site has been based on numerous previous investigation reports as listed below. There are 40 previous reports / data packages that were reviewed as part of the environmental audit. Many reports repeat previous information, and given the sheer number and size of some of the reports a selection of these reports has been provided in the audit report appendices, with the list of included reports having been limited to those considered relevant to the summary of the overall assessment and remediation process and those relevant to the final site condition.

Table 3: Summary of Reports

Report Title	Prepared By	For	Date	Copy Provided in Audit Report
Quantitative Health Risk Assessment of Former Service Station, Geelong West, Victoria (VO0993)	PPK Environment & Infrastructure Pty Ltd (PPK)	Mobil Oil Australia	December 1998	Not included – results are summarized in other reports.
Groundwater Monitoring, MSS Geelong West (VO0993)	PPK	Mobil Oil Australia	15 March 1999	Not included – results are summarized in other reports.
Groundwater Monitoring, October 1999 – Church Street, Geelong West (VO0993)	PPK	Mobil Oil Australia	15 December 1999	Not included – results are summarized in other reports.
Final Report Detailing Total Fluids Pilot Trial, Geelong West (VO0993) Victoria	PPK	Mobil Oil Australia	25 June 2002	Not included – results are summarized in other reports.
Groundwater Monitoring Report. Former Mobil Service Station Corner Shannon Avenue and Church Street, Geelong West, Victoria	Handex	Mobil Oil Australia	July 2003	Not included – results are summarized in other reports.
Summary Environmental Report. Former Mobil Service Station Corner Shannon Ave. and Church Street, Geelong West, Victoria	Handex	Mobil Oil Australia	August 2003	Appendix C
Grid based soil sampling (not formally reported – raw data, location plan and lab reports provided only)	IT Environmental	Mobil Oil Australia	Feb 2004	Appendix C
Groundwater Monitoring Results – Monitoring Well MW31. 149 Church Street, Geelong West, Victoria	Coffey Environments (Coffey)	Mobil Oil Australia	19 July 2007	Not included – results are summarized in other reports.
Hydrocarbon Fingerprinting Report No M071760,	Leeder Consulting	Coffey Environments	12 Dec 2007.	Appendix C
Annual Groundwater Monitoring Event Report. Former Mobil Service Station Geelong West (VO0993). 151 Church Street (Cnr Shannon Avenue) Geelong West, Victoria	Coffey	Mobil Oil Australia	17 November 2008	Appendix C

Report Title	Prepared By	For	Date	Copy Provided in Audit Report
Off-site Health Risk Assessment Mobil Geelong West Service Station (VO0993). Corner Shannon Avenue and Church Street Geelong West, Victoria	Coffey	Mobil Oil Australia	12 December 2008	Appendix C
Groundwater Multiphase Extraction and Air Treatment Event (27 th and 28 th August 2008) – Ref 700358. Former Mobil Service Station Cnr Shannon Ave and Church St, Geelong West, Vic (13 January 2009);	JFTA Environmental Solutions (JFTA)	Mobil Oil Australia	13 January 2009	Not included – results are summarized in other reports.
Groundwater Multiphase Extraction and Air Treatment Event (22 nd and 23 rd JFTA January 2009) – Ref 700418. Former Service Station Cnr Shannon Ave and Church St, Geelong West, Vic	JFTA	Mobil Oil Australia	6 April 2009	Not included – results are summarized in other reports.
Post Phase 2 Environmental Site Assessment Former Mobil Service Station Geelong West (VO0993) 151 Church Street (Cnr Shannon Avenue), Geelong West, Victoria	Coffey	Mobil Oil Australia	24 April 2009	Appendix D
Groundwater Multiphase Extraction and Air Treatment Event (19 th and 20 th March 2009) – Ref 700418. Former Mobil Service Station Cnr Shannon Ave and Church St, Geelong West, Vic	JFTA	Mobil Oil Australia	27 March 2009	Not included – results are summarized in other reports.
Groundwater Multiphase Extraction and Air Treatment Event (4 th and 6 th July 2009) – Ref 700418. Former Mobil Service Station Cnr Shannon Ave and Church St, Geelong West, Vic	JFTA	Mobil Oil Australia	10 July 2009	Not included – results are summarized in other reports.
Remediation Technology Screening Review for Former Mobil Geelong West Service Station (VO0993)	Coffey	Mobil Oil Australia	20 July 2009	Appendix D
Well Installation and Limited Environmental Investigation. Former Mobil Service Station Geelong West (VO0993). 151 Church Street (Cnr Shannon Ave), Geelong West, Victoria	Coffey	Mobil Oil Australia	22 September 2009	Not included – results are summarized in other reports.
Revised Remediation Technology Screening Review for Former Mobil Geelong West Service Station (VO0993)	Coffey	Mobil Oil Australia	2 October 2009	Appendix D
Groundwater Multiphase Extraction and Air Treatment Event (29 th September to 1 st October 2009) – Ref 700543. Former Mobil Service Station Cnr Shannon Ave and Church St, Geelong West, Vic	JFTA	Mobil Oil Australia	7 October 2009	Not included – results are summarized in other reports.
Oxygen Release Compound (ORC) Injection and Hydraulic Barrier Control	Coffey	Mobil Oil Australia	23 October 2009	Appendix D

Report Title	Prepared By	For	Date	Copy Provided in Audit Report
During Multi Phase Extraction Event at Former Mobil Geelong West Service Station (VO0993), 151 Church Street, Geelong West, Vic				
Soil Vapour Extraction Screening Event at Former Mobil Service Station Geelong West (VO0993). 151 Church Street, Geelong West, Victoria	Coffey	Mobil Oil Australia	28 October 2009	Appendix D
Interim Groundwater Monitoring Event. Former Mobil Service Station Geelong West (VO0993). 151 Church Street (Cnr Shannon Avenue), Geelong West, Victoria	Coffey	Mobil Oil Australia	18 December 2009	Not included – results are summarized in other reports.
Oxygen Release Compound (ORC) Injection and Hydraulic Barrier Control During Multi Phase Extraction and Treatment (MPEAT) Event at Former Mobil Geelong West Service Station (VO0993), 151 Church Street, Geelong West, Vic	Coffey	Mobil Oil Australia	13 April 2010	Appendix E
Soil Injection of RegenOx via Push Tube and Wavefront Technology at Former Mobil Geelong West Service Station (VO0993), 151 Church Street, Geelong West, Vic	Coffey	Mobil Oil Australia	13 April 2010	Appendix E
Combined MPEAT and Injection of RegenOx in On-Site Remediation Wells Using Wavefront Technology at Former Mobil Geelong West Service Station (VO0993), 151 Church Street, Geelong West, Vic	Coffey	Mobil Oil Australia	17 June 2010	Appendix E
Interim Groundwater Monitoring Event. Former Mobil Service Station Geelong West (VO0993). 151 Church Street (Cnr Shannon Avenue), Geelong West, Victoria	Coffey	Mobil Oil Australia	6 August 2010	Not included – results are summarized in other reports.
Soil Injection of RegenOx via Push Tube and Using Wavefront Technology (STEP 5), at Former Mobil Geelong West Service Station (VO0993), 151 Church Street, Geelong West, Vic;	Coffey	Mobil Oil Australia	31 August 2010	Appendix E
Coffey Environments (Coffey 2010f) Combined MPEAT and Injection of RegenOx in On-Site Remediation Wells Using Wavefront Technology (STEP 6) at Former Mobil Geelong West Service Station (VO0993), 151 Church Street, Geelong West, Vic	Coffey	Mobil Oil Australia	6 September 2010	Appendix E
Interim Groundwater Monitoring Event. Former Mobil Service Station Geelong West (VO0993). 151 Church Street (Cnr	Coffey	Mobil Oil Australia	8 October 2010	Not included – results are summarized in other reports.

Report Title	Prepared By	For	Date	Copy Provided in Audit Report
Shannon Avenue), Geelong West, Victoria				
Soil Injection of RegenOx via Push Tube and Using Wavefront Technology (STEP 8), and Data Gaps Filling at Former Mobil Geelong West Service Station (VO0993), 151 Church Street, Geelong West, Vic	Coffey	Mobil Oil Australia	12 January 2011	Appendix F
Combined MPVE and Injection of RegenOx in On-Site Remediation Wells Using Wavefront Technology (STEP 9) at Former Mobil Geelong West Service Station (VO0993), 151 Church Street, Geelong West, VIC	Coffey	Mobil Oil Australia	23 January 2011	Appendix F
Post Injection Groundwater Monitoring Event Former Mobil Service Station Geelong West (VO0993) 151 Church Street, Geelong West, Victoria.	Coffey	Mobil Oil Australia	4 May 2011	Not included – results are summarized in other reports.
Environmental Summary Report Former Mobil Service Station (VO0993) 151 Church Street, Geelong West	Coffey	Mobil Oil Australia	4 May 2011	Appendix F
Work Plan Former Mobil Geelong West Service Station (VO0993) Cnr Shannon Ave & Church St	Coffey	Mobil Oil Australia	4 July 2011	Not included – results are summarized in other reports.
Targetted Soil Impact Excavation Report. Former Mobil Geelong West Service Station (VO0993)	Coffey	Mobil Oil Australia	21 November 2011	Appendix G (Note this report is an Appendix to the CUTEP Report listed below)
Annual Groundwater Monitoring Event. Former Mobil Geelong West Service Station (VO0993)	Coffey	Mobil Oil Australia	15 June 2012	Appendix G (Note this report is an Appendix to the CUTEP Report listed below)
Human Health Risk Assessment Report Former Mobil Service Station 151 Church St, Geelong West, Victoria	Coffey	Mobil Oil Australia	14 August 2012	Appendix G (Note this report is an Appendix to the CUTEP Report listed below)
Clean Up to the Extent Practicable (CUTEP) Report - Former Mobil Geelong West Service Station (VO0993) (includes Feb 2012 GME Report)	Coffey	Mobil Oil Australia	14 August 2012	Appendix G

2.2 Audit Timeline and Other Information

The sequence of the main activities conducted by the auditor is summarised below:-

- o The auditor formally accepted the audit engagement on 10 January 2011. It is understood that Mobil intended to divest the site, and required the audit report under Section 53X of the Act in order to satisfy internal commercial requirements for handing it over in a condition suitable for uses permitted under current Residential 1 zoning under the Greater Geelong Planning Scheme.
- o The EPA issued Mobil a Clean Up Notice on 14 January 2011 (EPA Ref NO9017) due to the presence of residual subsurface fuel related hydrocarbon impacts remaining at and in the vicinity of the site. Amongst other things, this Notice required the engagement of an EPA-appointed environmental auditor by 14 March 2011, and submission to EPA of an environmental audit report by 16 May 2011, prepared in accordance with Section 53V of the Act.
- o An initial start-up meeting and site inspection was conducted on 1 February 2011, attended by the auditor, and representatives from Mobil and Coffey Environments.
- o Between January and May 2011, the auditor reviewed the various background reports available at the time, and in May 2011 completed the Section 53V environmental audit report as required by the Clean Up Notice. The audit report assessed the adequacy of prior investigations, assessed risks of any possible harm or detriment to the land, groundwater and surface water environment, assessed the adequacy of measures being planned and implemented to manage the risk, and provided recommendations for investigation and management measures to be addressed in the short term (within 3 months), medium term (within 6 months) and longer term (within 2 years).
- o Since June 2011, there has been ongoing consultation between Mobil's appointed consultants (Coffey Environments), the auditor and Mobil, to address the recommendations of the 53V Audit Report, and work towards obtaining a Clean Up to Extent Practicable (CUTEP) determination from EPA and ultimately completion of this 53X audit report confirming the suitability of the site for uses permitted under the current zoning.
- o In August 2012, Coffey Environments prepared a Clean Up to the Extent Practicable (CUTEP) report for the site.
- o During September 2012 the Auditor met with Coffey personnel at their Geelong office to clarify various issues with their CUTEP submission, and completed and lodged a CUTEP submission to the EPA.
- o EPA confirmed the CUTEP determination for the site in a letter dated 12 December 2012.
- o A final site inspection was carried out on 17 December 2012, and the environmental audit report and a Statement of Environmental Audit was subsequently issued on 21 December 2012, with copies provided to the EPA, the planning authority (City of Greater Geelong), and Mobil.

Further details of the assessment and clean up works are provided in Sections 4 and 5 of this audit report. The auditor was assisted by staff at AEC Environmental (Larissa Willoughby and Nick Waniarcha), Land and Water Consulting (Peter Howieson) and also by Jackie Wright (a member of the auditor's approved expert support team in the field of human health risk assessment).

2.3 Relevant Elements and Beneficial Uses

The beneficial uses of the site considered for this audit included (but were not limited to) the beneficial uses for land [as outlined in State Environment Protection Policy ('SEPP') Prevention and Management of Contamination of Land (PMCL)], groundwater (as outlined in SEPP Groundwaters of Victoria), surface waters (as outlined in SEPP Waters of Victoria), and air (as outlined in SEPP Ambient Air Quality). Further details of the beneficial uses of the two main elements (land and groundwater) are provided in the following paragraphs and tables.

The beneficial uses of land protected under the land SEPP are outlined in Table 4 below. Land has a very high intrinsic value and on this basis all of the beneficial uses are relevant when considering whether a Certificate of Environmental Audit can be issued.

Table 4: Beneficial Uses of Land

Beneficial Use	Land Use						
	Parks & Reserves	Agriculture	Sensitive Use (High Density Residential)	Sensitive Use (Other)	Recreation / Open space	Commercial	Industrial
Maintenance of ecosystems – natural	X						
- modified	X	X		X	X		
- highly modified		X	X	X	X	X	X
Human health	X	X	X	X	X	X	X
Buildings & structures	X	X	X	X	X	X	X
Aesthetics	X		X	X	X	X	
Production of food, flora & fibre	X	X		X			

Beneficial uses of groundwater identified in the SEPP Groundwaters of Victoria are outlined in Table 5 which follows. Only those groundwater uses which are relevant (i.e. existing or likely) affect the ability to issue a Certificate of Environmental Audit.

Table 5: Beneficial Uses of Groundwater

Beneficial Uses	Groundwater Segments (mg/L TDS)				
	A1 (0-500)	A2 (501-1,000)	B (1001-3,500)	C (3,501-13,000)	D (>13,000)
Maintenance of Ecosystems	X	X	X	X	X
Potable Water Supply - Desirable	X				
- Acceptable		X			
Potable Mineral Water Supply	X	X	X		
Agriculture Parks & Gardens	X	X	X		
Stock Watering	X	X	X	X	
Industrial Water Use	X	X	X	X	X
Primary Contact Recreation	X	X	X	X	
Buildings & Structures	X	X	X	X	X

2.4 Environmental Quality Criteria

Soil

The primary source of soil screening criteria adopted in assessing the site are the 'investigation levels' for soil from Schedule B(1) of the National Environment Protection (Assessment of Site Contamination) Measure. At the time of this audit the following investigation levels had been proposed in the NEPM: -

- o Interim urban ecological investigation levels (EIL's). The interim urban EIL's are based on considerations of phytotoxicity, soil survey data from four Australian capital cities, and values provided in the 1992 ANZECC Guidelines for the Assessment and Management of Contaminated Sites. The list of contaminants covered by the interim urban EIL's is limited to a few inorganic contaminants – including arsenic, barium, cadmium, chromium, copper, lead, manganese, mercury, and zinc.
- o Health investigation levels (HIL's). The health investigation levels (HIL's) listed in the current version of the NEPM include a limited range of metals/metalloids (including arsenic, beryllium, cadmium, cobalt, copper, lead, manganese, mercury, nickel, zinc) and organic compounds (including polycyclic aromatic hydrocarbons, polychlorinated biphenyls, total phenolics, selected organochlorine pesticides, and >C15 petroleum hydrocarbons considered as aliphatic and aromatic fractions).

The Cooperative Research Centre for Contamination Assessment and Remediation of the Environment (CRC CARE) has recently published Technical Report 10 entitled *Health screening levels for petroleum hydrocarbons in soil and groundwater* (Friebel, E & Nadebaum, P, Sept 2011). Health based screening levels (HSLs) have been developed for petroleum hydrocarbons using the risk based framework provided in the Assessment of Site Contamination NEPM. Screening values are provided for BTEX, naphthalene, and the volatile TPH fractions (nominally <C16) for the vapour exposure pathway from a subsurface source of impacted soil. There are also updated HSLs provided for direct contact exposure to petroleum hydrocarbon impacted soils for BTEX, naphthalene, and TPH fractions from C6-C40. The report notes the HSLs represent the best collective view of the available science and application of Australian approaches on selection of health criteria and exposure parameters.

It is acknowledged the HSLs developed by CRC CARE have limitations in their application. They do not take into account ecological risks, aesthetics, presence of non-aqueous phase liquids (NAPLs), or risks associated with explosion or fire – refer to the application document that forms Part 2 of the series of reports for Technical Report 10. The use of the HSLs requires expert judgment and an understanding of the context, requirements and limitations of such use. Given the numerous alternative scenarios covered by the HSLs for soils based on vapour intrusion risk, the Auditor does not consider it appropriate to list even a small selection of the HSLs values as initial screening criteria. As with any other alternative screening criteria, any use of the HSL's would need to be appropriately justified and documented in the assessor's reports.

Soils with concentrations meeting interim urban EIL values, HIL A values and appropriately justified alternative screening values would generally be considered suitable for unrestricted use in a sensitive land use subject to also satisfying aesthetics considerations (for example - absence of odours, staining, or secondary constituents such as waste items). In this case, the site is

being assessed in terms of commercial use (but the zoning also permits residential uses), so the HIL A and HSL A values were considered applicable as health screening criteria.

The NEPM and CRC CARE Technical Report 10 do not cover the breadth of contaminants of interest at this site, and the assessment consultant and Auditor have also used alternative sources for soil screening criteria including:-

- o ANZECC 'B' levels (ANZECC, 1992).
- o Typical background ranges of contaminants, as listed in ANZECC 1992 or the NEPM.
- o Dutch Target and Intervention Levels (MHSPE, 2000).
- o NSW EPA threshold concentrations for sensitive land use from the 'Guidelines for Assessment of Service Station Sites' (NSW EPA, 1994).
- o US EPA Regional Screening Levels for residential soil (updated May 2012).
- o Section 6 of the Australian Piling Code (AS2159-2009), for guidance in relation to potential adverse effects on buildings and structures.

The investigation levels are not intended to be interpreted strictly as "acceptance levels" or "maximum permissible levels". They are based on generic and conservative assumptions related to levels of exposure and potential adverse effects, and are simply intended to prompt further site specific investigation where they are exceeded. The NEPM notes contamination levels well in excess of the investigation levels can generally be tolerated before a response or clean up is required. The SEPP (PMCL) also provides direction in relation to objectives for cleanup of land. Cleanup can be based on the relevant objectives specified in Table 2 of the SEPP (PMCL), for the protected beneficial uses defined in the SEPP (PMCL), or alternatively via clean up objectives derived via a site specific risk assessment undertaken in accordance with the NEPM.

Table 6: Auditor Screening Criteria for Common Soil Contaminants

Category of screening criteria	Ecological	Standard residential	Medium & high density residential	Parks & open space	Commercial / industrial
Default Source (unless alternative values are adopted)	NEPM Interim urban EIL's	NEPM HIL A values	NEPM HIL D values	NEPM HIL E values	NEPM HIL F values
Antimony (Sb)	20 ¹	-	-	-	-
Arsenic (As)	20	100	400	200	500
Barium (Ba)	300	-	-	-	-
Beryllium (Be)	-	20	80	40	100
Cadmium (Cd)	3	20	80	40	100
Chromium (III)	400	12%	48%	24%	60%
Chromium (VI)	1	100	400	200	500
Cobalt (Co)	50 ¹	100	400	200	500
Copper (Cu)	100	1000	4000	2000	5000
Lead (Pb)	600	300	1200	600	1500
Manganese (Mn)	500	1500	6000	3000	7500
Mercury (inorganic)	1	15	60	30	75
Nickel (Ni)	60	600	2400	600	3000
Tin (Sn)	-	47,000 ⁴	47,000 ⁴	-	-
Zinc (Zn)	200	7000	14000	28000	35000
Aldrin	-	10	40	20	50
Dieldrin	0.2 ¹				
Chlordane	0.5	50	200	100	250

Category of screening criteria	Ecological	Standard residential	Medium & high density residential	Parks & open space	Commercial / industrial
Default Source (unless alternative values are adopted)	NEPM Interim urban EIL's	NEPM HIL A values	NEPM HIL D values	NEPM HIL E values	NEPM HIL F values
DDT + DDD + DDE	0.8 ³	200	800	400	1000
Heptachlor	0.8 ³	10	40	20	50
PCB's (total)	1 ¹	10	40	20	50
Benzo(a)pyrene	1 ²	1	4	2	5
Total PAH's	-	20	80	40	100
TPH C6-C9	65 ²	65 ²			
TPH C10-36	1000 ²	1000 ²			
TPH >C16-C35 aromatics	-	90	360	180	450
TPH >C16-C35 aliphatics	-	5600	22400	11200	288000
TPH > C35 aliphatics	-	56000	224000	112000	280000
Benzene	1 ²	1 ²			
Ethylbenzene	3.1 ²	3.1 ²			
Toluene	1.4 ²	1.4 ²			
Xylene	14 ²	14 ²			
Cyanide (free)	-	250	1000	500	1250
Cyanides (complexed)	-	500	2000	1000	2500
Sulfate	2000	-	-	-	-

NOTES:

1. ANZECC/NHMRC (1992) Environmental Investigation 'B' Levels
 2. NSW EPA (1994) Threshold Concentrations for Sensitive Land Use – Soils
 3. Dutch MHPSE (2006 as Amended October 2008) Soil Remediation Circular Soil Intervention Values
 4. USEPA Regional Screening Levels, Residential Soil (updated May 2012)
- = No value established

Groundwater

The groundwater results were compared with the criteria specified in the *SEPP Waters of Victoria (as varied 2003)* and SEPP (Groundwaters of Victoria) (1997). These are primarily derived from ANZECC and NHMRC documents, and are referenced below:-

- o Maintenance of ecosystems. ANZECC (2000) *Australian Water Quality Guidelines for Fresh and Marine Waters*. Given the nearest potential receiving water body is Corio Bay (approximately 1.5km east); results were compared against marine water ecosystems protection criteria, for 95% of species to be protected. ANZECC 1992 criteria were used if no updated values were listed in ANZECC 2000.
- o Potable water. The SEPP (Groundwaters of Victoria) specifies the water quality objectives for potable water are the ANZECC (1992) criteria for raw waters for drinking purposes. There have since been a number of updated publications regarding drinking water quality in Australia, including the NHMRC (2004) *Australian Drinking Water Guidelines*. Some values were adopted based on advice from EPA, where discrepancies exist between the ANZECC 1992 values and more recent criteria.
- o Potable mineral water supply. *Australian Food Standards Code (1987) – Standard 08 Mineral Water*, criteria for potable mineral water supply.
- o Stock watering. ANZECC (2000) *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*, criteria for livestock water. Criteria for raw drinking waters (ANZECC 1992) were used where no stock criteria were specified.
- o Agriculture, parks and gardens. ANZECC (2000) *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*. Generally, long term trigger values in irrigation waters were adopted (if available).
- o Industrial. ANZECC (1992) *Australian Water Quality Guidelines for Fresh and Marine Waters*, criteria for industrial water use.
- o Primary contact recreation. The SEPP (Groundwaters of Victoria) specifies the water quality objectives for recreational water are the ANZECC (1992) criteria for recreational waters. There have since been a number of updated publications regarding recreational water quality in Australia. The ANZECC (2000) *Australian Water Quality Guidelines for Fresh and Marine Waters* specified criteria for recreational water quality which were identical to the ANZECC (1992) values. The most recent Australian guidance is provided in *Guidelines for Managing Risks in Recreational Water (NHMRC, 2008)*. This Guideline advocates a simple screening approach where “a substance occurring in recreational water at a concentration of 10 times that stipulated in the drinking water guidelines may merit further consideration”. The Auditor adopted screening values of 10 x potable criteria for nitrate and some other inorganics, but retained the recreational or potable screening values for organics to account for uncertainty in dermal absorption, or where an aesthetic / odour based threshold applied. In addition, some values were adopted based on advice from EPA, where discrepancies exist between the ANZECC 1992 values and more recent criteria.
- o Buildings and Structures. No specific criteria are listed in the SEPP, but results were considered with regard to Section 6 of the Australian Piling Code (AS2159) for groundwater conditions and potential adverse effects on buildings and structures.

Table 7: Auditor Screening Criteria for Common Groundwater Contaminants (µg/L)

Beneficial Uses	Maintenance of Ecosystems (Freshwater)	Maintenance of Ecosystems (Marine)	Potable	Agr/ Parks/ Gardens	Stock	Primary Contact Recreation
pH	-	-	6.5-8.5	-	-	6.5-8.5
Cyanide	-	-	80	-	-	80
Fluoride	-	-	1,500	1,000	2,000	1,500
Ammonia (as N)	740	750	400	-	-	10
Nitrate (as N)	160	-	10,000	-	100,000	100,000
Nitrogen	-	-	-	5,000	-	-
Phosphorous	-	-	-	50	-	-
Arsenic	13	-	50	100	500	50
Beryllium	-	-	-	100	-	-
Boron	370 *	-	300 *	500	5,000	1,000 *
Cadmium	0.2	5.5	5	10	10	5
Chromium	1.4 (as Cr (VI)) - (as Cr (III))	4.4 (As Cr (VI)) 27.4 (as Cr (III))	50 (as Cr (VI))	100 (as Cr (VI))	1,000	50
Cobalt	-	1	-	50	1,000	-
Copper	1.4	1.3	1,000	200	500	1,000
Lead	3.4	4.4	50	2,000	100	50
Manganese	1,900	-	500 *	200	-	- *
Mercury	0.6 (inorganic)	0.4 (inorganic)	1	2	2	10
Molybdenum	-	-	50	10	150	-
Nickel	11	70	100	200	1,000	1,000
Selenium	11	-	10	20	20	100
Zinc	8	15	3,000 *	2,000	20,000	5,000
Benzene	950	700	1	-	-	10
Toluene	-	-	25 (aesthetics)	-	-	25 **
Ethyl Benzene	-	-	3 (aesthetics)	-	-	3 **
Xylenes	200 (p-xylene)	-	20 (aesthetics)	-	-	20 **
TPH C6-C9	-	-	-	-	-	-
TPH C10-C36	600 ^^	600 ^^	-	-	-	-
Aldrin	-	-	0.3	-	-	1
Dieldrin	-	-		-	-	1
Chlordane	0.08	-	1	-	-	6
DDT	0.01	-	20	-	-	3
Heptachlor	0.09	-	0.3	-	-	3
BaP	-	-	0.01	-	0.01 *	0.01
Phenolics	-	-	2	-	-	20
Vinyl Chloride	-	-	0.3	-	-	-
Trichloroethene	-	-	-	-	-	30
Tetrachloroethene	-	-	50	-	-	10

NOTES:-

Shaded result indicates above one or more guidelines

ND Denotes all individual compounds were below adopted laboratory detection limits.

* Values adopted based on advice from EPA, where a discrepancy existed between ANZECC (1992) values and other updated values.

** Primary contact recreation screening criteria for TEX were sourced from the aesthetics based guideline values from the Australian Drinking Water Guidelines (NHMRC, 2004)

*** Primary contact recreation screening values for inorganics and nitrate are based on 10 x guideline values for drinking water to account for limited consumption in a recreational water use scenario (as per NHMRC Managing Risks in Recreational Water guidance (2008)). Drinking water guidelines sourced from NHMRC Australian Drinking Water Guideline (2004).

^^ Dutch (2000) Intervention Level for mineral oil.

3. REVIEW OF BACKGROUND INFORMATION

3.1 Physical & Environmental Setting

The site is located approximately 2.5km north west of the Geelong city centre, and approximately 1.5km inland (west) of Corio Bay. The land in the locality is essentially level. The Victorian Government Land Channel website indicates the site lies approximately 33 metres above sea level. There are no watercourses or surface water bodies in the immediate vicinity. The Moorabool River is approximately 2km to the south west. The adjoining land uses comprise residential and commercial properties across Church Street to the north, residential properties to the east and south, and a convenience store and retail fuel outlet across Shannon Avenue to the west.

3.2 Geology & Hydrogeology

The regional and site geology and hydrogeology is detailed in numerous previous reports. The site is underlain by Tertiary Age sediments comprising Moorabool Viaduct Formation (fine sands with varying silt and clay) over Fyansford Formation / Batesford Limestone Formation (clays and calcarenite). Groundwater was encountered within a “shallow” fine sand water bearing zone between approximately 7 and 10 metres, and also in a “deeper” zone between approximately 12m and 14m depth. Coffey have interpreted these observations as indicating the groundwater in the ‘shallow’ and ‘deeper’ water bearing zones is part of an unconfined aquifer system that is interconnected to some degree.

Groundwater flow was interpreted to be north east based on surveyed groundwater levels, and has not varied significantly over the past decade or so of monitoring. There has been a steady decline in groundwater levels in the gauging records since the late 1990's. Gauging records prior to 2003 used an arbitrary datum. The earliest available gauging data to Australian Height Datum (AHD) dates from May 2003 – standing water levels ranged from 20.732m AHD to 21.425m AHD (refer Handex 2003a). The most recent reported standing water levels (SWL's) are approximately 0.3m to 0.8m lower than the 2003 levels – results from February 2012 indicated SWL's from approximately 20.4m AHD to 20.65m AHD (refer to the Coffey CUTEP report attached in Appendix G). Some of the ‘shallow’ monitoring wells have been dry in recent gauging events. Groundwater level trends are summarized in the Coffey CUTEP report attachments.

Coffey have interpreted the groundwater at the site to be in Segment C as per the SEPP Groundwaters of Victoria based on field and laboratory TDS measurements, and consideration of background TDS values which they report have been generally in the range of 5,000 mg/L to 10,000 mg/L TDS.

An updated review of local groundwater usage was provided in the February 2012 Groundwater Monitoring Event Report (attached as Appendix D of the Coffey Environments CUTEP report). Coffey's search of Department of Sustainability and Environment (DSE) records identified 17 registered bores within a 1 kilometre radius of the site, with all of the bores being groundwater investigation bores. It is noted the EPA expects groundwater usage and registered bores within a 2km radius to be considered as part of a CUTEP determination. The auditor completed a broader search of registered bores on the Department of Sustainability and Environment

interactive mapping tool, which identified two private bores, and one state observation bore within 2km of the site. A copy of the search map and records is provided in Appendix F of the auditor's CUTEP submission (attached as Appendix H in the attachments to this audit report).

3.3 Site History

Historical reviews indicate that prior to 1947 the site comprised three separate properties, assumed to be residential. The western lot (closest to Shannon Avenue) may have been a store/workshop. A service station was established on the three lots sometime between 1967 and 1970. The service station was decommissioned in 1997, and the site has remained vacant since then.

3.4 Site Layout and Condition

The site has been vacant since the late 1990's. The auditor first inspected the site in February 2011. It was vacant and covered in a mixture of gravel hardstand and grass. There was security fencing around the perimeter. Numerous monitoring bore standpipes and remediation well heads and pipework were visible across the site. The former service station layout described in the various past reports comprised a workshop/sales building, six underground storage tanks (ranging up to 58,000L in capacity), two bowser islands, separate diesel bowser, lube bay and triple interceptor tank. The former site layout is shown on Figure 3 in the report attachments.

3.5 Potential Historical Contamination

Potential historical contamination sources for the site identified in the historical reviews included imported fill materials, past storage and dispensing of fuels, and past motor vehicle maintenance and repairs operations. Potential contaminants of interest identified in the prior reports included the following:-

- o Metals / metalloids.
- o Total Petroleum hydrocarbons.
- o Benzene, Toluene, Ethylbenzene and Xylenes (BTEX).
- o Other volatile and semi volatile organic compounds (including chlorinated and non chlorinated hydrocarbons. polycyclic aromatic hydrocarbons and phenols).

It is also noted there remains an operational retail fuel retail outlet across Shannon Avenue to the west, and there are known to be fuel related hydrocarbon impacts associated with this property that have migrated eastwards under Shannon Avenue towards the audit site. Further details are provided later in this audit report.

4. REVIEW OF SITE ASSESSMENTS

4.1 Soil and Groundwater Investigations

A number of phases of soil and groundwater investigations have been completed since 1997. A network of groundwater monitoring wells has been progressively established on-site, and off-site in adjoining properties and road reserves to delineate groundwater impacts and monitor conditions over time (refer plan provided as Figure 3).

Handex and PPK (1997 to 2003)

The initial investigations at the site were reportedly conducted by Handex in December 1997 and comprised drilling of 20 soil bores using a Geoprobe rig in a grid pattern across the site, coinciding with the removal of the underground storage tanks and associated infrastructure. The bores were extended to depths ranging from 3.0m to 4.3m below ground level. Sampling of tank excavation pits and spoil stockpiles was also conducted as part of this phase of works. Selected samples were analysed for TPH, BTEX and lead. All analytical results from the soil bores were below adopted investigation levels. Four stockpile soil samples results exceeded adopted investigation levels (based on NSW EPA threshold levels for sensitive land use) for C6-C9 TPH, toluene, ethyl benzene and xylenes. A sample from the western wall of the triple interceptor tank pit wall also exceeded adopted investigation levels for C6-C9 TPH, toluene, ethyl benzene and xylenes.

Between May and October 1998, PPK installed 16 groundwater monitoring wells (MW1-MW3, MW5-MW10, MW12-MW18 inclusive, 11 on-site and 5 off-site), conducted a groundwater gauging and monitoring event, conducted further validation works of the existing excavations and stockpiled soils, and completed a quantitative health risk assessment. Elevated TPH and BTEX results were reported in groundwater samples analysed from a number of the bores drilled. Elevated TPH and BTEX results were also reported in a number of the groundwater monitoring locations. Phase separate hydrocarbons (PSH) were noted at two locations in the northern portion of the site (15mm at MW12, and 70mm at MW6). PSH was also noted in MW17, located in the Caltex service station site to the west (390mm thickness). Multiphase extraction (MPE) events were completed in October and December 1998, and are discussed in further detail later in this report.

PPK conducted groundwater monitoring events in March 1999, October 1999, July 2000, March 2001, July 2002, and May 2003. During this period, five new monitoring wells (MW19-MW23) were installed in July 2000, and four new monitoring wells (MW24-MW27) were installed in March 2001. During the March 2001 monitoring event, PSH was noted at 6 locations in the northern portion of the site (ranging from a sheen to 1.523mm thick), and in the 3 locations installed off site to the west, in and adjacent to the Caltex service station (ranging from 30mm to 330mm thick). During the May 2003 monitoring event, PSH was noted at 4 locations in the northern portion of the site (ranging from a sheen to 460mm thick). PSH was not noted in the 3 locations installed off site to the west in and adjacent to the Caltex service station, as passive skimmers had been installed in these wells.

IT Environmental (2004, 2005)

In February 2004, IT Environmental completed a soil sampling program comprising drilling of 30 soil bores in an 8.5m spaced grid across the site using hand auger equipment, and installed seven additional groundwater monitoring wells (MW27 and MW28 to approx. 15m depth, and MW29-MW33 inclusive to depths between 10m and 11m). Additional trenching and validation sampling was completed across the boundaries of former tank pits. Results from the soil bores indicated no elevated metals, OC/OP pesticides, TPH, BTEX, chlorinated hydrocarbons, phenols or PAH in samples from the upper 1m of the soil profile across the site. Elevated TPH (C6-C9), xylenes and PAH's were reported in soils from 1.2m-2.4m depth at location MW33. Elevated TPH (C6-C9) results were also reported in samples from the north wall of the main tank pit (Pit B), and elevated TPH (C10-C36) results were reported in samples from the floor of the former triple interceptor pit excavation. The only result for metals above the adopted screening criteria was a single total chromium result from a wall sample in the former bowzers area (Pit A). This was a total chromium result of 110 mg/kg which exceeded the adopted Cr (VI) screening criteria. However, based on the site history and prevailing soil conditions, any chromium present is likely to be naturally occurring and limited to the less toxic Cr (III) form. The chromium results are all well below the Cr (III) screening values and have not been considered further.

In October 2004, IT Environmental completed a groundwater monitoring event after completion of remediation trials including an aquifer pump test, drawdown/recovery tests, an in-situ soil vapour extraction (SVE) trial, a multiphase extraction (MPE) trial, and bioventing testing at the site. Elevated TPH and BTEX were reported in numerous on site wells, and PSH was reported in wells in the vicinity of the former main tank pit in the northern portion of the site (5mm at MW22 and 149mm at MW23).

In December 2004, IT Environmental conducted further tank pit excavation and validation work in the vicinity of MW27 and MW33, in response to comments from an auditor engaged at the time to review the works.

It is understood the 2004 works were never formally reported, but are discussed in the Coffey (2011) Summary Report, which is provided in Appendix F. The auditor has been provided with the summary results tables, laboratory reports, and location plans. These are attached in Appendix C.

In January 2005, IT Environmental installed two additional off site groundwater monitoring wells (MW39 and MW40).

Coffey Environments (2006 onwards)

Coffey Environments conducted groundwater monitoring events in April 2006, November 2007, and November 2008. The earlier monitoring events had focused on fuel related indicator analytes such as TPH, BTEX and lead. The analytical suites for the 2008 and 2009 events were broader and included TPH, BTEX, lead, PAH, phenols, natural attenuation parameters (nitrate, sulphate, iron species, methane) and also a broad suite of volatile organic compounds including halogenated volatiles. Elevated naphthalene and phenols results were reported in the hydrocarbon impacted zone but no other elevated VOCs were reported. PSH was still being reported in both on site wells in the northern portion of the site, and also in the wells installed on

and adjacent to the Caltex service station across Shannon Avenue to the west. The November 2007 monitoring event included PSH fingerprint analysis at the specialist laboratory of Leeder Consulting from three monitoring wells (MW23 from on site, and off site wells MW25, and MW26 from the Caltex site). The fingerprint analysis concluded all three PSH samples were a degraded leaded petrol and had been in the environment for between ten and eighteen years. The octane booster TEL was detected in all three samples, whilst other octane boosters such as TML, MTBE and the organomanganese compound MMT were not detected in the samples.

In February 2009, Coffey Environments completed a Post Phase 2 Environmental Site Assessment which comprised drilling of twenty soil bores at targeted locations across the site (all to 4m depth), a groundwater monitoring event, and a ground penetrating radar (GPR) survey across the site to confirm the absence of other underground petroleum related pipework or infrastructure. The results of the GPR survey are not discussed other than a note that a 0.5m section of remnant pipe was found and removed from one location. PSH was reported on site at MW6 (1mm), MW23 (1mm), MW38 (30mm), and off site adjacent the Caltex site at MW25 (110mm). This was the last assessment work prior to further remediation works, which were completed between September 2009 and November 2010. Additional monitoring wells were installed and interim groundwater monitoring events were completed during 2009, 2010, and 2011 to monitor groundwater conditions during and after the remediation works. The remediation works and ongoing monitoring are discussed in further detail later in this audit report.

Between July and September 2011, excavation works were completed to remove remaining impacted soils from the former bowser area and former triple interceptor trap / drain pit area adjoining the former workshop. This removed the remaining residual soil impacts in the upper 2m of the soil profile across the site. Soil impacts remained at depth beneath these locations – refer Figure 9 for a summary of residual impacts in soils. The works and results are documented in the Targetted Soil Impact Excavation Report (Coffey, Nov 2011) which is provided as an appendix in the CUTEP Report (Coffey, Aug 2012) – copy provided in Appendix G. The remediation works are discussed in further detail in a later section of the audit report.

In February 2012, Coffey Environments completed a final groundwater monitoring event, which comprised gauging of 51 on-site and off-site monitoring wells, and sampling of 39 wells. No LNAPL was measured in any of the on-site wells or off-site wells downgradient of the site. Well MW25, which is located off-site upgradient of the site, has historically reported LNAPL. The report indicates 1cm of LNAPL was measured in this well during this gauging event. As reported elsewhere, the impacts in this well are interpreted to be associated with the operational service station upgradient (west) of the site across Shannon Avenue. Coffey noted there is a monitoring bore between MW25 and the subject site (MW24 located on the eastern side of Shannon Avenue) and there has never been LNAPL identified in this well during historical gauging. Coffey noted there had not been LNAPL identified in any on-site wells since a mid 2010 monitoring event.

4.2 Soil Vapour Investigation and Monitoring

Flux Hood Monitoring (2003)

The May 2011 summary report by Coffey (Coffey 2011d) notes that in December 2003, IT Environmental conducted a petroleum vapour monitoring program (flux hood) at two locations on site. Results reported concentrations below the limit of reporting (0.2 mg/m^3) and no peaks were identified. The report also notes that in December 2004 and January 2005, IT Environmental conducted subfloor vapour monitoring on two occasions beneath the residential building on the adjoining lot to the east (149 Church Street). Results of this work are not discussed in the summary report or elsewhere in the reports provided for auditor review.

Soil Vapour Monitoring (2008)

Soil vapour implants were installed by Coffey at four on-site locations in September 2008 (locations SVB1 to SVB8 inclusive). Two separate vapour sampling bores were installed at each location – a shallow implant (1.5m deep) and a deeper implant just above the water table (7.5m deep). Two of the locations were over the main impacted zone in the north eastern portion of the site, with the other two locations near the eastern boundary adjoining the residence.

The details of the soil vapour probe installations were not clear from the logs and report text in the Coffey On-site Health Risk Assessment Report (Coffey 2008b). The Auditor sought further clarification from Coffey and based on their advice it has been established that the vapour probes were installed as detailed below:-

- o The soil vapour sample implant is supplied and installed by Leeder, and comprises a perforated stainless steel tube attached to $\frac{1}{4}$ inch Teflon tubing. The screened interval and sand pack are approximately 40cm in height. The Teflon tubing runs up to the surface.
- o There is a bentonite seal provided at the top of the sand pack section, and above this the borehole is grouted to the surface.
- o There is a flush mounted lockable gatic cover provided at the ground surface.

Soil vapour sampling was conducted by Leeder Consulting on 15 September 2008. Sampling methods adopted included sample collection in thermal desorption tubes and analysis via method TO-17 (USEPA, 1999), with backup sampling in carbon tubes and analysis via method MA-5 (Leeder Consulting, 2009). The MA-5 method was utilised where adsorbed concentrations on the thermal desorption tubes exceeded the reporting capacity of the detection device (GC-MS equipment). QA/QC measures adopted also included collection of blanks, including a helium tracer shroud being used to check for evidence of system leakage. Helium tracers were initially run through the system prior to sample collection and collected in a Tedlar bag. These were analysed via method ASTM D 1946-90 (ASTM, 1990).

The standard range of analytes included VOC's (including BTEX), naphthalene, and TPH aromatics/ aliphatics fractions. Gas samples were also collected and analysed for natural attenuation indicators (oxygen, carbon dioxide, and methane). Elevated results were reported in the deeper (7.5m deep) sampling points, with significantly lower results in the shallow (1.5m deep) sampling points. Results are discussed in detail later in this audit report.

Vapour monitoring of thirteen selected utility pits located within 30m of the site was conducted in February 2009 as part of Coffey's Post Phase II ESA (refer Coffey 2009a). Utility pits were continually screened using a photoionisation detector (PID) for five minutes with the PID set 0.5m depth inside each pit. No elevated results were reported, and no hydrocarbon or other odours were noted by the operator.

Soil Vapour Monitoring (2011)

Coffey completed additional soil vapour monitoring in October 2011. The work is documented in the Coffey (December 2011) Health Risk Assessment (copy provided in Appendix F). This investigation comprised the installation of 12 discrete soil vapour bores at 7 locations selected based on locations of receptors of interest, and also the presence of known residual petroleum hydrocarbon impact. Within each borehole, shallow soil vapour impacts were installed to 1.5m depth, and deeper implants installed to 2.5-3.5m depth. At three locations a deeper vapour implant was installed to 5.5m depth.

Vapour sampling was completed in October 2011 by experienced Coffey personnel using thermal desorption tubes. One previously installed shallow (1.5m) vapour point (SVB5) was also sampled, in addition to the 12 newly installed vapour points. Samples were submitted to a NATA accredited laboratory for analyses for VOC's, and aliphatic and aromatic TPH fractions. Soil vapour sampling was conducted by Coffey personnel in October 2011. Sampling methods adopted included sample collection in thermal desorption tubes and analysis via method TO-17 (USEPA, 1999). QA/QC measures adopted also included collection of blanks, including a helium tracer shroud being used to check for evidence of system leakage. Helium tracers were initially run through the system prior to sample collection and collected in a Tedlar bag. These were analysed via method ASTM D 1946-90 (ASTM, 1990).

The standard range of analytes included VOC's (including BTEX), naphthalene, and TPH aromatics/ aliphatics fractions. Gas samples were also collected and analysed for natural attenuation indicators (oxygen, carbon dioxide, and methane). Hydrocarbons were detected in all vapour samples collected, with the exception of two of the shallow vapour points. There was a clear trend of reducing concentrations reported for the shallow vapour points (1.5m) compared to the intermediate depth points (2.5-3m) and deeper points (5.5m). Results are discussed in detail later in this audit report.

4.3 Overall Quality and Adequacy of the Assessments

Aspect	General Requirements	Comments
Soil Sampling Density & Locations	The level of assessment must be consistent with the definition of an "environmental audit" under the Environment Protection Act 1970. That is, a "total assessment of the nature and extent of any harm or detriment to (or potential harm or detriment to) any beneficial use to be made of the site or any other segment of the environment".	The soil investigations were completed over a number of phases and covered a period from 1997 through to 2011. The initial works were focused on validation of excavations following removal of infrastructure. There was some systematic grid based testing completed in the late

Aspect	General Requirements	Comments
	Section 4.3 in Schedule B(2) of the NEPM indicates a considerable amount of professional judgment based on site history information is required to determine the density of sampling. The adopted sampling density will depend on an integrated appraisal of factors including proposed use(s) and users, current use, likely shape and distribution of contamination, size of contaminated areas to be detected, number of stages of sampling feasible, size of site and final subdivided sites; distribution of uses on site and disposition of structures, the site history; and potential remediation and management strategies. AS4482.1 also provides a suggested sampling density where the objective is to detect circular hotspots of a certain size.	1990's during the initial phases of assessment work, however with the benefit of hindsight it did not adequately characterize the subsurface impacts, particularly at depths near the saturated zone. In 2004 a systematic grid pattern of bores was completed across the entire site, which provides the main data set for overall shallow soil conditions (<3m depth). Further targeted investigations, clean up and validation have also been completed to improve the confidence in the data for the areas of residual soil impacts at depth. The sampling density and rationale of the various phases of soil investigation are considered reasonable. The adopted grid based sampling density (8.5m spacing and 30 locations in total) is well in excess of the AS4482.1 guidance for systematic grid sampling for a site of this size (7 locations for a 0.2 ha area), and point sources of concern were appropriately targeted, or subsequently assessed following removal of tanks or waste pits.
Groundwater Monitoring Well Locations and Network	The number of monitoring bores and locations is always site specific. The groundwater bore network should cover the study area and the aquifers and aquitards of concern, and should characterize the flow system. The final monitoring network will depend on the complexity of the site geology and the contamination being investigated. Refer to Vic EPA Publication 668 for further guidance.	The monitoring bore network allowed for the assessment of groundwater flow and groundwater quality at and in the vicinity of the audit site. Wells were located appropriately in terms of potential source areas, and also up and down gradient wells. This included a number of wells screened into a deeper portion of the aquifer systems in the Tertiary sediments.
Monitoring Well Construction and Development	Monitoring wells should be drilled and installed constructed using appropriate drilling methods and materials appropriate for the particular hydrogeology and potential contamination being	The various reports indicate the monitoring wells were drilled and installed appropriately. The construction of the wells at the site is considered adequate to

Aspect	General Requirements	Comments
	assessed. Refer Vic EPA Publication 668 for further guidance.	have identified any fuel related hydrocarbon impacts (including NAPL) if they had been present.
Sampling methodology	Soil sampling methods should be selected with regard to the location/depth, and type of contamination being targeted. Sampling methods should be conducted with regard to the location/depth, and type of contamination being targeted, and guidance provided in Vic EPA Publication 669.	SOIL The methods for the soil investigation (hollow push tube, hand auger, test pitting) are considered appropriate for the site conditions and potential contamination being targeted. GROUNDWATER Low-flow sampling methods were utilised for the various sampling events where possible, supplemented with disposable bailers or watterra foot valves in the event there was insufficient recharge to allow low flow sampling. The methods are considered appropriate for the site conditions and potential contamination being targeted.
Field equipment	Any field equipment used as part of the investigation should be appropriately calibrated and records provided for verification purposes.	Various phases of investigation used a photoionization detector for field screening purposes. A water quality meter was used for monitoring basic water quality parameters during groundwater purging and sampling. Calibration records were provided for the instruments.
Analyte selection	The analytical program should include assessment for an appropriate range of analytes based on the site's history and potential contamination sources, including any potential off site sources. Refer to guidance in NEPM Schedule B(2) and AS4482.1.	SOIL Soil investigation and validation sample analysis has predominantly focused on likely impacts from fuel related indicators (i.e. TPH, BTEX, Lead, PAH). In addition, a reasonable number of broad screen analyses have also been conducted to assess the potential for other contaminants. The 2004 program in particular included metals, OC/OP pesticides, phenols, and chlorinated hydrocarbons. GROUNDWATER The combined program over the

Aspect	General Requirements	Comments
		various phases of works has included assessment for an appropriate range of analytes. This included the main fuel related indicators, (TPH, BTEX, lead), but there was also analyses conducted for metals, PAH, phenols, and other VOCs including chlorinated hydrocarbons. NAPL fingerprinting was also conducted which confirmed the presence of the octane booster TEL, whilst other octane boosters such as TML, MTBE and the organomanganese compound MMT were not detected in the samples.
Plans & bore logs	Plans and bore logs should be prepared to an appropriate standard. Refer AS4482.1 and NEPM Schedule B(2).	Plans and bore logs in the various reports have generally been prepared and presented to an appropriate standard.
Accreditation of laboratories	Laboratories should hold NATA accreditation for analyses conducted.	Analytical reports indicate laboratories were NATA accredited for the analyses undertaken during all rounds of investigation.
Adherence to Holding Times	Samples should be analysed within recommended holding times. Refer to Vic EPA IWRG 701 (Sampling and Analysis of Waters, Wastewaters, Soils and Wastes).	Based on dates of samples and analyses indicated in the various reports, samples appear to have been generally analysed within recommended holding times.
Analytical Detection/Reporting Limits.	Reporting limits for analyses should be below comparable assessment criteria.	The laboratory reporting limits for soils were generally below the comparable assessment criteria.
Field QA/QC samples – blind field replicate samples.	An appropriate number and type of blind field replicate samples should be collected and analysed (AS4482.1 requires 1 replicate sample per 20 samples).	Duplicate samples were collected at appropriate rates during the various phases of investigation. The results are not indicative of any significant inter or intra laboratory variation, and any variation reported is considered to have been mitigated by the fact the soil assessments were carried out in multiple phases over many years.
Field QA/QC samples – blanks.	An appropriate number and type of blank samples should be collected and analysed (AS4482.1 requires 1 rinse blank per	Field, rinsate and trip blanks were collected during the various phases of soil sampling program

Aspect	General Requirements	Comments
	piece of sampling equipment per day). It is also generally regarded as good practice to collect 1 trip blank sample per day per sample container. Other blank samples (such as field blanks) should be collected as required.	at appropriate rates. The blank results are not indicative of any significant cross contamination or decontamination issues.
Laboratory internal QA/QC reporting	There should be an appropriate level of internal QA/QC reported in each laboratory report (refer AS4482.1 and NEPM Schedule B2).	Laboratory reports and internal QA/QC in the various reports do not indicate any significant laboratory quality issues.
Results interpretation – subsurface conditions.	The report should provide a discussion which conveys a reasonable understanding of the subsurface conditions, and anomalies or contamination indicators, including any impacts/observations from an aesthetic viewpoint.	The various reports have ultimately developed a comprehensive understanding of the subsurface conditions and residual impacts.
Assessment criteria.	Results should have been compared against environmental quality indicators specified in relevant SEPPs, or alternate criteria having due regard to their applicability and relevance. Use of waste classification criteria for determining the suitability of a site for use is unacceptable to EPA. (refer to the guidance for completing a site assessment report in EPA Publication 759.1).	The various reports used appropriate assessment criteria for interpreting the significance of the chemical test results.
Identification of chemicals/substances of concern.	Contaminants of interest should be identified in a clear and transparent manner. This should include tabulation of results exceeding adopted assessment criteria, and also any results above reporting limits that do not have assessment criteria.	The contaminants of interest were identified adequately in the assessment reports.
Conceptual hydrogeological model and risk evaluation for chemicals/substances of concern.	A conceptual model should be documented outlining the understanding of the site geology and hydrogeology, sufficient to convey an understanding of the potential sources and migration pathways, and receptors. Data should be presented and discussed in a manner that conveys a clear understanding of the nature and extent of impacts, and the significance of the results. Information should be provided for each chemical of concern for its toxicity, mobility, availability, likely fate, physical	A comprehensive conceptual model of the site hydrogeology and nature and extent of impacts has been developed. The most recent version detailing the current understanding is provided in the CUTEP report (Coffey, Aug 2012). The risks associated with the residual soil and groundwater impacts have been adequately addressed in the most recent health risk assessment report (Coffey, Aug 2012).

Aspect	General Requirements	Comments
	characteristics, form or species present, potential exposure pathways, potential harm to humans, plants, animals, and structures, and any detriment to any beneficial uses to be made of the site. Risks should have been evaluated by either comparison against investigation levels or via appropriate site specific risk assessment. (refer to the guidance for a site assessment report in EPA Publication 759.1).	The auditor was assisted by Jackie Wright in the review of the risk related reporting, who is a member of the auditor's approved expert support team.

5. REVIEW OF REMEDIATION

The following remediation activities have reportedly been completed to date: -

- o December 1997. Site demolition and clearance works, including excavation and removal of underground storage tanks, and associated pipework and bowers.
- o October and December 1998. Multiphase extraction (MPE) events completed by Handex.
- o June 2002. Total Fluids Extraction Pilot Trial completed by PPK Environment and Infrastructure.
- o October 2004. IT Environmental completed an aquifer pump test, drawdown/recovery tests, in-situ vapour extraction (SVE) test, multiphase extraction (MPE) trial, and bioventing trial.
- o August 2008 to July 2009. JFTA completed five separate multi-phase vacuum extraction (MPVE) and air treatment events.
- o October 2009 to November 2010. Combination of MPVE and oxygen release compound (ORC) injection (into either groundwater wells or into soils by push tube) along with the establishment of hydraulic barrier controls. Eight separate events were completed during the period. JFTA completed the MPVE aspect of these remediation works, while Coffey completed the ORC injection and hydraulic barrier controls.
- o July to September 2011. Between July and September 2011, excavation works were completed to remove remaining impacted soils from the former bowser area and former triple interceptor trap / drain pit area adjoining the former workshop.

The following sections summarise the auditor's review of the remediation works. The auditor's CUTEP submission (provided in Appendix H) included a detailed review of the overall technical and QA/QC aspects of the remediation works, and confirmed the clean up works have addressed the elements required for clean up and management of polluted groundwater, specifically items 3 to 8 in EPA Publication 840 (Clean Up and Management of Polluted Groundwater). Further comments on specific aspects of the remediation planning and implementation are provided in the following sections.

5.1 Site Decommissioning and UST Removal

The primary sources (ie. underground fuel storage tanks, pipework and bowers) were removed in 1997 and 1998, along with a quantity of surrounding contaminated soils. The works were conducted under the supervision of PPK and later Handex. Approximately 1,000 cubic metres of hydrocarbon impacted soils were reportedly removed and disposed off site as Prescribed Waste as part of these works. The works are documented in the Handex (2003) Summary Report, copy provided in Appendix C.

5.2 Interim Remedial Efforts (MPE and MPEAT)

Multiphase extraction (MPE) events via portable vacuum truck were utilised by Mobil as an interim measure to remove LNAPL and impacted groundwater from key areas of concern within

the site. Initial MPE events were completed by Handex in October 1998 and December 1998. These two events reportedly extracted a total of 12,220 litres of impacted groundwater from beneath the site. Handex calculated a total of approximately 26.4kg of vapour phase hydrocarbons were also recovered (equivalent to 37 litres of petrol). In 2002, PPK conducted a pilot trial to assess the applicability of combined soil vapour extraction and total fluids extraction to remediate the hydrocarbon impacts. The trial results indicated vacuum extraction alone was not a suitable option to remediate the site.

A further four Multiphase extraction and air treatment (MPEAT) events were completed by JFTA between August 2008 and July 2009. These events extracted a total of 16,900 litres of impacted groundwater and removed vapour phase hydrocarbons equivalent to approximately 120 litres of petrol.

5.3 Additional Remediation (ISCO and MPEAT)

Coffey Environments completed a program of Oxygen Release Agent (ORA) Injection and Multi Phase Extraction and Treatment (MPEAT) over two events in September/October 2009 and March 2010. Water and ORA (in this case calcium peroxide) were injected into wells MW49 and MW50 located on the upgradient boundary to create a hydraulic barrier from the upgradient hydrocarbon plume. Once the hydraulic barrier was established, the MPEAT event was completed from wells located above the most impacted areas of the site. Figure 10 attached shows the ORA injection and MPEAT locations. During September/October 2009, approximately 2,000L of ORA (10% solution) was injected into the aquifer at MW49 and MW50, and approximately 5,000L of fluids (hydrocarbon impacted groundwater and NAPL) were extracted via MPEAT. During March 2010, approximately 10,000L of ORA (10% solution) was injected into the aquifer at MW49 and MW50, and approximately 6,500L of fluids (hydrocarbon impacted groundwater and NAPL) were extracted via MPEAT.

Coffey Environments subsequently conducted three rounds of in-situ chemical oxidation (ISCO) between March and November 2010. The program comprised three rounds of sequential soil and groundwater injections of RegenOx. Coffey noted in the CUTEP Report that RegenOx was selected is the ISCO agent in order to limit the risk of surfacing incidents in the proximity of neighboring properties, as it is not as reactive as some other alternative ISCO agents and it was thought the process would be able to be better controlled. During each round, RegenOx was injected via direct push tube into soils at various depth intervals targeting hydrocarbon impacts in soils from just above the existing water table level and upwards into the inferred smear zone that has been created by historical groundwater water level fluctuations. Each round of soil injection was followed by a round of multiphase vacuum extraction (MPVE) and injection of RegenOx in selected groundwater bores. The objective of the follow up injection and MPVE was to control the reactivity of the Region being injected whilst also further mobilizing hydrocarbons from the overlying smear zone and drawing these into the saturated zone where they could be extracted via MPVE. Coffey have reported that a total of 5,625kg of RegenOx was injected into the subsurface over the three events. Coffey reported that the injections into soil had no significant influence on groundwater levels in neighboring wells, which suggested the injected fluids were being successfully distributed in the formation above the water table. Figure 11 attached shows the soil injection locations, whilst Figure 12 shows the groundwater injection locations.

Further details of the remediation works are provided in the Coffey (2012) CUTEP Report – copy provided in Appendix G.

5.4 Additional Soil Excavation Works

Between July and September 2011, excavation works were completed to remove remaining impacted soils from the former bowser area and former triple interceptor trap / drain pit area adjoining the former workshop. This removed the remaining residual soil impacts in the upper 2m of the soil profile across the site. Soil impacts remained at depth beneath these locations – refer Figure 9 for a summary of residual impacts in soils. The works and results are documented in the Targetted Soil Impact Excavation Report (Coffey, Nov 2011) which is provided as an appendix in the CUTEP Report (Coffey, Aug 2012) – copy provided in Appendix G. The remediation works are discussed in further detail in a later section of the audit report.

5.5 Overall Mass Removal/Reduction

Post remediation monitoring data indicates the remediation has been effective in removing NAPL and reducing dissolved phase hydrocarbon concentrations under the site. The following table summarises the mid range estimates provided in the Coffey CUTEP Report of the original (pre 2009) hydrocarbon mass present in the various phases, along with post remediation estimates from 2011. The detailed calculations are provided in Appendix E of the CUTEP Report, and the assumed areas of impact used for the estimates are provided as Figures 15A and 15B in the CUTEP Report.

Table 8. Mass Reduction Estimates

Date	LNAPL	Dissolved	Adsorbed	Vapour	Total
Feb 2009	35	5	5,588	-	5,628
May 2011	-	0.4	1,302	2	1,305
Overall Mass Reduction (%)					81%

NOTES:-

Vapour mass pre 2009 was not estimated, but is not expected to comprise a significant additional proportion to the overall mass estimate.

NAPL has not been noted in monitoring since July 2010 and has therefore not been included in residual mass estimate for May 2011.

It is noted there has been no NAPL reported in any on-site wells during post remediation monitoring since July 2010. It is acknowledged this does not conclusively rule out the possible presence of isolated zones of residual NAPL, but merely that none has been identified at the various monitoring locations (which it is noted are very closely spaced across the site). The most recent gauging and monitoring was completed in February 2012. The GME report from February 2012 is included as an Appendix to the Coffey Environments CUTEP Report. Further discussion regarding the possible existence of residual NAPL is provided later in the audit report.

5.6 Clean Up and Ongoing Management of Groundwater Pollution

Where polluted groundwater is established at a site, and it is not practicable to clean-up groundwater to protect the beneficial uses, clean-up must be undertaken to the extent practicable in accordance with the SEPP (Groundwaters of Victoria). The requirements for clean up to the extent practicable (CUTEP) are outlined in *The Clean Up and Management of Polluted Groundwater* (Vic EPA Publication 840, April 2002). The requirements for groundwater clean-up in the audit context depend on whether or not the site is the likely source of the pollution. This site was clearly the source of the fuel related hydrocarbon impacts (including the phase separate hydrocarbon, PSH, or non-aqueous phase liquid, NAPL, as it is referred to in the SEPP). In the case of source sites, the auditor is required to follow the process outlined in Section 13.7 of the current auditor guidelines (Vic EPA Publication 759.1, Sept 2007) which involved:-

- o Providing an opinion regarding the practicability of clean-up. The auditor provided this opinion in a CUTEP submission to EPA in September 2012. A copy of the CUTEP submission is attached in Appendix H.
- o Contacting EPA prior to completing the audit for advice as to whether EPA is satisfied that groundwater has been cleaned up to the extent practicable. EPA provided a letter dated 12 December 2012 confirming they had determined that groundwater pollution at the site had been cleaned up to the extent practicable, and that the site is within a Groundwater Quality Restricted Use Zone ("GQRUZ").
- o Completion of the audit in accordance with any advice received from EPA. The audit was completed in accordance with advice from EPA as outlined in their letter dated 12 December 2012, which stated that in finalising the audit the following must be included in the Statement of Environmental Audit ("SoEA"):-
 - (1) A condition restricting groundwater use for the existing and potential precluded extractive beneficial uses of groundwater;
 - (2) A condition with sufficient detail to make clear the required ongoing monitoring and management;
 - (3) A condition requiring compliance with a groundwater quality management plan;
 - (4) As an attachment to the SoEA, a detailed groundwater quality management plan identifying a Section 53V audit as the appropriate mechanism for cessation of the groundwater management and monitoring;
 - (5) in the 'other related information' section
 - (a) a note that the Authority has determined that
 - (i) groundwater has been cleaned up to the extent practicable, and
 - (ii) the site is within a GQRUZ
 - (b) information relating to the pollution of groundwater such as a list of beneficial uses of groundwater for which you consider the site suitable; and
 - (c) a note that, in accordance with Clause 19(3) of SEPP Groundwaters of Victoria, the Authority may require periodic reassessment of the practicability of groundwater clean up.

There is a figure provided in the audit report attachments showing the GQRUZ boundary. The audit client (Mobil Oil Australia) provided a letter committing to implement the groundwater management plan. The letter is attached along with the other CUTEP submission information in Appendix H. The groundwater management plan is also attached to the Statement of Environmental Audit.

6. FINAL INTERPRETED SITE CONDITIONS

6.1 Final Site Condition - Soils

Residual hydrocarbon impacts remain in soils under the site. The main impacts are located under the former bowser area in the central and western portion of the site, and under a former drain / interceptor trap under the former workshop. All of the impacts are at depth (>2.5m). A plan summarising the interpreted residual impacts in soils is provided as Figure 9. As discussed previously, the shallow soils across the site were assessed via a systematic grid pattern firstly by Handex in 1997 (20 bores at 8.5m grid spacing) however the analytical program conducted was limited. Another grid sampling program was completed by IT Environmental in 2004 (via 30 grid spaced bores) which included a more comprehensive analytical program including metals, PAHs, TPH, BTEX, phenols, OC and OP pesticides, and a suite of VOCs including BTEX and chlorinated hydrocarbons. Results of this program are included in Appendix C.

Table 8. Final Interpreted Soil Conditions (mg/kg)

Analytes	Adopted Screening Criteria			Range of Reported Results	
	Ecological	Standard Residential	High Density Residential	<2.5m Depth	>2.5m Depth
Arsenic	20	100	400	<10	<10
Cadmium	3	20	80	<1	<1
Chromium	400	12%	48%	38 – 110	10 – 38
Copper	100	1000	4000	10 – 24	<10
Lead	600	300	1200	4 – 240	4 – 21
Mercury	1	15	60	<0.2	<0.1
Nickel	60	600	2400	32 – 82	6 – 25
Zinc	200	7,000	28,000	26 – 120	2 – 14
Benzo(a)pyrene	-	1	4	< 0.5	<0.5
Total PAH	-	20	80	<8	<8
OC Pesticides	Varies	Varies	Varies	< LOR	< LOR
OP Pesticides	-	-	-	< LOR	< LOR
TPH (C6-C9)	65	65	65	<10	2,540
TPH (C10-C36)	1000	1000	1000	950	6,910
Benzene	1	1	1	< 1	16
Toluene	3.1	3.1	3.1	< 1	269
Ethyl Benzene	1.4	1.4	1.4	<1	105
Xylenes	14	14	14	< 2	905

Shaded results exceed one or more adopted screening values.

< LOR denotes results were below laboratory reporting limit.

6.2 Final Site Condition - Groundwater

Groundwater Occurrence

Groundwater was encountered at depths between approximately 7 and 10 metres, within a fine sand water bearing zone, which is consistent with the regional geology information. Deeper bores were also installed to 10-15m depth, intersecting deeper water bearing sediments. Coffey interpreted these water bearing zones to be part of an interconnected system based on similar chemical signatures and observed hydraulic heads. . Groundwater flow was interpreted to be north easterly based on surveyed groundwater levels.

Groundwater Salinity & Potential Beneficial Uses

The general water chemistry parameters from the most recent groundwater monitoring event (February 2012) are summarised below:-

- o pH values have historically ranged from approximately 6.5 to 8.5. The exception has been pH values of 12-13 reported in the ORA injection wells near the western boundary (MW49 and MW50).
- o Salinity values have historically ranged from approximately 3,000 to 11,000 mg/L TDS. Results have been relatively consistent across the site and off-site areas.
- o Redox potential values have historically indicated reducing conditions in the most heavily impacted zones, and oxidizing conditions near the fringes of the impacted zones. During the most recent GME (February 2012), all wells indicated oxidizing conditions with the exception of the ORA injection wells (MW49 and MW50), a historically NAPL impacted on-site well (MW47) and an off-site well under the adjoining residential property to the east (MW31).
- o Dissolved oxygen values have historically been relatively low (less than a few milligrams per litre), but since the 2009/2010 remediation work the reported values have increased in some locations ranging up to 20-30 mg/L. During the most recent GME (February 2012), dissolved oxygen levels in most on and off site wells were generally in the range of 2-5 mg/L, with the exception of results still in the 20-30 mg/L range at the former ORA injection wells near the western boundary (MW49 and MW50).

Based on the reported salinity range, the groundwater is considered to be within Segment C (3,501 - 13,000mg/L TDS) as per the SEPP Groundwaters of Victoria. This is consistent with the expected salinity in the locality.

Groundwater Analytical Results

Results of the groundwater investigations are discussed and summarised in various prior reports as discussed previously. Analytes exceeding one or more adopted water quality guidelines included ammonia, nitrate, numerous metals/metalloids, and petroleum hydrocarbons indicators (BTEX, TPH, and naphthalene). A summary of the groundwater results is presented in the following table.

Table 10. Groundwater Results Overall Summary (Results in µg/L)

Beneficial Uses	Maintenance of Ecosystems (Freshwater)	Stock	Primary Contact Recreation	Sept 2008 Results	Sept 2011 Results	Feb 2012 Results
pH	-		6.5-8.5	7.1-8.3		6.2-12.7
Ammonia (as N)	740	-	10		<10 – 290 (J)	
Nitrate (as N)	160	100,000	100,000	20 – 15,000	2,400 – 19,000 (J)	
Arsenic	13	500	50	<1 – 30	<1 – 1,080	
Cadmium	0.2	10	5	<0.1 – 0.2	All < 0.1	
Chromium	1.4 (as Cr (VI)) - (as Cr III)	1,000	50	<1 – 2	1 – 176	
Copper	1.4	500	1,000	<1 – 3	1 – 63	
Lead	3.4	100	50	<1 – 5	<1 – 47	<1 – 16
Manganese	1,900	-	- *		<1 – 326 (J)	
Mercury	0.6 (inorganic)	2	10	All <0.1	All <0.1	
Nickel	11	1,000	1,000	<1 – 3	<1 – 157	
Zinc	8	20,000	5,000	6 – 14	7 – 64	
Benzene	950	10	10			<1 – 1,340
Toluene	-	800	25 **			<2 – 8,320
Ethyl Benzene	-	300	3 **			<2 – 1,490
Xylenes	200 (p-xylene)	600	20 **			<2 – 12,500
TPH C6-C9	-	-	-			<20 – 26,500
TPH C10-C36	600 ^^	-	-			<50 – 5,790
Naphthalene	70	-	-			<1 – 364
BaP	-	0.01 *	0.01			All <0.5
Phenolics	320	-	20			<1 – 90
SV CHC's	-	-	-			All < LOR
Volatile CHC's	-	-	-			All < LOR

NOTES:-

- * Values adopted based on advice from EPA, where a discrepancy existed between ANZECC (1992) values and other updated values.
- ** Primary contact recreation screening criteria for TEX were sourced from the aesthetics based guideline values from the Australian Drinking Water Guidelines (NHMRC, 20011)
- *** Primary contact recreation screening values for inorganics and nitrate are based on 10 x guideline values for drinking water to account for limited consumption in a recreational water use scenario (as per NHMRC Managing Risks in Recreational Water guidance (2008)). Drinking water guidelines sourced from NHMRC Australian Drinking Water Guideline (2004).
- (J) These results are from the Jan 2011 GME.
- ^^ Dutch (2000) Intervention Level for mineral oil.
- LOR Limit of reporting.

Based on advice from EPA. The BaP results are deemed to be above the screening criteria for primary contact recreation and stock water on the basis of the reporting limit being greater than the adopted screening criteria.

Summary of Groundwater Impacts

Details of the nature and extent of impacts are provided in the Coffey Environments CUTEP Report (Aug 2012) – copy provided in Appendix G. The main impacts are the two distinct hydrocarbon plumes in the vicinity of the 151-153 Church Street site. There is one plume under the northern portion of the 151-153 Church Street site, which is inferred to be associated with the past service station operations which occurred on site from the 1960's to 1990's. The other plume to the west of the 151-153 Church Street site is likely to be associated with operations at the retail fuel outlet on the west side of Shannon Avenue.

The impacts are primarily low molecular weight petroleum hydrocarbons, as indicated by elevated BTEX results, and also lower molecular weight TPH fractions. There have been no other volatile organic compounds detected, such as halogenated volatile compounds.

Results presented by Coffey indicate LNAPL impacts associated with the 151-153 Church Street site have historically been limited to the northern portion of the site, although it is possible there has been some encroachment under the adjoining residential lot to the east and road reserve to the north. Prior to multiphase extraction events conducted by Handex in October and December 1998, measurable LNAPL had been identified in three on-site wells ranging from 15mm to 390 mm. Following these MPE events, there was a reduction in measured LNAPL thickness to 1mm in the March 1999 gauging event. The maximum historical LNAPL thickness measured in on-site wells has been 1,534mm (MW23). Coffey have noted that since 2004, the number of wells and apparent thickness of LNAPL showed a decreasing trend over time. There has been no LNAPL noted in any on or off site monitoring wells downgradient of the site since mid 2010.

There has been fingerprinting analysis undertaken to confirm the age/nature of the fuel product, and also to establish whether or not there are other additives present that may need to be considered as chemicals/substances of interest in addition to the usual TPH/BTEX/lead suite. Historically these may have included octane boosters such as tetraethyl lead (TEL), tetramethyl lead (TML), methyl tert-butyl ether (MTBE), and the organomanganese compound, MMT. Coffey submitted three samples of NAPL to Leeder Consulting for fingerprinting as part of their November 2007 groundwater monitoring event. Two samples were from the on-site NAPL plume (MW23 and MW38), and the third sample was from the off-site NAPL plume (MW25). The Leeder Consulting report is provided in the audit report attachments in Appendix C. The report concluded all three samples were found to have the same chromatographic profile, typical of a weathered leaded petrol product, aged between 10 and 18 years (refer to Leeder report M071760 in audit report attachments). The octane booster TEL was detected in all three samples, whilst other octane boosters such as TML, MTBE and the organomanganese compound MMT were not detected in the samples.

The historical monitoring data indicates the dissolved phase impacts emanating from the 151 Church Street site have extended under the adjoining residential lot to the east, and also under the adjoining road reserve to the north of the site. Impacts have not been detected in the residential and commercial properties on the north side of Church Street. Monitoring data suggests remediation works by Coffey and others during 2009 and 2010 has achieved a decrease in both the extent and concentrations of the hydrocarbon impacts.

A series of historical plans is attached showing the changes in LNAPL and dissolved phase impacts over time. Interpreted benzene concentration plans from 2009 to 2012 are provided as Figures 5, 6 and 7. A plan summarizing the interpreted LNAPL extent from 1998 to 2011 is attached as Figure 8. Further discussion regarding the potential for residual / immobile NAPL to remain under the audit site has been provided later in the audit report.

The auditor's interpretation of the groundwater impacts at and in the vicinity of the site is as follows:-

- o Some reported ammonia results at the site exceed the adopted water criteria for recreational use.
- o Some reported nitrate results at the site exceed the adopted water criteria for freshwater ecosystems.
- o The reported arsenic results at the site exceed the adopted water criteria for freshwater ecosystems, stock water, and recreational waters.
- o The reported chromium results at the site exceed the adopted water criteria for freshwater ecosystems, and recreational waters.
- o The reported copper results at the site exceed the adopted water criteria for freshwater ecosystems.
- o The reported lead results at the site exceed the adopted water criteria for freshwater ecosystems.
- o The reported nickel results at the site exceed the adopted water criteria for freshwater ecosystems, stock water, and recreational waters.
- o The reported zinc results at the site exceed the adopted water criteria for freshwater ecosystems, stock water, and recreational waters.
- o The reported benzene results at the site exceed the adopted water criteria for freshwater ecosystems, stock water and recreational waters.
- o The reported toluene, ethyl benzene, and xylenes results at the site exceed the adopted water criteria for stock water and recreational waters.
- o The reported naphthalene results at the site exceed the adopted water criteria for freshwater ecosystems.
- o The reported C10-C36 TPH results at the site exceed the adopted water criteria for freshwater ecosystems.
- o The reported benzo(a)pyrene results exceed the adopted water criteria for stock water and primary contact recreation, based on the reporting limit being greater than the relevant screening values. This was based on advice from EPA in the CUTEP determination, discussed elsewhere in the audit report.
- o The reported phenol results exceed the adopted water criteria for primary contact recreation. This was based on advice from EPA in the CUTEP determination, discussed elsewhere in the audit report.

The ammonia and nitrate impacts are likely to be attributable to changes in groundwater chemistry due to the fuel impacts as the highest concentrations coincide with historically fuel impacted areas. A sequence of summary figures is attached to this summary. The ammonia and nitrate levels have increased across the site since the ORA and RegenOx injection events during 2009/2010. Some of the nitrates and ammonia may also be associated with the ambient

background groundwater quality given this is an older urban area.

The metals concentrations have increased across the site since the ORA and RegenOx injection events during 2009/2010. A sequence of summary figures is attached to this summary. The results suggest they have been mobilized as a result of changes to the groundwater chemistry associated with those events. The monitoring data suggests the impacts are localized and limited to the areas of fuel related impacts.

The following groundwater results from under the site exceeded guidelines for protected uses in Segment C as defined in the SEPP (Groundwaters of Victoria):-

- o Freshwater Ecosystems Protection – nitrate, arsenic, chromium, copper, lead, nickel, zinc, benzene, naphthalene, >C10 TPH.
- o Stock Watering – arsenic, benzene, toluene, ethyl benzene, xylenes, benzo(a)pyrene.
- o Primary Contact Recreation – ammonia, arsenic, chromium, benzene, toluene, ethyl benzene, xylenes, benzo(a)pyrene, phenol.

Further discussion regarding the impacts on beneficial uses of groundwater and whether groundwater pollution exists (i.e. whether the contamination levels are such that they preclude a protected beneficial use), is provided in the following section.

6.3 Evidence for Residual NAPL Being Present

It is noted there has been no NAPL reported in any on-site wells during post remediation monitoring since mid 2010. The auditor's CUTEP submission acknowledged this does not conclusively rule out the possible presence of isolated zones of residual NAPL, but merely that none has been identified at the various monitoring locations (which it is noted are very closely spaced across the site). The most recent gauging and monitoring was completed in February 2012.

The 53V Audit report completed in May 2011 contained a detailed discussion on NAPL occurrence and recoverability based on CRC CARE Technical Report No. 6 (Lam, D & Moritz, P 2007), Technical impracticability of further remediation for LNAPL-impacted soils and aquifers. A fuel product release into the subsurface that results in NAPL being present will have a mobile and a residual / immobile component. The residual component is comprised of the disconnected films and droplets left behind by migrating NAPL in the unsaturated zone, and disconnected 'blobs' of NAPL that have been cut off by water in the saturated zone. Mobile NAPL refers to connected portions of product that are able to coalesce and migrate (which is what appears in a monitoring well if it intersects one of these zones).

The fact there is no measurable NAPL in a monitoring well does not necessarily mean there is no NAPL present, but only indicates that there is no mobile NAPL present at that location that has accumulated in the monitoring well. There is still the possibility of residual / immobile NAPL being present. Whilst measurements of NAPL thickness are useful for ongoing monitoring purposes and general delineation of impacts, this is just one of a number of possible lines of evidence to assess presence of NAPL.

Some recent American Petroleum Institute vapour intrusion guidance (Lahvis et al, in preparation) suggests using dissolved phase concentrations that are a significant portion (>20%) of the effective solubility in a petroleum product as an indicator of the possible presence of NAPL. The values that have been suggested are 3 mg/L for benzene, and 20 mg/L for total BTEX. Prior to the remediation works, numerous on-site wells had either measurable NAPL or dissolved phase concentrations indicative of NAPL. During the last 2 monitoring rounds (Jan 2011 and Feb 2012), there was only 1 well (MW47) that showed total dissolved BTEX at approximately 21 mg/L (refer Figure 7 in the audit report figures). All other results were well below this figure.

If the evidence for the presence of NAPL was based entirely on observed NAPL in monitoring wells, then one could conclude there was no NAPL. However, as discussed above the situation is likely to be more complex. On the basis of other lines of evidence such as isolated zone of relatively high dissolved phase concentrations in groundwater, it is not possible to rule out the possible presence of isolated zones of residual NAPL. However, the groundwater monitoring data suggests that if there was residual NAPL present, it is likely to be very localised and isolated. The risk posed by any residual hydrocarbon impacts (including NAPL, if present) is discussed in more detail in the following section.

7. IMPACTS ON BENEFICIAL USES OF THE SITE

The following section details the auditor's assessment of risks to the environment posed by the subsurface hydrocarbon impacts at and in the vicinity of the 151-153 Church Street site. The main hazards associated with the release of hydrocarbon products into the environment include (CCME, 2008):-

- o Fire and / or explosion hazard.
- o Asphyxiation hazard.
- o Toxicity to humans.
- o Toxicity to flora, fauna, and aquatic ecosystems.
- o Aesthetic impacts (odours, staining).

It is important to distinguish between the definition of a hazard (ie. a possible adverse event), and risk (ie. the probability of the adverse event occurring). The purpose of a risk assessment is to evaluate the probability of any one or combination of the above hazards eventuating and resulting in adverse effects on the environment.

The main risks associated with the residual hydrocarbon impacts at the 151-153 Church Street site relate to indirect exposures via vapour intrusion into overlying buildings, or trenches and excavations associated with maintenance or redevelopment work. The historically affected areas include the site, the adjoining road reserve to the north (Church Street) and the residential property to the east. The risk profile may also change with future changes in the extent of the hydrocarbon impacts. These risks include possible future expansion of the existing residual dissolved phase impacts under the 151-153 Church Street site, but there is also potential for future expansion of the residual hydrocarbon impacts (NAPL and dissolved phase) from the operational retail fuel outlet site to the west which could migrate back under the 151-153 Church Street site.

7.1 Vapour Intrusion Risk Assessment

Two earlier risk assessments were completed prior to remediation works – the first by PPK Environments and Infrastructure in 1998, and the second by Coffey Environments in 2008. An updated health risk assessment was completed by Coffey Environments in 2012, based on the updated assessment of site conditions after the 2009/2010 remediation work. The risk assessment is included as an Appendix to the Coffey Environments CUTEP Report (copy provided in Appendix G of this audit report). Both the 2008 and 2012 health risk assessments focused on vapour intrusion risks and used soil vapour measurements from a network of vapour bores installed in the historically most heavily impacted areas, and also on the eastern site boundary nearest the existing adjacent residence.

The risk assessment work by Coffey has been reviewed by Jackie Wright, who is part of the Auditor's expert support team in the area of "Contaminant Transport and Assessment of Exposure Pathways and Risk". The work has been found to be generally technically sound, although both the auditor and Jackie had issues with the way the assessment was presented and discussed. The assessment modeled vapour intrusion from all sources (groundwater, soil and soil gas) and then later in the document had to explain why the use of the soil gas data was

considered more appropriate. Jackie's opinion was that if the soil gas data was based on a network of properly installed and located monitoring points and samples collected with appropriate methods and QA/QC protocols, then it was not necessary to run models based on the groundwater data and/or soil data.

The presentation of the various model outcomes in the Coffey risk assessment from different media (soil, groundwater, soil gas) makes it difficult to interpret the report and leaves it to the reader to make the judgement which model scenario and data is applicable. Based on the advice from Jackie Wright, it is considered appropriate to use the measured soil gas concentrations in the vapour risk characterization – the modeling run from soil and groundwater sources is not helpful in clarifying the assessment of risks when there is soil vapour data of acceptable quality available (as is the case for this site).

The tables below summarise the risk estimates for various receptors and exposure scenarios, based on soil gas measurements from the appropriate depth for the particular exposure scenario. Results are presented as two distinct values – a hazard index for non-carcinogenic effects, and as an excess lifetime cancer risk for carcinogenic effects. The results from the 2008 and 2011 soil vapour measurements indicated risks are acceptably low for occupants of a residence or commercial building with a slab on ground type construction (including on-site or off-site buildings). It is noted the adjacent residence at 149 Church Street has a crawl space and in terms of vapour intrusion risk there is an even greater margin of safety for this type of construction. The risks are also considered low and acceptable for shallow trenches, which might be relevant in terms of the site redevelopment or future maintenance works at the site or the affected off site areas. The risk estimates are unacceptably high for basements (in a future commercial building or residence) or deeper excavations. There are currently no known basements on the adjoining residential property or in the wider area.

Table 11. Predicted Vapour Intrusion risks (Based on 2008 Soil Vapour Data)

Exposure Scenario	Estimated Hazard Quotient	Estimated incremental excess lifetime cancer risk
Maintenance Worker - 1m deep sub-surface maintenance trench (1)	0.0001	1.1×10^{-9}
Construction Worker – 3m x 3m by 2.5m deep excavation	NC	NC
Residents – Slab on-ground residential dwelling (1)	0.008	6.2×10^{-8}
Residents – Basement in residential dwelling	NC	NC
Workers – Slab on ground commercial/office building	NC	NC
Workers – Basement in commercial/office building	NC	NC
Adopted Criteria used in Coffey HRA	1	1×10^{-5}

NOTES:-

(1) Based on soil vapour data from 1.5m depth vapour points.

NC denotes no calculation done for this exposure scenario.

Table 12. Predicted Vapour Intrusion Risks (Based on 2011 Soil Vapour Data)

Exposure Scenario	Estimated Hazard Quotient	Estimated incremental excess lifetime cancer risk
Maintenance Worker - 1m deep sub-surface maintenance trench (1)	0.14	7.65×10^{-10}
Construction Worker – 3m x 3m by 2.5m deep excavation (2)	1.37	5.0×10^{-8}
Residents – Slab on-ground residential dwelling (1)	0.003	4.0×10^{-8}
Residents – Basement in residential dwelling (2)	2.08	5.5×10^{-6}
Workers – Slab on ground commercial/office building (1)	0.26	1.9×10^{-9}
Workers – Basement in commercial/office building (2)	1.37	1.6×10^{-6}
Adopted Criteria used in Coffey HRA	1	1×10^{-5}

NOTES:-

- (2) Based on soil vapour data from 1.5m depth vapour points.
- (3) Based on soil vapour data from 2.5m/3m/3.5m depth vapour points.

The future risks associated with deep excavations could be mitigated by implementing appropriate OH&S measures during any such works – which could be informed by way of an Environmental Management Plan. The potential additional vapour intrusion risks associated with migration of the NAPL and dissolved phase impacts from the retail fuel outlet on the western side of Shannon Avenue (if this occurred) could be mitigated by taking a conservative approach and installing vapour mitigation measures into any future buildings on the 151-153 Church Street site. Similarly, potential vapour intrusion risks associated with basements could also be mitigated by incorporating appropriate vapour mitigation measures into future buildings if they included basements. It is noted no such measures would be warranted if the future basement areas were not enclosed, for example an open car park under apartments.

It is also noted the vapour risk for the basement scenario was evaluated based on an isolated result under the former bowser area in the western portion of the 151-153 Church Street site. The results elsewhere (including near the adjacent residential property) are not indicative of a significant vapor risk for the basement scenario.

The Statement of Environmental Audit will include a condition to manage vapour risks for future redevelopment on the audit site. The condition would require vapour mitigation measures to be incorporated into any future buildings on the site. Although no vapour mitigation measures are warranted based on current conditions (with the exception of enclosed basement structures), given the planning authority and future site owners have no control over management of the impacts arising from the retail fuel outlet site on the west side of Shannon Avenue, requiring mitigation measures at this stage would cover the possible future migration of the NAPL or dissolved phase impacts from the retail fuel outlet located to the west. Retrofitting mitigation measures (should they be required at a later stage) is not considered reasonable or practicable.

7.2 Attenuation Capacity of the Aquifer System

The Coffey Environments CUTEP Report presents an assessment of the evidence for natural attenuation processes, mass flux estimates for the eastern (downgradient) site boundary, and the assimilative capacity of the aquifer system to degrade the residual hydrocarbon impacts. Refer Sections 8.4, 8.5 and 8.6 of the CUTEP Report for details.

There is primary evidence of natural attenuation evidenced by decreasing trends in dissolved hydrocarbon concentrations over time. It is noted this is also likely attributable to the recent (2009/2010) remediation work.

There is secondary evidence of natural attenuation processes downgradient of the source zone, based on measurements of natural attenuation parameters including nitrate, sulphate, iron and manganese. The mass flux leaving the eastern (downgradient) site boundary has been estimated by Coffey to have decreased by approximately 2 orders of magnitude since 2009. Coffey have estimated the assimilative capacity of the aquifer is three to four orders of magnitude greater than the post remediation estimated mass flux of hydrocarbons migrating across the eastern site boundary. The auditor sought clarification from Coffey whether or not they had taken into account the residual concentrations of RegenOx in the system. Coffey have confirmed their calculations conservatively assume that there is no ongoing contribution to attenuation capacity due to residual RegenOx, and are based entirely on the geochemistry of groundwater entering the inferred source zone.

Overall, the assessment of the assimilative capacity of the aquifer and potential for future expansion of the residual hydrocarbon impacts from the 151-153 Church Street site is considered reasonable and appropriate. Based on the current available data, it is agreed the data as presented in the CUTEP report (Coffey, Aug 2012) suggests it is highly unlikely there will be any significant future expansion of the current extent of dissolved phase impacts.

7.3 Impacts on Beneficial Uses of Land

This section assesses the risk of harm or detriment to beneficial uses of land posed by the fuel related hydrocarbon impacts at and in the vicinity of the 151-153 Church Street site. The SEPP Prevention and Management of Contamination of Land (2002) specifies the beneficial uses associated with various land uses, and indicators and objectives to be applied in assessment of land contamination. The site is zoned Residential 1, which permits a variety of residential and commercial uses. The intended future use of the site is for commercial purposes.

The beneficial uses of land protected under the SEPP (PMCL) for residential land usage are:-

- o Maintenance of ecosystems (modified and highly modified);
- o Human health;
- o Buildings and structures;
- o Aesthetics; and
- o Production of food, flora and fibre.

Maintenance of Ecosystems

The affected area is within an older residential area, and may be considered to be a highly modified ecosystem, typical of an urban area. It would be reasonable to expect the soils within the affected area to sustain “modified ecosystems” and “highly modified ecosystems” found in urban environments. The soils in the area should be able to support vegetation typical of an urban area, which may include lawns, shrubs and other domestic plants, as well as small to medium sized trees. Petroleum hydrocarbon results (TPH and BTEX) on-site in the affected area exceed the adopted ecological soil assessment criteria. However, it is noted the majority of the residual impacts in soil under the site are located at significant depth near water table level (generally greater than 6m depth). Two shallower ‘hot-spot’ contamination areas are noted to remain in the vicinity of the former bowser area and a former TIT (near MW3).

The fuel related hydrocarbon contamination is not likely to currently pose a detriment to this beneficial use either on-site or off-site within the affected area.

Human Health

The main potential human health risk posed by the residual hydrocarbon impacts is indirect exposures via vapour intrusion into buildings or confined spaces such as trenches or excavations. Direct exposure to hydrocarbon impacted soils is also possible for on-site workers involved in trenching or excavation works. Based on current conditions potentially exposed persons include excavation workers on site, the occupants of the two adjoining residential properties to the east where historical impacts have been noted, and also for workers in the road reserve areas to the north.

The results from the vapour investigations and risk assessments indicated risks are acceptably low for occupants of a residence or commercial building with a slab on ground type construction (including on-site or off-site buildings). It is noted the adjacent residence at 149 Church Street has a crawl space and in terms of vapour intrusion risk there is an even greater margin of safety for this type of construction. The risks are also considered low and acceptable for shallow trenches, which might be relevant in terms of the site redevelopment or future maintenance works at the site or the affected off site areas. The risk estimates are unacceptably high for basements (in a future commercial building or residence) or deeper excavations. There are currently no known basements on the adjoining residential property or in the wider area.

The other potential source of impact to air quality at the site is the fuel related impacts (NAPL and dissolved phase plume) on the western side of Shannon Avenue. It is uncertain whether these impacts will eventually migrate under the site.

The future risks associated with deep excavations could be mitigated by implementing appropriate OH&S measures during any such works – which could be informed by way of an Environmental Management Plan. The potential additional vapour intrusion risks associated with migration of the NAPL and dissolved phase impacts from the Caltex site (if this occurred) could be mitigated by taking a conservative approach and installing vapour mitigation measures into any future buildings on the 151 Church Street site. However, it is noted the risks associated with slab on ground type structures at the site were assessed to be acceptable even prior to the 2009/2010 remediation works. So even if the hydrocarbon impacts to the west did eventually migrate under the site, the risks to slab on ground structures would still be expected to be low and acceptable. Potential vapour intrusion risks could be mitigated by incorporating appropriate

vapour mitigation measures into future buildings if they included basements or cellars. It is noted no such measures would be warranted if the future basement areas were not enclosed, for example an open car park under apartments.

Coffey notes that the site and surrounding areas are zoned residential and supplied by reticulated water and the likelihood of groundwater being extracted and used for industrial, agriculture, parks and gardens and stock watering is low. Coffey also notes that while primary contact recreation (ie filling of swimming pools/spas etc) could potentially occur, all registered groundwater bores within 1km are listed as investigation bores only.

Based on the absence of any evidence of current groundwater extraction or usage, the risk of adverse human health effects arising from extraction and use of groundwater is considered low. Any extraction from the affected areas should be restricted until groundwater quality is restored to acceptable levels.

Although it was not specifically mentioned in the health risk assessment, the auditor notes the utility monitoring suggests there is not likely to be a significant risk of an explosive mixture accumulating in a subsurface utility pit or trench either on site or off site in the affected area.

Overall, the fuel related hydrocarbon contamination is not likely to pose a detriment to human health either on-site or off-site within the affected area. However, vapour mitigation measures are warranted in any future buildings that include basements or cellars (except for basements that are not enclosed). There is also a need to prevent any groundwater extraction and use in the affected area. The Statement of Environmental Audit has included conditions to address these issues.

Buildings and Structures

The fuel related impacts are in general present at depths below any current or likely services or buildings, and there are no indications the fuel related impacts pose a significant risk to the integrity of buildings or underground services. This includes the risk of explosive mixtures accumulating in subsurface utilities or other confined spaces.

Certain building materials or structures could be adversely affected if they were in direct contact with residual fuel product, for example PVC pipework or certain glues used in pipe joints. However, there is no evidence to suggest this situation currently exists.

The fuel related hydrocarbon contamination is not likely to currently pose a detriment to buildings and structures either on-site or off-site within the affected area.

Aesthetics

Hydrocarbon impacted land is typically associated with staining and odours that would be unacceptable from an aesthetic viewpoint in certain circumstances. This would include where the impacted soils are easily accessible or visible, or shallow enough for vapours and odours to be detectable. The impacts do not pose an aesthetic limitation in the context of ongoing use of the site as a retail fuel outlet. Considering the significant depth of the impacts in off-site areas (>6m depth), they also do not pose a limitation from an aesthetic viewpoint to off-site uses including the road reserve areas, or other properties in the affected area.

The fuel related hydrocarbon contamination does not currently pose a detriment to aesthetics either on-site or off-site within the affected area.

Production of Food, Flora and Fibre

The presence of fuel related hydrocarbon impacts in garden areas or cropping land may pose a limitation on production of food, flora and fibre, due to possible impediments to plant growth. This does not pose a significant limitation in the context of the existing land use patterns in the affected area. The depth of the impacts within the affected area (>6m depth) are well below those likely to affect cropping or plant growth.

The fuel related hydrocarbon contamination does not currently pose a detriment to production of food, flora and fibre either on-site or off-site within the affected area.

7.4 Impacts on Beneficial Uses of Groundwater

This section is an overview of the auditor's evaluation of the condition of groundwater at the site, and potential impacts to beneficial uses of the site, including (but not limited to) the beneficial uses of groundwater protected under the SEPP Groundwaters of Victoria (1997). It is noted that the presence of NAPL is in non-compliance with the SEPP (Groundwaters of Victoria) and by definition constitutes pollution of groundwater. Clause 18 of the SEPP requires that NAPL must be removed from an aquifer unless the EPA is satisfied the NAPL does not pose an unacceptable risk to any beneficial use. It is noted that there has not been any NAPL found in on-site wells since mid 2010, however as discussed elsewhere in the report the auditor cannot conclusively rule out the possible presence of isolated zones of residual / immobile NAPL under the site. In addition, there is also NAPL present across Shannon Avenue to the west of the site which has been discussed elsewhere in the audit report.

Maintenance of Ecosystems

This beneficial use applies at the nearest surface body where groundwater could in theory discharge. There are no freshwater ecosystems on site or in the vicinity of the site, with the nearest surface water bodies being Corio Bay (1.5k east) & Moorabool River (2km south west). Corio Bay is the nearest water body downgradient of the site. Results above adopted screening criteria with respect to this beneficial use included nitrate, arsenic, chromium, copper, lead, nickel, zinc, benzene, naphthalene, >C10 TPH.

The abovementioned groundwater impacts are not likely to pose a significant threat to water quality in downgradient water bodies where groundwater could eventually discharge. Mitigating factors include the limited plume extent (essentially limited to the site itself), relatively large separation distances between the site and the water bodies, relatively low bulk permeability and low groundwater flow velocity, and potential for attenuation via dilution, dispersion, adsorption in the underlying aquifer system. It is concluded that there is no groundwater pollution arising from the site that would preclude the beneficial use of freshwater ecosystems protection in Corio Bay or the Moorabool River.

Potable Water

This beneficial use is not protected for Segment C groundwaters, and has not been considered further.

Potable Mineral Water

This beneficial use is not protected for Segment C groundwaters, and has not been considered further.

Agriculture, Parks and Gardens

This beneficial use is not protected for Segment C groundwaters, and has not been considered further.

Stock Watering

Results reported above adopted screening criteria for this beneficial use included arsenic, benzene, toluene, ethyl benzene, xylenes, and benzo(a)pyrene. Groundwater is considered to be polluted with respect to this beneficial use.

It is noted there is no current groundwater use for this purpose identified in the locality. Future use on site and in the locality is also considered unlikely as it is incompatible with the future land use and zoning, and also considering the variable (generally low) yields of the water table aquifer, the relatively high cost of installing a bore and pump system, and the presence of a reliable reticulated supply. However, it is noted that issues of water supply have become more prominent with climate change and recent long term drought conditions, which may increase consideration of groundwater use for stock watering purposes in the future.

Industrial Water Use

Suitability of water supply for industrial purposes is very specific to the particular use. Basic water quality parameters such as salinity can preclude many industrial uses. For example, Chapter 6 of the 1992 ANZECC guidelines lists several industrial uses that require a water supply which has a salinity of less than 1,000 mg/kg TDS. These uses include once through cooling and make-up waters for fresh water, textile industry, food and beverage industry, iron and steel industry, pulp and paper industry, and petroleum industry. The background salinity precludes these particular industrial uses. There are also numerous results above recreational and/or potable water criteria (including arsenic, chromium, benzene, toluene, ethyl benzene, xylenes). The groundwater quality would therefore preclude some of these particular industrial uses associated with the food industry. It is considered groundwater is polluted with respect to this beneficial use.

There is no identified current industrial use of groundwater in the locality, and future use is also considered unlikely as it is incompatible with the zoning, the variable (generally low) yields of the water table aquifer, the relatively high cost of installing a bore and pump system, and the presence of a reliable reticulated supply. However, it is noted that issues of water supply have become more prominent with climate change and recent long term drought conditions, which may increase consideration of groundwater use for industrial purposes in the future.

Primary Contact Recreation

Results above the adopted screening criteria for this beneficial use included ammonia, arsenic, chromium, benzene, toluene, ethyl benzene, and xylenes.

Although the ammonia results exceeded the adopted screening criteria for recreational water use, the following is noted with regard to the ammonia concentrations present and their potential impacts on the use of the water for recreational purposes:-

- o According to the Australian Drinking Water Guidelines (2004 and 2011 versions), the odour threshold of ammonia in water is 1,500 µg/L.
- o There is no health based guideline for ammonia specified for water in the 2004 or 2011 Australian Drinking Water Guidelines. There is an aesthetics based value of 500 µg/L specified.
- o The most recent Australian guidance for recreational waters is provided in *Guidelines for Managing Risks in Recreational Water (NHMRC, 2008)*. This Guideline advocates a simple screening approach where “a substance occurring in recreational water at a concentration of 10 times that stipulated in the drinking water guidelines may merit further consideration”.

The maximum historical reported ammonia result was 290 µg/L, which is well below all the above values. Based on the above considerations, the auditor did not consider the ammonia results fitted the definition of pollution with respect to recreational water quality. However, the EPA has since advised the auditor that it considers the ammonia results to be pollution.

The remaining analytes (ie. arsenic, chromium, benzene, toluene, ethyl benzene, xylenes, benzo(a)pyrene and phenols) are considered to pose a limitation to recreational use of the groundwater. It is considered groundwater is polluted with respect to this beneficial use.

There is no current groundwater use for this purpose identified in the locality, and the future uses permitted under the zoning (residential or commercial) are not likely to incorporate a bore water supply. Future use for this purpose on site or in the locality is also considered unlikely given the presence of a reliable reticulated supply, the variable (generally low) yields of the water table aquifer, and the relatively high cost of installing a bore and pump system. However, it is noted that issues of water supply have become more prominent with climate change and recent long term drought conditions, which may increase consideration of groundwater use for this purpose in the future.

Buildings and Structures

The high dissolved concentrations of fuel indicators (BTEX and TPH) and possible presence of isolated discrete zones of residual NAPL could in theory pose a risk to the integrity of some structures such as pipes or footings if they were in direct contact with the impacts. However, it is noted the depth to groundwater is 7-10m, which is well below any likely buildings or infrastructure at the site. The reported range of pH values (generally > 6.5), chlorides in groundwater (<2,000 mg/L), and sulphates in groundwater (300-1,000 mg/L) falls within the ‘non-aggressive’ exposure classification for concrete piles (refer AS2159-1995). In addition, there was no evidence of the presence of volatile substances or other chemicals at concentrations that might have adverse effects on buildings or services. Given the depth to groundwater is well below the likely depth of any structures, and it is in the ‘non aggressive’ exposure category for concrete piles, it is concluded groundwater is not polluted with respect to this beneficial use.

Groundwater as a Source of Air Pollution

There are impacts to groundwater that have potential impacts on air quality for future development at the site. These have been discussed in detail in Section 7.3 (Impacts on Human Health).

Summary of Groundwater Pollution Status

It has been established that the past service station operations at the site have resulted in groundwater pollution. The protected beneficial uses for Segment C (the relevant groundwater segment for the site), their relevance, and their pollution status are summarised below: -

- o Maintenance of ecosystems. There is no groundwater pollution arising from the site that would preclude the beneficial use of ecosystems protection in Corio Bay or the Moorabool River.
- o Stock watering. Groundwater is considered to be polluted with respect to this beneficial use. Results reported above adopted screening criteria for this beneficial use included arsenic, benzene, toluene, ethyl benzene, xylenes and benzo(a)pyrene. This beneficial use is not considered relevant for the site or locality.
- o Industrial Water Use. Groundwater is considered to be polluted with respect to this beneficial use. Results above relevant screening criteria included arsenic, chromium, benzene, toluene, ethyl benzene, and xylenes. In addition, the natural background salinity of groundwater under the site would preclude some industrial uses. This beneficial use is not considered relevant for the site or locality.
- o Primary contact recreation. Groundwater is considered to be polluted with respect to this beneficial use. Results above the adopted screening criteria for this beneficial use included ammonia, arsenic, chromium, benzene, toluene, ethyl benzene, xylenes, benzo(a)pyrene and phenol. This beneficial use is not considered relevant for the site or locality.
- o Buildings and structures. Groundwater is not considered to be polluted with respect to this beneficial use. This beneficial use is not considered relevant given groundwater occurs at a depth that is unlikely to be intersected by future building footings or other structures.

7.5 Impacts on Beneficial Uses of Surface Waters

This section assesses the risk of harm or detriment to beneficial uses of surface waters posed by the fuel related hydrocarbon impacts from the 151-153 Church Street site. The SEPP (Waters of Victoria) specifies the following beneficial uses of surface waters:-

- o Maintenance of aquatic ecosystems;
- o Water based recreation;
- o Production of molluscs for human consumption;
- o Commercial and recreational use of edible fish and crustaceans;
- o Navigation and shipping; and
- o Industrial water use.

It is expected that stormwater from the area ultimately discharges to Corio Bay via various drains. Stormwater drains are not considered waterbodies, however they are relevant in the context that they provide conduits and ultimately discharge to receiving waters. The environmental quality objectives and indicators apply at the point of discharge into the receiving water body.

There have not been any impacts identified in near surface soils and there are no structures or infrastructure present on the site that have the potential to impact on stormwater discharging from the site. It is concluded the site is not impacting on beneficial uses of surface waters protected under the SEPP (Waters of Victoria).

8. AUDIT CONCLUSIONS

The environmental audit of the site at was undertaken in accordance with Part IXD of the Environment Protection Act 1970 (the Act), and specifically Sections 53W and 53X which relate to an audit of the condition of a segment of the environment (the relevant segment being the site, as defined in Section 1 of this report). The audit is an independent review of the information relating to the condition of the site, and the potential for adverse impacts on beneficial uses of the site. The relevant legislation, guidelines and standards current at the time of the audit are summarised in Section 9 of this audit report.

The site does not qualify for a Certificate of Environmental Audit, because its condition precludes some relevant beneficial uses associated with the site. A Statement of Environmental Audit has been issued and is attached to this audit report. Subject to compliance with the Statement of Environmental Audit (which includes groundwater related conditions), the site is considered suitable for the following land uses:-

- o Sensitive use (other)
- o Sensitive use (high density residential);
- o Recreation / open space;
- o Commercial;
- o Industrial.

The auditor has considered the need for future management of contamination with regard to the condition of the site, and the proposed and possible future land uses. Based on these factors, the following conditions have been imposed in the Statement of Environmental Audit:-

- a. Any future buildings on site that include basements or cellars (except for buildings with basement areas that are not enclosed) must be provided with a vapour mitigation system. The system must be designed by a suitably qualified professional and the design must be accepted by an environmental auditor appointed under Part IXD of the *Environment Protection Act 1970*, and this acceptance be provided in writing to EPA and the planning authority.
- b. If condition a. above is triggered. the vapour mitigation system must be installed by a suitably qualified professional and the installation confirmed in writing to EPA and the planning authority at completion.
- c. Any future redevelopment involving excavation works beyond 2.5m depth within the site, must be carried out in accordance with an Occupational Health and Safety Plan developed by a suitably qualified professional, to manage potential exposures to hydrocarbon vapours during the excavation works . Prior to works commencing, the plan must be accepted by an environmental auditor appointed under Part IXD of the *Environment Protection Act 1970*, and this acceptance must be provided in writing to EPA and the planning authority.
- d. Groundwater under the site is polluted and should not be used for stock watering, primary contact recreation, or industrial uses.
- e. Ongoing groundwater monitoring must be carried out in accordance with the Groundwater Quality Management Plan accepted by the environmental auditor and attached to the Statement of Environmental Audit (Coffey Environments, 2 Aug 2012).

- f. The Groundwater Quality Management Plan must remain in force until such time as an environmental auditor (appointed under Part IXD of the *Environment Protection Act 1970*) confirms to the EPA and the planning authority via a Section 53V audit that the monitoring and management program is no longer required.

The condition of the site is detrimental or potentially detrimental to any (one or more) beneficial uses of the site. Accordingly, I have not issued a Certificate of Environmental Audit for the site in its current condition, the reasons for which are presented in the environmental audit report. The terms and conditions that need to be complied with before a Certificate of Environmental Audit may be issued are set out as follows:-

- o The groundwater pollution from on and off site sources would need to be cleaned up so that protected beneficial uses are restored, or a risk assessment conducted to demonstrate that all beneficial uses are protected.
- o The hydrocarbon impacted soil under the site would need to be cleaned up, or a risk assessment conducted to demonstrate that all beneficial uses are protected.

There are some related environmental issues that have arisen during the course of the environmental audit, but they do not affect the issues of a Certificate or Statement. The following items have been noted in the Statement of Environmental Audit in the section entitled 'other related information':-

- o The Authority (ie. The Victorian EPA) has determined that groundwater has been cleaned up to the extent practicable.
- o The site has been declared to be within a Groundwater Quality Restricted Use Zone ("GQRUZ").
- o The condition of groundwater does not preclude the beneficial uses of 'maintenance of ecosystems' and 'buildings and structures'.
- o In accordance with Clause 19(3) of SEPP Groundwaters of Victoria, the Authority may require periodic reassessment of the practicability of groundwater clean up.
- o Some soil below 2.5m depth at the site may contain odours. This material is not considered to represent a health or environmental risk but may cause a noticeable odour if exposed during development or occupation of the site.
- o Any fill or soil imported to the site must be chemically tested soil or fill that classifies as "fill material" in accordance with relevant EPA guidelines.
- o Any disposal of soils from the site, or importation of soils onto the site, should be conducted in accordance with relevant EPA policies and guidelines.
- o Any disposal of groundwater from the site should be conducted in accordance with relevant EPA policies and guidelines.
- o In accordance with Section 53ZE of the *Environment Protection Act 1970* the owner/occupier of the site must provide a copy of the Statement of Environmental Audit to any person who becomes or proposes to become an occupier of the site.
- o Not all land uses for which this land is considered suitable by this audit may be allowed under the existing zoning of the Greater Geelong Planning Scheme.

9. REFERENCES

Vic EPA Guidelines & Legislation

- o Environment Protection Act 1970
- o Planning and Environment Act 1987
- o State Environment Protection Policy (Prevention and Management of Contamination of Land), Victorian Government Gazette Publication No. S95, 2002
- o State Environment Protection Policy (Groundwaters of Victoria), Victorian Government Gazette Publication No. S160, 1997 (and variations dated June 1999 and June 2003)
- o State Environment Protection Policy (Ambient Air Quality), Victorian Government Gazette Publication No. S19, 1999
- o State Environment Protection Policy (Air Quality Management), Victorian Government Gazette Publication No. S240, 2001
- o State Environment Protection Policy (Waters of Victoria), Victorian Government Gazette Publication No. S13, 1988 (as varied on 3 June 2003 No. S107) and Schedule F6 (Waters of Port Philip Bay) as varied in S121, 2003
- o Environment Protection (Industrial Waste Resource) Regulations 2009
- o Environmental Auditor Guidelines for the Preparation of Environmental Audit Reports on Risk to the Environment (Vic EPA Publication 952.2, August 2007)
- o Guidelines for Issue of Certificates and Statements of Environmental Audit (Vic EPA Publication 759.1 Oct 2007)
- o Guidelines on the Design, Installation and Management Requirements for Underground Petroleum Storage Systems (UPSS) (Vic EPA Publication 888.1, January 2009)
- o Sampling and Analysis of Waters, Wastewaters, Soils and Wastes (IWRG701 – June 2009)
- o Hydrogeological Assessments (Water Quality) Guidelines, Vic EPA Publication 668, September 2006
- o Groundwater Sampling Guidelines. Vic EPA Publication 669, April 2000.
- o The Clean Up and Management of Polluted Groundwater, Vic EPA Publication 840, April 2002
- o Various guidance provided to auditors (unpublished) prior to the date of this audit report

Other National Documents

- o National Environment Protection (Assessment of Site Contamination) Measure (NEPC, 1999)
- o National Environment Protection (Air Toxics) Measure (NEPC, 2004)
- o Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites (ANZECC, 1992)
- o AS/NZS ISO 31000:2009 *Principles and Guidelines on Implementation*
- o AS/NZS ISO 31010:2009 *Risk Management – Risk Assessment Techniques*
- o Australian and New Zealand Water Quality Guidelines for Fresh and Marine Waters (Australian and New Zealand Environment and Conservation Council, ANZECC, 1992)

- o Australian Standard, Guide to the investigation and sampling of sites with potentially contaminated soil, Part 1: Non-volatile and semi-volatile compounds. AS4482.1-2005.
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- o Coffey Environments (2012a). Annual Groundwater Monitoring Event. Former Mobil Geelong West Service Station (VO0993) (15 June 2012). NOTE THIS REPORT IS INCLUDED AS AN APPENDIX TO THE CUTEP REPORT LISTED BELOW – NO.37)
- o Coffey Environments (Coffey 2012b) Human Health Risk Assessment Report Former Mobil Service Station 151 Church St, Geelong West, Victoria (14 Aug 2012). NOTE THIS REPORT IS INCLUDED AS AN APPENDIX TO THE CUTEP REPORT LISTED BELOW – NO.37)
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STATEMENT OF ENVIRONMENTAL AUDIT



ENVIRONMENT PROTECTION ACT 1970

STATEMENT OF ENVIRONMENTAL AUDIT

I, Mr Steven Jon Kirsanovs of Kirs Environmental Pty Ltd, a person appointed by the Environment Protection Authority ('the Authority') under the Environment Protection Act 1970 ('the Act') as an environmental auditor for the purposes of the Act, having:-

1. been requested by Mr. Stewart Frater of Mobil Oil Australia Pty Ltd, to issue a certificate of environmental audit in relation to the site located at 151-153 Church Street, Geelong West, Victoria, comprising Vol 8666 Fol 665 (Lot 1 on TP 382065X) ("the site") owned by Dags Wash Pty Ltd,
2. had regard to, among other things,
 - i. guidelines issued by the Authority for the purposes of Part IXD of the Act,
 - ii. the beneficial uses that may be made of the site, and
 - iii. relevant State environment protection policies/industrial waste management policies, namely
 - SEPP Prevention and Management of Contamination of Land
 - SEPP Waters of Victoria
 - SEPP Groundwaters of Victoria
 - Environment Protection (Industrial Waste Resource) Regulations 2009in making a total assessment of the nature and extent of any harm or detriment caused to, or the risk of any possible harm or detriment which may be caused to, any beneficial use made of the site by any industrial processes or activity, waste or substance (including any chemical substance), and
3. completed an environmental audit report in accordance with Section 53X of the Act, a copy of which has been sent to the Authority and the relevant planning and responsible authority.

HEREBY STATE that I am of the opinion that:

The site is suitable for the beneficial uses associated with sensitive use (high density residential), sensitive use (other), recreation / open space, commercial and industrial use, subject to the following conditions attached thereto:-

- a. Any future buildings on site that include basements or cellars (except for buildings with basement areas that are not enclosed) must be provided with a vapour mitigation system. The system must be designed by a suitably qualified professional and the design must be accepted by an environmental auditor appointed under Part IXD of the *Environment Protection Act 1970*, and this acceptance be provided in writing to EPA and the planning authority.
- b. If condition a. above is triggered, the vapour mitigation system must be installed by a suitably qualified professional and the installation confirmed in writing to EPA and the planning authority at completion.
- c. Any future redevelopment involving excavation works beyond 2.5m depth within the site, must be carried out in accordance with an Occupational Health and Safety Plan developed by a suitably qualified professional, to manage potential exposures to hydrocarbon vapours during the excavation works. Prior to works commencing, the plan must be accepted by an environmental auditor appointed under Part IXD of the *Environment Protection Act 1970*, and this acceptance must be provided in writing to EPA and the planning authority.

ENVIRONMENT PROTECTION ACT 1970 STATEMENT OF ENVIRONMENTAL AUDIT

- d. Groundwater under the site is polluted and should not be used for stock watering, primary contact recreation, or industrial uses.
- e. Ongoing groundwater monitoring must be carried out in accordance with the Groundwater Quality Management Plan accepted by the environmental auditor and attached to the Statement of Environmental Audit (Coffey Environments, 2 Aug 2012).
- f. The Groundwater Quality Management Plan must remain in force until such time as an environmental auditor (appointed under Part IXD of the *Environment Protection Act 1970*) confirms to the EPA and the planning authority via a Section 53V audit that the monitoring and management program is no longer required.

The condition of the site is detrimental or potentially detrimental to any (one or more) beneficial uses of the site. Accordingly, I have not issued a Certificate of Environmental Audit for the site in its current condition, the reasons for which are presented in the environmental audit report. The terms and conditions that need to be complied with before a Certificate of Environmental Audit may be issued are set out as follows:-

- o The groundwater pollution from on and off site sources would need to be cleaned up so that protected beneficial uses are restored, or a risk assessment conducted to demonstrate that all beneficial uses are protected.
- o The hydrocarbon impacted soil under the site would need to be cleaned up, or a risk assessment conducted to demonstrate that all beneficial uses are protected.

Other related information:-

- o The Authority (ie. The Victorian EPA) has determined that groundwater has been cleaned up to the extent practicable.
- o The site has been declared to be within a Groundwater Quality Restricted Use Zone ("GQRUZ").
- o The condition of groundwater does not preclude the beneficial uses of 'maintenance of ecosystems' and 'buildings and structures'.
- o In accordance with Clause 19(3) of SEPP Groundwaters of Victoria, the Authority may require periodic reassessment of the practicability of groundwater clean up.
- o Some soil below 2.5m depth at the site may contain odours. This material is not considered to represent a health or environmental risk but may cause a noticeable odour if exposed during development or occupation of the site.
- o Any fill or soil imported to the site must be chemically tested soil or fill that classifies as "fill material" in accordance with relevant EPA guidelines.
- o Any disposal of soils from the site, or importation of soils onto the site, should be conducted in accordance with relevant EPA policies and guidelines.
- o Any disposal of groundwater from the site should be conducted in accordance with relevant EPA policies and guidelines.
- o In accordance with Section 53ZE of the *Environment Protection Act 1970* the

ENVIRONMENT PROTECTION ACT 1970
STATEMENT OF ENVIRONMENTAL AUDIT

owner/occupier of the site must provide a copy of the Statement of Environmental Audit to any person who becomes or proposes to become an occupier of the site.

- o Not all land uses for which this land is considered suitable by this audit may be allowed under the existing zoning of the Greater Geelong Planning Scheme.

This Statement forms part of environmental audit report (*Environmental Audit Report, 151-153 Church Street, Geelong West, Vic, Kirsa Environmental Pty Ltd, Report Ref 20125176, 21 Dec 2012*). Further details regarding the condition of the site may be found in the environmental audit report.

Dated: - 21 December 2012

Signed:- ... 

Steven Jon Kirsanovs
ENVIRONMENTAL AUDITOR

AUDIT STATEMENT ANNEX 1 (GROUNDWATER QUALITY MANAGEMENT PLAN)



**GROUNDWATER QUALITY MANAGEMENT PLAN
FORMER MOBIL GEELONG WEST SERVICE
STATION (VO0993)
151 CHURCH STREET, GEELONG WEST,
VICTORIA**

Prepared for:

Mobil Oil Australia Pty Ltd
Level 13, 28 Freshwater Place
Southbank, VIC 3000

Report Date: 2 August 2012
Project Ref: ENVIABTF07113EB_GMP_R01

Written/Submitted by:



Chris Molloy for;
Daniel Guille
Environmental Scientist

Reviewed/Approved by:



Andrew Labbett
Principal Remediation
Engineer

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1	ENVIABTF07013EB_GMP_R01a.doc	Draft	18 November 2011	Steve Kirsanovs C/- AEC Environmental Pty Ltd	JG
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Figure 2B – Groundwater Analytical Plan – TPH C₆-C₉ Contours (February 2012)

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Figure 3 –Ongoing Monitoring of Groundwater Wells

ABBREVIATIONS

BTEX	Benzene, Toluene, Ethylbenzene and Total Xylenes
C₆-C₃₆	Hydrocarbon chain length fraction
Coffey Environments	Coffey Environments Australia Pty Ltd
EPA	Environment Protection Authority
Groundwater SEPP	State Environment Protection Policy (Groundwaters of Victoria)
HRA	Health Risk Assessment
LOR	Limit of Reporting
mbgs	Metres Below Ground Surface
mBTC	Metres below top of casing
Mobil	Mobil Oil Australia Pty Ltd
MW	Groundwater Monitoring Well
NEPM	National Environment Protection Measure
PSH	Phase Separated Hydrocarbon
TEA	Tank Excavation Assessment
TPH	Total Petroleum Hydrocarbon
UST	Underground Storage Tank

1 INTRODUCTION

Mobil Oil Australia Pty Ltd (Mobil) contracted Coffey Environments Pty Ltd (Coffey Environments) to prepare a Groundwater Monitoring Plan (GMP) for the former Mobil Geelong West (VO0993) Service Station (the site), located at 151 Church Street, Geelong West, Victoria (the site).

The site is a former service station that was decommissioned in 1997. All infrastructure, including petroleum infrastructure, was removed from the site at that time. Between 1997 and 2011, remediation works were conducted at the site, including a combination of excavation and soil treatment and/or off-site disposal, MultiPhase Extraction and Air Treatment (MPEAT) events and injection of oxidants.

A Clean Up to the Extent Practicable (CUTEP) Report has been prepared documenting the remediation works conducted at the site, and recommending that no further remediation works be conducted at the site as no active remediation approach would effectively recover a significant mass of hydrocarbon cost effectively.

This Groundwater Management Plan (GMP) prepared for this site is to be implemented in accordance with EPA Publication 840.

2 OBJECTIVE OF GROUNDWATER MANAGEMENT PLAN

The objective of the Groundwater Management Plan (GMP) is to outline the strategy to manage the residual groundwater pollution in accordance with the requirements of EPA Publication 840 'The Clean Up and Management of Polluted Groundwater'.

In accordance with the Groundwater SEPP, and guidelines from EPA Victoria, where groundwater has been polluted:

- Groundwater should be cleaned up such that the protection of beneficial uses (existing and potential) is restored. In some cases this will not be possible or feasible, however, in all cases polluted groundwater must be cleaned up to the extent practicable.
- Clean up and management (i.e. Groundwater Management Plan) must address the full extent of groundwater pollution both on-site and off-site.

3 GROUNDWATER MANAGEMENT PLAN ELEMENTS

The elements and attributes of a GMP include the following:

- Clean up objectives are set out;
- Aquifers and groundwater at the site are characterised;
- Groundwater contamination at the site is characterised;
- Necessary further characterisation of groundwater contamination is proposed;
- Technology assessment and pilot trials currently being undertaken are referenced;
- Consideration of Clean Up To the Extent Practicable (CUTEP) has been made;
- A groundwater monitoring programme is proposed;
- The quality assurance programme is outlined;
- Triggers levels/ points and contingency plan are proposed;
- Possible controls on use of polluted groundwater are described;
- Periodic review of the practicability of clean up of polluted groundwater will be required as specified by the Groundwater SEPP in the event that CUTEP is achieved and a GQRUZ is declared;
- The necessary conditions for cessation of groundwater management are included; and
- An information and communication plan is outlined.

4 GROUNDWATER MONITORING PLAN DETAILS

4.1 Clean up Objectives

Laboratory analytical results of total dissolved solids (TDS) of the site's groundwater generally ranged between 5000 mg/L to 10,000 mg/L, which classifies the groundwater as Segment C based on the State Environment Protection Policy (SEPP) Groundwaters of Victoria. Segment C groundwater has therefore been adopted for the purposes of this investigation, having protected beneficial uses of:

- Maintenance of Ecosystems,
- Stock Watering,
- Industrial Water Use,
- Primary Contact Recreation, and
- Buildings and Structures.
- The ultimate clean up objectives for the site are to restore all of these potential beneficial uses.

It was noted that as there is no groundwater quality objective for TPH, the adopted value for TPH C₁₀-C₃₆ (600 µg/L) for the beneficial uses of maintenance of ecosystems, stock watering and primary contact recreation was developed by the Netherlands Ministry of Housing for "mineral oil". The adopted values for groundwater quality objectives for the site are presented below.

Table 4.1. Groundwater Quality Objective, Former Mobil Geelong West Service Station

Contaminant	Groundwater Quality Objective
TPH (C ₆ -C ₉)	150 ⁴
TPH (C ₁₀ -C ₃₆)	600 ⁴
Benzene	1 [^]
Toluene	25 [^]
Ethylbenzene	3 [^]
Total Xylenes	20 [^]
Benzo(a)pyrene	0.01
Naphthalene	70
Arsenic	50
Copper	13
Lead	4.4
Nickel	70
Vanadium	100
Zinc	15
Manganese	100
Nitrate (as N)	10 [#]
Sulphate	400

Notes:

1 = ANZECC/NHMRC 2000 Australian Water Quality Guidelines for Marine Waters (95 %).

2 = ANZECC 2000 – Primary Industry - Livestock

3 = ANZECC 2000 - Recreational Water Quality and Aesthetics

4 = Dutch Criteria

[^] = Please note these are aesthetic criteria from NHMRC/NRMMC 2004

[#] = Please note criteria for potable water from ANZECC (1992) adopted in the absence of other criteria.

µg/L = Micrograms per Litre

NE = Guidelines not established

4.2 Aquifers and Groundwater at the Site

4.2.1 Site Geology

Site specific subsurface geological profile encountered during previous investigation work is summarised below:

Table 2.1 – Site Specific Geology

Depth Range (mbgl)	Soil Type
0.0 - 0.2	Fill, gravel, coarse sand and clay.
0.2 - 1.2	Gravelly sandy clay and clay to silty clay, dark brown with some calcareous material at other drilling locations.
1.2 - 9.5	Fine sand with minor clay and silt across the entire site. Interbedded weathered basalt to a depth of 1.8 mbgs at the west and northwest portion of the site (MW28 and MW29).
9.5 - 10.8	Clay to sandy silty clay, grey to brown, with large (<30mm) chips of calcareous sediments (Geoprobe refusal) at well locations MW27 and MW32.
10.8 - 15	Fine Sandy Silty Clay, light brown, moisture content greater than plasticity limit and increasing with depth. Saturated at 14.5 m to 15 m.

The observed site geology corresponds with the expected geological units: Clay and calcarenite of the Fyansford Formation overlain by sediments of the Moorabool Viaduct Formation, with interbedded basalt associated with the Newer Volcanic in the western portion of the site.

4.2.2 Site Hydrogeology

Site specific hydrogeology is summarised in the table below.

Table 4.2.2 - Site Specific Hydrogeology

Item	Description
Depth to groundwater	Depth to groundwater across the wells investigated ranged between 7.959 mBTC (MW40) and 9.320 (MW50) during the February 2012 GME.
Groundwater Occurrence	Groundwater was encountered during previous drilling works in a fine sand water bearing zone between 7 to 10 m. Deeper monitoring wells MW27, MW28 and the newly installed MW55 (with screen intervals between 12 and 13 mbgs) reported water levels at the same level as the shallow wells screened within the shallow water bearing zone. This indicates groundwater is in an unconfined aquifer, given the level of hydraulic connection between the two water bearing zones.
Gradient and Groundwater Flow Direction	The average hydraulic gradient across the site was 0.006 (MW10 to MW41) in February 2012. The flow direction was found to be north-east, which is consistent with previous findings. The groundwater gradient plan for February 2012 is shown on Figure 8.
Hydraulic Conductivity	Transmissivity values determined from the 2004 pumping test ranged between 7.8 and 12.4 m ² / day, equating to a hydraulic conductivity of 4.7 to 7.4 m/ day. The estimated hydraulic conductivity values are consistent with the published values of 0.017 m/ day to 17 m/ day for fine sand (Domenico and Schwartz, 1990).

Item	Description
Seepage Velocity	Using the estimated average hydraulic gradient of 0.006 and assuming an effective porosity of between 0.25 and 0.30 (based on the 2004 aquifer test), the seepage velocity (i.e., the average linear groundwater velocity) in the aquifer, is estimated to range between 37 to 58 m per year. Seepage velocity was found to be consistent with previous findings.
Beneficial Uses of Groundwater that require protection.	Field based total dissolved solids recorded during the current investigation ranged between 2,048 mg/L (MW18) and 10,829 mg/L (MW27). The high TDS concentrations in a number of monitoring wells are considered attributable to RegenOxTM and ORC remediation activities. Previous laboratory analysed total dissolved solids (TDS) generally range between 5000 mg/L to 10,000 mg/L, which classifies the groundwater as Segment C based on the State Environment Protection Policy (SEPP) Groundwaters of Victoria. Segment C groundwater has therefore been adopted for the purposes of this investigation, having protected beneficial uses of: • Maintenance of Ecosystems, • Stock Watering, • Industrial Water Use, • Primary Contact Recreation, and • Buildings and Structures.

5 GROUNDWATER CONTAMINATION AT THE SITE

It is considered that dissolved phase hydrocarbons (benzene, TPH C₆-C₉ and TPH C₁₀-C₃₆), are delineated in all directions both on and off site, except to the north, south and west of MW25 and to the north and west of MW2 (according to previous investigations conducted at the site). However, it is considered likely hydrocarbon impact in MW25 is associated with a separate contamination plume.

One off-site groundwater monitoring well MW31 (located in the driveway of the adjacent residential property) is down gradient of the dissolved phase plume and has historically reported petroleum hydrocarbon concentrations above criteria. However, the past three recent rounds of sampling (March 2011, May 2011 and February 2012) reported concentrations below laboratory LOR for all targeted analytes.

It is noted that the most recent February 2012 monitoring event recorded elevated concentrations of dissolved hydrocarbons in off-site locations to the north (MW14, located in a nature strip across Church St) and west of the site (MW24).

Phenolic compounds were detected (below the adopted criteria) in three on-site monitoring wells (MW46, MW47 and MW54) during the previous May 2011 event and in four on-site monitoring wells during the most recent February 2012 event.

The February 2012 event reported concentrations of PAHs (as naphthalene) above the adopted criteria for on-site monitoring well MW47 (located down-gradient of the former tank farm). PAH impact was reported in two on-site monitoring wells (MW46 and MW47) below the adopted criteria.

- The effects of the residual hydrocarbon contamination (vapour, soil and groundwater) on the beneficial use 'Human Health' has been assessed by quantitative risk assessments.
- These concluded that the contamination remaining at the site poses an unacceptable risk to:
- On-site and off-site construction workers (undertaking excavation (at a depth of 2.5 mbgs) via direct contact with contaminated soil or groundwater, and via inhalation of vapour).
- On-site and off-site maintenance workers working in a 1 m trench or maintenance pit via inhalation of vapour.

5.1 Technology Assessment

The technical, logistical and financial considerations related to remediation previously undertaken at the site were provided in the CUTEP Report (Coffey, 2011). An assessment of the practicability of further remediation at the site was also provided in the CUTEP Report.

A combination of remediation technologies including Multiphase Extraction and Air Treatment (MPEAT) events, injection of oxidants and excavation were applied at the site.

- Twenty-two days of MPEAT events were conducted between August 2008 and November 2010, of which 16 were combined with injection of oxidant:
- All impacted soil to a depth of 5 mbgs was excavated, treated and/or disposed of offsite.

The CUTEP Report indicated that no active remediation approach will effectively recover a significant mass of hydrocarbon cost effectively.

5.2 Consideration of Clean Up To the Extent Practicable (CUTEP)

A CUTEP report was prepared by Coffey Environments in November 2011. The intent of the CUTEP report was to provide the Auditor with a report for consideration of a possible submission to EPA for determination of CUTEP.

In considering whether or not it would be appropriate to apply further remedial technologies at the site, the following points were considered important:

- Remediation works already performed (i.e. source removal, Multiphase Vapour Event (MPVE) events combined with injection of oxidants) have remediated the LNAPL impact and significantly reduced the concentration and extent of dissolved hydrocarbons impact in the groundwater.
- Elevated concentrations of hydrocarbons in groundwater had been shown to be not posing a risk to current site use or off site beneficial uses of land or groundwater.
- Elevated concentrations of hydrocarbons were not expected to migrate further off site, which is far short of the distance to the nearest surface water receptors located some 1.5 km metres from the site.

Overall, it had been concluded that site remedial works had removed all known sources of soil contamination that were considered to be impacting groundwater, with the exception of any contamination that remained in the smear zone or areas that were not able to be excavated.

On the basis of the above considerations, it was considered that the net benefit of applying any further remedial measures would be small to negligible, especially considering the fate and transport modelling predictions and that the risk to beneficial users of land was also considered negligible in terms of current site use.

5.3 Groundwater Monitoring Programme

The details of the groundwater monitoring programme (GMP) are as follows (please refer to Figure 3 for groundwater monitoring wells to be retained for ongoing monitoring):

- The GMP is to be undertaken by a qualified and experience environmental practitioner;
- Six-monthly gauging (and sampling when no NAPL present) of on-site groundwater monitoring well MW43 and off-site groundwater monitoring wells MW14, MW24 and MW31;
- Annual gauging and sampling of off-site groundwater monitoring wells MW16, MW18, MW25 and MW40;
- Field parameters are to be collected at the time of sampling and shall include pH, temperature, electrical conductivity, dissolved oxygen and redox potential;
- The parameters to be analysed are TPH, BTEX and Lead;
- Natural attenuation indicator parameters are to be analysed annually from on-site groundwater monitoring well MW43 and off-site groundwater monitoring wells MW24 and MW31; and
- Groundwater sampling is to be continued until the clean up objectives are met or an Environmental Auditor determines that monitoring can cease.

5.4 Quality Assurance Programme

- The quality assurance of the groundwater monitoring programme is to be consistent with EPA Publication 668 and EPA Publication 669 to assure quality of data, including the QC programme for sampling.
- The groundwater monitoring program is to be undertaken by a trained and qualified staff;
- Groundwater monitoring wells are to be installed in accordance with EPA Publication 669;
- Groundwater samples taken during on-going monitoring at the site will be collected using sampling method in accordance with the Groundwater Sampling Guidelines (EPA Publication 669, April 2000);
- Handling of groundwater samples is to be consistent with the EPA Publication 669;
- Quality control measures (i.e. collection of duplicates, triplicates and blank samples) in any future monitoring event are to be undertaken and reported in accordance with Section 4.3 of the EPA Publication 669 in order to verify the reliability of the data presented. This may include the selection of laboratories which use comparable techniques for specific compounds or analytes, so that the difference between laboratory data (reproducibility) can be correctly evaluated;
- Documented Standard Operating Procedures (SOP's) will be employed for the works conducted; and
- The groundwater monitoring programme will be conducted in accordance with Coffey Environments' quality system.

5.5 Triggers Levels/ Points and Contingency Plan

Trigger Levels and Contingency Plans are summarised below.

Trigger Levels and Events (from Baseline Groundwater Monitoring Event (GME) February 2012)

- The trigger for the implementation of contingency measures will be either:
- The presence of detectable LNAPL in any of the groundwater monitoring wells;
- Groundwater contamination concentrations exceeding the theoretical solubility of the hydrocarbon contaminants as a component of fuel hydrocarbons. In the case of benzene, groundwater concentrations in excess of 30 mg/L would be an appropriate basis for a trigger; or
- Groundwater contamination concentration(s) trends increase over three consecutive groundwater monitoring events.

Contingency Measures

- If any of the above trigger levels occurs, the Auditor shall be notified and confirmatory sampling will be undertaken to confirm the groundwater contamination concentration(s). If the trigger is confirmed, the frequency of the monitoring program shall be increased to every three months;
- If any of the above trigger levels persists, the Auditor will be notified and consulted and the Auditor's endorsement and recommendations for appropriate remediation will be undertaken if deemed necessary;
- No further action will be required unless one of the above trigger conditions occurs over three consecutive monitoring rounds (based on a three monthly schedule);

- If the trigger is not encountered at the second monitoring round (that is, after three months), then the monitoring program will revert to a six monthly program;
- If persistent LNAPL is encountered in any of the wells (occurring at more than three consecutive monitoring rounds) then the significance of the contamination should be assessed with the Environmental Auditor and with the EPA, and appropriate measures (e.g. further clean up) undertaken as may be agreed to address the LNAPL contamination.

5.6 Controls on Use of Polluted Groundwater

- Affected landholders or subsequent landholders will be provided with information about the groundwater contamination at the site. Affected landholders or subsequent landholders will also be notified not to use the impacted groundwater underneath the site for any one of the precluded groundwater beneficial uses. The forum in which this occurs will be agreed between Mobil, the EPA and the Auditor.
- In summary, the following beneficial uses of groundwater are precluded by impacts at the site:
- Agriculture, parks and gardens;
- Stock watering;
- Industrial; and
- Primary contact recreation.
- These beneficial uses of groundwater are neither existing or likely at or in the vicinity of the site due to groundwater quality variability (background TDS), low aquifer yield (silty clays), inconsistency of most of these beneficial uses with the existing and likely long term uses of the site and surrounding areas. There is no down gradient registered groundwater bore within 1000 m of the site.

5.7 Periodic Review of the Practicability of Clean Up of Polluted Groundwater

- Once CUTEP has been determined (if protected beneficial uses are still precluded) the EPA may require a periodic review of the practicability of groundwater clean up. This should include:
- Research of new/updated (and available) clean up technologies (after 3 years);
- Data from the groundwater monitoring program (e.g. geochemical data, plume/contaminant migrations, contaminant concentration and transformations); and
- Updated assessment of the risk posed to existing and potential uses of the groundwater, both on-site and off-site (e.g. toxicological data).

5.8 Cessation of Groundwater Management

- The management of groundwater (including water quality monitoring) shall be maintained until such time that either:
- All protected beneficial uses of the groundwater at the Site have been restored; or
- The Environmental Auditor advises (in consultation with the EPA) that the monitoring program can be ceased.

5.9 Information and Communication Plan

- As noted, affected landholders or subsequent landholders will be provided with information about the groundwater contamination at the site. Affected landholders or subsequent landholders will also be notified not to use the impacted groundwater underneath the site for any one of the precluded groundwater beneficial uses. The forum in which this occurs will be agreed between Mobil, the EPA and the Auditor.

In addition, provision of information relating to groundwater contamination and associated risks will be provided to utility operators in the affected area.

The results of the groundwater monitoring programme and the information about the site conditions will be provided to the Auditor within 4 weeks of receipt of field and laboratory data following individual monitoring events.

6 REFERENCES

The following reference was used in the Groundwater Management Plan. This document should be read in conjunction with this report.

Coffey Environments (2011), *Clean Up To the Extent Practicable (CUTEP) Report, Former Mobil Geelong West (VO0993) Service Station, 151 Church Street, Geelong West, Victoria*. Preliminary Final report dated 29 November 2011.

EPA Publication 840, *The Clean Up and Management of Polluted Groundwater*, April 2002.

EPA Publication 668, *Hydrogeological Assessments*, April 2000

EPA Publication 669, *Groundwater Sampling Guidelines*, April 2000.

Netherlands Groundwater Gazette (February 2000), *Circular on target values and intervention values for soil remediation*.

Important information about Coffey Environments Report for Mobil

Your report has been written for a specific purpose

Your report has been developed on the basis of a specific purpose as understood by Coffey Environments and applies only to the site or area investigated.

Scope of Investigations

The work was conducted, and the report has been prepared, in response to specific instructions from the client to whom this report is addressed, within practical time and budgetary constraints, and in reliance on certain data and information made available to Coffey Environments. The analyses, evaluations, opinions and conclusions presented in this report are based on those instructions, requirements, data or information.

Subsurface conditions can change

Subsurface conditions are created by natural processes and the activity of man and may change with time. For example, groundwater levels can vary with time, fill may be placed on a site and pollutants may migrate with time. Because a report is based on conditions which existed at the time of the subsurface exploration, decisions should not be based on a report whose adequacy may have been affected by time.

Interpretation of factual data

Environmental site assessments identify actual subsurface conditions only at those points where samples are taken and when they are taken. Data derived from indirect field measurements and sometimes other reports on the site are interpreted by geologists, engineers or scientists to provide an opinion about overall site conditions, their likely impact with respect to the report purpose and recommended actions. Actual conditions may differ from those inferred to exist, because no professional, no matter how well qualified, can reveal what is hidden by earth, rock and time. The actual interface between materials may be far more gradual or abrupt than assumed based on the facts obtained. Nothing can be done to change the actual site conditions which exist, but steps can be taken to reduce the impact of unexpected conditions.

Report Conclusions

Your report is based on the assumption that the site conditions as revealed through selective point sampling are indicative of actual conditions throughout an area. The report will set out conclusions derived from the use of relevant industry and regulatory authority recognised sampling regimes, standards, protocols, guidelines and assessment principles. Analysis of the data so collected allows an expression of opinion to be provided based upon the absence of concentrations of concern in excess of risk assessment levels so as to

provide a characterisation (to industry and regulatory body accepted levels of estimated certainty) of conditions with respect to potential contaminants. The report accordingly is not a guarantee that the condition of the Property could not be different at intermediate points between sampling locations or at different parts of the Property.

Your report is prepared for specific purposes and persons

Your report should not be applied for any purpose other than that originally specified at the time the report was issued.

Interpretation by other professionals

Costly problems can occur when other professionals develop their plans based on misinterpretations of a report. To help avoid misinterpretations, retain Coffey Environments to work with other professionals who are affected by the report. Have Coffey Environments explain the report implications to professionals affected by them and then review plans and specifications produced to see how they have incorporated the report findings.

Data should not be separated from the report

The report as a whole presents the findings of the site assessment and the report should not be copied in part or altered in any way. Logs, figures, laboratory data, drawings, etc. are customarily included in our reports and are developed by scientists, engineers or geologists based on their interpretation of field logs (assembled by field personnel), field testing and laboratory evaluation of field samples. This information should not under any circumstances be redrawn for inclusion in other documents or separated from the report in any way.

Reliance

This report has been provided by Coffey Environments for the benefit of Mobil and the purchaser from Mobil (but not that purchaser's successors in title) where a site is owned by Mobil and also for the benefit of Mobil and the third party owner or assignee from Mobil (as the case may be) but not their respective successors in title where a site is/was leased by Mobil.

In this report a reference to "Mobil" means:

- (a) (i) Mobil Oil Australia Pty Ltd ABN 88 004 052 984; or
- (ii) An Affiliate of Mobil; and

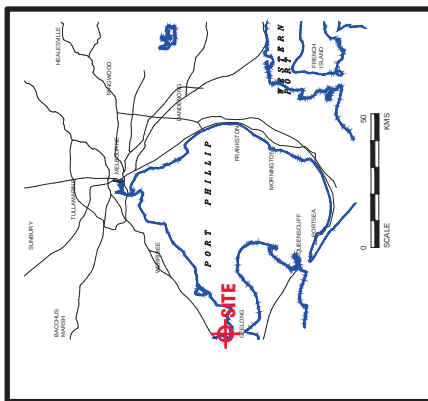
(b) Affiliate means:

- (i) A corporation owned beneficially or otherwise as to 50% of the voting shares by Mobil; or
- (ii) A related body corporate of Mobil or an affiliate, provided that the term "related body corporate" has the meaning ascribed in section 50 of the Corporations Act 2001 (C'th).

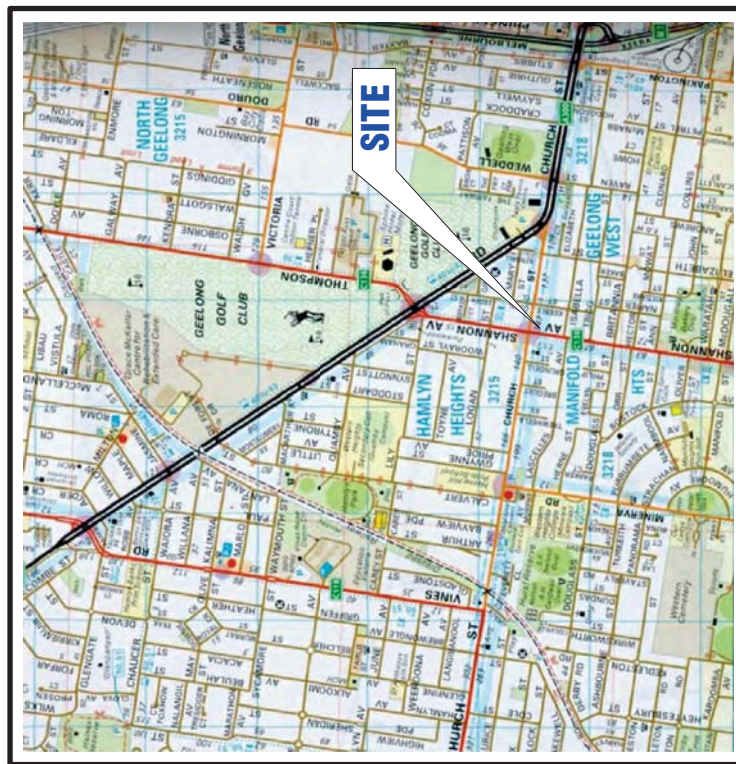
Appendix A

Figures

**Groundwater Quality Management Plan
Former Mobil Geelong West Service Station (VO0993)
151 Church Street, Geelong West, Victoria**

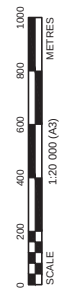


GENERAL AREA MAP



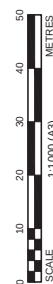
REGIONAL AREA MAP

SOURCE: GREATER MELBOURNE GEELONG WEST,
VICTORIA MAP REF: 441 11G EDITION 31st 2004



SOURCE: Nearmap.com, Hypertiles, 07/04/2011

LOCAL AREA MAP



GENERAL AREA LAND USE: COMMERCIAL & RESIDENTIAL

GENERAL HYDROGEOLOGY OF LOCALITY

1. **SOIL TYPE:** INTERBEDDED CALCAREOUS SEDIMENTS
2. **DEPTH TO AQUIFER:** ~7.96 - 9.32mBGS
3. **AQUIFER USAGE:** UNKNOWN

POTENTIALLY SENSITIVE RECEPTORS:

- CORIO BAY LOCATED 1.5km EAST
- HERNE HILL PRIMARY SCHOOL 500m WEST
- WESTERN HEIGHTS SECONDARY COLLEGE 500m NORTH WEST
- RESIDENTIAL PROPERTIES (SURROUNDING THE SITE)

LOCATION OF WATER BORES WITHIN 500m RADIUS:

NOTED 18 GROUNDWATER BORES WITHIN 1km RADIUS

1. **USAGE:** GROUNDWATER INVESTIGATION
2. **DEPTH TO SCREENED INTERVAL:** FOUR BORES (#142458, 142460, 142462, 142463) ARE SCREENED BETWEEN 4 to 12m
3. **DATE OF COMPLETION:** UNKNOWN

POTENTIAL OFFSITE SOURCES OF HYDROCARBON RELEASES WITHIN 100m RADIUS:

CALTEX SERVICE STATION TO THE WEST OF SITE ACROSS SHANNON AVENUE



coffey environments Pty Ltd ©

Rev	Date	Revision Details	Dm
A	18.04.12	GMP ISSUE APR 2012	CGT

coffey
environments
SPECIALISTS IN ENVIRONMENTAL
SOCIAL AND SAFETY PERFORMANCE

126 Trenerry Crescent
Abbotsford VIC 3067
Ph: (03) 9473 1400
Fax: (03) 9473 1450

Client:

MOBIL OIL AUSTRALIA PTY LTD

Project:

MOBIL GEELONG WEST (V00993)
GROUNDWATER MANAGEMENT PLAN

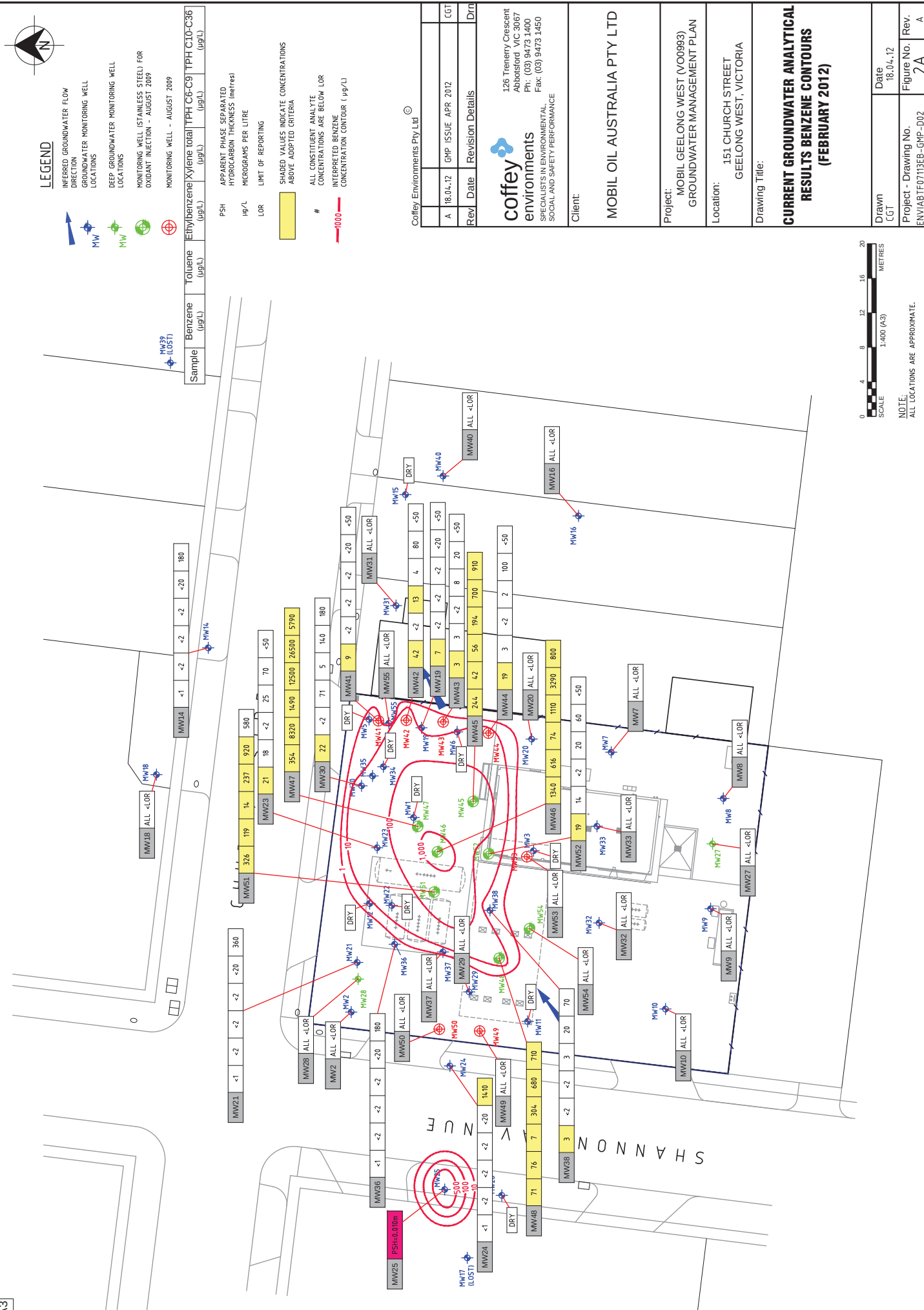
Location:

151 CHURCH STREET
GEELONG WEST, VICTORIA

Drawing Title:

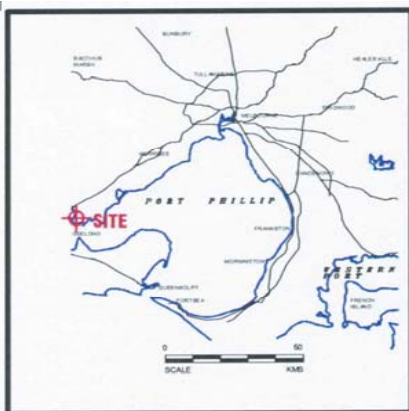
SITE LOCALITY PLAN
(FEBRUARY 2012)

Drawn	Date	Rev.
CGT	18.04.12	1
Project - Drawing No.	Figure No.	
ENVIABTF0713EB-GMP-002	1	A

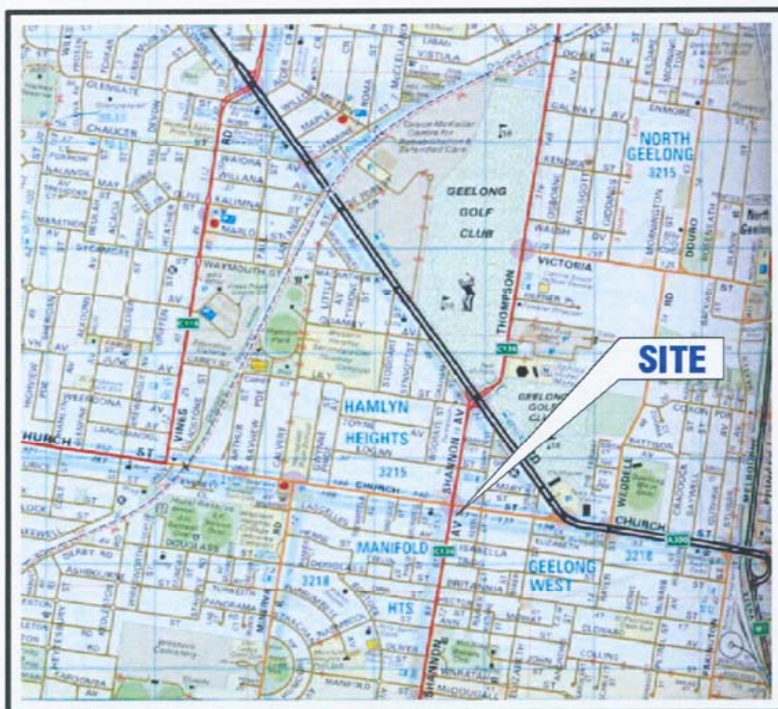


FIGURES



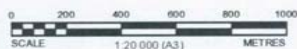


GENERAL AREA MAP



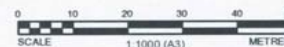
REGIONAL AREA MAP

SOURCE: GREATER MELBOURNE GEELONG WEST,
VICTORIA MAP REF: 441 11G EDITION 31st 2004



LOCAL AREA MAP

SOURCE: google earth, Oct 9, 2008



GENERAL AREA LAND USE: COMMERCIAL & RESIDENTIAL

GENERAL HYDROGEOLOGY OF LOCALITY

1. **SOIL TYPE:** INTERBEDDED CALCAREOUS SEDIMENTS
2. **DEPTH TO AQUIFER:** ~7.6-9.0mBGS
3. **AQUIFER USAGE:** UNKNOWN

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HERNE HILL PRIMARY SCHOOL 500m WEST
WESTERN HEIGHTS SECONDARY COLLEGE 500m NORTH WEST
RESIDENTIAL PROPERTIES (SURROUNDING THE SITE)

LOCATION OF WATER BORES WITHIN 500m RADIUS:

GROUNDWATER DATABASE SEARCH FROM FEBRUARY 2004
NOTED 18 GROUNDWATER BORES WITHIN 1km RADIUS

1. **USAGE:** GROUNDWATER INVESTIGATION
2. **DEPTH TO SCREENED INTERVAL:** FOUR BORES (#142458, 142460, 142462, 142463)
ARE SCREENED BETWEEN 4 to 12m
3. **DATE OF COMPLETION:** UNKNOWN

POTENTIAL OFFSITE SOURCES OF HYDROCARBON RELEASES WITHIN 100m RADIUS:

CALTIX SERVICE STATION TO THE WEST OF SITE ACROSS SHANNON AVENUE

Figure 1. Locality Plan

Location: 151 Church Street, Geelong West

Job Ref: 5176

Drawn: SK

Checked: SK

Date: Dec 2012

Scale: As shown

Source: Coffey (2012) CUTEP Report

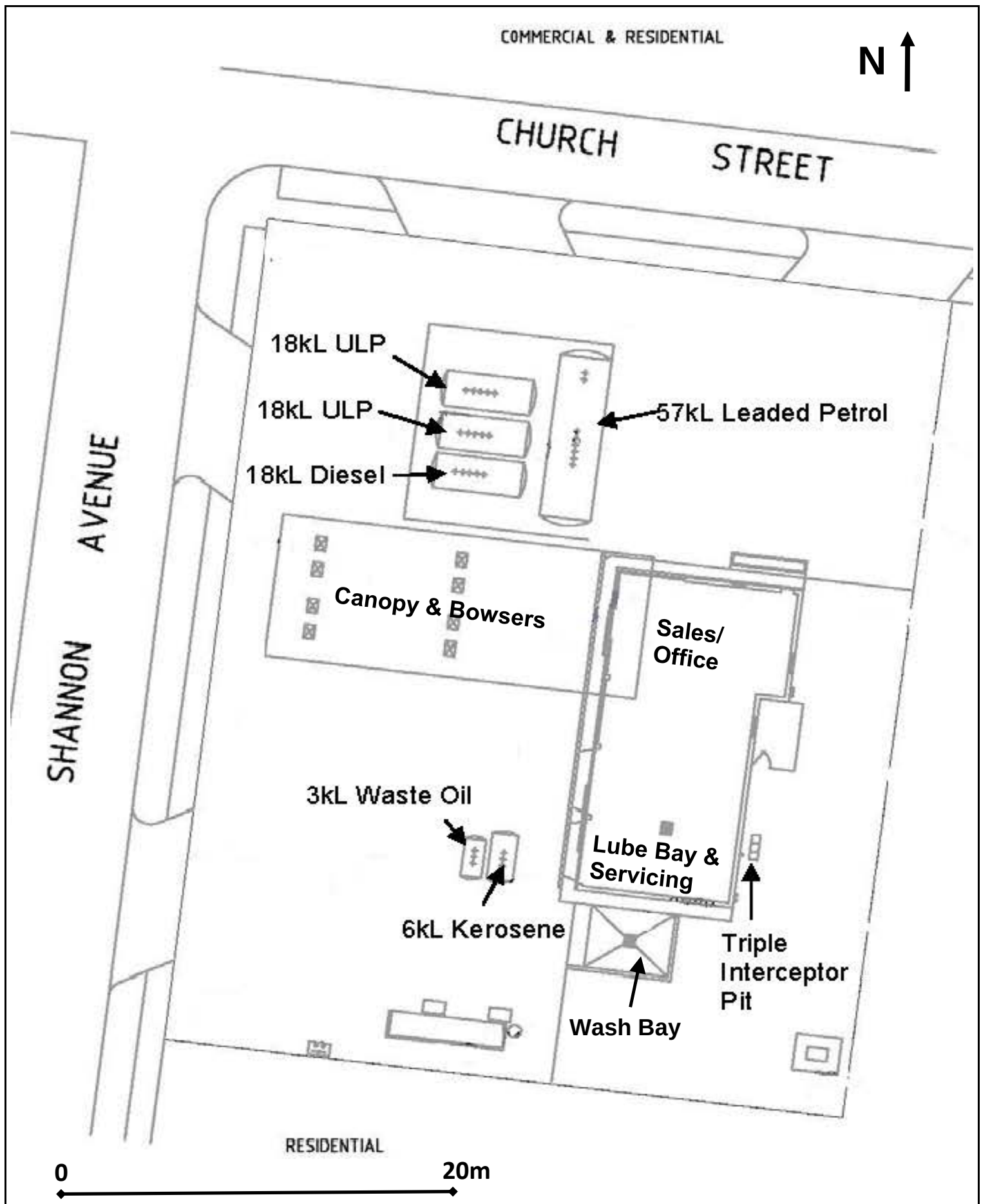


Figure 2. Former Site Layout

Location: 151 Church Street, Geelong West

Job Ref: 5176

Source: Adapted from Coffey

Drawn: NW

Date: Sept 2011

(May 2011) Summary Report

Checked: SK

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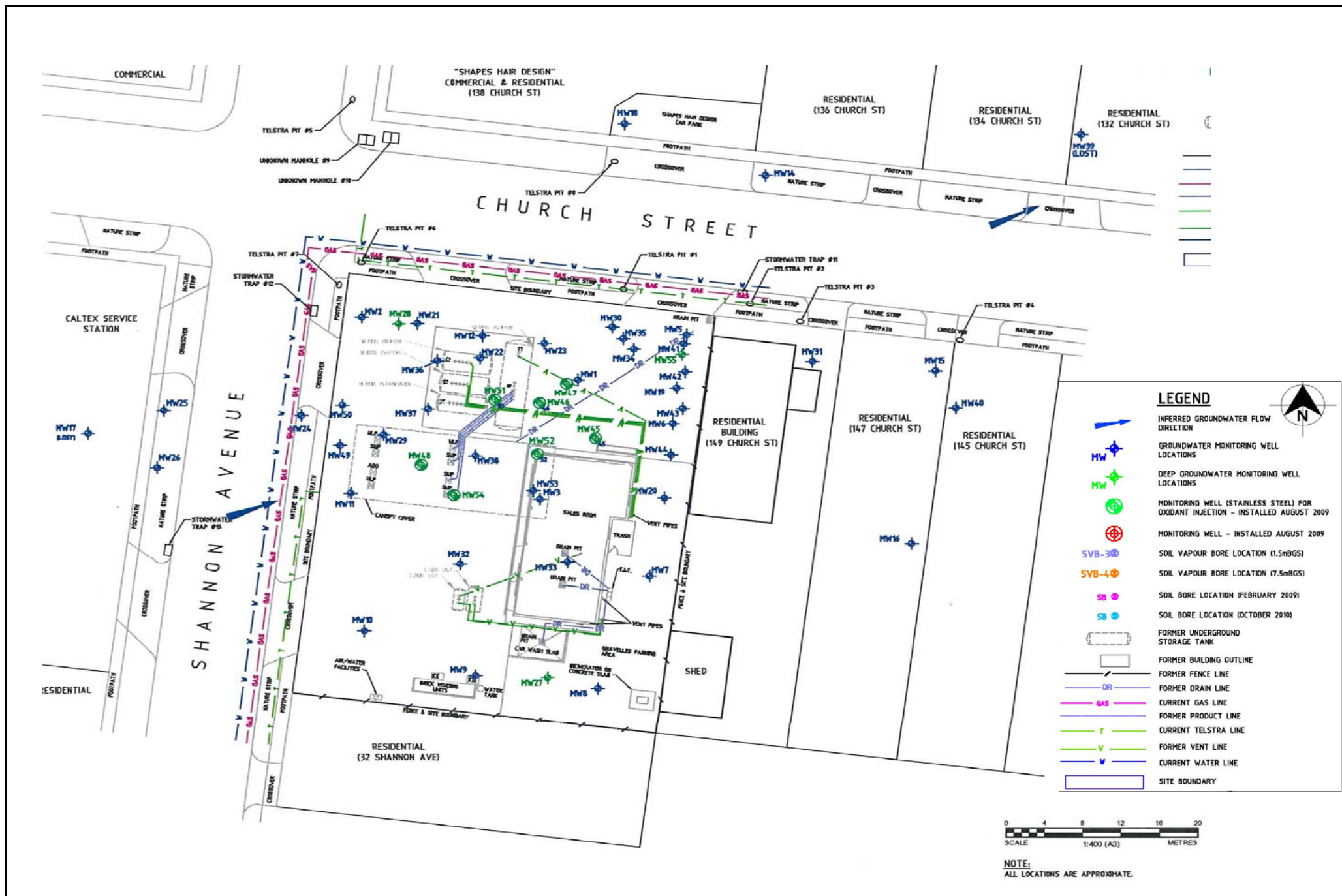


Figure 3. Monitoring Wells & Soil Vapour Bore Locations

Location: 151 Church Street, Geelong West

Job Ref: 5176

Drawn: NW

Checked: SK

Date: Sept 2012

Scale: As shown

Source: Adapted from Coffey (Aug 2012) CUTEP Report

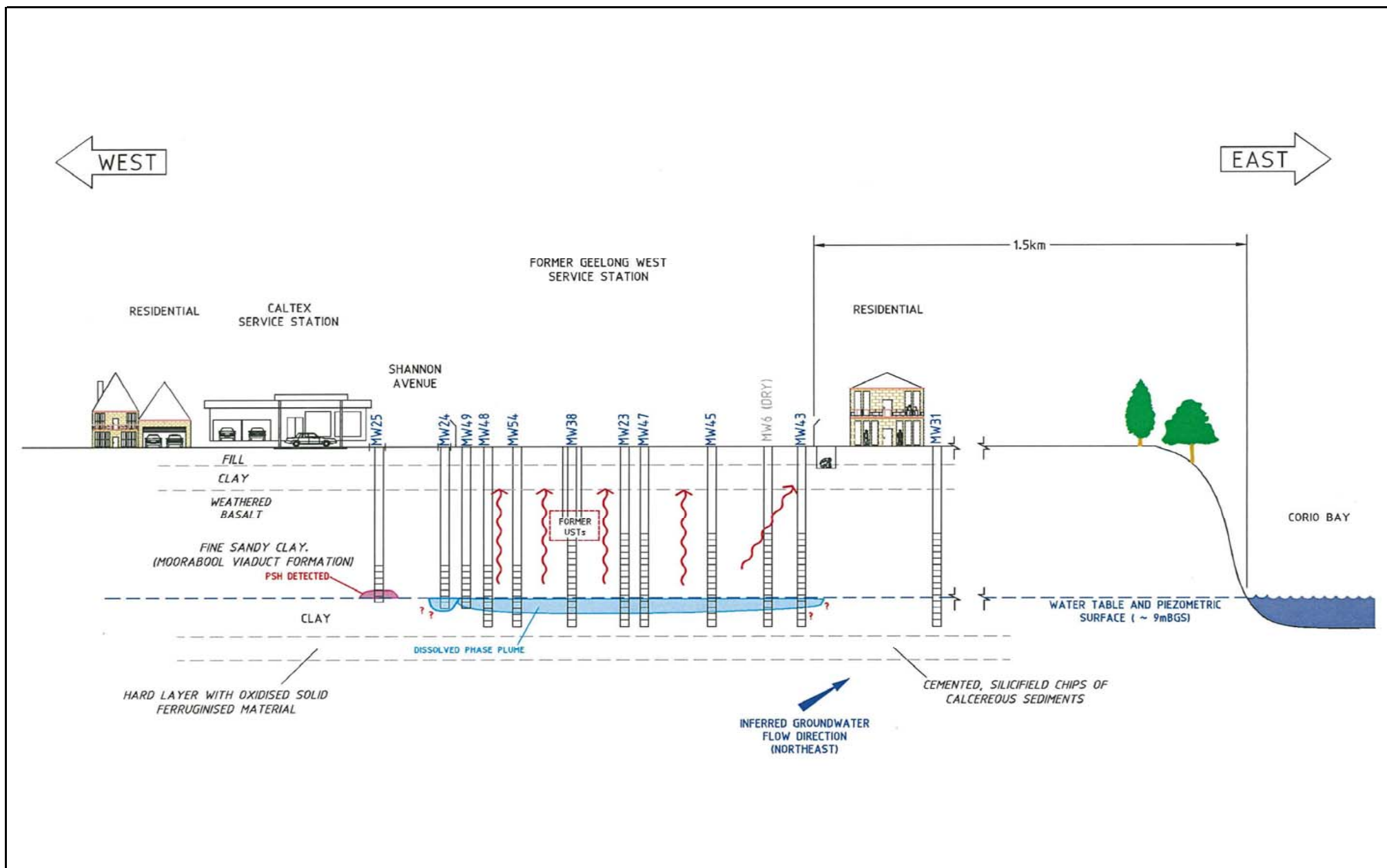


Figure 4. Conceptual Site Model

Location: 151 Church Street, Geelong West

Job Ref: 5176

Drawn: NW

Checked: SK

Date: Sept 2012

Scale: As shown

Source: Adapted from Coffey (Aug 2012) CUTEP Report

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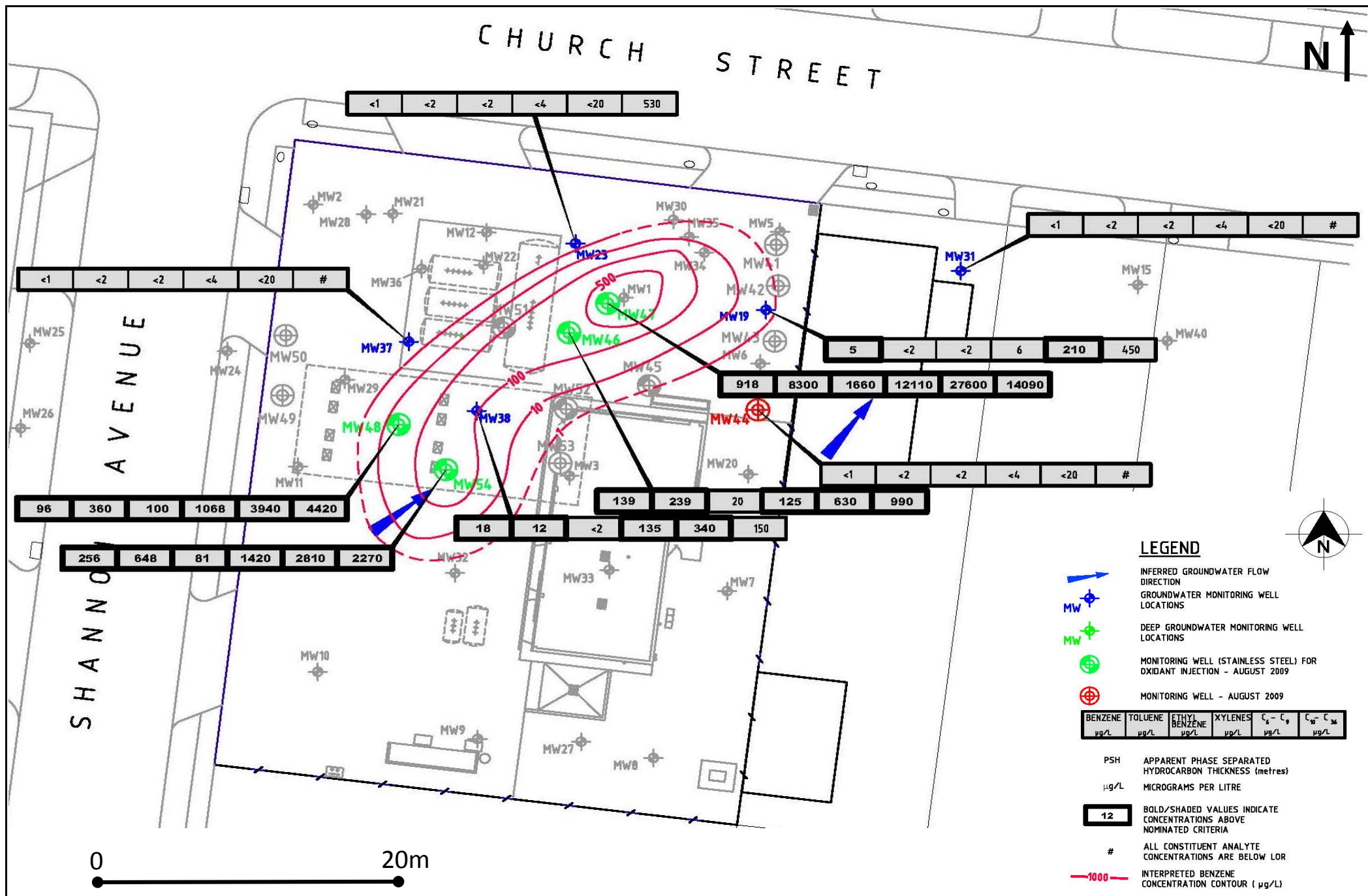


Figure 6. Benzene in Groundwater (Jan 2011)

Location: 151 Church Street, Geelong West

Job Ref: 5176

Drawn: NW

Checked: SK

Date: Sept 2012

Scale: As shown

Source: Adapted from Coffey (Aug 2012) CUTEP Report

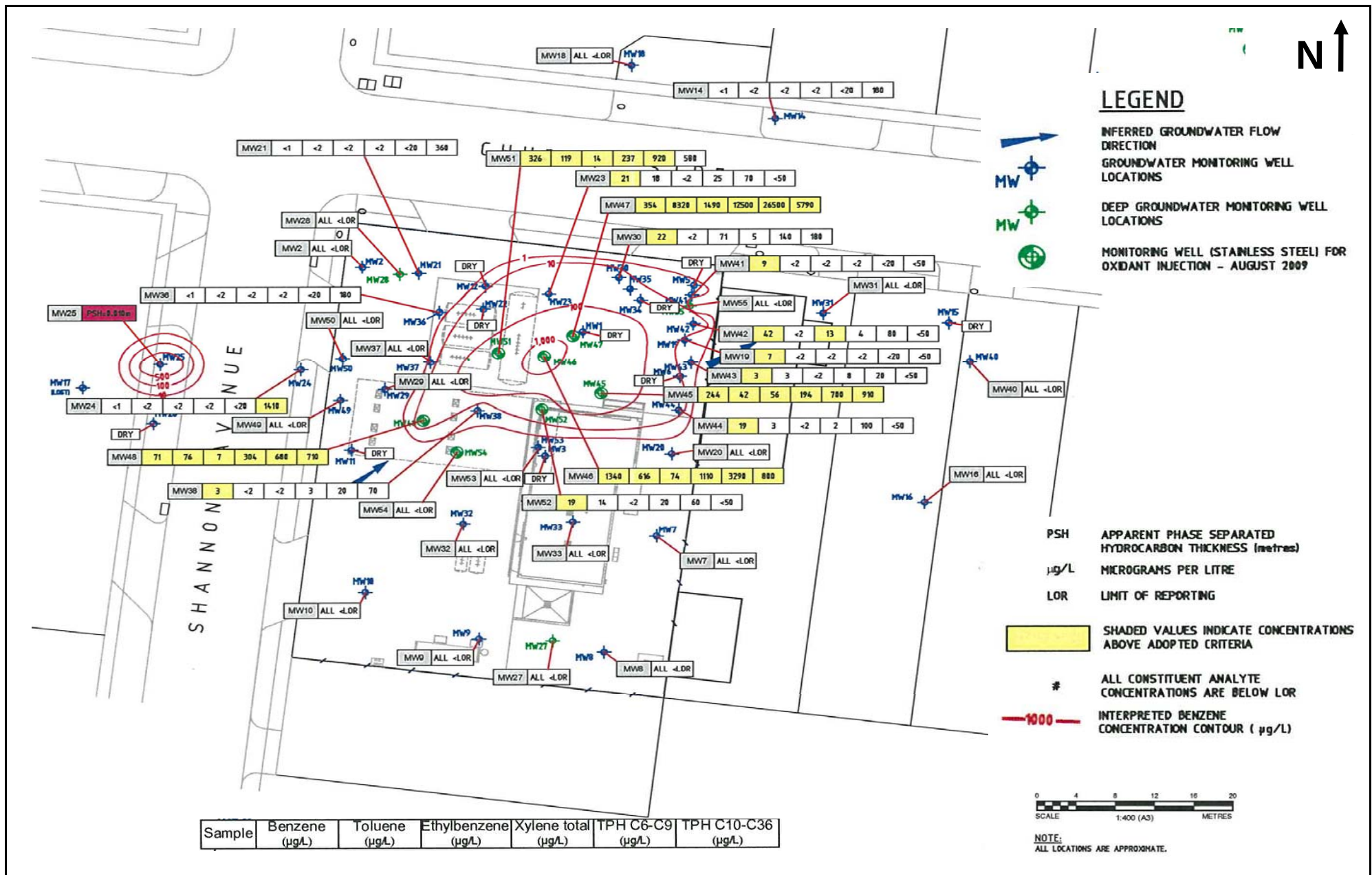
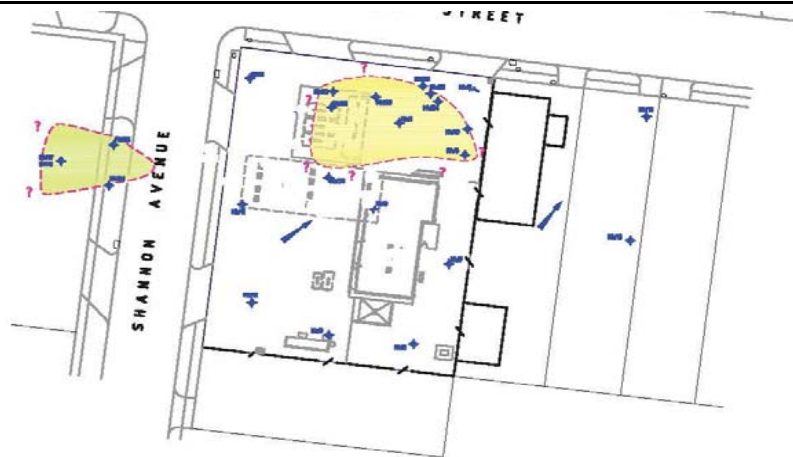


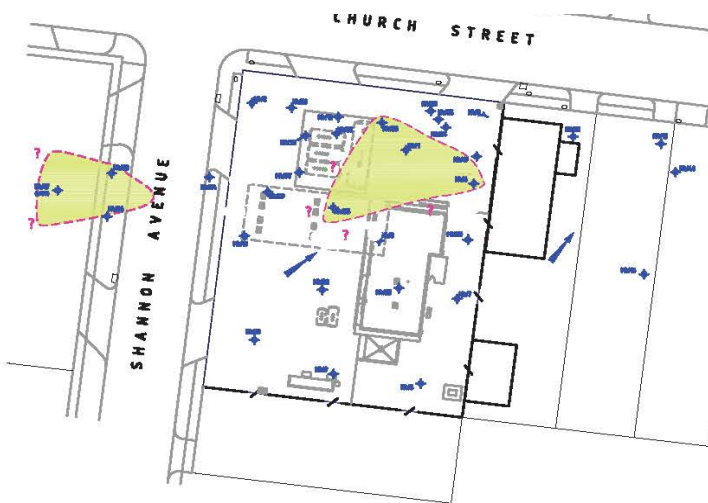
Figure 7. Benzene in Groundwater (Feb 2012)



INFERRED PSH PLUME OCTOBER 1998
CONDUCTED BY HANDEX



INFERRED PSH PLUME JUNE 2003
CONDUCTED BY COFFEY (IT Environmental)



INFERRED PSH PLUME FEBRUARY 2009



INFERRED PSH PLUME JANUARY 2011
NO MEASURABLE PSH

0 20m

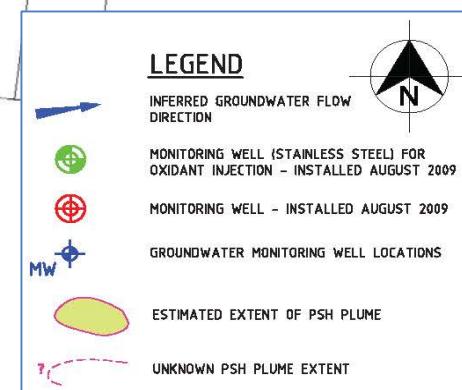


Figure 8. Interpreted Historical NAPL Extent

Location: 151 Church Street, Geelong West

Job Ref: 5176

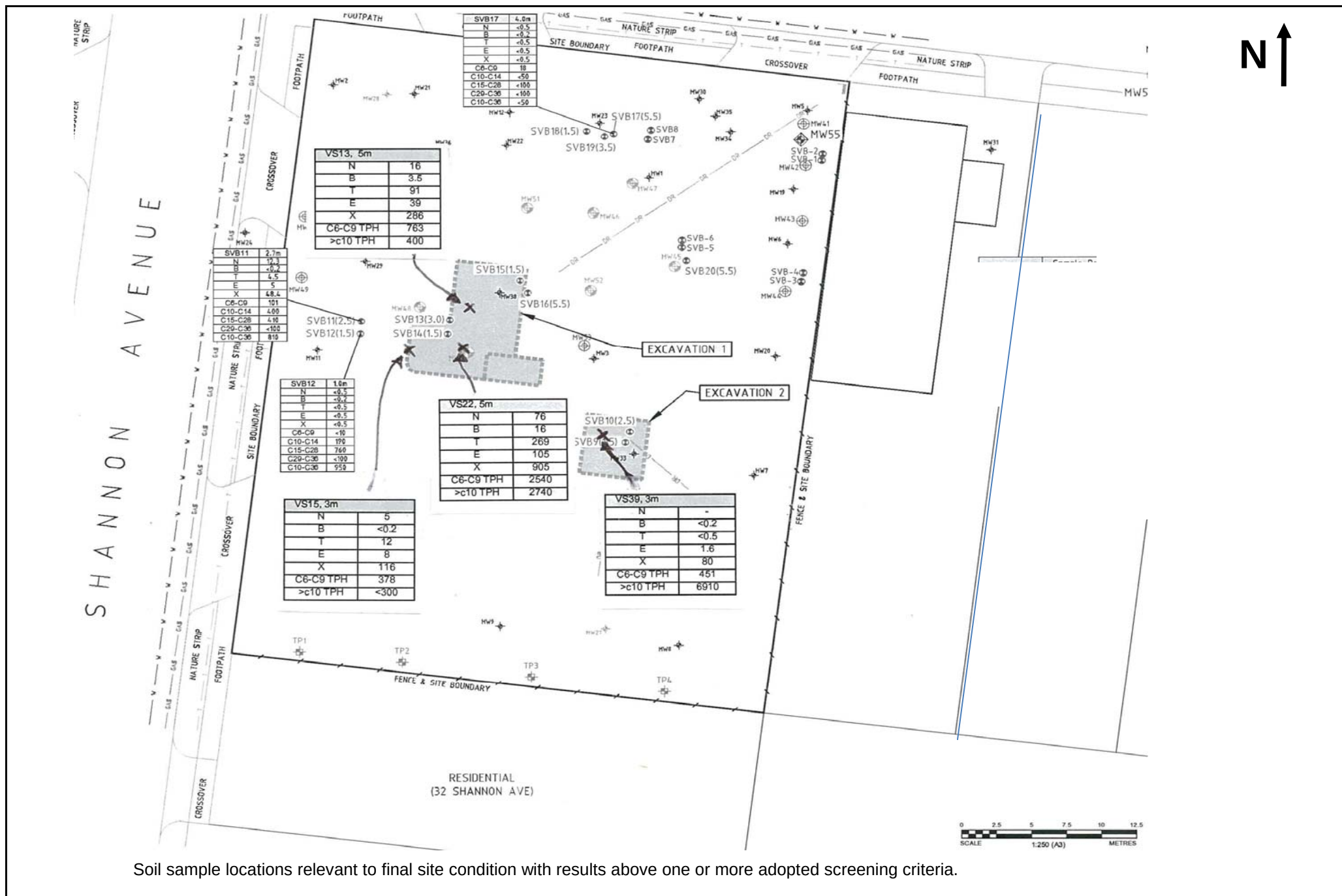
Drawn: NW

Checked: SK

Date: Sept 2012

Scale: As shown

Source: Adapted from Coffey (Aug 2012) CUTEP Report



Soil sample locations relevant to final site condition with results above one or more adopted screening criteria.

Figure 9. Residual Soil Impacts

Location: 151 Church Street, Geelong West

AEC Job Ref: 5176

Drawn: NW

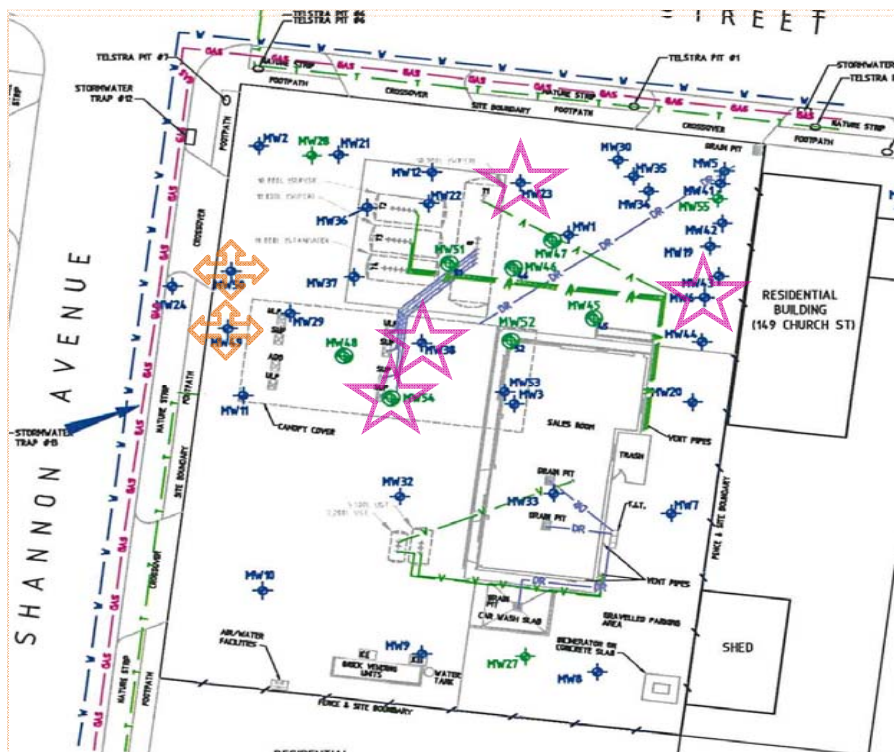
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Date: Sept 2012

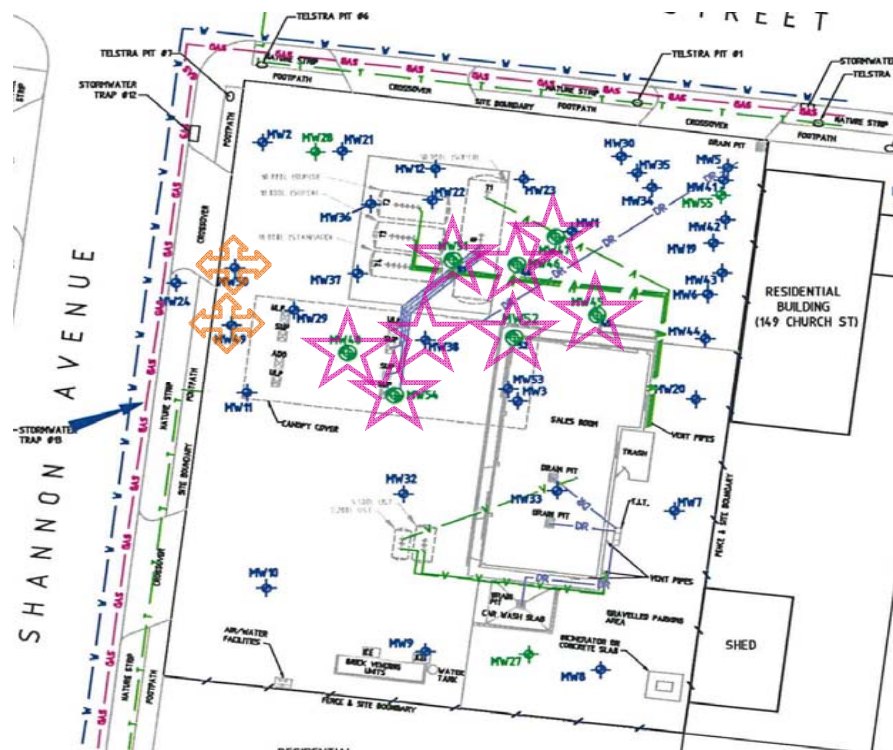
Scale: As shown

Source: Adapted from Coffey (Aug 2012) CUTEP Report

SEPTEMBER 2009 (ORA INJECTION AND MPEAT)



MARCH 2010 (ORA INJECTION AND MPEAT)



Oxygen release agent (ORA) injection locations.
(total 4,750L of ORA injected)



Multiphase extraction and treatment (MPEAT) locations.
(total 5,000L of fluids extracted)



Oxygen release agent (ORA) injection locations.
(total 10,495L of ORA injected)



Multiphase extraction and treatment (MPEAT) locations.
(total 6,000L of fluids extracted)

Figure 10. ORA Injection Locations and MPEAT Locations (2009/2010)

Location: 151 Church Street, Geelong West

Job Ref: 5176

Drawn: SK

Checked: SK

Date: Sept 2012

Scale: As shown

Source: Adapted from Coffey (Aug 2012) CUTEP Report

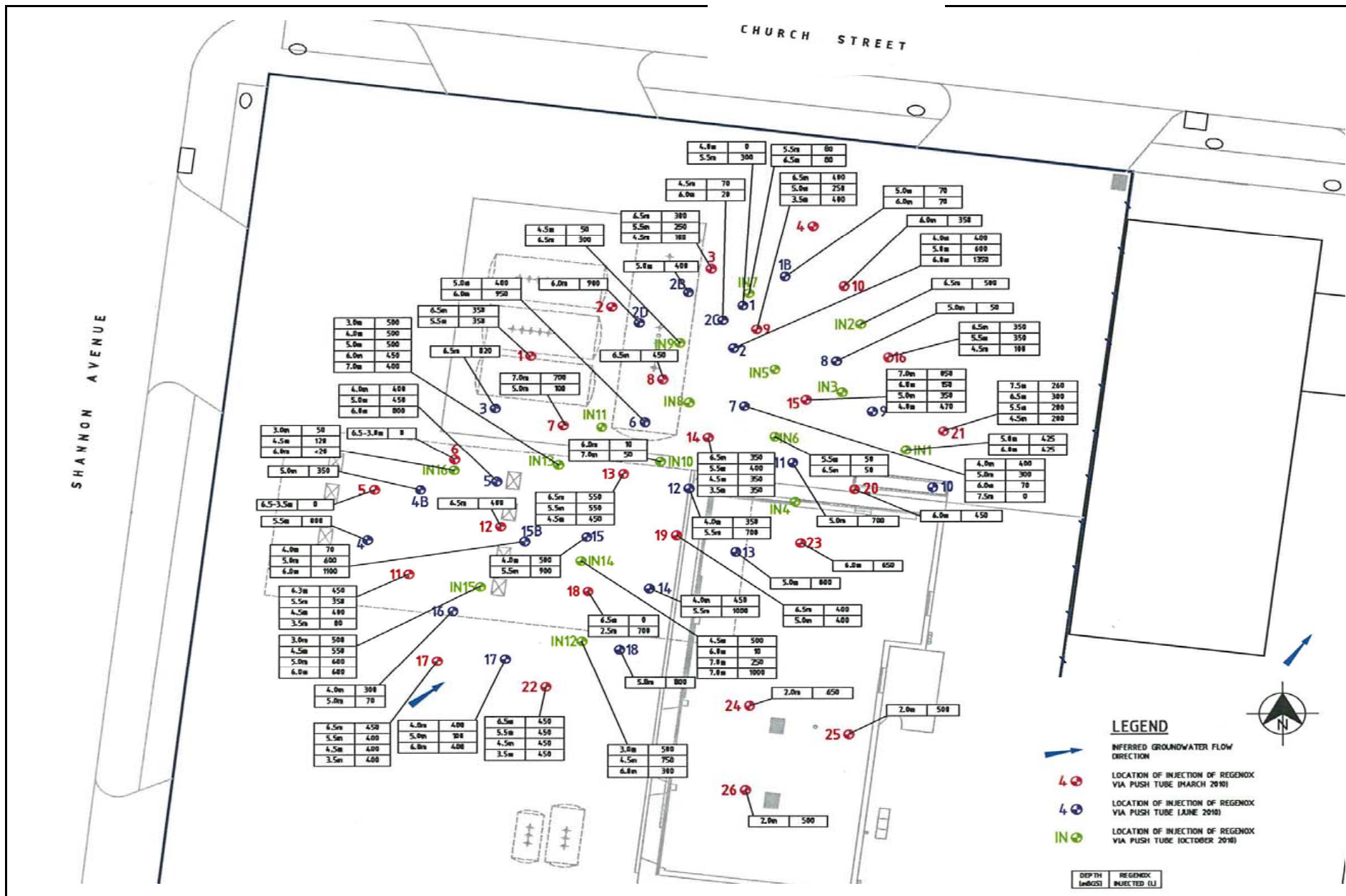


Figure 11. ISCO Injection Locations in Soil (2010)

Location: 151 Church Street, Geelong West

Job Ref: 5176

Drawn: SK

Checked: SK

Date: Sept 2012

Scale: As shown

Source: Adapted from Coffey (Aug 2012) CUTEP Report

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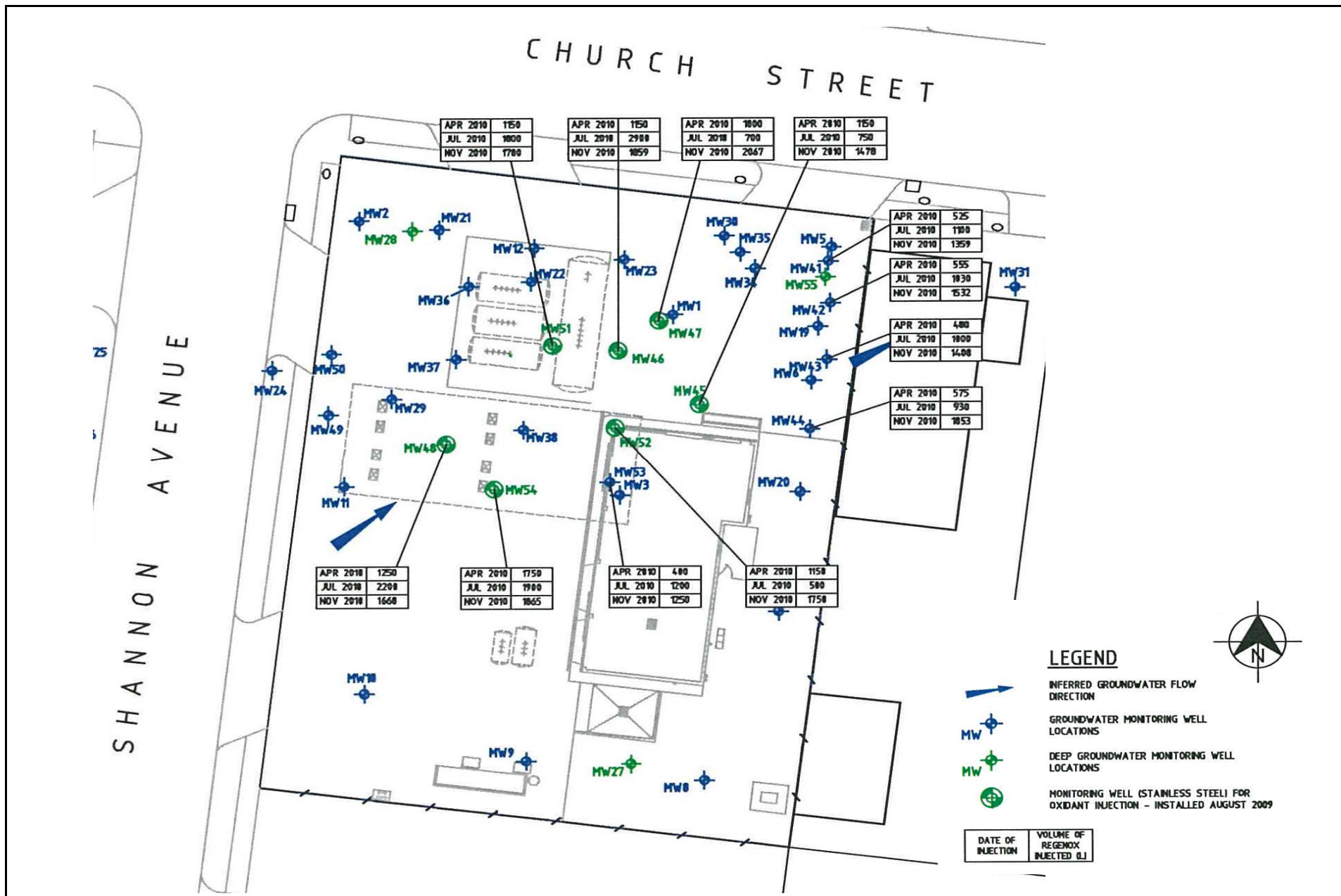


Figure 12. ISCO Injection Locations in Groundwater (2010)

Location: 151 Church Street, Geelong West

Job Ref: 5176

Drawn: SK

Checked: SK

Date: Sept 2012

Scale: As shown

Source: Adapted from Coffey (Aug 2012) CUTEP Report

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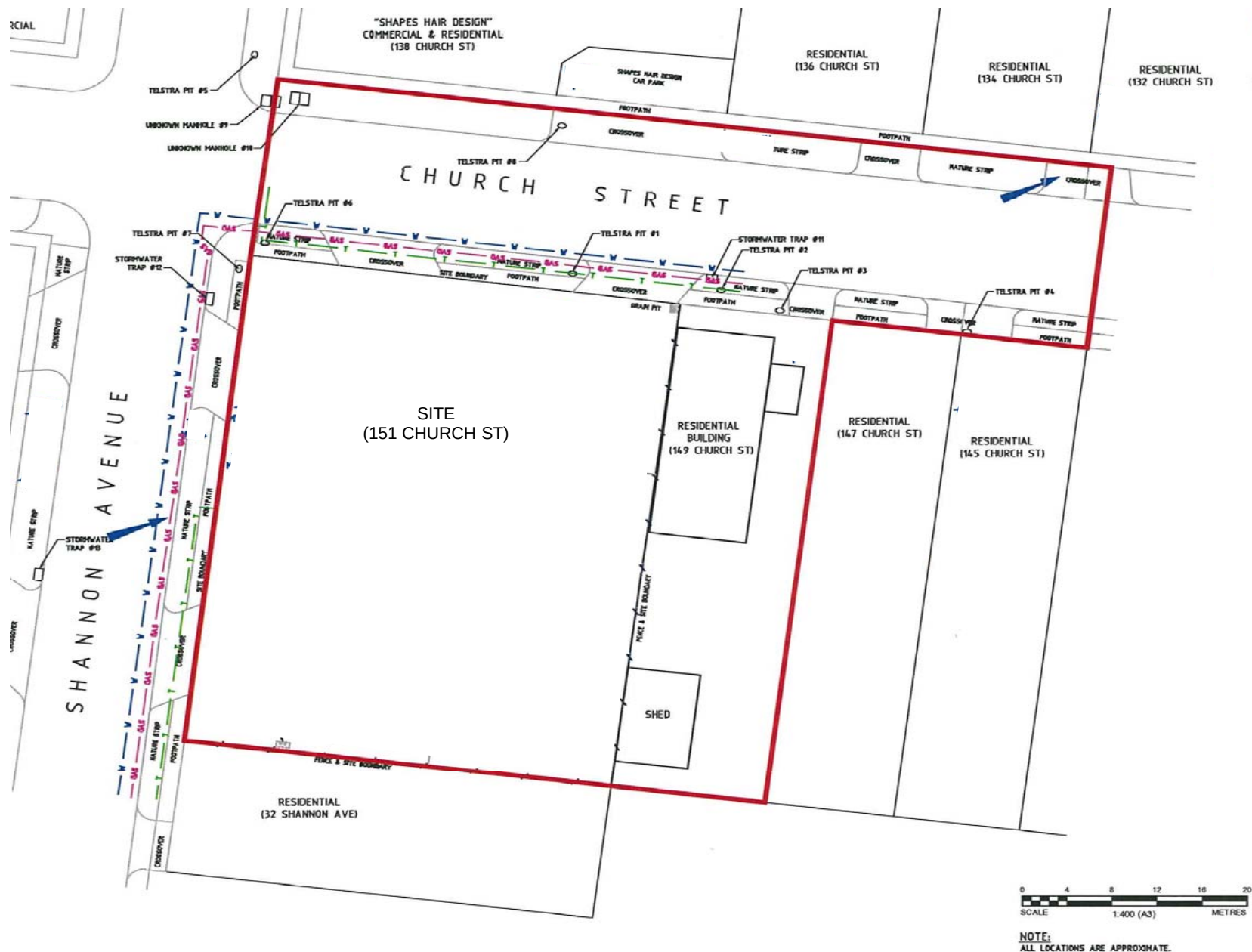


Figure 13. Groundwater Quality Restricted Use Zone

Location: 151 Church Street, Geelong West		Job Ref: 5176	Drawn: SK	 Page 105 of 156
Date: Sept 2012	Scale: As shown	Source: Adapted from Coffey (Aug 2012) CUTEP Report	Checked: SK	

TABLES



TABLE 1
FORMER UNDERGROUND STORAGE TANK DETAILS
Former Mobil Geelong West Service Station (VO0993)
Annual GME (February 2012)

Tank ID	Type of Tank	Approximate Size (kL)	Product Type	Type of Construction	Status	Corrosion Protection	Condition of Tank if Exposed	Overfill Protection	Leak Detection Type	Date of Installation	Tank Bottom Invert (mBGS)	Date of Last Integrity Test	Removal or Abandonment Date	Origin of Information
T1	UST	57	Leaded Petrol	NK	Removed	NK	NA	NK	NK	NK	NK	NK	Approx 1997	PPK (1998)*
T2	UST	18	Unleaded Petrol	NK	Removed	NK	NA	NK	NK	NK	NK	NK	Approx 1997	PPK (1998)*
T3	UST	18	Unleaded Petrol	NK	Removed	NK	NA	NK	NK	NK	NK	NK	Approx 1997	PPK (1998)*
T4	UST	18	Diesel	NK	Removed	NK	NA	NK	NK	NK	NK	NK	Approx 1997	PPK (1998)*
T5	UST	6	Kerosene	NK	Removed	NK	NA	NK	NK	NK	NK	NK	Approx 1997	PPK (1998)*
T6	UST	3	Waste Oil	NK	Removed	NK	NA	NK	NK	NK	NK	NK	Approx 1997	PPK (1998)*

Notes:

UST = Underground Storage Tank

NA = Not Applicable

NK = Not Known

* Origin of Information = PPK Environment and Infrastructure, *Quantitative Health Risk Assessment Of Former Service Station, Geelong West, Victoria (VO0993)*, December 1998

TABLE 2
GROUNDWATER MONITORING WELL DETAILS
FORMER MOBIL SERVICE STATION GEELONG WEST (V00993)
ANNUAL GME
February 2012

Well ID	Date of Installation	Casing Diameter (mm)	Total Depth (m) bgs	Screen length (m)	Top of Well Casing Elevation (mAHD)	Well Head Type	Well Cap Type	Well Head and Cap Condition	Screen Zone Lithology ***
MW1	30/04/1998	50	8.00	3.0	29.050	Standpipe with monument	Push down Cap	Good	Silt to Silty Clay
MW2	11/06/1998	50	9.00	4.5	29.380	Standpipe with monument	Screw down "J" Cap	Good	Silt, Silty Clay, Clayey Sand, Sandy Silt
MW3	30/04/1998	50	8.00	3.0	29.260	Standpipe with monument	Push down Cap	OK. Monument slightly bent	Silt
MW4						Lost/ abandoned			
MW5	11/06/1998	50	8.00	4.5	28.420	Standpipe with monument	Screw down "J" Cap	OK. Cracked standpipe	Clayey Sand
MW6	11/06/1998	50	9.50	4.5	28.940	Standpipe with monument	Push down Cap	Good	Sand, Sandy Clay, Clayey Sand
MW7	11/06/1998	50	10.00	4.5	29.110	Standpipe with monument	Screw down "J" Cap	OK. Cracked cap replaced	Clayey Sand, Sandy Clay
MW8	11/06/1998	50	8.60	4.5	29.240	Standpipe with monument	Screw down "J" Cap	Good	Clayey Sand
MW9	11/06/1998	50	9.50	4.5	29.300	Standpipe with monument	Screw down "J" Cap	Good	Clayey Sand
MW10	11/06/1998	50	9.10	4.5	29.470	Standpipe with monument	Screw down "J" Cap	Good	Clayey Sand
MW11	11/06/1998	50	8.60	4.5	29.330	Standpipe with monument	Screw down "J" Cap	Good	Clayey Sand
MW12	11/06/1998	50	7.70	4.5	29.150	Standpipe with monument	Screw down "J" Cap	Good	Clayey Sand
MW13						Lost/ abandoned			
MW14	07/08/1998	50	8.50	3.0	28.470	Flush mounted gatic (Flip top)	Screw down "J" Cap	Good	Silt
MW15	06/08/1998	50	9.00	3.0	28.340	Flush mounted gatic (Flip top)	Screw down "J" Cap	Good	Silt
MW16	13/02/2012	50	8.89	3.0	28.500	Flush mounted gatic (Flip top)	Screw down "J" Cap	Good	Silt
MW17	05/10/1998	50	10.00	4.5	29.260	Well not found			
MW18	05/10/1998	50	10.00	4.5	28.730	Flush mounted gatic (Flip top)	Screw down "J" Cap	Good	Silt
MW19	19/01/2000	50	10.00	NK	29.210	Standpipe without monument	Screw down "J" Cap	OK. No monument	Clayey Sand
MW20	19/01/2000	50	10.00	NK	29.500	Standpipe without monument	Screw down "J" Cap	OK. No monument	Clayey Sand
MW21	24/05/2000	50	10.00	NK	29.620	Standpipe without monument	Screw down "J" Cap	OK. No monument	Clayey Sand
MW22	24/05/2000	50	10.00	NK	29.460	Standpipe without monument	Screw down "J" Cap	OK. No monument	Clayey Sand
MW23	24/05/2000	50	10.00	NK	29.290	Standpipe without monument	Screw down "J" Cap	OK. No monument	Sandy Clay
MW24	19/03/2001	50	9.00	3.0	29.150	Flush mounted gatic (Screw down)	Screw down "J" Cap	Poor. Gatic not fixed.	Sandy Clay
MW25	14/02/2012	50	9.15	3.0	29.140	Flush mounted gatic (Screw down)	Screw down "J" Cap	Poor. Gatic not fixed.	Clayey sand
MW26	20/03/2001	50	9.20	3.0	29.120	Flush mounted gatic (Screw down)	Screw down "J" Cap	Poor. Gatic not fixed.	Clayey Sand
MW27	12/02/2004	50	15.00	3.0	29.810	Standpipe with monument	Push down Cap	Good	Sandy Clay
MW28	13/02/2004	50	15.00	3.0	29.790	Standpipe with monument	Push down Cap	Good	Sand Silty Clay
MW29	13/02/2004	50	10.00	4.0	29.690	Standpipe with monument	Screw down "J" Cap	Good	Sand
MW30	26/02/2004	50	9.50	3.0	29.400	Standpipe with monument	Screw down "J" Cap	Good	Sand to Clayey sand
MW31	26/02/2004	50	9.00	4.0	28.500	Flush mounted gatic (Screw down)	Screw down "J" Cap	Good	Sand with Some Gravels
MW32	12/02/2004	50	11.00	4.5	29.650	Standpipe with monument	Push down Cap	Good	Sand to Silty Clayey Sand
MW33	13/02/2004	50	10.50	4.5	29.620	Standpipe with monument	Push down Cap	Good	Sand to Silty Clayey Sand
MW34	12/10/2004	50	9.70	5.0	29.000	Standpipe without monument	Screw down "J" Cap	OK. No monument	Clayey Silty Sand to Silty Sand
MW35	12/10/2004	50	9.70	6.0	29.370	Standpipe with monument	Push down Cap	Good	Silty Sand to Sand
MW36	12/10/2004	50	10.00	6.0	29.490	Standpipe with monument	Push down Cap	Good	Sand
MW37	12/10/2004	50	10.00	4.0	29.490	Standpipe with monument	Push down Cap	Good	Sand
MW38	12/10/2004	50	9.50	4.0	29.420	Standpipe with monument	Push down Cap	Good	Sandy Silt to Sand
MW39	12/10/2004	50	9.00	3.0	27.980	Flush mounted gatic (Screw down)	Push down Cap	Good	Silty Sand
MW40	12/10/2004	50	11.00	3.0	28.290	Flush mounted gatic (Screw down)	Push down Cap	Good	Silt to silty sand
MW41	22/07/2009	50	11.00	5.5	29.470	Flush mounted gatic (Screw down)	Push down Cap	Good	Silty sand
MW42	22/07/2009	50	11.00	5.5	29.407	Flush mounted gatic (Screw down)	Push down Cap	Good	Silt
MW43	22/07/2009	50	11.00	5.5	29.351	Flush mounted gatic (Screw down)	Push down Cap	Good	Silty sand
MW44	22/07/2009	50	11.00	5.5	29.414	Flush mounted gatic (Screw down)	Push down Cap	Good	Silty sand
MW45	22/07/2009	50	11.50	5.5	29.255	Flush mounted gatic (Screw down)	Push down Cap	Good	Silty Sand to Clayey Sand
MW46	14/02/2012	50	11.05	4.5	29.310	Flush mounted gatic (Screw down)	Push down Cap	Good	Silty Sand to Clayey Sand
MW47	22/07/2009	50	11.50	5.0	29.323	Flush mounted gatic (Screw down)	Push down Cap	Good	Clayey Sand to Sand
MW48	23/07/2009	50	11.50	5.0	29.552	Flush mounted gatic (Screw down)	Push down Cap	Good	Silty Sand to Clayey Sand
MW49	23/07/2009	50	11.50	5.5	29.810	Flush mounted gatic (Screw down)	Push down Cap	Good	Silty Sand
MW50	23/07/2009	50	11.50	5.5	29.861	Flush mounted gatic (Screw down)	Push down Cap	Good	Silty Sand
MW51	23/07/2009	50	11.5	5.0	29.405	Flush mounted gatic (Screw down)	Push down Cap	Good	Sand, Silty sand and Clayey Sand
MW52	23/07/2009	50	11.50	5.0	29.383	Flush mounted gatic (Screw down)	Push down Cap	Good	Sand to Silty Sand
MW53	23/07/2009	50	11.50	5.5	29.561	Flush mounted gatic (Screw down)	Push down Cap	Good	Silty Sand
MW54	23/07/2009	50	11.50	4.5	29.509	Flush mounted gatic (Screw down)	Push down Cap	Good	Silty Sand
MW55	31/08/2011	50	15.00	3.0	29.505	Standpipe with monument	Push down Cap	Good	Silty Sand

Notes:

Well head condition survey conducted

NK = Not known

ID = identification

AHD = Australia Height Datum (Surveyed 2004 & 2009)

*** These descriptions are extracted from available bore logs

TABLE 3
CURRENT GROUNDWATER GAUGING RESULTS
FORMER MOBIL SERVICE STATION GEELONG WEST (V00993)
ANNUAL GME
February 2012

Well ID	Date Measured	Time Measured	Event	Top of Well Casing Elevation (mAHD)	Depth to Water* (m)	Depth to PSH* (m)	PSH Thickness (m)	Product Gravity*	Hydraulic Equivalent (m)	Corrected Depth to Water (m)	Corrected Water Elevation (mAHD)	Comments
MW1	09/02/2012	PM	GME	29.085	DRY					DRY	DRY	Dry, no odour, PID reading of 4.8 ppm
MW2	09/02/2012	PM	GME	29.379	8.881					8.881	20.498	Gatic full of water, no HCO
MW3	09/02/2012	PM	GME	29.260	DRY					DRY	DRY	Dry, flush gatic
MW5	09/02/2012	PM	GME	28.940	DRY					DRY	DRY	Dry, well in good condition
MW6	09/02/2012	PM	GME	28.937	DRY					DRY	DRY	PID reading of 57.6ppm, no odour, well in good condition, well deeper in casing
MW7	09/02/2012	PM	GME	29.107	8.608					8.608	20.499	no odour, well in good condition
MW8	09/02/2012	PM	GME	29.291	8.730					8.730	20.561	no odour, well in good condition
MW9	09/02/2012	PM	GME	29.298	8.686					8.686	20.612	Well in good condition, no odour
MW10	09/02/2012	PM	GME	29.468	8.801					8.801	20.667	Well in good condition, no odour
MW11	09/02/2012	PM	GME	29.330	DRY					DRY	DRY	Dry, well in good condition, no odour
MW12	09/02/2012	PM	GME	29.146	DRY					DRY	DRY	Dry, Water in gatic
MW14	09/02/2012	PM	GME	28.481	8.123					8.123	20.358	PID reading of 0ppm, no odour
MW15	09/02/2012	PM	GME	28.337	DRY					DRY	DRY	Dry
MW16	13/02/2012	PM	GME	28.340	8.156					8.156	20.184	Well in good condition. No sheen, no odour
MW18	09/02/2012	PM	GME	28.727	8.321					8.321	20.406	PID reading of 0ppm, no odour
MW19	09/02/2012	PM	GME	29.211	8.805					8.805	20.406	0.0ppm, no odour, well in good condition
MW20	09/02/2012	PM	GME	29.502	9.037					9.037	20.465	PID reading of 0.0ppm, no odour, well in good condition
MW21	09/02/2012	PM	GME	29.622	9.131					9.131	20.491	Missing stickup gatic/lockable lid, no HCO
MW22	09/02/2012	PM	GME	29.458	DRY					DRY	DRY	Dry, no stickup gatic/lockable lid
MW23	09/02/2012	PM	GME	29.291	8.856					8.856	20.435	No stickup gatic/lockable lid, PID reading of 2.8 ppm, no odour
MW24	14/02/2012	PM	GME	29.153	8.557					8.557	20.596	No HCO, no odour, broken lid
MW25	14/02/2012	PM	GME	29.143	8.483	8.443	0.010	0.720	0.007	8.476	20.667	Cover broken, Bailer confirmed 1cm PSH, dark brown
MW26	14/02/2012	PM	GME	29.124	DRY					DRY	DRY	Dry. No well cap
MW27	14/02/2012	PM	GME	29.807	9.253					9.253	20.554	Well in good condition, no odour
MW28	14/02/2012	PM	GME	29.790	9.310					9.310	20.480	Well in good condition, no HCO
MW29	09/02/2012	PM	GME	29.695	9.135					9.135	20.560	Well in good condition, no odour
MW30	09/02/2012	PM	GME	29.403	8.981					8.981	20.422	Well in good condition, no odour, PID reading of 7.8 ppm
MW31	26/05/2011	PM	GME	28.493	8.132					8.132	20.361	Well in good condition, no odour, PID reading of 0.0ppm
MW32	09/02/2012	PM	GME	29.649	9.076					9.076	20.573	Well in good condition, no odour
MW33	09/02/2012	PM	GME	29.618	9.079					9.079	20.539	No odour. Pipe bent
MW34	09/02/2012	PM	GME	28.615	DRY					DRY	DRY	Dry, no odour, flush gatic
MW35	09/02/2012	PM	GME	29.437	9.210					9.210	20.227	Well in good condition
MW36	09/02/2012	PM	GME	29.491	8.999					8.999	20.492	Well in good condition, no HCO
MW37	09/02/2012	PM	GME	29.493	8.826					8.826	20.667	Well in good condition, bailer check confirms no PSH
MW38	09/02/2012	PM	GME	29.424	8.901					8.901	20.523	Well in good condition, strong HCO, PID reading of 159ppm, bailer check confirms no PSH
MW40	09/02/2012	PM	GME	28.286	7.959					7.959	20.327	No odour, PID reading of 0ppm
MW41	09/02/2012	PM	GME	29.509	9.120					9.12	20.389	Oppm, no odour, well in good condition
MW42	09/02/2012	PM	GME	29.467	9.069					9.069	20.398	0.0ppm, no odour, well in good condition
MW43	09/02/2012	PM	GME	29.346	8.934					8.934	20.412	PID reading of 0.3ppm, no odour, well in good condition
MW44	09/02/2012	PM	GME	29.458	9.019					9.019	20.439	Well in good condition, no odour, PID reading of 0.0ppm
MW45	09/02/2012	PM	GME	29.295	8.798					8.798	20.497	Well in good condition, strong HCO, Bailer check confirms no PSH, PID reading of 18.0ppm
MW46	14/02/2012	PM	GME	29.311	8.841					8.841	20.47	Well cap used to be stuck, slight HCO, Bailer check confirms no PSH
MW47	09/02/2012	PM	GME	29.324	8.893					8.893	20.431	Well in good condition, no odour, PID reading of 3.5 ppm
MW48	14/02/2012	PM	GME	29.558	9.011					9.011	20.547	Well cap used to be stuck, no sheen, no HCO
MW49	09/02/2012	PM	GME	29.845	9.237					9.237	20.608	Well in good condition, no odour
MW50	09/02/2012	PM	GME	29.897	9.320					9.320	20.577	Well in good condition, no odour
MW51	09/02/2012	PM	GME	29.405	8.931					8.931	20.474	Well in good condition, no odour
MW52	09/02/2012	PM	GME	29.388	8.895					8.895	20.493	Well in good condition, slight HCO, Bailer check confirms no PSH, PID reading of 1.1ppm
MW53	09/02/2012	PM	GME	29.601	9.091					9.091	20.51	Well in good condition, no odour
MW54	09/02/2012	PM	GME	29.512	8.952					8.952	20.560	Well in good condition, slight HCO, Bailer check confirms no PSH, PID reading of 1.9ppm
MW55	09/02/2012	PM	GME	29.505	9.231					9.231	20.274	0.0 ppm, no odour, well in good condition

TABLE 4
HISTORICAL GROUNDWATER GAUGING RESULTS
FORMER MOBIL SERVICE STATION GEELENG WEST (ND09993)
ANNUAL CME
February 2012

WMID	Date	WM Diameter (mm)	PR Depth (mm)	Total Well Depth (mtrCS)	Total Depth (mtrCS)	WMI TOC (mtrCS)	SML (mtrCS)	Depth to PSI (mtrCS)	PSI Thickness (m)	SML Elevation (mMAD)	Corrected SML (mMAD)	Comments
WM1	1/10/2011	50	-	1.00	-	7.760	29.055	DRY	-	DRY	DRY	DRY
	1/10/2011	50	2.7	7.760	-	7.760	29.055	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	-	-	7.760	29.055	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	3.00	-	8.070	29.379	DRY	-	20.417	20.417	DRY
	1/10/2011	50	7.8	8.070	-	7.760	29.055	DRY	-	-	-	DRY
WM2	1/10/2011	50	0.0	3.00	-	8.070	29.379	DRY	-	20.417	20.417	DRY
	1/10/2011	50	0.0	3.00	-	8.070	29.379	DRY	-	20.417	20.417	DRY
	1/10/2011	50	0.0	3.00	-	8.070	29.379	DRY	-	20.417	20.417	DRY
	1/10/2011	50	0.0	3.00	-	8.070	29.379	DRY	-	20.417	20.417	DRY
	1/10/2011	50	0.0	3.00	-	8.070	29.379	DRY	-	20.417	20.417	DRY
WM3	1/10/2011	50	14.3	-	-	7.640	29.250	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	-	-	7.640	29.250	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	-	-	7.640	29.250	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	-	-	7.640	29.250	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	-	-	7.640	29.250	DRY	-	DRY	DRY	DRY
WM4	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	5.5	8.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	-	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	-	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	-	-	8.280	28.930	DRY	-	DRY	DRY	DRY
WM5	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
WM6	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
WM7	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
WM8	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
WM9	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
WM10	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
WM11	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
WM12	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
WM13	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
WM14	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
WM15	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
WM16	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
WM17	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
WM18	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
WM19	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
WM20	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
WM21	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
WM22	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
WM23	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY
	1/10/2011	50	0.0	3.00	-	8.280	28.930	DRY	-	DRY	DRY	DRY

TABLE 4
RIVER/WATER GAUGING RESULTS
STATION GEELONG WEST (NO0993)
ANNUAL GME
February 2012

Well ID	Date	Well Diameter (mm)	True Well			Total Depth (m)	Coreing Depth (m)	True Elevation (mASL)	Well Elevation (mASL)	SML (mASL)	PSH (mASL)	Depth to PSH (m)	Corrected SML (mASL)	Comments
			PD (gpm)	(m/s)	(m/s)									
WM24	13/03/2011	50	41.5	930	-	834	29.153	8.603	-	-	-	20.600	20.600	Gas: Boils under static lift of water
	15/04/2011	50	54.8	930	-	830	29.153	8.533	-	-	-	20.600	20.600	Gas: removable. Strong HCO ₂ no PSH in boiler
	15/04/2011	50	64.8	930	-	830	29.153	8.572	-	-	-	20.351	20.351	Gas: removable. Strong HCO ₂ no PSH in boiler
	13/03/2011	50	10.0	-	10.01	29.143	8.588	8.444	0.054	20.605	20.644	Strong HCO ₂ boiler check confirms 1.5m above PSH		
	23/03/2011	50	-	10.00	-	900	29.143	8.548	8.415	0.018	20.700	20.713	Gas: removable. Strong HCO ₂ boiler confirms 1.5m above PSH	
WM25	15/04/2011	50	15.0	10.60	-	900	29.143	8.458	8.441	0.017	20.685	20.697	Gas: removable. Strong HCO ₂ boiler check confirms 1.5m above PSH	
	14/03/2012	50	-	930	-	915	29.143	8.438	8.433	0.010	20.680	20.687	Gas: removable. Strong HCO ₂ boiler confirms 1.5m above PSH	
	13/03/2011	50	31.7	930	-	835	29.154	8.617	-	-	-	20.697	20.697	Gas: removable. Strong HCO ₂ boiler confirms 1.5m above PSH
	09/02/2012	50	0.0	10.00	-	10.01	29.066	9.188	-	-	-	20.697	20.697	Gas: removable. Strong HCO ₂ boiler confirms 1.5m above PSH
	17/03/2011	50	0.0	10.00	-	10.01	29.066	9.188	-	-	-	20.697	20.697	Gas: removable. Strong HCO ₂ boiler confirms 1.5m above PSH
WM26	23/03/2011	50	0.0	15.00	-	15.83	29.607	9.522	-	-	-	20.575	20.575	Well in good condition, no HCO ₂ PSH reading of 0.0gpm
	17/03/2011	50	0.0	15.00	-	15.83	29.607	9.522	-	-	-	20.575	20.575	Well in good condition, no HCO ₂ PSH reading of 0.0gpm
	23/03/2011	50	0.3	15.00	-	15.60	29.790	9.113	-	-	-	20.677	20.677	Well in good condition, no HCO ₂ PSH reading of 0.0gpm
	09/02/2012	50	-	10.00	-	10.46	29.605	9.135	-	-	-	20.375	20.375	Well in good condition, no HCO ₂ PSH reading of 0.0gpm
	23/03/2011	50	0.0	10.00	-	10.46	29.605	9.135	-	-	-	20.375	20.375	Well in good condition, no HCO ₂ PSH reading of 0.0gpm
WM27	13/03/2011	50	-	930	-	930	29.400	9.065	-	-	-	20.388	20.388	Well in good condition, no HCO ₂ PSH reading of 0.0gpm
	17/03/2011	50	0.0	930	-	930	29.400	9.065	-	-	-	20.388	20.388	Well in good condition, no HCO ₂ PSH reading of 0.0gpm
	23/03/2011	50	0.0	930	-	930	29.400	9.065	-	-	-	20.388	20.388	Well in good condition, no HCO ₂ PSH reading of 0.0gpm
	09/02/2012	50	7.8	930	-	930	29.400	9.065	-	-	-	20.388	20.388	Well in good condition, no HCO ₂ PSH reading of 0.0gpm
	17/03/2011	50	0.0	930	-	930	29.400	9.065	-	-	-	20.388	20.388	Well in good condition, no HCO ₂ PSH reading of 0.0gpm
WM28	13/03/2011	50	-	930	-	930	29.400	9.065	-	-	-	20.388	20.388	Well in good condition, no HCO ₂ PSH reading of 0.0gpm
	17/03/2011	50	0.0	930	-	930	29.400	9.065	-	-	-	20.388	20.388	Well in good condition, no HCO ₂ PSH reading of 0.0gpm
	23/03/2011	50	10.0	930	-	930	29.400	9.065	-	-	-	20.388	20.388	Well in good condition, no HCO ₂ PSH reading of 0.0gpm
	17/03/2011	50	0.0	930	-	930	29.400	9.065	-	-	-	20.388	20.388	Well in good condition, no HCO ₂ PSH reading of 0.0gpm
	09/02/2012	50	7.8	930	-	930	29.400	9.065	-	-	-	20.388	20.388	Well in good condition, no HCO ₂ PSH reading of 0.0gpm
WM29	13/03/2011	50	-	930	-	930	29.400	9.065	-	-	-	20.388	20.388	Well in good condition, no HCO ₂ PSH reading of 0.0gpm
	17/03/2011	50	0.0	930	-	930	29.400	9.065	-	-	-	20.388	20.388	Well in good condition, no HCO ₂ PSH reading of 0.0gpm
	23/03/2011	50	10.0	930	-	930	29.400	9.065	-	-	-	20.388	20.388	Well in good condition, no HCO ₂ PSH reading of 0.0gpm
	17/03/2011	50	0.0	930	-	930	29.400	9.065	-	-	-	20.388	20.388	Well in good condition, no HCO ₂ PSH reading of 0.0gpm
	09/02/2012	50	7.8	930	-	930	29.400	9.065	-	-	-	20.388	20.388	Well in good condition, no HCO ₂ PSH reading of 0.0gpm
WM30	13/03/2011	50	-	930	-	930	29.400	9.065	-	-	-	20.388	20.388	Well in good condition, no HCO ₂ PSH reading of 0.0gpm
	17/03/2011	50	0.0	930	-	930	29.400	9.065	-	-	-	20.388	20.388	Well in good condition, no HCO ₂ PSH reading of 0.0gpm
	23/03/2011	50	10.0	930	-	930	29.400	9.065	-	-	-	20.388	20.388	Well in good condition, no HCO ₂ PSH reading of 0.0gpm
	17/03/2011	50	0.0	930	-	930	29.400	9.065	-	-	-	20.388	20.388	Well in good condition, no HCO ₂ PSH reading of 0.0gpm
	09/02/2012	50	7.8	930	-	930	29.400	9.065	-	-	-	20.388	20.388	Well in good condition, no HCO ₂ PSH reading of 0.0gpm
WM31	13/03/2011	50	-	930	-	930	29.400	9.065	-	-	-	20.388	20.388	Well in good condition, no HCO ₂ PSH reading of 0.0gpm
	17/03/2011	50	0.0	930	-	930	29.400	9.065	-	-	-	20.388	20.388	Well in good condition, no HCO ₂ PSH reading of 0.0gpm
	23/03/2011	50	10.0	930	-	930	29.400	9.065	-	-	-	20.388	20.388	Well in good condition, no HCO ₂ PSH reading of 0.0gpm
	17/03/2011	50	0.0	930	-	930	29.400	9.065	-	-	-	20.388	20.388	Well in good condition, no HCO ₂ PSH reading of 0.0gpm
	09/02/2012	50	7.8	930	-	930	29.400	9.065	-	-	-	20.388	20.388	Well in good condition, no HCO ₂ PSH reading of 0.0gpm
WM32	13/03/2011	50	0.0	10.00	-	10.16	29.618	9.072	-	-	-	20.546	20.546	Well in good condition, no HCO ₂ PSH reading of 0.0gpm
	17/03/2011	50	0.0	10.00	-	10.16	29.618	9.072	-	-	-	20.546	20.546	Well in good condition, no HCO ₂ PSH reading of 0.0gpm
	23/03/2011	50	5.3	10.00	-	11.16	29.618	9.072	-	-	-	20.546	20.546	Well in good condition, no HCO ₂ PSH reading of 0.0gpm
	13/03/2011	50	1.0	10.00	-	11.44	29.618	9.072	-	-	-	20.523	20.523	Well in good condition, no HCO ₂ PSH reading of 0.0gpm
	09/02/2012	50	-	10.00	-	11.44	29.618	9.072	-	-	-	20.523	20.523	Well in good condition, no HCO ₂ PSH reading of 0.0gpm
WM33	13/03/2011	50	-	930	-	930	29.400	9.065	-	-	-	20.388	20.388	Well in good condition, no HCO ₂ PSH reading of 0.0gpm
	17/03/2011	50	0.0	930	-	930	29.400	9.065	-	-	-	20.388	20.388	Well in good condition, no HCO ₂ PSH reading of 0.0gpm
	23/03/2011	50	10.0	930	-	930	29.400	9.065	-	-	-	20.388	20.388	Well in good condition, no HCO ₂ PSH reading of 0.0gpm
	17/03/2011	50	0.0	930	-	930	29.400	9.065	-	-	-	20.388	20.388	Well in good condition, no HCO ₂ PSH reading of 0.0gpm
	09/02/2012	50	7.8	930	-	930	29.400	9.065	-	-	-	20.388	20.388	Well in good condition, no HCO ₂ PSH reading of 0.0gpm
WM34	13/03/2011	50	-	930	-	930	29.400	9.065	-	-	-	20.388	20.388	Well in good condition, no HCO ₂ PSH reading of 0.0gpm
	17/03/2011	50	0.0	930	-	930	29.400	9.065	-	-	-	20.388	20.388	Well in good condition, no HCO ₂ PSH reading of 0.0gpm
	23/03/2011	50	10.0	930	-	930	29.400	9.065	-	-	-	20.388	20.388	Well in good condition, no HCO ₂ PSH reading of 0.0gpm
	17/03/2011	50	0.0	930	-	930	29.400	9.065	-	-	-	20.388	20.388	Well in good condition, no HCO ₂ PSH reading of 0.0gpm
	09/02/2012	50	7.8	930	-	930	29.400	9.065	-	-	-	20.388	20.388	Well in good condition, no HCO ₂ PSH reading of 0.0gpm
WM35	13/03/2011	50	-	930	-	930	29.400	9.065	-	-	-	20.388	20.388	Well in good condition, no HCO ₂ PSH reading of 0.0gpm
	17/03/2011	50	0.0	930	-	930	29.400	9.065	-	-	-	20.388	20.388	Well in good condition, no HCO ₂ PSH reading of 0.0gpm
	23/03/2011	50	10.0	930	-	930	29.400	9.065	-	-	-	20.388	20.388	Well in good condition, no HCO ₂ PSH reading of 0.0gpm
	17/03/2011	50	0.0	930	-	930	29.400	9.065	-	-	-	20.388	20.388	Well in good condition, no HCO ₂ PSH reading of 0.0gpm
	09/02/2012	50	7.8	930	-	930	29.400	9.065	-	-	-	20.388	20.388	Well in good condition, no HCO ₂ PSH reading of 0.0gpm
WM36	13/03/2011	50	-	930	-	930	29.400	9.065	-	-	-	20.388	20.388	Well in good condition, no HCO ₂ PSH reading of 0.0gpm
	17/03/2011	50	0.0	930	-	930	29.400	9.065	-	-	-	20.388	20.388	Well in good condition, no HCO ₂ PSH reading of 0.0gpm
	23/03/2011	50	10.0	930	-	930	29.400	9.065	-	-	-	20.388	20.388	Well in good condition, no HCO ₂ PSH reading of 0.0gpm
	17/03/2011	50	0.0	930	-	930	29.400	9.065	-	-	-	20.388	20.388	Well in good condition, no HCO ₂ PSH reading of 0.0gpm
	09/02/2012	50	7.8	930	-	930	29.400	9.065	-	-	-	20.388	20.388	Well in good condition, no HCO ₂ PSH reading of 0.0gpm
WM37	13/03/2011	50	-	930	-	930	29.400	9.065	-	-	-	20.388	20.388	Well in good condition, no HCO ₂ PSH reading of 0.0gpm
	17/03/2011	50	0.0	930	-	930	29.400	9.065	-	-	-	20.388	20.388	Well in good condition, no HCO ₂ PSH reading of 0.0gpm
	23/03/2011	50	10.0	930	-	930	29.400	9.065	-	-	-	20.388	20.388	Well in good condition, no HCO ₂ PSH reading of 0.0gpm
	17/03/2011	50	0.0	930	-	930	29.400	9.065	-	-	-	20.388	20.388	Well in good condition, no HCO ₂ PSH reading of 0.0gpm
	09/02/2012	50	7.8	930	-	930	29.400	9.065	-	-	-	20.388	20.388	Well in good condition, no HCO ₂ PSH reading of 0.0gpm
WM38	13/03/2011	50	-	930	-	930	29.400	9.065	-	-	-	20.388	20.388	Well in good condition, no HCO ₂ PSH reading of 0.0gpm
	17/03/2011	50	0.0	930	-	930	29.400	9.065	-	-	-	20.388	20.388	Well in good condition, no HCO ₂ PSH reading of 0.0gpm
	23/03/2011	50	10.0	930	-	930	29.400	9.065	-	-	-	20.388	20.388	Well in good condition, no HCO ₂ PSH reading of 0.0gpm
	17/03/2011	50	0.0	930	-	930	29.400	9.065	-	-	-	20.388	20.388	Well in good condition, no HCO ₂ PSH reading of 0.0gpm
	09/02/2012	50	7.8	930	-	930	29.400	9.065	-	-	-	20.388	20.388	Well in good condition, no HCO ₂ PSH reading of 0.0gpm
WM39	13/03/2011	50	-	930	-	930	29.400	9.065	-	-	-	20.388	20.388	Well in good condition, no HCO ₂ PSH reading of 0.0gpm
	17/03/2011	50	0.0	930	-	930	29.400	9.065	-	-	-	20.388	20.388	Well in good condition, no HCO ₂ PSH reading of 0.0gpm
	23/03/2011	50	10.0	930	-	930	29.400	9.065	-	-	-	20.388	20.388	Well in good condition, no HCO ₂ PSH reading of 0.0gpm
	17/03/2011	50	0.0	930	-	930	29.400	9.065	-	-	-	20.388	20.388	Well in good condition, no HCO ₂ PSH reading of 0.0gpm
	09/02/2012	50	7.8	930	-	930	29.400	9.065	-	-	-	20.388	20.388	Well in good condition, no HCO ₂ PSH reading of 0.0gpm
WM40	13/03/2011	50	-	930	-	930	29.400	9.065	-	-	-	20.388	20.388	Well in good condition, no HCO ₂ PSH reading of 0.0gpm
	17/03/2011	50	0.0	930	-	930	29.400	9.065	-	-	-	20.388	20.388	Well in good condition, no HCO ₂ PSH reading of 0.0gpm
	23/03/2011	50	10.0	930	-	930	29.400	9.065	-	-	-	20.388	20.388	Well in good condition, no HCO ₂ PSH reading of 0.0gpm
	17/03/2011	50	0.0	930	-	930	29.400	9.065	-	-	-	20.388	20.388	Well in good condition, no HCO ₂ PSH reading of 0.0

TABLE 4
UNDWATER GAUGING RESULTS
STATION GEELONG WEST (N00993)
ANNUAL GME
February 2012

[illegible]

TABLE 5
CURRENT GROUNDWATER FIELD QUALITY PARAMETERS
FORMER MOBIL SERVICE STATION GEELONG WEST (VO0993)
ANNUAL GME
February 2012

Well ID	Date Measured	Time Measured	Pump Rate	Purge Volume	Dissolved Oxygen	Temperature	Redox Potential	pH	Electrical Conductivity	Total Dissolved Solids**	Comments
			(ml/min)	(L)	(mg/L)	(°C)	(mV)		(ms/cm)	(mg/L)	
MW2	14/02/2012	Pre-Purge	Bailer	0.2	8.01	19.5	155	7.67	4.75	3088	Turbid, orange/ brown, no HCO or sheen, dry at 0.2 L
MW3	09/02/2012	DRY									
MW4	09/02/2012	Lost/Abandoned									
MW5	09/02/2012	DRY									
MW6	09/02/2012	DRY									
MW7	10/02/2012	Pre-Purge	100	0.5	4.47	24.2	53	7.65	10.34	6721	Turbid, brown, no HCO or sheen
		Post-purge	100	3.7	4.27	19.8	85	7.44	11.36	7384	Clear, no HCO or sheen
MW8	13/02/2012	Pre-Purge	Waterra	0.2	6.95	24	77	7.73	10.55	6858	Turbid, orange/ brown, no HCO or sheen
MW9	10/02/2012	Pre-Purge	100	0.5	2.67	25*	112	6.34	11.95	7768	Turbid, orange/ brown, no HCO or sheen
		Post-purge	100	3.2	0.32	25*	127	6.19	12.28	7982	Turbid, orange/ brown, no HCO or sheen
MW10	13/02/2012	Pre-Purge	100	0.5	3.90	22.6	98	7.32	8.94	5811	Turbid, orange/ brown, no HCO or sheen
		Post-purge	100	3.0	3.52	20.5	94	7.18	10.69	6949	Clear, no HCO or sheen
MW11	09/02/2012	DRY									
MW12	09/02/2012	DRY									
MW13	09/02/2012	Lost/Abandoned									
MW14	15/02/2012	Pre-Purge	Bailer	0.1	3.64	24.5	117	7.95	0.07	46	Turbid, orange/ brown, no HCO or sheen, dry at 0.1 L
MW15	09/02/2012	DRY									
MW16	13/02/2012	Pre-Purge	Bailer	1	4.59	17.9	172	8.12	11.54	7501	Turbid, orange/ brown, no HCO or sheen
		Post-purge	Bailer	6	4.88	17	131	7.89	11.79	7664	Turbid, orange/ brown, no HCO or sheen
MW17	09/02/2012	Lost/Abandoned									
MW18	15/02/2012	Pre-Purge	Bailer	1	3.20	20.9	52	8.10	0.04	26	Very cloudy/ turbid, no HCO or sheen, dry at 1.0 L
MW19	10/02/2012	Pre-Purge	100	0.5	4.77	21.4	10	7.46	9.11	5922	Turbid, orange/ brown, no HCO or sheen
		Post-purge	100	3.2	3.59	16.8	49	7.51	10	6500	Slightly cloudy, orange/ brown, no HCO or sheen
MW20	10/02/2012	Pre-Purge	100	0.5	3.34	24.7	91	7.54	10.37	6741	Turbid, orange/ brown, no HCO or sheen
		Post-purge	100	3.2	2.29	19.4	70	7.48	10.54	6851	Clear, no HCO or sheen
MW21	14/02/2012	Pre-Purge	60	0.5	18.44	16.2	114	7.42	7.76	5044	Slightly cloudy, no HCO or sheen
		Post-purge	60	3.2	22.75	17.1	95	7.36	8.12	5278	Clear, no HCO or sheen
MW22	09/02/2012	DRY									
MW23	15/02/2012	Pre-Purge	100	0.5	6.99	23.6	81	6.94	9.23	6000	Clear, slight HCO, no sheen
		Post-purge	100	3.4	6.65	21.2	148	6.55	9.95	6468	Clear, slight HCO, no sheen
MW24	15/02/2012	Pre-Purge	Bailer	1	2.73	27.4	73	7.25	6.47	4206	Turbid, brown, no HCO or sheen, dry at 1.0 L
MW25	14/02/2012	PSH 1 cm									
MW26	14/02/2012	DRY									
MW27	10/02/2012	Pre-Purge	100	0.5	4.37	22.5	117	7.55	18.57	12071	Clear, no HCO or sheen
		Post-purge	60	3.2	3.93	20.8	148	7.51	18.9	12285	Clear, no HCO or sheen
MW28	14/02/2012	Pre-Purge	100	0.5	5.52	22.8	117	7.67	5.73	3725	Clear, no HCO or sheen
		Post-purge	60	3.05	4.35	21	136	6.7	5.73	3725	Clear, no HCO or sheen
MW29	13/02/2012	Pre-Purge	100	0.5	7.02	22.4	155	6.60	8.9	5785	Cloudy, white, no HCO or sheen
		Post-purge	50	2	1.42	20.9	169	6.22	9.39	6104	Clear, no HCO or sheen

TABLE 5
CURRENT GROUNDWATER FIELD QUALITY PARAMETERS
FORMER MOBIL SERVICE STATION GEELONG WEST (VO0993)
ANNUAL GME
February 2012

Well ID	Date Measured	Time Measured	Pump Rate	Purge Volume	Dissolved Oxygen	Temperature	Redox Potential	pH	Electrical Conductivity	Total Dissolved Solids**	Comments
			(ml/min)	(L)	(mg/L)	(°C)	(mV)		(ms/cm)	(mg/L)	
MW30	15/02/2012	Pre-Purge	100	0.5	3.80	22.3	-6	7.10	5.2	3380	Clear, no HCO or sheen
		Post-purge	100	3.5	2.02	21	15	6.49	7.64	4966	Clear, no HCO or sheen
MW31	15/02/2012	Pre-Purge	Bailer	1	1.22	25.2	-60	7.35	6.61	4297	Clear, no HCO or sheen
		Post-purge	Bailer	4	1.66	18.8	-77	7.28	7.73	5025	Turbid, brown, no HCO or sheen, dry at 4.0 L
MW32	13/02/2012	Pre-Purge	Waterra	0.5	2.53	19.2	95	7.78	9.03	5870	No HCO or sheen
MW33	13/02/2012	Pre-Purge	100	0.5	4.05	21.7	99	6.50	12.32	8008	Very cloudy, orange/ brown, no HCO or sheen
		Post-purge	100	3.2	0.50	21.2	150	6.35	13.22	8593	Cloudy, orange/ brown, no HCO or sheen
MW34	09/02/2012	DRY									
MW35	15/02/2012	Pre-Purge	Waterra	Well not sampled as waterra was lodging at 1.5 mBTC. NO SAMPLE COLLECTED							
MW36	14/02/2012	Pre-Purge	100	0.5	9.85	22	103	7.49	8.14	5291	Slightly cloudy, brown, no HCO or sheen
		Post-purge	100	3	11.22	18.5	114	7.41	8.56	5564	Clear, no HCO or sheen
MW37	13/02/2012	Pre-Purge	100	0.5	8.57	21.6	123	7.72	8.41	5467	Very cloudy, white, no HCO or sheen
		Post-purge	100	3.1	8.92	20	107	7.54	8.63	5610	Clear, no HCO or sheen
MW38	13/02/2012	Pre-Purge	100	0.5	3.09	22.3	128	7.32	11.4	7410	Very Cloudy, orange/ brown, slight HCO, no sheen
		Post-purge	100	3.2	1.59	19.9	117	6.79	12.07	7846	Cloudy, orange/ brown, slight HCO, no sheen
MW39	09/02/2012	DESTROYED									
MW40	15/02/2012	Pre-Purge	Bailer	1	2.66	21.8	100	7.76	6.3	4095	Turbid, brown, no HCO or sheen
		Post-purge	Bailer	2	8.59	20	99	7.55	8.64	5616	Turbid, brown, no HCO or sheen, dry at 2.0 L
MW41	10/02/2012	Pre-Purge	100	0.5	5.97	19.3	95	8.33	10.9	7085	Slightly cloudy, no HCO or sheen
		Post-purge	60	2.3	6.27	18.6	75	7.95	11.61	7547	Clear, no HCO or sheen
MW42	10/02/2012	Pre-Purge	100	0.5	3.91	21.3	49	8.22	10.62	6903	Turbid, orange/ red, no HCO or sheen
		Post-purge	100	3.5	2.05	19.2	40	8.18	11.17	7261	Clear, no HCO or sheen
MW43	10/02/2012	Pre-Purge	100	0.5	5.07	25*	-44	7.33	9.44	6136	Slightly cloudy, orange/ brown, no HCO or sheen
		Post-purge	100	3.5	3.87	25*	61	7.34	9.89	6429	Slightly cloudy, orange/ brown, no HCO or sheen
MW44	10/02/2012	Pre-Purge	100	0.5	2.70	20.5	39	8.38	10.69	6949	Clear, no HCO or sheen
		Post-purge	75	2.375	1.56	19.1	45	8.49	11.04	7176	Clear, no HCO or sheen
MW45	14/02/2012	Pre-Purge	100	0.5	2.66	19.2	73	7.47	6.31	4102	Clear, HCO or sheen
		Post-purge	50	2.3	0.64	19.6	67	6.66	6.34	4121	Clear, HCO or sheen
MW46	14/02/2012	Pre-Purge	100	0.5	4.24	24.1	19	9.45	8.21	5337	Clear, HCO or sheen
		Post-purge	60	2.5	1.77	23	-7	9.59	8	5200	Clear, HCO or sheen
MW47	14/02/2012	Pre-Purge	100	0.5	3.28	23	9	9.77	13.43	8730	Clear, strong HCO or sheen
		Post-purge	50	2.5	0.26	22.6	-23	9.66	13.63	8860	Clear, strong HCO or sheen
MW48	14/02/2012	Pre-Purge	Bailer	1	2.82	20.6	25	10.21	9.75	6338	Clear, slight HCO, no sheen
		Post-purge	Bailer	7	3.74	18.4	10	10.36	10.57	6871	Turbid, orange/ brown, HCO, no sheen, dry at 7.0 L
MW49	13/02/2012	Pre-Purge	100	0.5	21.97	23.7	-59	12.56	14	9100	Clear, no HCO or sheen
		Post-purge	50	1.75	24.84	22.8	-37	12.03	9.9	6435	Very cloudy, white, no HCO or sheen
MW50	13/02/2012	Pre-Purge	Bailer	1	22.80	19.2	-17	12.68	14.32	9308	Very cloudy, white, no HCO or sheen, dry at 1.0 L
MW51	14/02/2012	Pre-Purge	100	0.5	3.10	24.6	67	8.38	11.14	7241	Clear, no HCO or sheen
		Post-purge	50	2	1.42	22	85	7.45	10.67	6936	Clear, no HCO or sheen
MW52	13/02/2012	Pre-Purge	100	0.5	4.36	22.1	99	8.72	7.51	4882	Very cloudy, orange/ brown, slight HCO, no sheen
		Post-purge	50	2	2.90	20.9	109	8.36	7.78	5057	Slightly cloudy, orange/ brown, slight HCO, no sheen
MW53	13/02/2012	Pre-Purge	100	0.5	4.43	23.4	108	8.04	11.23	7300	Clear, no HCO or sheen
		Post-purge	50	2.1	2.79	21.8	114	7.52	11.59	7534	Clear, no HCO or sheen
MW54	13/02/2012	Pre-Purge	Bailer	1	4.16	19.4	68	8.79	10.23	6650	Clear, slight HCO, no sheen
		Post-purge	Bailer	12	6.69	18.6	41	8.46	10.74	6981	Clear, slight HCO, no sheen, dry at 12 L
MW55	10/02/2012	Pre-Purge	100	0.5	4.90	19	171	7.36	9.84	6396	Clear, no HCO or sheen
		Post-purge	50	2.3	3.20	18.7	171	6.74	11.08	7202	Clear, no HCO or sheen

Field Equipment Used:

Water quality meter model 90FMLV

* = temperature probe from WQM not working correctly therefore temperature reported could be incorrect

°C = degrees Celsius

** Approximate value determined using the following equation: TDS (mg/L) = EC x 0.65

Well ID	Date Measured	Time Measured	Pump Rate (million)	Purge Volume (L)	Dissolved Oxygen (mg/L)	Temperature (°C)	Redox Potential (mV)	pH	Electrical Conductivity (microsiemens)	Total Dissolved Solids (µg/L)	Comments
MW1	15/04/2004										
	11/04/2006										
	12/11/2007										
	24/02/2009										
	28/10/2009										
MW2	10/05/2010										
	30/08/2010										
	17/03/2011										
	23/05/2011										
	09/02/2012										
MW3	15/04/2004										
	12/04/2006										
	12/11/2007										
	25/02/2009										
	28/10/2009										
MW4	10/05/2010										
	30/08/2010										
	17/03/2011										
	23/05/2011										
	09/02/2012										
MW5	15/04/2004										
	12/04/2006										
	12/11/2007										
	24/02/2009										
	30/10/2009										
MW6	10/05/2010										
	30/08/2010										
	17/03/2011										
	23/05/2011										
	09/02/2012										
MW7	15/04/2004										
	12/04/2006										
	12/11/2007										
	24/02/2009										
	28/10/2009										
MW8	10/05/2010										
	30/08/2010										
	23/05/2011										
	15/04/2004										
	12/04/2006										
MW9	12/11/2007										
	24/02/2009										
	28/10/2009										
	10/05/2010										
	30/08/2010										
MW10	23/05/2011										
	15/04/2004										
	12/04/2006										
	13/11/2007										
	28/10/2009										

Well ID	Date Measured	Time Measured	Pump Rate (m/min)	Purge Volume (L)	Dissolved Oxygen (mg/L)	Temperature (°C)	Redox Potential (mV)	pH	Electrical Conductivity (µmhos/cm)	Total Dissolved Solids (mg/L)	Comments
MM11	15/04/2004	Pre-Purge		3.0	2.7	17.2	38	10.8	426	2769	Turbid
	12/04/2006	Pre-Purge		0.9	2.15	19.3	82	6.92	3.10	2015	
	12/11/2007	Pre-Purge		1.2	3.49	18.4	79	7.25	2.10	1382	
	24/02/2009	Pre-Purge		0.5	4.31	18.5	38	7.86	4.14	2711	
MM11	28/10/2009	Post-Purge									Insufficient sample. Well Dry
	30/08/2010	Post-Purge									Well Dry
	17/3/2011	Post-Purge									No sampling (August 2010)
	23/05/2011	Post-Purge									Well Dry
MM12	15/04/2004	Post-Purge									Well Dry
	24/02/2009	Post-Purge									Well Dry
	28/10/2009	Post-Purge									Well Dry
	30/08/2010	Post-Purge									Well Dry
MM13	17/3/2011	Post-Purge									Well Dry
	09/02/2012	Post-Purge									Well Dry
	12/11/2007	Post-Purge									Well Dry
	10/05/2010	Post-Purge									Well Dry
MM14	13/04/2006	Post-Purge									Well Dry
	12/11/2007	Post-Purge									Well Dry
	28/10/2009	Post-Purge									Well Dry
	30/08/2010	Post-Purge									Well Dry
MM15	18/3/2011	Post-Purge									Well Dry
	06/09/2011	Post-Purge									Well Dry
	15/02/2012	Post-Purge									Well Dry
	15/04/2004	Post-Purge									Well Dry
MM16	12/04/2006	Post-Purge									Well Dry
	12/11/2007	Post-Purge									Well Dry
	28/10/2009	Post-Purge									Well Dry
	30/08/2010	Post-Purge									Well Dry
MM17	24/02/2009	Post-Purge									Well Dry
	26/05/2011	Post-Purge									Well Dry
	13/02/2012	Post-Purge									Well Dry
	10/05/2010	Post-Purge									Well Dry
MM18	15/04/2004	Post-Purge									Well Dry
	13/04/2006	Post-Purge									Well Dry
	12/11/2007	Post-Purge									Well Dry
	28/10/2009	Post-Purge									Well Dry
MM19	18/3/2011	Post-Purge									Well Dry
	21/3/2011	Post-Purge									Well Dry
	25/05/2011	Post-Purge									Well Dry
	10/02/2012	Post-Purge									Well Dry
MM20	15/04/2004	Post-Purge									Well Dry
	12/11/2007	Post-Purge									Well Dry
	24/02/2009	Post-Purge									Well Dry
	28/10/2009	Post-Purge									Well Dry
MM21	10/05/2010	Post-Purge									Well Dry
	23/3/2011	Post-Purge									Well Dry
	27/05/2011	Post-Purge									Well Dry
	14/02/2012	Post-Purge									Well Dry

Well ID	Date Measured	Time Measured	Pump Rate (million)	Purge Volume (L)	Dissolved Oxygen (mg/L)	Temperature (°C)	Redox Potential (mV)	pH	Electrical Conductivity (micro)	Total Dissolved Solids (µg/L)	Comments
MM/22	15/04/2004										
	11/04/2006										
	13/11/2007	Post-purge		12.0	2.35	19.5	69	7.6	745	4843	Misty, light brown, HC odour
	28/02/2009	Post-purge		32.0	4.59	11.7	131	8.06	755	4895	Turbid, orange/brown, slight HCO
	29/10/2009	Post-purge		3.0	0.61	18.9	235	7.50	3085	472	Very cloudy, brown, no odour and dry at 3L
	30/06/2010	Pre-purge		3.0	25.71	18.1	31	7.83	10.59	1709	no HCO or PSH, dry at 3L
	17/3/2011	Pre-purge		1.0	17.24	18.7	31	9.65	12.74	8281	Turbid, lots of sediment, no odour
	17/03/2011										
	08/02/2012										
	15/04/2004										
MM/23	11/04/2006										
	12/11/2007										
	24/02/2009	Post-purge		11.0	2.90	23.4	139	7.37	4.47	2905	Turbid brown and slight HCO
	29/10/2009	Post-purge		1.5	3.00	18.4	59	8.63	6.17	4011	Dry at 2 L, lots of sediment, HCO
	30/08/2010	Post-purge		1.0	3.64	19.0	112	8.05	8.15	5298	Clear, HCO
	18/01/2011	Post-purge		21.0	11.42	18.7	107	8.31	8.61	5597	Turbid, orange, HCO
	21/03/2011	Post-purge		3.0	9.20	20.6	131	7.7	9.68	6292	Slightly cloudy, no HCO
	25/05/2011	Post-purge		4.0	10.32	17.1	187	7.06	7.47	4656	Slightly cloudy, brown, no HCO
	25/02/2012	Post-purge	100	3.4	6.65	21.2	148	6.55	9.95	6468	Clear, slight HCO, no shien
	15/04/2004	Post-purge		10.0	0.02	18.4	33	7.18	4.98	3237	Dry @ 3L
MM/24	13/04/2006	Post-purge		1.0	0.6	18.7	84	6.39	2.66	1179	Turbid, light brown, HC odour
	12/11/2007	Post-purge		6.0	3.15	19.9	19	7.25	4.88	3172	Well dry @ 3L
	25/02/2009	Post-purge		3.0	1.43	17.7	90	7.78	4.68	3042	Very cloudy, brown and no HCO and dry at 1L
	30/10/2009	Post-purge		1.0	1.27	19.0	96	7.63	3.98	2597	
	10/05/2010	Pre-purge		1.0	5.03	17.7	159	6.2	5.76	3744	Turbid, dark brown, no odour
	30/08/2010	Post-purge		2.0	6.09	17.5	22	7.22	4.44	2886	Turbid, brown, HCO, ants
	29/05/2011	Post-purge		1.0	3.83	18.9	191	7.07	3.95	2568	Turbid, brown, slight HCO and swamp odour, dry @ 1.25L
	15/02/2006	Pre-purge		1	2.73	27.4	73	7.25	6.47	4206	Turbid brown, no HCO or shien, dry at 1.0 L
	01/05/2006										
	12/11/2007										
MM/25	24/02/2009										
	29/10/2009										
	10/05/2010										
	30/08/2010										
	23/03/2011										
	23/05/2011										
	14/02/2012										
	15/04/2004										
	12/11/2007										
	24/02/2009										
MM/26	10/05/2010										
	30/08/2010										
	17/03/2011										
	23/05/2011										
	14/02/2012										
	15/04/2004										
	12/11/2007										
	24/02/2009										
	29/10/2009										
	10/05/2010										
MM/27	30/08/2010										
	23/03/2011										
	24/05/2011	Post-purge		3.1	1.18	18.2	183	6.43	17	11050	Clear, no HCO
	08/09/2011	Post-purge		3.2	1.88	16.2	196	5.97	16.66	10829	Slightly cloudy, orange/brown, no HCO/shien
	08/09/2012	Post-purge	75	3.2	5.40	16.4	181	7.72	16.45	10663	Clear, no HCO or shien
	15/04/2004	Post-purge	60	3.2	3.93	20.8	148	7.51	18.9	11285	Clear, no HCO or shien
	15/04/2006	Post-purge		12.0	1.92	17.8	102	7.94	6.27	4076	Clear, no HCO or shien
	15/04/2006	Post-purge		28.0	2.75	16.9	120	7.44	5.94	3601	turbid
	13/11/2007	Post-purge		12.0	3.75	18.2	30	7.28	7.15	9338	Slightly turbid, light brown
	29/10/2009	Post-purge		18.0	4.33	16.9	173	6.97	7.90	5135	Cloudy, orange-brown, no odour
MM/28	30/10/2009	Post-purge		3.0	17.22	21.4	56	12.30	0.395	5257	Turbid, white and dry at 3L
	30/08/2010	Post-purge		8.0	18.75	16.3	96	7.34	8.03	5220	cloudy, white, no odour, dry at 8.5L
	30/08/2010	Post-purge		3.0	11.82	18.5	16	11.10	22.3	14485	Dry at 3.5L, Brown slurry of sediment, no odour
	23/03/2011	Post-purge		1.5	11.82	22	80	9.82	8.88	5772	Turbid, white, no HCO
	21/05/2011	Post-purge		2.2	15.18	16.9	214	6.48	8.4	5460	Very cloudy, white, no HCO/shien
	13/02/2012	Post-purge	50	2	1.42	20.9	169	6.22	9.39	6104	Clear, no HCO or shien
	15/04/2004	Post-purge		30.0	0.13	18.2	134	7.07	6.31	4102	
	11/04/2006										
	12/11/2007										
	25/02/2009										
MM/29	30/10/2009	Post-purge		14.0	1.91	16.5	32	8.35	6.47	4206	Cloudy, orange-brown, thick particles, strong HCO
	10/05/2010	Post-purge		1.5	1.11	21.2	68	7.38	3.99	2594	Turbid brown and slight HCO
	30/08/2010	Post-purge		6.0	5.73	16.4	142	7.06	6.72	4368	cloudy, shien and HCO
	17/03/2011	Post-purge		18.0	2.40	18.1	55	7.28	6.27	4817	Turbid, HCO
	26/05/2011	Post-purge		4.5	0.38	19.2	60	7.45	7.41	4817	Very cloudy, brown, no HCO
	15/02/2012	Post-purge	100	3.5	2.02	17.3	43	6.29	6.06	3359	Very cloudy, light brown, HCO, no shien
	15/04/2004	Post-purge		17.0	0.16	17.3	123	7.31	4.33	2815	Clear, no HCO or shien
	13/04/2006	Post-purge		6.0	1.21	16.1	102	7.35	3.59	2334	turbid, grey, stiller and HC odour
	12/11/2007	Post-purge		8.0	3.85	17.8	149	7.47	6.01	3907	Cloudy, orange-brown, strong HCO
	25/02/2009	Post-purge		6.0	2.92	16.7	10	8.15	6.27	4076	Cloudy, brown, some sediment and dry at 1.5L
MM/30	30/10/2009	Post-purge		1.5	2.85	19	11	7.63	6.04	3926	
	10/05/2010										
	31/08/2010	Post-purge		2.5	2.48	17.2	193	7.16	6.78	4407	Dry at 3 L, no odour
	17/01/2011	Post-purge		1.0	2.90	19.2	48	8.62	8.41	5467	Very cloudy, orange, white, no HCO
	21/03/2011	Post-purge		10.0	4.61	20.0	74	7.72	8.07	5246	Turbid, orange, no HCO, dry at 10L
	26/05/2011	Post-purge		3.5	0.72	19.7	48	7.57	7.43	4830	Clear, no HCO
	06/09/2011	Post-purge		2.6	2.70	16.3	43	6.47	6.96	4524	Very cloudy, orange, no HCO/shien
	15/02/2012	Post-purge	100	2.1	0.62	16.5	58	7.32	8.67	4466	Clear, no HCO, no shien
	15/02/2012	Post-purge		4	1.66	18.8	77	7.28	7.73	5025	Turbid, brown, no HCO or shien, dry at 4.0 L
	15/02/2012	Post-purge									

Well ID	Date Measured	Time Measured	Pump Rate (g/min)	Purge Volume (L)	Dissolved Oxygen (mg/L)	Temperature		Redox Potential (mV)	pH	Electrical Conductivity (µm/cm)	Observed Solids ¹ (µg/L)	Comments	
						(°C)	(°F)						
MM3/2	15/04/2004	Post-purge		20.0	2.31	19.4	14.7	7.43	6.84	6344	4446		
	11/04/2006	Post-purge		18.0	5.99	16.2	28	7.11	6.07	3946		Turbid, light brown	
	12/11/2007	Post-purge		18.0	4.23	18.4	76	7.12	5.92	5298		Turbid, light brown, no odour	
	24/02/2009	Post-purge		28.0	5.49	16.9	166	8.17	6.59	6234		Cloudy, light brown, no odour	
	28/10/2009	Post-purge		22.0	4.41	17.3	168	7.41	5.94	3851		Very cloudy, no odour	
	10/05/2010	Post-purge		21.0	14.74	17.2	63	7.23	10.61	6897		Dry at 7 L, turbid, orange sediment, no odour	
	31/08/2010	Post-purge		6.0	13.47	15.7	127	9.4	8.62	5975		Slightly cloudy, light grey, no odour	
	23/03/2011	Post-purge		3.5	5.80	20.2	145	7.22	10.73	6903		Cloudy, grey, HCO, no stream	
	27/05/2011	Pre-Purge		9.0	6.50	18.1	193	6.21	8.73	5675		No HCO or stream	
	13/02/2012	Post-purge		0.5	2.53	19.2	95	7.78	9.03	5900			
MM3/3	15/04/2004	Post-purge		20.0	1.53	18	143	7.4	6.00	5200			
	11/04/2006	Post-purge		15.0	5.09	16.7	7	7.65	7.75	5368		Turbid, light brown	
	12/11/2007	Post-purge		18.0	4.62	18.5	79	7.52	12.08	7852			
	24/02/2009	Post-purge		14.0	4.99	16.9	182	7.92	11.19	7214		Cloudy, orange-brown, no odour	
	10/05/2010	Post-purge										No sampling (October 2009)	
	30/08/2010	Post-purge										No sampling (May 2010)	
	22/03/2011	Post-purge		3.5	3.62	19.1	171	7.07	12.68	8242		Clear, no HCO	
	27/05/2011	Post-purge		3.0	6.40	17.6	212	6.1	10.15	6598		Cloudy, grey, no HCO/stream	
	13/02/2012	Post-purge		1.00	1.08	16.5	11	7.66	5.63	3660		Cloudy, orange/brown, no HCO or stream	
	12/04/2006	Post-purge		50.0	2.23	16.4	11	7.63	5.46	3549		Slightly turbid, light brown, HCO odour	
MM3/4	13/11/2007	Post-purge		42.0	1.56	18.5	-112	7.67	7.54	4901		Turbid, light brown, no odour	
	25/02/2009	Post-purge		48.0	4.44	16.8	59	8.57	7.89	5129		Turbid, light brown, no odour	
	29/10/2009	Post-purge		2.0	2.07	19.9	-280	7.49	6.79	4114		Turbid, grey, organic odour (H2S smell) and dry at 2L	
	10/05/2010	Post-purge		10.0	3.27	16.5	-230	7.24	8.82	5733		Cloudy, light grey, organic odour	
	30/08/2010	Post-purge										Well Dry	
	17/03/2011	Post-purge										Well Dry	
	23/05/2011	Post-purge										Well Dry	
	09/02/2012	Post-purge										Well Dry	
	12/04/2006	Pre-Purge		1.0	2.12	16.8	1	7.84	7.84	4.99	3244		Brown/Turbid HCO
	MM3/5	13/11/2007	Post-purge		10.0	1.42	16.2	-18	7.47	4.98	3237		
25/02/2009		Post-purge		10.0	1.26	18.4	-142	7.56	6.79	4414		Turbid, orange/brown, HCO odour	
28/10/2009		Post-purge		18.0	4.1	16.1	72	6.64	6.95	4518		Turbid, orange, HCO, no stream	
29/10/2009		Post-purge		4.0	3	21.6	135	7.48	2.94	1911		Turbid brown, no odour and dry 4L	
10/05/2010		Post-purge		6.0	6.11	17	186	7.12	7.46	4849		Very cloudy, orange, no odour	
30/08/2010		Post-purge		10.0	2.15	17.9	111	7.39	7.46	4849		Turbid, dark brown, no odour	
21/03/2011		Post-purge		3.0	2.45	20.8	52	9.35	6.5	4225		Cloudy, light brown, no HCO	
26/05/2011		Post-purge		3.0	3.40	17.5	180	6.4	7.42	4823		Turbid, orange, slight HCO, no stream	
15/02/2012		Post-purge										Well and sampled as well as looking at 1.5 mBTOC, NO SAMPLE COLLECTED	
12/04/2006		Pre-Purge		1.0	2.05	17.4	4	7.61	5.33	3465		Well almost dry at 15L	
MM3/6	13/11/2007	Post-purge		15.0	4.67	16.6	11	7.53	4.71	3062		Very turbid, silty	
	25/02/2009	Post-purge		6.0	3.6	18.8	82	7.4	7.38	4797		Turbid, orange, no odour	
	29/10/2009	Post-purge		22.0	5.46	16.2	189	8.49	7.08	4602		Cloudy, brown, no HCO and dry at 6L	
	10/05/2010	Post-purge		8.0	6.03	19.9	167	8.2	4.6	2990		Cloudy, orange, no odour	
	30/08/2010	Post-purge		15.0	11.57	16.8	87	7.15	7.46	4849		Cloudy, orange, no odour	
	23/03/2011	Post-purge		18.0	10.20	18.0	158	7.47	6.64	4316		Turbid brown, bits of sediment	
	27/05/2011	Post-purge		3.5	11.18	18.9	172	7.49	9.32	6058		Cloudy, orange, no HCO	
	14/02/2012	Post-purge		2.7	13.43	17.9	166	6.55	7.93	5155		Turbid, orange, no HCO/stream	
	12/04/2006	Pre-Purge		100	3	11.22	18.5	114	7.41	8.56	5564		Clear, no HCO or stream
	13/11/2007	Post-purge		16.0	2.63	16.5	92	7.49	5.45	3543		Clear	
MM3/7	25/02/2009	Post-purge		18.0	3.53	17.9	47	7.41	7.92	5148		Turbid, light brown, no odour	
	30/10/2009	Post-purge		18.0	4.22	16.4	147	8.22	7.69	4899		Cloudy, orange-brown, no HCO	
	10/05/2010	Post-purge		12.0	4.60	21.8	131	8.12	4.96	3224		Cloudy, brown and no HCO	
	30/08/2010	Post-purge		12.0	11.51	17.2	90	7.08	8.14	5291		Very cloudy, no HCO or PSH	
	17/01/2011	Post-purge		12.0	15.63	18.5	149	8.61	4.596	4596		Very cloudy, brown, no odour	
	21/03/2011	Pre-Purge		1.0	23.18	19.5	176	9.86	10.38	6127		Cloudy, white, no HCO	
	21/03/2011	Post-purge		21.0	21.36	20.1	85	9.45	9.34	6071		Turbid, white brown, no HCO	
	25/05/2011	Post-purge		3.5	1.89	20.4	95	8.32	9.34	6071		Clear, no HCO	
	13/02/2012	Post-purge		100	3.1	8.92	20	107	7.54	8.63	5610		Slightly cloudy, light brown, no HCO/stream
	12/04/2006	Post-purge										Clear, no HCO or stream	
MM3/8	12/11/2007	Post-purge										PSH, 0.050m	
	24/02/2009	Post-purge										PSH, 0.020m	
	30/10/2009	Post-purge										PSH, 0.020m	
	10/05/2010	Post-purge			6.0	6.33	17.4	34	7.21	10.25	6663		Cloudy, slight HCO, orange, dry at 7L
	31/08/2010	Post-purge			9.0	5.01	17.4	154	8.07	9.32	6058		Cloudy, orange-brown, slight stream, HCO
	18/01/2011	Pre-Purge			1.0	3.47	18.6	192	8.54	9.44	6136		Clear, HCO
	18/01/2011	Post-purge			27.0	6.09	18.0	126	8.06	10.70	6951		Turbid, orange, HCO, slight stream
	22/03/2011	Post-purge			3.5	3.53	19.4	117	7.39	10.54	6851		Slightly cloudy, light brown, no HCO
	25/05/2011	Post-purge			2.5	2.96	17.2	145	7.17	10.34	6121		Cloudy, orange, no HCO/stream
	13/02/2012	Post-purge			100	3.2	1.59	19.9	117	6.79	12.07	7846	
MM3/9	13/04/2006	Pre-Purge			1.0	1.85	15.5	-9	7.86	4.19	2724		Orange-brown turbid, no HCO
	12/11/2007	Post-purge			9.0	2.48	15.6	0	7.85	3.85	2503		
	26/02/2009	Post-purge			8.0	5.03	-	50	7.9	5.20	3380		Turbid, light brown, no odour
	28/10/2009	Post-purge			21.0	3.48	16.6	147	8.01	5.20	3380		Turbid, orange, no odour
	10/05/2010	Post-purge										No sampling (May 2010)	
	30/08/2010	Post-purge										No sampling (August 2010)	
	17/03/2011	Post-purge										Well Described	
	09/02/2012	Post-purge										Well Described	
	13/04/2006	Pre-Purge			0.0	2.76	16	3	7.68	4.82	3133		
	12/11/2007	Post-purge			10.0	2.74	15.8	10	7.76	4.61	2397		Slightly turbid, light brown, no odour
MM4/0	28/02/2009	Post-purge			8.0	2.28	16.7	-20	7.75	7.66	4979		
	10/05/2010	Post-purge			18.0	3.33	16.8	109	7.81	7.33	5428		Turbid, orange, slight HCO
	30/08/2010	Post-purge										No sampling (May 2010)	
	21/03/2011	Post-purge										No sampling (August 2010)	
	15/02/2012	Post-purge										No sampling (August 2010)	
	29/05/2011	Post-purge			2.9	1.24	16.5	141	6.37	8.55	5571		Slightly cloudy, light brown, no HCO
	31/08/2010	Post-purge			2	8.59	18	99	7.55	8.64	5616		Cloudy, orange, no HCO/stream
	30/10/2009	Pre-Purge			0.5	2.38	20	-35	7.25	3.80	2470		Turbid, brown, no HCO or stream, dry at 2.0 L
	10/05/2010	Post-purge			24.0	4.04	18.3	25	7.38	4.92	3198		Clear and moderate HCO
	31/08/2010	Post-purge			21.0	21.38	17.9	26	7.37	12.49	8119		Very cloudy, brown
MM4/1	10/05/2010	Post-purge			24.0	17.92	17.3	122	9.16	11.38	7397		Turbid, orange/light brown, no odour
	03/03/2011	Post-purge			3.0	9.01	21.6	76	9.61	11.83	7680		Turbid, orange/brown, no HCO, no stream
	24/02/2011	Post-purge			3.5	7.41	18.8	85	9.27	10.52	6838		Slightly cloudy, orange/brown, no HCO
	24/02/2011	Post-purge			3.0	10.23	18.4	294	8.61	9.96	6474		Turbid, orange/brown, no HCO, no stream
	05/06/2011	Post-purge			3.0	6.76	17.6	178	8.82	10.19	6624		Turbid, orange, HCO, no stream
	29/05/2011	Post-purge			2.9	3.78	16.7	130	6.42	9.78	6357		Turbid, orange, no HCO, no stream
	07/09/2011	Post-purge			100	9.41	17.7	238	8.49	9.99	6494		Cloudy, orange, no HCO/stream
	10/02/2012	Post-purge			60	6.27	18.6	75	7.95	11.61	7547		Clear, no HCO or stream
	30/10/2009	Pre-Purge			0.5	4.41	18.2	-3	7.54	6.70	4355		Clear, brown and moderate HCO
	10/05/2010	Post-purge			25.0	2.84	19.9	73	7.27	5.41	3517		Very cloudy, brown and moderate HCO
MM4/2	31/08/2010	Post-purge			18.0	29.98	17.6	49	7.34	11.8	7670		Very cloudy, orange, no odour
	29/05/2011	Post-purge			24.0	20.85	16.8						

Well ID	Date Measured	Time Measured	Pump Rate (m/min)	Purge Volume (L)	Dissolved Oxygen (mg/L)	Temperature (°C)	Redox Potential (mV)	pH	Electrical Conductivity (microS)	Total Dissolved Solids (mg/L)	Comments
MM44	10/05/2010	Post-purge		20.0	3.51	18	55	7.33	6.11	3972	Very cloudy and dry at 20L
	10/05/2010	Post-purge		20.0	18.58	17.1	10	7.44	15.63	10160	Turbid, orange, no odour
	31/08/2010	Post-purge		10.0	18.37	16.6	13.1	10.21	16.01	10407	Dry at 11 L, orange/light brown, no odour
	18/01/2011	Pre-purge		1.0	21.90	18.6	87	11.44	20.64	13416	Cloudy, no HCO
	21/03/2011	Post-purge		32.0	14.78	18.5	61	10.92	15.37	9991	Turbid, orange/brown, no HCO
MM46	25/05/2011	Post-purge		3.1	8.27	19.1	78	9.13	13.11	8522	Clear, no HCO
	10/02/2012	Post-purge		2.8	6.89	19.5	77	6.9	6.54	4251	Slightly cloudy, brown, no HCO/shreen
	30/10/2009	Pre-purge		2.375	1.56	19.1	45	8.49	11.04	7116	Clear, no HCO or shreen
	30/10/2009	Pre-purge		0.5	2.75	19.3	35	7.25	6.66	4339	Clear and no HCO
	10/05/2010	Post-purge		7.0	3.88	18.6	77	7.27	6.61	4297	Very cloudy, brown and no HCO
MM45	31/08/2010	Post-purge		27.0	26.85	18.4	28	12.24	18.01	11017	Very Cloudy, orange, no HCO
	22/03/2011	Post-purge		3.0	25.07	18.4	36	10.69	15.07	9785	Dry at 11 L, bits of orange sediment, HCO
	27/05/2011	Post-purge		3.0	1.45	17.4	28	10.14	10.23	6690	Slightly cloudy, slight HCO
	14/02/2012	Post-purge		2.3	0.64	19.6	193	6.29	9.41	6117	Cloudy, brown HCO, no shreen
	30/10/2009	Pre-purge		0.5	2.89	21.5	219	7.37	3.44	2236	Clear HCO or shreen
MM49	10/05/2010	Post-purge		24.0	23.66	18.6	72	7.31	19.95	12173	Cloudy, slight HCO and dry at 18L
	30/08/2010	Post-purge		3.0	Over RHM	18.1	86	10.21	30.00	11550	Turbid, clear red, bits of sediment, dry at 4.5 L, HCO
	17/01/2011	Pre-purge		1.0	14.99	21.5	88	10.48	19.59	12734	Slightly cloudy, orange, strong HCO
	21/03/2011	Post-purge		18.0	25.05	19.3	48	11.1	29.00	19850	Turbid, orange, strong HCO, dry at 18L
	24/05/2011	Post-purge		3.0	12.50	23	49	10.15	22.71	14762	Cloudy, orange, no HCO
MM47	14/02/2012	Post-purge		2.5	4.89	16	130	7.72	13.9	9035	Turbid, orange/brown HCO, no shreen
	29/10/2009	Pre-purge		2.5	1.77	23	-7	9.59	8	5200	Clear, HCO or shreen
	10/05/2010	Post-purge		0.5	2.57	21.1	202	7.5	5.04	3276	Clear, brown, moderate HCO
	31/08/2010	Post-purge		11.0	2.26	20.9	29	7.41	3.03	1970	Very cloudy, moderate HCO and dry at 11L
	18/01/2011	Pre-purge		21.0	18.57	16.6	39	10.31	25.7	16765	Dry at 22 L, slight shreen, orange/light brown, HCO
MM48	21/03/2011	Post-purge		32.0	27.06	18.6	110	11.39	31.4	20160	Cloudy, orange/brown, strong HCO
	25/05/2011	Post-purge		3.2	11.45	21.9	14	11.1	24.7	16065	Turbid, orange/brown, strong HCO, slight shreen
	07/09/2011	Post-purge		2.8	0.25	16.5	87	9.15	12.78	9307	Slightly cloudy, orange/brown, no HCO
	14/02/2012	Post-purge		50	0.26	22.6	-23	9.66	13.63	8860	Slightly cloudy, brown, slight HCO, no shreen
	29/10/2009	Pre-purge		0.5	4.2	17.6	141	7.74	0.563	396	Clear, strong HCO or shreen
MM49	10/05/2010	Post-purge		11.0	22.19	17	26	7.43	21.4	15860	Very cloudy, some sediment and slight HCO
	31/08/2010	Post-purge		6.0	16.34	17.1	78	10.71	30.6	19580	Cloudy, brown, slight HCO, no HCO or shreen
	17/01/2011	Pre-purge		12.0	23.37	18.9	51	11.52	31.1	20215	Dry at 6 L, slight shreen, thick red slurry of sediment, HCO
	22/03/2011	Post-purge		3.0	13.21	18.3	49	10.19	23.23	15100	Turbid, orange/brown, slight HCO, dry at 13L
	25/05/2011	Post-purge		2.3	8.88	16.5	152	7.7	13.2	8590	Cloudy, orange/brown HCO
MM50	14/02/2012	Post-purge		7	3.74	18.4	10	10.36	10.57	6871	Slightly cloudy, orange, slight HCO, no shreen
	29/10/2009	Pre-purge		0.5	28.42	18.2	-5	12.34	7.35	4778	Turbid, orange/brown, HCO, no shreen, dry at 7.0 L
	10/05/2010	Post-purge		25.0	24.98	19.3	5	10.41	6.52	4238	Cloudy white colour, no HCO
	30/08/2010	Post-purge		4.0	Over RHM	18.4	36	12.28	8.14	5291	Turbid, white, dry at 15L
	03/03/2011	Post-purge		3.0	16.25	23.0	28	13.71	10.46	6799	Turbid white slurry of sediment, no odour
MM51	28/03/2011	Post-purge		1.5	24.36	20.4	43	12.56	15.28	9332	Very cloudy, white, no HCO or shreen
	06/04/2011	Post-purge		3.0	14.4	20.4	88	12.56	10.38	8127	Slightly cloudy, no HCO
	09/05/2011	Post-purge		3.0	32.61	17.3	59	12.11	13.67	8896	Turbid, white, no HCO, no shreen
	27/05/2011	Post-purge		2.4	22.61	17.3	-8	7.3	6.98	4337	Very cloudy, white, no HCO/shreen
	13/02/2012	Post-purge		1.3	27.53	20.7	-14	13.42	14.12	9435	Cloudy, white, no HCO, no shreen
MM52	29/10/2009	Pre-purge		1.75	24.84	22.8	-37	12.03	9.9	6435	Very cloudy, white, no HCO or shreen
	10/05/2010	Post-purge		6.0	29.76	18.3	-1	12.91	7.69	4999	Cloudy white bubbles at surface
	30/08/2010	Post-purge		0.5	9.20	18.2	211	7.65	6.35	4128	Turbid, white, bits of sediment, no odour
	26/05/2011	Pre-purge		0.8	16.71	24.6	63	13.15	8.84	5746	Cloudy, orange/white, no HCO, Well stopped dry, sampled with bailer
	13/02/2012	Pre-purge		0.8	30.38	18	-4	12.58	6.92	4968	Cloudy, grey, dry @ 0.8L
MM53	30/10/2009	Pre-purge		7.5	22.80	19.2	-12	12.68	14.32	9388	Very cloudy, white, no HCO or shreen
	10/05/2010	Post-purge		7.0	34	20.2	7	7.53	3.16	2019	Slightly cloudy, and dry at 7L
	30/08/2010	Post-purge		22.0	26.58	16.6	151	7.84	21.20	13780	Cloudy, light brown, no odour
	21/03/2011	Post-purge		3.3	17.55	19	14	10.71	16.06	10439	Dry at 16 L, clear, orange, no odour
	27/05/2011	Post-purge		2.3	6.34	16.9	169	6.65	10.93	8281	Clear, no HCO
MM54	08/09/2011	Post-purge		30	2.8	16.3	147	9.54	9.48	6162	Slightly cloudy, grey HCO, no shreen
	14/02/2012	Post-purge		2	1.42	22	85	7.45	10.67	6936	Clear, strong HCO, no shreen
	30/10/2009	Pre-purge		0.5	2.44	23.1	80	7.29	4.99	3244	Clear and slight HCO
	10/05/2010	Post-purge		22.0	3.51	20.1	119	7.27	4.29	2789	Cloudy, brown, slight HCO and dry at 21L
	03/03/2011	Post-purge		4.0	22.95	17.1	9	0.38	16.81	10927	Clear and slight HCO
MM55	22/03/2011	Post-purge		3.0	22.97	22.5	48	15.26	13.43	8217	Slightly cloudy, orange
	06/04/2011	Post-purge		3.0	1.60	19.8	-10	10.48	11.21	7287	Dry at 15 L, thick slurry of orange sediment, slight HCO
	06/04/2011	Post-purge		3.0	4.64	18.5	157	9.48	10.53	6845	Very cloudy, orange, slight HCO, no shreen
	20/04/2011	Post-purge		3.0	21.04	17.8	-42	12.82	13.19	8574	Slightly cloudy, light brown, slight HCO, no shreen
	05/06/2011	Post-purge		3.0	5.32	17.5	99	9.45	9.25	6013	Turbid, white, no HCO, no shreen
MM55	07/09/2011	Post-purge		2.0	3.29	14.5	156	6.63	12.4	8060	Slightly cloudy, slight HCO
	29/10/2009	Pre-purge		30	0.89	15.6	140	8.58	9.51	6182	Clear, no HCO, no shreen
	13/02/2012	Post-purge		2	2.90	20.9	109	7.39	7.78	5057	Slightly cloudy, orange/brown, slight HCO, no shreen
	29/10/2009	Pre-purge		0.5	5.75	18	182	7.39	6.8	4420	Clear no HCO
	10/05/2010	Post-purge		10.5	4.01	17.4	184	7.42	4.29	2789	Very cloudy, brown, no HCO or PSH
MM55	31/08/2010	Post-purge		24.0	19.52	17.0	18	10.35	16.68	16120	Dry at 12 L, bits of orange sediment, no odour
	22/03/2011	Post-purge		3.1	16.68	18	82	9.87	13.31	10842	Slightly cloudy, orange, no HCO
	27/05/2011	Post-purge		2.5	9.59	16.7	167	6.67	9.85	6403	Slightly cloudy, orange, no HCO
	13/02/2012	Post-purge		2.1	2.78	21.8	114	7.37	3.99	7534	Cloudy
	30/10/2009	Pre-purge		50	2.9	18.7	171	6.74	11.08	7202	Clear, no HCO or shreen
MM55	10/05/2010	Post-purge		22.0	24.12	17.1	-2	7.43	27.5	11875	Very cloudy, orange, HCO
	31/08/2010	Post-purge		9.0	19.21	16.8	78	10.61	35.8	23270	Dry at 11 L, very turbid, orange/light brown, HCO
	18/01/2011	Pre-purge		1.0	25.91	18.6	214	11.20	20.02	13013	Slightly cloudy, brown, strong HCO
	22/03/2011	Post-purge		19.0	24.60	18.3	131	11.20	24.00	15600	Turbid, orange/brown, strong HCO, dry at 18L
	08/09/2011	Post-purge		3.0	4.26	18.3	105	7.44	15.27	9926	Slightly cloudy, orange, HCO
MM55	08/09/2011	Post-purge		20.0	1.55	17.5	75	8.97	11.3	7345	Very cloudy, orange, strong HCO
	13/02/2012	Post-purge		12	6.59	18.6	41	8.46	10.74	6801	Turbid, orange/brown, no shreen, no HCO
	07/09/2011	Pre-purge		50	6.33	16.9	169	8.03	11.54	7501	Clear, slight HCO, no shreen, dry at 12L
	10/02/2012	Post-purge		50	2.3	3.20	18.7	171	6.74	1108	Clear, HCO, no shreen
	10/02/2012	Post-purge		50	2.3	3.20	18.7	171	6.74	1108	Clear, no HCO or shreen

Field Equipment Used:
 Water level: 100mm model 90FMV
 °C = degrees Celsius
 ** Approximate value determined using the following equation: TDS (mg/L) = EC x 0.65
 N/A= Not Measured due to faulty DO electrode

Table 7
GROUNDWATER ANALYTICAL RESULTS- TPH, BTEX Lead (February 2012)
FORMER MOBIL SERVICE STATION GEELONG WEST (VO0993)
ENVIABTF07113FB

Field ID	MW 2	MW7	MW 8	MW9	MW 10	MW 14	MW 16	MW 18	MW19	MW20	MW 21	MW 23	MW 24
Sample Date	14/02/2012	10/02/2012	13/02/2012	10/02/2012	13/02/2012	15/02/2012	13/02/2012	15/02/2012	10/02/2012	10/02/2012	14/02/2012	15/02/2012	15/02/2012
SDG	EM1201655	EM1201476	EM1201655	EM1201476	EM1201655	EM1201655	EM1201655	EM1201655	EM1201476	EM1201476	EM1201655	EM1201655	EM1201655
Sample Code	EM1201655018	EM1201476006	EM1201655006	EM1201476005	EM1201655012	EM1201655034	EM1201655002	EM1201655033	EM1201476003	EM1201476001	EM1201655023	EM1201655032	EM1201655035

Method Type	Chemical Name	Units	LOR	Maintenance of Ecosystems (a)	Stock Watering (b)	Primary Contact & Recreation (c)													
TPH	TPH C6 - C9	µg/L	20	150 (e)	NE	NE	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	70	<20
	TPH C10 - C14	µg/L	50	NE	NE	NE	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	800
	TPH C15 - C28	µg/L	100	NE	NE	NE	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	200	<100	380
	TPH C29 - C36	µg/L	50	NE	NE	NE	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	180	<50	230
	TPH C10 - C36 (Sum of total)	µg/L	50	600 (e)	NE	NE	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	360	<50	1410
BTEX	Benzene	µg/L	1	700	10	1 (f)	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	21	<1
	Toluene	µg/L	2	NE	NE	25 (f)*	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	18	<2
	Ethylbenzene	µg/L	2	NE	NE	3 (f)*	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
	Xylene (m & p)	µg/L	2	NE	NE	NE	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	13	<2
	Xylene (o)	µg/L	2	350	NE	NE	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	12	<2
	Xylene Total	µg/L	2	NE	NE	20 (f)*	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	25	<2
	Heavy Metals	Lead (Filtered)	mg/L	0.001	0.0034	0.1	0.01 (f)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	<0.001	<0.001	0.002

Notes:
QC = Quality Control Sample.
"g" = All constituent analyte concentrations are below LOR.
"i" = Analysis not requested
LOR = Limit of Reporting (= Method Detection Limit)
NE = Guideline not established
NA = Not Applicable
RPD = Relative Percent Difference
(a) Where results are derived from the summation of selected
All samples collected and analysed according to Mobil Specifications unless otherwise noted in Comments
* = aesthetic

Nominated Investigation Criteria:
(a) ANZECC (2000) Australian Water Quality Guidelines for Fresh and Marine Waters (Marine Water - 95% level of protection)
(b) ANZECC (2000) Water Quality Guidelines for Agricultural Water Use (Livestock)
(c) ANZECC (2000) Recreational Water Quality and Aesthetics.
(e) Ministry of Housing, Spatial Planning and Environment,
(f) NHMRC/NRMMC (2004) National Water Quality Management

	Shaded values exceed applicable beneficial use
	Shaded values exceed applicable beneficial use criteria- Livestock
	Shaded values exceed applicable beneficial use criteria- Primary Contact Recreation
< LOR	Where the LOR exceeds applicable beneficial use criteria

Table 7
GROUNDWATER ANALYTICAL RESULTS- TPH, BTEX Lead (February 2012)
FORMER MOBIL SERVICE STATION GEELONG WEST (VO0993)
ENVIABTF07113FB

Field ID	MW27	MW 28	MW 29	MW 30	MW 31	MW 32	MW 33	MW 36	MW 37	MW 38	MW 40	MW41	MW42
Sample Date	10/02/2012	14/02/2012	13/02/2012	15/02/2012	15/02/2012	13/02/2012	13/02/2012	14/02/2012	13/02/2012	13/02/2012	15/02/2012	10/02/2012	10/02/2012
SDG	EM1201476	EM1201655	EM1201655	EM1201655	EM1201655	EM1201655	EM1201655	EM1201655	EM1201655	EM1201655	EM1201655	EM1201476	EM1201476
Sample Code	EM1201476010	EM1201655019	EM1201655016	EM1201655031	EM1201655036	EM1201655017	EM1201655005	EM1201655024	EM1201655013	EM1201655003	EM1201655037	EM1201476009	EM1201476008

Method Type	Chemical Name	Units	LOR	Maintenance of Ecosystems (a)	Stock Watering (b)	Primary Contact & Recreation (c)													
TPH	TPH C6 - C9	µg/L	20	150 (e)	NE	NE	<20	<20	<20	140	<20	<20	<20	<20	<20	20	<20	<20	80
	TPH C10 - C14	µg/L	50	NE	NE	NE	<50	<50	<50	180	<50	<50	<50	<50	<50	70	<50	<50	<50
	TPH C15 - C28	µg/L	100	NE	NE	NE	<100	<100	<100	<100	<100	<100	<100	<100	<100	100	<100	<100	<100
	TPH C29 - C36	µg/L	50	NE	NE	NE	<50	<50	<50	<50	<50	<50	<50	<50	<50	80	<50	<50	<50
	TPH C10 - C36 (Sum of total)	µg/L	50	600 (e)	NE	NE	<50	<50	<50	180	<50	<50	<50	<50	<50	180	<50	<50	<50
BTEX	Benzene	µg/L	1	700	10	1 (f)	<1	<1	<1	22	<1	<1	<1	<1	<1	3	<1	9	42
	Toluene	µg/L	2	NE	NE	25 (f)*	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
	Ethylbenzene	µg/L	2	NE	NE	3 (f)*	<2	<2	<2	71	<2	<2	<2	<2	<2	<2	<2	<2	13
	Xylene (m & p)	µg/L	2	NE	NE	NE	<2	<2	<2	2	<2	<2	<2	<2	<2	<2	<2	<2	2
	Xylene (o)	µg/L	2	350	NE	NE	<2	<2	<2	3	<2	<2	<2	<2	<2	3	<2	<2	2
	Xylene Total	µg/L	2	NE	NE	20 (f)*	<2	<2	<2	5	<2	<2	<2	<2	<2	3	<2	<2	4
	Lead (Filtered)	mg/L	0.001	0.0034	0.1	0.01 (f)	<0.001	0.002	0.002	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	0.004	<0.001	<0.001

Notes:
QC = Quality Control Sample.
*# = All constituent analyte concentrations are below LOR.
'-' = Analysis not requested
LOR = Limit of Reporting (= Method Detection Limit)
NE = Guideline not established
NA = Not Applicable
RPD = Relative Percent Difference
(a) Where results are derived from the summation of selected
All samples collected and analysed according to Mobil Specifications unless otherwise noted in Comments
* = aesthetic

Nominated Investigation Criteria:
(a) ANZECC (2000) Australian Water Quality Guidelines for Fresh and Marine Waters (Marine Water - 95% level of protection)
(b) ANZECC (2000) Water Quality Guidelines for Agricultural Water Use (Livestock)
(c) ANZECC (2000) Recreational Water Quality and Aesthetics.
(e) Ministry of Housing, Spatial Planning and Environment,
(f) NHMRC/NRMMC (2004) National Water Quality Management

	Shaded values exceed applicable beneficial use
	Shaded values exceed applicable beneficial use criteria- Livestock
	Shaded values exceed applicable beneficial use criteria- Primary Contact Recreation
< LOR	Where the LOR exceeds applicable beneficial use criteria

Table 7
GROUNDWATER ANALYTICAL RESULTS- TPH, BTEX Lead (February 2012)
FORMER MOBIL SERVICE STATION GEELONG WEST (VO0993)
ENVIABTF07113FB

Field ID	MW43	MW44	MW 45	QC 11	Duplicate of MW45	QC12	TriPLICATE of MW45	MW 46	MW 47	MW 48	MW 49	MW 50	MW 51
Sample Date	10/02/2012	10/02/2012	14/02/2012	14/02/2012		14/02/2012		14/02/2012	14/02/2012	14/02/2012	13/02/2012	15/02/2012	14/02/2012
SDG	EM1201476	EM1201476	EM1201655	EM1201655		2/16/2012		EM1201655	EM1201655	EM1201655	EM1201655	EM1201655	EM1201655
Sample Code	EM1201476002	EM1201476007	EM1201655020	EM1201655026		M12-Fe10192		EM1201655022	EM1201655021	EM1201655025	EM1201655015	EM1201655030	EM1201655029

Method Type	Chemical Name	Units	LOR	Maintenance of Ecosystems (a)	Stock Watering (b)	Primary Contact & Recreation (c)	RPD%								RPD%							
TPH	TPH C6 - C9	µg/L	20	150 (e)	NE	NE	20	100	640	700	9%	570	12%	3290	26,500	680	<20	<20	920			
	TPH C10 - C14	µg/L	50	NE	NE	NE	<50	<50	390	470	19%	410	5%	640	5340	310	<50	-	390			
	TPH C15 - C28	µg/L	100	NE	NE	NE	<100	<100	230	380	49%	<100	#	160	450	280	<100	-	190			
	TPH C29 - C36	µg/L	50	NE	NE	NE	<50	<50	<50	60	#	<100	#	<50	<50	120	<50	-	<50			
	TPH C10 - C36 (Sum of total)	µg/L	50	600 (e)	NE	NE	<50	<50	620	910	38%	410	41%	800	5790	710	<50	-	580			
BTEX	Benzene	µg/L	1	700	10	1 (f)	3	19	244	221	10%	200	20%	1340	354	71	<1	<1	326			
	Toluene	µg/L	2	NE	NE	3 (f)*	3	3	38	42	10%	34	11%	616	8320	76	<2	<2	119			
	Ethylbenzene	µg/L	2	NE	NE	3 (f)*	<2	<2	53	56	6%	23	79%	74	1490	7	<2	<2	14			
	Xylene (m & p)	µg/L	2	NE	NE	NE	4	2	93	109	16%	85	9%	716	8500	171	<2	<2	135			
	Xylene (o)	µg/L	2	350	NE	NE	4	<2	78	85	9%	80	3%	398	4010	133	<2	<2	102			
	Xylene Total	µg/L	2	NE	NE	20 (f)*	8	2	171	194	13%	160	7%	1110	12,500	304	<2	<2	237			
Heavy Metals	Lead (Filtered)	mg/L	0.001	0.0034	0.1	0.01 (f)	<0.001	<0.001	0.006	0.006	0%	0.005	18%	0.005	0.016	<0.001	0.009	-	<0.001			

Notes:
QC = Quality Control Sample.
"N" = All constituent analyte concentrations are below LOR.
"-" = Analysis not requested.
LOR = Limit of Reporting (= Method Detection Limit)
NE = Guideline not established
NA = Not Applicable
RPD = Relative Percent Difference
(a) Where results are derived from the summation of selected
All samples collected and analysed according to Mobil Specifications unless otherwise noted in Comments
* = aesthetic

Nominated Investigation Criteria:
(a) ANZECC (2000) Australian Water Quality Guidelines for Fresh and Marine Waters (Marine Water - 95% level of protection)
(b) ANZECC (2000) Water Quality Guidelines for Agricultural Water Use (Livestock)
(c) ANZECC (2000) Recreational Water Quality and Aesthetics.
(e) Ministry of Housing, Spatial Planning and Environment,
(f) NHMRC/NRMMC (2004) National Water Quality Management

	Shaded values exceed applicable beneficial use
	Shaded values exceed applicable beneficial use criteria- Livestock
	Shaded values exceed applicable beneficial use criteria- Primary Contact Recreation
< LOR	Where the LOR exceeds applicable beneficial use criteria

Table 7
GROUNDWATER ANALYTICAL RESULTS- TPH, BTEX Lead (February 2012)
FORMER MOBIL SERVICE STATION GEELONG WEST (VO0993)
ENVIABTF07113FB

Field ID	MW 52	QC 8		QC9		MW 53	MW 54	MW55
Sample Date	13/02/2012	13/02/2012		13/02/2012		13/02/2012	13/02/2012	10/02/2012
SDG	EM1201655	EM1201655	Duplicate of MW52	2/16/2012		EM1201655	EM1201655	EM1201476
Sample Code	EM1201655001	EM1201655010		M12-Fe10191		EM1201655004	EM1201655014	EM1201476004

Method Type	Chemical Name	Units	LOR	Maintenance of Ecosystems (a)	Stock Watering (b)	Primary Contact & Recreation (c)	RPD%							
TPH	TPH C6 - C9	µg/L	20	150 (e)	NE	NE	60	60	0%	<20	#	<20	<20	<20
	TPH C10 - C14	µg/L	50	NE	NE	NE	<50	<50	#	<50	#	<50	<50	<50
	TPH C15 - C28	µg/L	100	NE	NE	NE	<100	<100	#	<100	#	<100	<100	<100
	TPH C29 - C36	µg/L	50	NE	NE	NE	<50	<50	#	<100	#	<50	<50	<50
	TPH C10 - C36 (Sum of total)	µg/L	50	600 (e)	NE	NE	<50	<50	#	<100	#	<50	<50	<50
BTEX	Benzene	µg/L	1	700	NE	1 (d)	18	19	5%	<1	#	<1	<1	<1
	Toluene	µg/L	2	NE	NE	25 (f)*	14	13	7%	<1	#	<2	<2	<2
	Ethylbenzene	µg/L	2	NE	NE	3 (f)*	<2	<2	#	<1	#	<2	<2	<2
	Xylene (m & p)	µg/L	2	NE	NE	NE	11	11	0%	<2	#	<2	<2	<2
	Xylene (o)	µg/L	2	350	NE	NE	9	8	12%	<1	#	<2	<2	<2
	Xylene Total	µg/L	2	NE	NE	20 (f)*	20	19	5%	<3	#	<2	<2	<2
Heavy Metals	Lead (Filtered)	mg/L	0.001	0.0034	0.1	0.01 (f)	0.002	0.002	0%	0.002	0%	<0.001	0.005	0.009

Notes:

QC = Quality Control Sample.

*# = All constituent analyte concentrations are below LOR.

.. = Analysis not requested

LOR = Limit of Reporting (= Method Detection Limit)

NE = Guideline not established

NA = Not Applicable

RPD = Relative Percent Difference

^(d) Where results are derived from the summation of selected

All samples collected and analysed according to Mobil Specifications unless otherwise noted in Comments

* = aesthetic

Nominated Investigation Criteria:

(a) ANZECC (2000) Australian Water Quality Guidelines for Fresh and Marine Waters (Marine Water - 95% level of protection)

(b) ANZECC (2000) Water Quality Guidelines for Agricultural Water Use (Livestock)

(c) ANZECC (2000) Recreational Water Quality and Aesthetics.

(e) Ministry of Housing, Spatial Planning and Environment,

(f) NHMRC/NRMMC (2004) National Water Quality Management

	Shaded values exceed applicable beneficial use
	Shaded values exceed applicable beneficial use criteria- Livestock
	Shaded values exceed applicable beneficial use criteria- Primary Contact Recreation
< LOR	Where the LOR exceeds applicable beneficial use criteria

Table 8
GROUNDWATER ANALYTICAL RESULTS-
PAHs Phenols (February 2012)
FORMER MOBIL SERVICE STATION GEELONG WEST (VO0993)

Field ID	MW 2	MW7	MW 8	MW 9	MW 10	MW 14	MW 16	MW 18	MW19	MW20	MW 21	MW 23	MW 24	MW27	MW 28
Sample Date	14/02/2012	10/02/2012	13/02/2012	10/02/2012	13/02/2012	15/02/2012	13/02/2012	15/02/2012	10/02/2012	10/02/2012	14/02/2012	15/02/2012	15/02/2012	2/10/2012	14/02/2012
SDG	EM1201655	EM1201476	EM1201655	EM1201476	EM1201655	EM1201655	EM1201655	EM1201655	EM1201476	EM1201476	EM1201655	EM1201655	EM1201655	EM1201476	EM1201655
Sample Code	EM1201655018	EM1201476006	EM1201655006	EM1201476005	EM1201655012	EM1201655034	EM1201655002	EM1201655033	EM1201476003	EM1201476001	EM1201655032	EM1201655031	EM1201655032	EM1201476010	EM1201655019

[illegible]

Notes:
 QC = Quality Control Sample.
 "##" = All constituent analyte concentrations are below LOR.
 "-" = Analysis not requested
 LOR = Limit of Reporting (= Method Detection Limit)
 NE = Guideline not established
 NA = Not Applicable
 RPD = Relative Percent Difference
^(a) Where results are derived from the summation of selected
 All samples collected and analysed according to Mobil Specifications unless otherwise noted in Comments
 * = aesthetic

Nominated Investigation Criteria:

- (a) ANZECC (2000) Australian Water Quality Guidelines for Fresh and Marine Waters (Marine Water - 95% level of protection)
- (b) ANZECC (2000) Water Quality Guidelines for Agricultural Water Use (Livestock)
- (c) ANZECC (2000) Recreational Water Quality and Aesthetics.
- (e) Ministry of Housing, Spatial Planning and Environment,
- (f) NHMRC/NRMMC (2004) National Water Quality Management

	Shaded values exceed applicable beneficial use
	Shaded values exceed applicable beneficial use criteria- Livestock
	Shaded values exceed applicable beneficial use criteria- Primary Contact Recreation
< LOR	Where the LOR exceeds applicable beneficial use criteria

Table 8
GROUNDWATER ANALYTICAL RESULTS-
PAHs Phenols (February 2012)
FORMER MOBIL SERVICE STATION GEELONG WEST (V00993)

Field ID	MW 29	MW 30	MW 31	MW 32	MW 33	MW 36	MW 37	MW 38	MW 40	MW41	MW42	MW43	MW44
Sample Date	13/02/2012	15/02/2012	15/02/2012	13/02/2012	13/02/2012	14/02/2012	13/02/2012	13/02/2012	15/02/2012	2/10/2012	2/10/2012	10/02/2012	2/10/2012
SDG	EM1201655	EM1201655	EM1201655	EM1201655	EM1201655	EM1201655	EM1201655	EM1201655	EM1201655	EM1201476	EM1201476	EM1201476	EM1201476
Sample Code	EM1201655016	EM1201655031	EM1201655036	EM1201655017	EM1201655005	EM1201655024	EM1201655013	EM1201655003	EM1201655037	EM1201476009	EM1201476008	EM1201476002	EM1201476007

Method Type	Chemical Name	Units	LOR	Maintenance of Ecosystems (a)	Stock Watering (b)	Primary Contact & Recreation (c)													
Phenols	2,4,5-trichlorophenol	µg/L	1	NE	NE	NE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	2,4,6-trichlorophenol	µg/L	1	20	NE	2 (f)*	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	2,4-dichlorophenol	µg/L	1	160	NE	0.3 (f)*	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	2,4-dimethylphenol	µg/L	1	NE	NE	NE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	2,4-dinitrophenol	mg/L	0.03	0.045	NE	NE	-	-	-	-	-	-	-	-	-	-	-	-	-
	2,6-dichlorophenol	µg/L	1	NE	NE	NE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	2-chlorophenol	µg/L	1	490	NE	0.1 (f)*	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	2-methylphenol	µg/L	1	NE	NE	NE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	2-nitrophenol	µg/L	1	NE	NE	NE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	3,4-methylphenol	µg/L	2	NE	NE	NE	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
	4,6-Dinitro-2-methylphenol	µg/L	30	NE	NE	NE	-	-	-	-	-	-	-	-	-	-	-	-	-
	4,6-Dinitro-o-cyclohexyl phenol	µg/L	100	NE	NE	NE	-	-	-	-	-	-	-	-	-	-	-	-	-
	4-chloro-3-methylphenol	µg/L	1	NE	NE	NE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	4-nitrophenol	µg/L	30	NE	NE	NE	-	-	-	-	-	-	-	-	-	-	-	-	-
	Dinoseb	µg/L	100	NE	NE	NE	-	-	-	-	-	-	-	-	-	-	-	-	-
	Pentachlorophenol	µg/L	2	22	NE	10 (f)	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
	Phenol	µg/L	1	320	NE	NE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Phenols (Total Halogenated)	mg/L	0.01	NE	NE	NE	-	-	-	-	-	-	-	-	-	-	-	-	-
	Phenols (Total Non Halogenated)	mg/L	0.1	NE	NE	NE	-	-	-	-	-	-	-	-	-	-	-	-	-
PAHs	tetrachlorophenols	µg/L	30	NE	NE	NE	-	-	-	-	-	-	-	-	-	-	-	-	-
	Acenaphthene	µg/L	1	NE	NE	NE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Acenaphthylene	µg/L	1	NE	NE	NE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Anthracene	µg/L	1	NE	NE	NE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Benz(a)anthracene	µg/L	1	NE	NE	NE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Benzo(a)pyrene	µg/L	0.5	NE	NE	0.01 (f)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(b)fluoranthene	µg/L	1	NE	NE	NE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Benzo(g,h,i)perylene	µg/L	1	NE	NE	NE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Benzo(k)fluoranthene	µg/L	1	NE	NE	NE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Chrysene	µg/L	1	NE	NE	NE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Dibenz(a,h)anthracene	µg/L	1	NE	NE	NE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Fluoranthene	µg/L	1	NE	NE	NE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Fluorene	µg/L	1	NE	NE	NE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Indeno(1,2,3-c,d)pyrene	µg/L	1	NE	NE	NE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Naphthalene	µg/L	1	16	NE	NE	<1	8.2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	PAHs (Sum of total)	µg/L	0.5	NE	NE	NE	<0.5	8.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Phenanthrene	µg/L	1	NE	NE	NE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Pyrene	µg/L	1	NE	NE	NE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1

Notes:

QC = Quality Control Sample.

*# = All constituent analyte concentrations are below LOR.

.- = Analysis not requested

LOR = Limit of Reporting (= Method Detection Limit)

NE = Guideline not established

NA = Not Applicable

RPD = Relative Percent Difference

(a) Where results are derived from the summation of selected

All samples collected and analysed according to Mobil Specifications unless otherwise noted in Comments

* = aesthetic

Nominated Investigation Criteria:

(a) ANZECC (2000) Australian Water Quality Guidelines for Fresh and Marine Waters (Marine Water - 95% level of protection)

(b) ANZECC (2000) Water Quality Guidelines for Agricultural Water Use (Livestock)

(c) ANZECC (2000) Recreational Water Quality and Aesthetics.

(e) Ministry of Housing, Spatial Planning and Environment.

(f) NHMRC/NRMMC (2004) National Water Quality Management

	Shaded values exceed applicable beneficial use
	Shaded values exceed applicable beneficial use criteria- Livestock
	Shaded values exceed applicable beneficial use criteria- Primary Contact Recreation
< LOR	Where the LOR exceeds applicable beneficial use criteria

Table 8
GROUNDWATER ANALYTICAL RESULTS-
PAHs Phenols (February 2012)
FORMER MOBIL SERVICE STATION GEELONG WEST (V00993)

Field ID	MW 45	MW 46	QC12	MW 46	MW 47	MW 48	MW 49	MW 50	MW 51
Sample Date	14/02/2012	14/02/2012	14/02/2012	14/02/2012	14/02/2012	14/02/2012	13/02/2012	15/02/2012	14/02/2012
SDG	EM1201655	EM1201655	2/16/2012	EM1201655	EM1201655	EM1201655	EM1201655	EM1201655	EM1201655
Sample Code	EM1201655020	EM1201655026	M12-Fe10192	EM1201655022	EM1201655021	EM1201655025	EM1201655015	EM1201655030	EM1201655029

Method Type	Chemical Name	Units	LOR	Maintenance of Ecosystems (a)	Stock Watering (b)	Primary Contact & Recreation (c)	RPD%									
Phenols	2,4,5-trichlorophenol	µg/L	1	NE	NE	NE	<1	<1	#	<10	#	<1	<1	<1	<1	<1
	2,4,6-trichlorophenol	µg/L	1	20	NE	2 (f)*	<1	<1	#	<10	#	<1	<1	<1	<1	<1
	2,4-dichlorophenol	µg/L	1	160	NE	0.3 (f)*	<1	<1	#	<3	#	<1	<1	<1	<1	<1
	2,4-dimethylphenol	µg/L	1	NE	NE	NE	1.9	2.4	23%	11	141%	47.8	379	<1	<1	2
	2,4-dinitrophenol	mg/L	0.03	0.045	NE	NE	-	-	#	<0.03	#	-	-	-	-	-
	2,6-dichlorophenol	µg/L	1	NE	NE	NE	<1	<1	#	<3	#	<1	<1	<1	<1	<1
	2-chlorophenol	µg/L	1	490	NE	0.1 (f)*	<1	<1	#	<3	#	<1	<1	<1	<1	<1
	2-methylphenol	µg/L	1	NE	NE	NE	1.5	2.3	42%	10	148%	3.9	22.1	<1	<1	1.9
	2-nitrophenol	µg/L	1	NE	NE	NE	<1	<1	#	<10	#	<1	<1	<1	<1	<1
	3,4-methylphenol	µg/L	2	NE	NE	NE	<2	<2	#	<6	#	<2	9.3	<2	<2	<2
	4,6-Dinitro-2-methylphenol	µg/L	30	NE	NE	NE	-	-	-	<30	-	-	-	-	-	-
	4,6-Dinitro-o-cyclohexyl phenol	µg/L	100	NE	NE	NE	-	-	-	<100	-	-	-	-	-	-
	4-chloro-3-methylphenol	µg/L	1	NE	NE	NE	<1	<1	#	<10	#	<1	<1	<1	<1	<1
	4-nitrophenol	µg/L	30	NE	NE	NE	-	-	-	<30	-	-	-	-	-	-
	Dinoseb	µg/L	100	NE	NE	NE	-	-	-	<100	-	-	-	-	-	-
	Pentachlorophenol	µg/L	2	22	NE	10 (f)	<2	<2	#	<10	#	<2	<2	<2	<2	<2
	Phenol	µg/L	1	320	NE	NE	1.3	1.4	7%	3	#	90	1.7	<1	<1	3.9
	Phenols (Total Halogenated)	mg/L	0.01	NE	NE	NE	-	-	-	<0.01	-	-	-	-	-	-
	Phenols (Total Non Halogenated)	mg/L	0.1	NE	NE	NE	-	-	-	<0.1	-	-	-	-	-	-
PAHs	tetrachlorophenols	µg/L	30	NE	NE	NE	-	-	-	<30	-	-	-	-	-	-
	Acenaphthene	µg/L	1	NE	NE	NE	<1	<1	#	<1	#	<1	1.7	<1	<1	<1
	Acenaphthylene	µg/L	1	NE	NE	NE	<1	<1	#	<1	#	<1	<1	<1	<1	<1
	Anthracene	µg/L	1	NE	NE	NE	<1	<1	#	<1	#	<1	<1	<1	<1	<1
	Benz(a)anthracene	µg/L	1	NE	NE	NE	<1	<1	#	<1	#	<1	<1	<1	<1	<1
	Benzo(a)pyrene	µg/L	0.5	NE	NE	0.01 (f)	<0.5	<0.5	#	<1	#	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(b)fluoranthene	µg/L	1	NE	NE	NE	<1	<1	#	<1	#	<1	<1	<1	<1	<1
	Benzo(g,h,i)perylene	µg/L	1	NE	NE	NE	<1	<1	#	<1	#	<1	<1	<1	<1	<1
	Benzo(k)fluoranthene	µg/L	1	NE	NE	NE	<1	<1	#	<1	#	<1	<1	<1	<1	<1
	Chrysene	µg/L	1	NE	NE	NE	<1	<1	#	<1	#	<1	<1	<1	<1	<1
	Dibenz(a,h)anthracene	µg/L	1	NE	NE	NE	<1	<1	#	<1	#	<1	<1	<1	<1	<1
	Fluoranthene	µg/L	1	NE	NE	NE	<1	<1	#	<1	#	<1	<1	<1	<1	<1
	Fluorene	µg/L	1	NE	NE	NE	<1	<1	#	<1	#	<1	1.2	<1	<1	<1
	Indeno(1,2,3-c,d)pyrene	µg/L	1	NE	NE	NE	<1	<1	#	<1	#	<1	<1	<1	<1	<1
	Naphthalene	µg/L	1	16	NE	NE	<1	<1	#	<1	#	10.2	363.9	<1	<1	1.2
	PAHs (Sum of total)	µg/L	0.5	NE	NE	NE	<0.5	<0.5	#	<1	#	10.2	361	<0.5	<0.5	1.2
	Phenanthrene	µg/L	1	NE	NE	NE	<1	<1	#	<1	#	<1	<1	<1	<1	<1
	Pyrene	µg/L	1	NE	NE	NE	<1	<1	#	<1	#	<1	<1	<1	<1	<1

Notes:

QC = Quality Control Sample.
 *# = All constituent analyte concentrations are below LOR.
 - = Analysis not requested
 LOR = Limit of Reporting (= Method Detection Limit)
 NE = Guideline not established
 NA = Not Applicable
 RPD = Relative Percent Difference

(a) Where results are derived from the summation of selected
 All samples collected and analysed according to Mobil Specifications unless otherwise noted in Comments
 * = aesthetic

Nominated Investigation Criteria:

- (a) ANZECC (2000) Australian Water Quality Guidelines for Fresh and Marine Waters (Marine Water - 95% level of protection)
- (b) ANZECC (2000) Water Quality Guidelines for Agricultural Water Use (Livestock)
- (c) ANZECC (2000) Recreational Water Quality and Aesthetics.
- (d) Ministry of Housing, Spatial Planning and Environment.
- (f) NHMRC/NRMMC (2004) National Water Quality Management

	Shaded values exceed applicable beneficial use
	Shaded values exceed applicable beneficial use criteria- Livestock
	Shaded values exceed applicable beneficial use criteria- Primary Contact Recreation
< LOR	Where the LOR exceeds applicable beneficial use criteria

Table 8
GROUNDWATER ANALYTICAL RESULTS-
PAHs Phenols (February 2012)
FORMER MOBIL SERVICE STATION GEELONG WEST (V00993)

Field ID	ENVIA570711307	QC 8	QC9	QC9	MW 53	MW 54	MW55
Sample Date	13/02/2012	13/02/2012	13/02/2012	2/16/2012	13/02/2012	13/02/2012	10/02/2012
SDG	EM1201655	EM1201655	Duplicate of MW52	M12-Fe10191	EM1201655	EM1201655	EM1201476
Sample Code	EM1201655001	EM1201655010			EM1201655004	EM1201655014	EM1201476004

Method Type	Chemical Name	Units	LOR	Maintenance of Ecosystems (a)	Stock Watering (b)	Primary Contact & Recreation (c)	RPD%				RPD%			
Phenols	2,4,5-trichlorophenol	µg/L	1	NE	NE	NE	<1	<1	#	<10	#	<1	<1	<1
	2,4,6-trichlorophenol	µg/L	1	20	NE	2 (f)*	<1	<1	#	<10	#	<1	<1	<1
	2,4-dichlorophenol	µg/L	1	160	NE	0.3 (f)*	<1	<1	#	<3	#	<1	<1	<1
	2,4-dimethylphenol	µg/L	1	NE	NE	NE	<1	<1	#	<3	#	<1	<1	<1
	2,4-dinitrophenol	mg/L	0.03	0.045	NE	NE	-	-	-	<0.03	-	-	-	-
	2,6-dichlorophenol	µg/L	1	NE	NE	NE	<1	<1	#	<3	#	<1	<1	<1
	2-chlorophenol	µg/L	1	490	NE	0.1 (f)*	<1	<1	#	<3	#	<1	<1	<1
	2-methylphenol	µg/L	1	NE	NE	NE	<1	<1	#	<3	#	<1	<1	<1
	2-nitrophenol	µg/L	1	NE	NE	NE	<1	<1	#	<10	#	<1	<1	<1
	3,4-methylphenol	µg/L	2	NE	NE	NE	<2	<2	#	<6	#	<2	<2	<2
	4,6-Dinitro-2-methylphenol	µg/L	30	NE	NE	NE	-	-	-	<30	-	-	-	-
	4,6-Dinitro-o-cyclohexyl phenol	µg/L	100	NE	NE	NE	-	-	-	<100	-	-	-	-
	4-chloro-3-methylphenol	µg/L	1	NE	NE	NE	<1	<1	#	<10	#	<1	<1	<1
	4-nitrophenol	µg/L	30	NE	NE	NE	-	-	-	<30	-	-	-	-
	Dinoseb	µg/L	100	NE	NE	NE	-	-	-	<100	-	-	-	-
	Pentachlorophenol	µg/L	2	22	NE	10 (f)	<2	<2	#	<10	#	<2	<2	<2
	Phenol	µg/L	1	320	NE	NE	<1	<1	#	<3	#	<1	<1	<1
	Phenols (Total Halogenated)	mg/L	0.01	NE	NE	NE	-	-	-	<0.01	-	-	-	-
	Phenols (Total Non Halogenated)	mg/L	0.1	NE	NE	NE	-	-	-	<0.1	-	-	-	-
PAHs	tetrachlorophenols	µg/L	30	NE	NE	NE	-	-	-	<30	-	-	-	-
	Acenaphthene	µg/L	1	NE	NE	NE	<1	<1	#	<1	#	<1	<1	<1
	Acenaphthylene	µg/L	1	NE	NE	NE	<1	<1	#	<1	#	<1	<1	<1
	Anthracene	µg/L	1	NE	NE	NE	<1	<1	#	<1	#	<1	<1	<1
	Benz(a)anthracene	µg/L	1	NE	NE	NE	<1	<1	#	<1	#	<1	<1	<1
	Benzo(a)pyrene	µg/L	0.5	NE	NE	0.01 (f)	<0.5	<0.5	#	<1	#	<0.5	<0.5	<0.5
	Benzo(b)fluoranthene	µg/L	1	NE	NE	NE	<1	<1	#	<1	#	<1	<1	<1
	Benzo(b,h,i)perylene	µg/L	1	NE	NE	NE	<1	<1	#	<1	#	<1	<1	<1
	Benzo(k)fluoranthene	µg/L	1	NE	NE	NE	<1	<1	#	<1	#	<1	<1	<1
	Chrysene	µg/L	1	NE	NE	NE	<1	<1	#	<1	#	<1	<1	<1
	Dibenz(a,h)anthracene	µg/L	1	NE	NE	NE	<1	<1	#	<1	#	<1	<1	<1
	Fluoranthene	µg/L	1	NE	NE	NE	<1	<1	#	<1	#	<1	<1	<1
	Fluorene	µg/L	1	NE	NE	NE	<1	<1	#	<1	#	<1	<1	<1
	Indeno(1,2,3-c,d)pyrene	µg/L	1	NE	NE	NE	<1	<1	#	<1	#	<1	<1	<1
	Naphthalene	µg/L	1	16	NE	NE	<1	<1	#	<1	#	<1	<1	<1
	PAHs (Sum of total)	µg/L	0.5	NE	NE	NE	<0.5	<0.5	#	<1	#	<0.5	<0.5	<0.5
	Phenanthrene	µg/L	1	NE	NE	NE	<1	<1	#	<1	#	<1	<1	<1
	Pyrene	µg/L	1	NE	NE	NE	<1	<1	#	<1	#	<1	<1	<1

Notes:

QC = Quality Control Sample.

*# = All constituent analyte concentrations are below LOR.

./ = Analysis not requested

LOR = Limit of Reporting (= Method Detection Limit)

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(a) Where results are derived from the summation of selected

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Nominated Investigation Criteria:

(a) ANZECC (2000) Australian Water Quality Guidelines for Fresh and Marine Waters (Marine Water - 95% level of protection)

(b) ANZECC (2000) Water Quality Guidelines for Agricultural Water Use (Livestock)

(c) ANZECC (2000) Recreational Water Quality and Aesthetics.

(e) Ministry of Housing, Spatial Planning and Environment.

(f) NHMRC/NRMMC (2004) National Water Quality Management

	Shaded values exceed applicable beneficial use
	Shaded values exceed applicable beneficial use criteria- Livestock
	Shaded values exceed applicable beneficial use criteria- Primary Contact Recreation
< LOR	Where the LOR exceeds applicable beneficial use criteria

Table 6
HISTORICAL GROUNDWATER ANALYTICAL RESULTS - METALS
FORMER MOBIL SERVICE STATION GEELONG WEST (VO0993)
(All results in µg/L unless otherwise specified)

Field ID	Sample Date	Chemical Name	Arsenic	Barium	Cadmium	Chromium (III+VI)	Copper	Mercury	Nickel	Vanadium	Zinc	Iron
		Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
		LOR	0.001	0.001	0.0001	0.001	0.001	0.0001	0.001	0.01	0.005	0.05
		Maintenance of Ecosystems (a)	0.007 (f)		0.0055		0.0013	0.0004	0.07	0.1	0.015	NE
		Stock Watering (b)	0.5		0.01	1	0.4	0.002	1		20	NE
		Primary Contact & Recreation (c)	0.05	1	0.005		1	0.001	0.1		0.5	0.3
MW7	16/09/2008		0.008	0.089	<0.0001	<0.001	0.002	<0.0001	<0.001	<0.01	0.01	-
MW8	17/09/2008		0.001	0.059	0.0001	0.002	0.002	<0.0001	<0.001	0.01	0.008	-
MW10	11/04/2006		<LOR	0.31	0.0016	0.008	0.008	<LOR	0.005	0.025	0.47	-
MW10	13/11/2007		0.002	0.036	<0.0001	<0.001	0.002	<0.0001	<0.001	0.02	0.006	0.05
MW10	17/09/2008		<0.001	0.043	0.0001	<0.001	0.002	<0.0001	<0.001	0.01	0.007	0.02
MW10	26/02/2009		0.003	0.044	<0.0001	0.001	0.002	<0.0001	<0.001	0.02	0.007	-
MW10	22/03/2011		0.002	0.058	<0.0001	0.007	<0.001	<0.0001	<0.001	0.02	0.006	<0.05
MW10	23/05/2011		0.001	0.048	<0.0001	0.001	0.002	<0.0001	<0.001	0.02	0.008	-
MW11	13/04/2006		0.004	0.14	<LOR	0.002	0.002	<LOR	0.004	0.036	0.13	-
MW11	13/11/2007		0.003	0.032	<0.0001	<0.001	0.002	<0.0001	0.003	0.02	0.014	0.02
MW14	24/05/2011		0.001	0.083	<0.0001	<0.001	0.001	<0.0001	<0.001	0.01	0.007	-
MW14	8/09/2011		<0.001	0.086	<0.0001	0.003	0.001	<0.0001	<0.001	<0.01	0.008	-
MW15	13/04/2006		<LOR	0.25	<LOR	0.002	0.002	<LOR	0.002	0.01	0.18	-
MW19	11/04/2006		0.008	0.12	0.0005	0.002	0.003	<LOR	0.004	0.014	0.085	-
MW19	13/11/2007		0.013	0.087	0.0001	0.001	0.002	<0.0001	0.002	0.01	<0.005	0.22
MW19	17/09/2008		0.003	0.083	<0.0001	<0.001	0.001	<0.0001	0.001	<0.01	0.007	0.17
MW19	26/02/2009		0.008	0.07	<0.0001	<0.001	0.001	<0.0001	0.001	0.01	0.006	-
MW19	21/03/2011		0.009	0.071	<0.0001	<0.001	0.004	<0.0001	0.004	0.01	0.009	0.05
MW19	25/05/2011		0.013	0.12	<0.0001	<0.001	0.029	<0.0001	0.008	0.02	0.059	-
MW20	8/09/2011		0.001	0.059	<0.0001	0.007	0.006	<0.0001	0.008	0.01	0.014	-
MW21	11/04/2006		<LOR	0.34	<LOR	0.005	0.008	<LOR	0.002	0.016	0.44	-
MW21	13/11/2007		0.001	0.54	<0.0001	<0.001	<0.001	<0.0001	<0.001	0.02	<0.005	0.01
MW21	17/09/2008		<0.001	0.059	0.0001	<0.001	0.002	<0.0001	<0.001	0.01	0.006	<0.01
MW21	26/02/2009		0.002	0.65	<0.0001	<0.001	0.001	<0.0001	<0.001	0.02	0.006	-
MW22	13/11/2007											0.01
MW22	16/09/2008		<0.001	0.035	0.0002	0.001	0.002	<0.0001	0.001	0.01	0.008	0.04
MW22	26/02/2009		<0.001	0.038	<0.0001	<0.001	0.001	<0.0001	<0.001	0.02	0.008	-
MW23	25/05/2011		0.002	0.05	<0.0002	0.013	<0.001	<0.0001	0.019	<0.005	0.025	0.007
MW24	13/04/2006		0.001	0.49	<LOR	0.011	0.004	<LOR	0.018	0.054	0.43	-
MW24	17/09/2008		<0.001	0.092	<0.0001	<0.001	0.001	<0.0001	0.004	0.02	0.014	-
MW27	11/04/2006		<LOR	0.34	<LOR	0.007	0.007	<LOR	0.004	0.05	0.84	-
MW27	8/09/2011		0.003	0.025	0.0001	0.004	0.025	<0.0001	0.03	<0.01	0.033	-
MW28	8/09/2011		0.002	0.038	<0.0001	0.009	0.01	<0.0001	0.157	<0.01	0.064	-
MW29	12/04/2006		<LOR	0.1	<LOR	0.005	0.001	<LOR	0.002	0.019	0.77	-
MW29	13/11/2007		0.001	0.151	0.0002	<0.001	<0.001	<0.0001	<0.001	0.02	0.008	0.01
MW29	17/09/2008		<0.001	0.059	0.0002	<0.001	0.002	<0.0001	<0.001	0.02	0.007	0.01
MW29	26/02/2009		0.003	0.062	<0.0001	<0.001	0.001	<0.0001	0.001	0.02	0.008	-
MW30	16/09/2008		0.03	0.116	<0.0001	<0.001	0.001	<0.0001	0.002	<0.01	0.006	-
MW31	16/09/2008		0.013	0.148	<0.0001	<0.001	<0.001	<0.0001	0.003	<0.01	0.007	-
MW31	8/09/2011		0.005	0.223	<0.0001	0.001	0.004	<0.0001	0.026	<0.01	0.046	-
MW32	11/04/2006		<LOR	0.16	<LOR	0.006	0.005	<LOR	0.003	0.029	0.35	-
MW33	11/04/2006		<LOR	0.23	<LOR	0.006	0.006	<LOR	0.003	0.018	0.34	-
MW33	22/03/2011		0.003	0.066	<0.0001	<0.001	0.005	<0.0001	0.006	0.02	0.01	-
MW33	27/05/2011		0.002	0.068	<0.0001	0.004	0.001	<0.0001	<0.001	0.02	0.008	-
MW37	16/09/2008		0.002	0.049	0.0001	<0.001	0.003	<0.0001	<0.001	0.02	0.008	-
MW37	21/03/2011		0.008	0.054	<0.0001	<0.001	0.002	<0.0001	<0.001	<0.01	<0.005	<0.05
MW37	25/05/2011		0.009	0.061	<0.0001	0.002	0.027	<0.0001	0.016	0.01	0.05	-
MW38	22/03/2011		0.008	0.048	<0.0001	0.008	0.008	<0.0001	0.019	0.03	0.014	<0.05
MW38	25/05/2011		0.006	0.059	<0.0001	0.002	0.007	<0.0001	0.012	0.02	0.012	-
MW39	17/09/2008		<0.001	0.156	<0.0001	<0.001	0.001	<0.0001	<0.001	0.01	0.008	0.01
MW39	26/02/2009		0.002	0.147	<0.0001	<0.001	0.001	<0.0001	0.001	0.01	0.008	-
MW40	13/11/2007		<0.001	0.123	0.0004	<0.001	<0.001	<0.0001	0.001	0.02	<0.005	0.02
MW40	16/09/2008		<0.001	0.108	<0.0001	<0.001	0.001	<0.0001	<0.001	<0.01	0.007	-
MW40	26/02/2009		0.002	0.133	<0.0001	<0.001	0.002	<0.0001	<0.001	0.01	0.007	-
MW41	7/09/2011		0.006	0.021	<0.0001	0.007	0.004	<0.0001	0.014	0.02	0.011	-
MW43	7/09/2011		0.002	0.024	<0.0001	0.004	0.004	<0.0001	0.016	<0.01	0.013	-
MW44	21/03/2011		0.317	0.01	<0.0001	0.001	0.011	<0.0001	0.001	0.86	0.018	0.09
MW44	25/05/2011		0.092	0.021	<0.0001	<0.001	0.021	<0.0001	0.004	0.26	0.034	-
MW46	21/03/2011		1.69	0.001	<0.0001	0.09	0.013	<0.0001	0.004	0.85	0.007	0.16
MW46	24/05/2011		0.659	0.008	<0.0001	<0.001	0.014	<0.0001	0.077	0.32	0.022	-
MW47	21/03/2011		2.95	0.002	<0.0001	<0.001	0.025	<0.0001	0.005	1.82	0.006	<0.05
MW47	25/05/2011		-	-	-	-	-	<0.0001	-	-	-	-
MW47	7/09/2011		1.08	0.001	<0.0001	<0.001	0.01	<0.0001	0.008	1	0.01	-
MW49	8/09/2011		0.001	0.341	<0.0001	0.178	0.063	<0.0001	<0.001	0.01	0.06	-
MW51	24/03/2011		0.925	0.001	<0.0001	<0.001	0.014	<0.0001	0.007	1.48	0.014	-
MW51	8/09/2011		0.096	0.006	<0.0001	0.004	0.008	<0.0001	0.011	0.16	0.02	-
MW52	7/09/2011		0.066	0.027	<0.0001	0.005	0.004	<0.0001	0.052	0.06	0.017	-
MW54	22/03/2011		0.452	0.006	<0.0001	0.01	0.034	<0.0001	0.011	0.5	0.043	0.28
MW54	24/05/2011		0.156	0.019	<0.0001	0.004	0.059	<0.0001	0.181	0.19	0.111	0.048
MW54	8/09/2011		0.07	0.013	<0.0001	0.012	0.003	<0.0001	0.002	0.05	0.007	-
MW55	7/09/2011		0.004	0.074	<0.0001	0.002	0.007	<0.0001	0.03	0.01	0.03	-

Notes:

Post Injection Event Initial ORC Injection (29-30 September 2009) & Initial Regenox (1-5 March 2010).

Pre Injection Event

QC = Quality Control Sample.

*# = All constituent analyte concentrations are below LOR.

^ = Analysis not requested

LOR = Limit of Reporting (= Method Detection Limit)

NE = Guideline not established

NA = Not Applicable

RPD = Relative Percent Difference

(*) Where results are derived from the summation of selected analytes, LOR can not be determined.

All samples collected and analysed according to

Nominated Investigation Criteria:

(a) ANZECC (2000) Australian Water Quality Guidelines for Fresh and Marine Waters (Marine Water - 95% level of protection)

(b) ANZECC (2000) Water Quality Guidelines for Agricultural Water Use (Livestock)

(c) ANZECC (2000) Recreational Water Quality and Aesthetics.

(e) Ministry of Housing, Spatial Planning and Environment, Netherlands (2000) Intervention Values (Dutch Guidelines)

(f) NHMRC/NRMMC (2004) National Water Quality Management Strategy. Australian Drinking Water Guidelines (Aesthetic criteria)

Shaded values exceed applicable beneficial use criteria- Maintenance of Ecosystems (Marine water 95%)

Shaded values exceed applicable beneficial use criteria- Livestock

Shaded values exceed applicable beneficial use criteria- Primary Contact Recreation

< LOR Where the LOR exceeds applicable beneficial use criteria

Table 7
HISTORICAL GROUNDWATER ANALYTICAL RESULTS - NATURAL ATTENUATION PARAMETERS
FORMER MOBIL SERVICE STATION GEELONG WEST (V00993)

Field ID	Sample Date	Analyte	Sulphate (Filtered)	Ferrous iron	Ferric iron (Filtered)	Nitrite (as N)	Nitrate (as N)	TOC	Methane	Alkalinity (Bicarbonate)	Alkalinity (Carbonate)	Alkalinity (Hydroxide) as CaCO3	Alkalinity (total) as CaCO3	Dissolved iron	Manganese (Filtered)	Ammonia as N	Reactive Phosphorus as P	Kjeldahl Nitrogen Total	Nitrogen (Total Oxidised)	Heterotrophic Plate Count	Hydrocarbon Utilising Bacteria	Peroxide
		Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	CFU/ml	CFU/ml	meq O2
		LOR	10	0.02	0.05	0.01	5	1	0.01	20	10	20	0.05	0.05	0.001	0.01	0.01	0.1	0.01	1	1	NA (a)
		Maintenance of Ecosystems (a)	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
		Stockwatering (b)	2000	400	NE	30	400	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
		Primary Contact & Recreation (c)	400	10	NE	1	10	NE	NE	NE	NE	NE	NE	0.3	0.1	0.01	NE	NE	NE	NE	NE	NE
MW10	23/05/2011		803	<0.05	-	-	17.1	8	<0.01	1010	<1	<1000	1010	-	<0.001	-	-	-	-	-	-	-
MW10	22/03/2011		626	<0.05	<0.05	-	15.6	8	<0.01	925	925	-	-	-	-	-	-	-	-	-	-	-
MW10	26/02/2009		748	<0.05	<0.05	<0.01	22.5	<1	<0.01	-	-	-	-	-	-	-	-	-	-	-	-	-
MW10	17/09/2008		753	<0.05	0.15	0.02	21.5	<1	<0.01	-	-	-	-	-	-	-	-	-	21.5	-	-	-
MW10	13/11/07		595	<0.05	<0.05	<0.010	26.2	16	<10	-	-	-	-	-	-	-	-	-	-	-	-	-
MW11	13/11/07		191	<0.05	<0.05	<0.010	7.63	15	<10	-	-	-	-	-	-	-	-	-	-	-	-	-
MW14	18/03/2011		110	<0.05	<0.05	-	4.69	18	<0.01	-	-	-	-	-	-	-	-	-	-	-	-	-
MW18	24/05/2011		14	<0.05	-	-	0.05	8	<0.01	1470	<1	<1000	1470	-	0.052	-	-	-	-	-	-	-
MW19	21/03/2011		677	0.06	<0.05	-	14.1	6	<0.01	961	961	-	-	-	-	-	-	-	-	-	-	-
MW19	25/05/2011		837	0.8	-	-	11.8	8	<0.01	1190	<1	<1000	1190	-	0.254	-	-	-	-	-	-	-
MW19	18/01/2011		95	<0.05	<0.05	-	2.36	14	<0.01	519	566	-	-	<0.05	0.058	0.01	NE	NE	-	-	-	-
MW19	26/02/2009		478	0.18	0.13	0.23	12.7	<1	<0.01	-	-	-	-	-	-	-	-	-	-	-	-	-
MW19	17/09/2008		461	0.08	0.08	0.12	10.8	<1	<0.01	-	-	-	-	-	-	-	-	-	10.9	-	-	-
MW19	13/11/07		389	<0.05	0.22	0.228	10.6	23	<10	-	-	-	-	-	-	-	-	-	-	-	-	-
MW21	26/02/2009		417	<0.05	<0.05	0.03	19.9	<1	<0.01	-	-	-	-	-	-	-	-	-	-	-	-	-
MW21	17/09/2008		405	<0.05	<0.05	0.02	17.4	<1	<0.01	-	-	-	-	-	-	-	-	-	17.4	-	-	-
MW21	13/11/07		388	<0.05	<0.05	<0.010	19	<1	<10	-	-	-	-	-	-	-	-	-	-	-	-	-
MW22	26/02/2009		412	<0.05	<0.05	<0.01	16.6	<1	<0.01	-	-	-	-	-	-	-	-	-	-	-	-	-
MW22	16/09/2008		449	<0.05	<0.05	0.06	15.2	<1	<0.01	-	-	-	-	-	-	-	-	-	15.3	-	-	-
MW22	13/11/07		386	<0.05	<0.05	0.011	17.6	12	<10	-	-	-	-	-	-	-	-	-	-	-	-	-
MW23	25/05/2011		839	<0.05	-	-	16.5	5	<0.01	1310	<1	<1000	1310	-	0.021	-	-	-	-	-	-	-
MW23	21/03/2011		451	<0.05	<0.05	-	15.7	55	<0.01	1420	1420	-	-	-	-	-	-	-	-	-	-	-
MW23	18/01/2011		556	<0.05	<0.05	-	16.7	11	<0.01	1050	1050	-	-	<0.05	0.015	<0.01	0.77	0.5	-	-	-	-
MW24	23/05/2011		439	<0.05	-	-	14.7	28	0.075	938	<1	<1000	9.38	-	0.149	-	-	-	-	-	-	-
MW24	18/03/2011		361	0.05	<0.05	-	12.4	18	<0.01	-	-	-	-	-	-	-	-	-	-	-	-	-
MW29	26/02/2009		424	<0.05	<0.05	<0.01	18.2	<1	<0.01	-	-	-	-	-	-	-	-	-	-	-	-	-
MW29	17/09/2008		448	<0.05	<0.05	0.02	14.6	<1	<0.01	-	-	-	-	-	-	-	-	-	14.6	-	-	-
MW29	13/11/07		405	<0.05	<0.05	<0.010	17.6	6	<10	-	-	-	-	-	-	-	-	-	-	-	-	-
MW31	26/05/2011		242	0.07	-	-	1.41	7	<0.001	1230	<1	<1000	1230	0.2	0.4	-	-	-	-	-	-	-
MW31	21/03/2011		380	<0.05	<0.05	-	2.28	8	<0.01	1030	1030	-	-	-	-	-	-	-	-	-	-	-
MW31	17/01/2011		430	<0.05	<0.05	-	2.85	6	<0.01	1010	1010	-	-	<0.05	0.326	0.04	0.31	0.1	-	-	-	-
MW31	22/10/2010	No Regenox injected, Low impact, Down-gradient	451	-	-	0.06	5.04	-	-	1080	<1	<1	1080	<0.05	0.314	-	<0.01	<0.1	5.1	25000	3300	0.6
MW36	22/10/2010	No Regenox injected, Low historical impact	533	-	-	0.02	19.3	-	-	854	<1	<1	854	<0.05	0.002	-	0.05	0.2	19.3	4700	<100	0.88
MW37	25/05/2011		712	<0.05	-	-	21.2	7	<0.001	981	<1	<1000	981	-	0.023	-	-	-	-	-	-	-
MW37	21/03/2011		425	<0.05	<0.05	-	21.3	5	<0.01	963	963	-	-	-	-	-	-	-	-	-	-	-
MW37	17/01/2011		722	<0.05	<0.05	-	19.3	6	<0.01	776	1120	-	-	<0.05	<0.001	<0.01	<0.01	<0.1	-	-	-	-
MW38	25/05/2011		903	<0.05	-	-	15.2	9	<0.001	953	<1	<1000	953	-	0.028	-	-	-	-	-	-	-
MW38	22/03/2011		526	<0.05	<0.05	-	16.6	9	<0.01	901	901	-	-	-	-	-	-	-	-	-	-	-
MW38	18/01/2011		586	<0.05	<0.05	-	18.4	13	<0.01	915	915	-	-	<0.05	0.048	<0.01	<0.01	<0.1	-	-	-	-
MW39	26/02/2009		234	<0.05	<0.05	<0.01	12.9	<1	<0.01	-	-	-	-	-	-	-	-	-	-	-	-	-
MW39	17/09/2008		222	<0.05	<0.05	0.02	10.4	<1	<0.01	-	-	-	-	-	-	-	-	-	10.5	-	-	-
MW40	26/05/2011		499	<0.05	-	-	20.8	7	<0.001	1130	<1	<1000	1130	0.14	0.026	-	-	-	-	-	-	-
MW40	21/03/2011		638	<0.05	<0.05	-	21.4	6	<0.01	960	960	-	-	-	-	-	-	-	-	-	-	-
MW40	26/02/2009		427	<0.05	<0.05	<0.01	20.4	<1	<0.01	-	-	-	-	-	-	-	-	-	-	-	-	-
MW40	13/11/07		401	<0.05	<0.05	<0.010	17.5	1	<10	-	-	-	-	-	-	-	-	-	-	-	-	-
MW44	25/05/2011		848	0.1	-	-	11.3	9	<0.001	1690	<1	<1	1690	-	0.032	-	-	-	-	-	-	-
MW44	21/03/2011		753	0.15	<0.05	-	14	8	<0.01	1940	1940	-	-	-	-	-	-	-	-	-	-	-
MW44	18/01/2011		834	<0.05	<0.05	-	15	11	<0.01	<1	<1	-	-	<0.05	0.001	0.02	0.42	<0.1	-	-	-	-
MW46	24/05/2011		<10	0.73	-	-	2	2	<0.01	8330	<1	<1000	8330	-	0.014	-	-	-	-	-	-	-
MW46	21/03/2011		1150	0.13	<0.05	-	2.88	43	<0.01	3480	13,300	-	-	-	-	-	-	-	-	-	-	-
MW46	17/01/2011		774	<0.05	<0.05	-	3.5	1860	<0.01	<1	<1	-	-	<0.5	<0.01	0.04	5.98	0.1	-	-	-	-
MW47	25/05/2011		1200	0.15	-	-	2.59	2	<0.01	9950	<1	<1000	9950	-	0.005	-	-	-	-	-	-	-
MW47	21/03/2011		966	<0.05	<0.05	-	1.87	54	<0.01	2160	15,100	-	-	<0.05	0.002	#	#REF!	#REF!	-	-	-	-
MW47	18/01/2011		1190	<0.05	<0.05	-	2.64	1920	<0.01	<1	<1	-	-	<0.05	0.002	#	#REF!	#REF!	-	-	-	-
MW48	25/05/2011		576	1.69	-	-	10.5	326	<0.01	6470	<1	<1000	6470	-	0.004	-	-	-	-	-	-	-
MW48	22/03/2011		716	<0.05	<0.05	-	7.48	4	<0.01	7180	11,800	-	-	-	-	-	-	-	-	-	-	-
MW48	17/01/2011		1030	<0.05	<0.05	-	3.49	8	<0.01	<1	<1	-	-	<0.5	<0.01	0.05	22.4	<1	-	-	-	-
MW51	22/10/2010	Regenox injected, Historical impact	958	-	-	0.16	14	-	-	2350	1450	<1	3800	0.18	0.003	-	4.9	0.1	14.2	83000	4200	1.47
MW54	24/05/2011		756	0.26	-	-	15.4	16	<0.01	1740	<1	<1000	1740	-	0.012	-	-	-	-	-	-	-
MW54	22/03/2011		634	0.27	<0.05	-	14.6	13	<0.01	2480	2480	-	-	-	-	-	-	-	-	-	-	-
MW54	18/01/2011		998	0.11	<0.05	-	6.59	1320	<0.01	<1	<1	-	-	<0.05	0.002	0.29	30.2	<1	-	-	-	-

Notes:

Post Injection Event Initial ORC Injection (29-30 September 2009) & Regenox (1-5 March 2010).
Pre Injection Event

QC = Quality Control Sample.
*# = All constituent analyte concentrations are below LOR.
- = Analysis not requested
LOR = Limit of Reporting (= Method Detection Limit)
NE = Guideline not established
NA = Not Applicable
RPD = Relative Percent Difference

(All results in $\mu\text{g/L}$, unless specified in Notes)

Sample Code	EM0807747015	EM0807747020	EM0807747028	EM0807747032	EM0807747029	EM0807747034	EM0807747009	EM0807747035	EM0807747033	EM0807747	Interlab D	EM0807747011	EM0807747032	EM0807747007	EM0807747027		
Field ID	MW2	MW7	MW8	MW9	MW10	MW14	MW16	MW18	MW19	QC13	RPD	QC14	RPD	MW20	MW21	MW22	MW24
Sample Date	16/09/2008	16/09/2008	17/09/2008	15/09/2008	17/09/2008	17/09/2008	16/09/2008	17/09/2008	17/09/2008	17/09/2008		17/09/2008		16/09/2008	17/09/2008	16/09/2008	17/09/2008
Comments									Duplicate of MW19		RPD%	Triplicate of MW19		RPD%			

[illegible]

Notes:
 NA = Not Applicable
 (a) = Where results are derived from the summation of selected analytes, LOR can not be determined.
 '.' = Analysis not requested
 NE = Guideline not established
 LOR = Limit of reporting
 MW = Permanent Groundwater Monitoring Well; QC = Quality Control Sample.
BOLD = RPD% is above acceptance target
 # = RPD% could not be calculated because both results were below LOR

All samples collected and analysed according to Mobil Specifications unless otherwise noted in Comments section.

Nominated Investigation Criteria:

- (a) ANZECC (2000) Australian Water Quality Guidelines for Fresh and Marine Waters (Marine Water - 95% level of protection)
(b) ANZECC (2000) Water Quality Guidelines for Agricultural Water Use (Irrigation Water)
(c) ANZECC (2000) Water Quality Guidelines for Agricultural Water Use (Livestock)
(d) ANZECC (2000) Recreational water Quality and Aesthetics.

	Shaded values exceed applicable beneficial use criteria- Maintenance of Ecosystems (Marinewater 95%)
	Shaded values exceed applicable beneficial use criteria- Primary Contact Recreation
	Shaded values exceed applicable beneficial use criteria- Irrigation Watering
	Shaded values exceed applicable beneficial use criteria- Livestock Watering
< LOR	Where the LOR exceeds applicable beneficial use criteria

TABLE 8
GROUNDWATERS ANALYTICAL RESULTS
VOLATILE ORGANIC COMPOUNDS
ENVIABTF07113HA
(All results in µg/L, unless specified in Notes)

Sample Code	EM0807747001	EM0807747013	EM0807747031	EM0807747019	EM0807747		Interlab_D	EM0807747017	EM0807747012	EM0807747002	EM0807747008	EM0807747010	EM0807747014	EM0807747016	EM0807747036	EM0807747018	
Field ID	MW27	MW28	MW29	MW30	QC7	RPD	QC8	RPD	MW31	MW32	MW33	MW34	MW35	MW36	MW37	MW39	MW40
Sample Date	15/09/2008	16/09/2008	17/09/2008	16/09/2008	16/09/2008		16/09/2008		16/09/2008	16/09/2008	15/09/2008	16/09/2008	16/09/2008	16/09/2008	17/09/2008	17/09/2008	16/09/2008
Comments					Duplicate of MW30	RPD%	Triplicate of MW30	RPD%									

Analytes		Units	LOR	ANZECC 2000 Marine	ANZECC 2000 Primary	ANZECC 2000	ANZECC 2000																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
				water 95%	Industry (Irrigation)	Primary Industry (Livestock)	Recreational Water Quality and Aesthetics																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															

Notes:
 NA = Not Applicable
 (a) = Where results are derived from the summation of selected analytes, LOR can not be determined.
 'x' = Analysis not requested
 NE = Guideline not established
 LOR = Limit of reporting
 MW = Permanent Groundwater Monitoring Well; QC = Quality Control Sample.
BOLD = RPD% is above acceptance target
= RPD% could not be calculated because both results were below LOR

All samples collected and analysed according to Mobil Specifications unless otherwise noted in Comments section.

TABLE 5. SOIL ANALYTICAL RESULTS - TYPE A ANALYTES
TOTAL PETROLEUM HYDROCARBONS (TPH),
BTEX COMPOUNDS AND LEAD
J307113B
(All results in mg/kg, unless specified in Notes)

Laboratory ID				0402734/005	0402734/010	0402734/015	0402734/018	0402734/024	0402734/027	0402734/033	0402734/039	0402734/041	0402734/046	0402734/049	0402734/055	0402734/058
Sample ID-Depth (m)				GS1-1.0	GS2-1.0	GS3-1.0	GS4-0.6	GS5-0.8	GS6-0.4	GS7-0.6	GS8-0.8	GS9-0.4	GS10-1.0	GS11-0.6	GS12-0.8	GS13-0.6
Sample Depth (m)				-	-	-	-	-	-	-	-	-	-	-	-	-
Headspace (ppm _v)				-	-	-	-	-	-	-	-	-	-	-	-	-
Sample Collection Date				26/02/2004	26/02/2004	26/02/2004	26/02/2004	26/02/2004	26/02/2004	26/02/2004	26/02/2004	26/02/2004	26/02/2004	27/02/2004	27/02/2004	27/02/2004
Sample Extraction Date				1/03/2004	1/03/2004	1/03/2004	1/03/2004	1/03/2004	1/03/2004	1/03/2004	1/03/2004	1/03/2004	1/03/2004	1/03/2004	1/03/2004	1/03/2004
Sample Analysis Date				2/03/2004	2/03/2004	2/03/2004	2/03/2004	2/03/2004	2/03/2004	2/03/2004	2/03/2004	2/03/2004	2/03/2004	2/03/2004	2/03/2004	2/03/2004
Comments																
Analytes	Lab Method*	LOR	Nominated Investigation Criteria													
TPH																
TPH C6 - C9*	E1230	5	65	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR
TPH C10 - C14	E1221	10	NE	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR
TPH C15 - C28	E1221	50	NE	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR
TPH C29 - C36	E1221	50	NE	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR
TPH C10 - C36	E1221	NA ^(a)	1000	#	#	#	#	#	#	#	#	#	#	#	#	#
BTEX COMPOUNDS*																
Benzene	E1010	0.2	1	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR
Toluene	E1010	1	130	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR
Ethylbenzene	E1010	1	50	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR
ortho-xylene	E1010	1	25	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR
m,p-xylenes	E1010	2	25	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR
Lead	406MS	2	300	17	3.8	4.8	3.7	4.1	3.6	26	6.8	27	31	10	13	21

Notes:

* Samples from the indicated depths were analysed for TPH C6-C9 and BTEX cor
NE = Guideline not established
- = Analysis not requested

^(a) Where results are derived from the summation of selected analytes, LOR can not be determined.

All samples collected and analysed according to Mobil Specifications unless otherwise noted in Comments section.

Nominated Investigation Criteria:

NEPM (1999) and NSW EPA (1994)

Results Values in highlighted cells exceed nominated investigation criteria

TABLE 5. SOIL ANALYTICAL RESULTS - TYPE A ANALYTES
TOTAL PETROLEUM HYDROCARBONS (TPH),
BTEX COMPOUNDS AND LEAD
J307113B
(All results in mg/kg, unless specified in Notes)

Laboratory ID				0402734/065	0402734/069	0402734/073	0402734/078	0402734/139		0402734/085	0402734/144		AGAL		0402734/090	0402734/094
Sample ID-Depth (m)				GS14-1.0	GS15-0.8	GS16-0.6	GS17-0.6	QC10-A		GS18-1.0	QC11-A		QC12		GS19-1.0	GS20-0.8
Sample Depth (m)				-	-	-	-	-		-	-				-	-
Headspace (ppm _v)				-	-	-	-	-		-	-				-	-
Sample Collection Date				27/02/2004	27/02/2004	27/02/2004	27/02/2004	27/02/2004		27/02/2004	27/02/2004		27/02/2004		27/02/2004	27/02/2004
Sample Extraction Date				1/03/2004	1/03/2004	1/03/2004	1/03/2004	1/03/2004		1/03/2004	1/03/2004		-		1/03/2004	1/03/2004
Sample Analysis Date				2/03/2004	2/03/2004	2/03/2004	2/03/2004	2/03/2004		2/03/2004	2/03/2004		-		2/03/2004	2/03/2004
Comments																
Analytes	Lab Method*	LOR	Nominated Investigation Criteria					Duplicate of GS17-0.6	RPD%		Duplicate of GS18-1.0	RPD%	Triplicate of GS18-1.0	RPD%		
TPH																
TPH C6 - C9*	E1230	5	65	<LOR	<LOR	<LOR	<LOR	<LOR	~	<LOR	<LOR	~	<25	~	<LOR	<LOR
TPH C10 - C14	E1221	10	NE	<LOR	<LOR	<LOR	32	42	27	<LOR	<LOR	~	<50	~	<LOR	<LOR
TPH C15 - C28	E1221	50	NE	<LOR	<LOR	<LOR	<LOR	68	~	<LOR	<LOR	~	<100	~	<LOR	<LOR
TPH C29 - C36	E1221	50	NE	<LOR	<LOR	<LOR	<LOR	<LOR	~	<LOR	<LOR	~	<100	~	<LOR	<LOR
TPH C10 - C36	E1221	NA ^(a)	1000	#	#	#	32	110	110	#	#	~	#	~	#	#
BTEX COMPOUNDS*																
Benzene	E1010	0.2	1	<LOR	<LOR	<LOR	<LOR	<LOR	~	<LOR	<LOR	~	<0.5	~	<LOR	<LOR
Toluene	E1010	1	130	<LOR	<LOR	<LOR	<LOR	<LOR	~	<LOR	<LOR	~	<0.5	~	<LOR	<LOR
Ethylbenzene	E1010	1	50	<LOR	<LOR	<LOR	<LOR	<LOR	~	<LOR	<LOR	~	<0.5	~	<LOR	<LOR
ortho-xylene	E1010	1	25	<LOR	<LOR	<LOR	<LOR	<LOR	~	<LOR	<LOR	~	<1	~	<LOR	<LOR
m,p-xylenes	E1010	2	25	<LOR	<LOR	<LOR	<LOR	<LOR	~	<LOR	<LOR	~	<1	~	<LOR	<LOR
Lead	406MS	2	300	37	26	7.9	13	15	14	8.9	10	12	<0.5	~	100	40

Notes:

* Samples from the indicated depths were analysed for TPH C6-C9 and BTEX cor

NE = Guideline not established

~ = Analysis not requested

^(a) Where results are derived from the summation of selected analytes, LOR can not be determined.

All samples collected and analysed according to Mobil Specifications unless otherwise noted in Comments section.

TABLE 5. SOIL ANALYTICAL RESULTS - TYPE A ANALYTES
TOTAL PETROLEUM HYDROCARBONS (TPH),
BTEX COMPOUNDS AND LEAD
J307113B
(All results in mg/kg, unless specified in Notes)

Laboratory ID				0402734/099	AGAL		0402734/103	0402734/108	0402734/112	0402734/113	0402734/120	0402734/125	0402734/127	0402734/133	0402734/135
Sample ID-Depth (m)				GS21-0.8	QC17		GS22-0.6	GS23-0.8	GS24-0.8	GS25-0.2	GS26-0.6	GS27-1.0	GS28-0.4	GS29-0.6	GS30-0.2
Sample Depth (m)				-			-	-	-	-	-	-	-	-	-
Headspace (ppm _v)				-			-	-	-	-	-	-	-	-	-
Sample Collection Date				27/02/2004	27/02/2004		27/02/2004	27/02/2004	27/02/2004	27/02/2004	27/02/2004	27/02/2004	27/02/2004	27/02/2004	27/02/2004
Sample Extraction Date				1/03/2004			1/03/2004	1/03/2004	1/03/2004	1/03/2004	1/03/2004	1/03/2004	1/03/2004	1/03/2004	1/03/2004
Sample Analysis Date				2/03/2004			2/03/2004	2/03/2004	2/03/2004	2/03/2004	2/03/2004	2/03/2004	2/03/2004	2/03/2004	2/03/2004
Comments															
Analytes	Lab Method*	LOR	Nominated Investigation Criteria		Triplicate of GS21-0.8	RPD%									
TPH															
TPH C6 - C9*	E1230	5	65	<LOR	<25	~	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR
TPH C10 - C14	E1221	10	NE	<LOR	<50	~	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR
TPH C15 - C28	E1221	50	NE	<LOR	<100	~	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR
TPH C29 - C36	E1221	50	NE	<LOR	<100	~	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	68	<LOR	<LOR
TPH C10 - C36	E1221	NA ^(a)	1000	#	<275	~	#	#	#	#	#	#	68	#	#
BTEX COMPOUNDS*															
Benzene	E1010	0.2	1	<LOR	<0.5	~	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR
Toluene	E1010	1	130	<LOR	<0.5	~	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR
Ethylbenzene	E1010	1	50	<LOR	<0.5	~	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR
ortho-xylene	E1010	1	25	<LOR	<1	~	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR
m,p-xylenes	E1010	2	25	<LOR		~	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR
Lead	406MS	2	300	30	17	55	42	430	240	83	110	18	38	32	35

Notes:

* Samples from the indicated depths were analysed for TPH C6-C9 and BTEX cc

NE = Guideline not established

^(a) = Analysis not requested

^(a) Where results are derived from the summation of selected analytes, LOR can not be determined.

All samples collected and analysed according to Mobil Specifications unless otherwise noted in Comments section.

TABLE 6. SOIL ANALYTICAL RESULTS - TYPE B ANALYTES
POLYCYCLIC AROMATIC HYDROCARBONS (PAHs) and Total Phenols
J307113B
(All results in mg/kg, unless specified in Notes)

Laboratory ID				0402734/159	0402734/162	0402734/165	0402734/168	0402734/171	0402734/173	0403073/001	0402734/176	AGAL		0403073/002	0402734/179	0403073/003
Sample ID				GS1	GS4	GS7	GS10	GS13	GS15	GS16	GS18	QC12		GS19	GS21	GS22
Sample Depth (m)				-	-	-	-	-	-	-	-	-	-	-	-	-
Headspace (ppm _v)				-	-	-	-	-	-	-	-	-	-	-	-	-
Sample Collection Date				27/02/2004	27/02/2004	27/02/2004	27/02/2004	27/02/2004	27/02/2004	27/02/2004	27/02/2004	27/02/2004	27/02/2004	27/02/2004	27/02/2004	27/02/2004
Sample Extraction Date				1/03/2004	1/03/2004	1/03/2004	1/03/2004	1/03/2004	1/03/2004	9/03/2004	1/03/2004			9/03/2004	1/03/2004	9/03/2004
Sample Analysis Date				2/03/2004	2/03/2004	2/03/2004	2/03/2004	2/03/2004	2/03/2004	10/03/2004	2/03/2004			10/03/2004	2/03/2004	10/03/2004
Comments																
Analytes	Lab Method*	LOR	Nominated Investigation Criteria										RPD %			
PAHs																
Pyrene	E1110	0.5		<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<0.1	~	<LOR	<LOR	<LOR
Phenanthrene	E1110	0.5		<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<0.1	~	<LOR	<LOR	<LOR
Naphthalene	E1110	0.5		<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<0.1	~	<LOR	<LOR	<LOR
Indeno(1,2,3-c,d)pyrene	E1110	0.5		<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<0.1	~	<LOR	<LOR	<LOR
Fluoranthene	E1110	0.5		<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<0.1	~	<LOR	<LOR	<LOR
Fluorene	E1110	0.5		<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<0.1	~	<LOR	<LOR	<LOR
Dibenz(a,h)anthracene	E1110	0.5		<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<0.1	~	<LOR	<LOR	<LOR
Chrysene	E1110	0.5		<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<0.1	~	<LOR	<LOR	<LOR
Benzo(b & k)fluoranthene	E1110	1		<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<0.1	~	<LOR	<LOR	<LOR
Benzo(g,h,i)perylene	E1110	0.5		<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<0.1	~	<LOR	<LOR	<LOR
Benzo(a)pyrene	E1110	0.5		<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<0.1	~	<LOR	<LOR	<LOR
Benzo(a)anthracene	E1110	0.5		<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<0.1	~	<LOR	<LOR	<LOR
Anthracene	E1110	0.5		<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<0.1	~	<LOR	<LOR	<LOR
Acenaphthene	E1110	0.5		<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<0.1	~	<LOR	<LOR	<LOR
Acenaphthylene	E1110	0.5		<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<0.1	~	<LOR	<LOR	<LOR
Total PAH's	E1110	NA ^(a)		#	#	#	#	#	#	#	#	<1.6	~	#	#	#
TOTAL PHENOLS				-	-	-	-	-	-	-	-	-	-	-	-	-
Total Phenolics	244	0.1		0.4	<LOR	2.3	0.2	1.2	0.2	-	1.3	1.5	14.29	14	0.1	-

*- = Analysis not requested

*m = metres

*ppm_v = Parts per million by volume

LOR = Limit of Reporting (= Method Detection Limit)

NE = Guideline not established

NA = Not Applicable

^(a) Where results are derived from the summation of selected analytes, LOR can not be determined.

All samples collected and analysed according to Mobil Specifications unless otherwise noted in Comments section.

TABLE 6. SOIL ANALYTICAL RESULTS - TYPE B ANALYTES
POLYCYCLIC AROMATIC HYDROCARBONS (PAHs) and Total Phenols
J307113B
(All results in mg/kg, unless specified in Notes)

Laboratory ID				0402734/182	0403073/004	0402734/185	0403073/005	0402734/188
Sample ID				GS24	GS25	GS27	GS28	GS30
Sample Depth (m)				-	-	-	-	-
Headspace (ppm _v)				-	-	-	-	-
Sample Collection Date				27/02/2004	27/02/2004	27/02/2004	27/02/2004	27/02/2004
Sample Extraction Date				1/03/2004	9/03/2004	1/03/2004	9/03/2004	1/03/2004
Sample Analysis Date				2/03/2004	10/03/2004	2/03/2004	10/03/2004	2/03/2004
Comments								
Analytes	Lab Method*	LOR	Nominated Investigation Criteria					
PAHs								
Pyrene	E1110	0.5		<LOR	<LOR	<LOR	<LOR	<LOR
Phenanthrene	E1110	0.5		<LOR	<LOR	<LOR	<LOR	<LOR
Naphthalene	E1110	0.5		<LOR	<LOR	<LOR	<LOR	<LOR
Indeno(1,2,3-c,d)pyrene	E1110	0.5		<LOR	<LOR	<LOR	<LOR	<LOR
Fluoranthene	E1110	0.5		<LOR	<LOR	<LOR	<LOR	<LOR
Fluorene	E1110	0.5		<LOR	<LOR	<LOR	<LOR	<LOR
Dibenz(a,h)anthracene	E1110	0.5		<LOR	<LOR	<LOR	<LOR	<LOR
Chrysene	E1110	0.5		<LOR	<LOR	<LOR	<LOR	<LOR
Benzo(b & k)fluoranthene	E1110	1		<LOR	<LOR	<LOR	<LOR	<LOR
Benzo(g,h,i)perylene	E1110	0.5		<LOR	<LOR	<LOR	<LOR	<LOR
Benzo(a)pyrene	E1110	0.5		<LOR	<LOR	<LOR	<LOR	<LOR
Benz(a)anthracene	E1110	0.5		<LOR	<LOR	<LOR	<LOR	<LOR
Anthracene	E1110	0.5		<LOR	<LOR	<LOR	<LOR	<LOR
Acenaphthene	E1110	0.5		<LOR	<LOR	<LOR	<LOR	<LOR
Acenaphthylene	E1110	0.5		<LOR	<LOR	<LOR	<LOR	<LOR
Total PAH's	E1110	NA ^(a)		#	#	#	#	#
TOTAL PHENOLS				-	-	-	-	-
Total Phenolics	244	0.1		0.1	-	0.9	-	0.8

* = Analysis not requested

"m" = metres

"ppm_v" = Parts per million by volume

LOR = Limit of Reporting (= Method Detection Limit)

NE = Guideline not established

NA = Not Applicable

^(a) Where results are derived from the summation of selected analytes, LOR can not be determined.

All samples collected and analysed according to Mobil Specifications unless otherwise noted in Comments section.

TABLE 7. SOIL ANALYTICAL RESULTS TYPE C ANALYTES
VOLATILE ORGANIC COMPOUNDS
J307113B
(All results in mg/kg, unless specified in Notes)

Laboratory ID				0402734/005	0402734/018	0402734/033	0402734/046	0402734/058	0402734/069	0402734/085	AGAL		0402734/099	0402734/112	0402734/125	0402734/135
Sample ID				GS1-1.0	GS4-0.6	GS7-0.6	GS10-1.0	GS13-0.6	GS15-0.8	GS18-1.0	QC12		GS21-0.8	GS24-0.8	GS27-1.0	GS30-0.2
Sample Depth (m)				-	-	-	-	-	-	-			-	-	-	-
Headspace (ppm _v)				-	-	-	-	-	-	-			-	-	-	-
Sample Collection Date				26/02/2004	26/02/2004	26/02/2004	26/02/2004	27/02/2004	27/02/2004	27/02/2004	27/02/2004		27/02/2004	27/02/2004	27/02/2004	27/02/2004
Sample Extraction Date				1/03/2004	1/03/2004	1/03/2004	1/03/2004	1/03/2004	1/03/2004	1/03/2004	1/03/2004		1/03/2004	1/03/2004	1/03/2004	1/03/2004
Sample Analysis Date				2/03/2004	2/03/2004	2/03/2004	2/03/2004	2/03/2004	2/03/2004	2/03/2004			2/03/2004	2/03/2004	2/03/2004	2/03/2004
Comments																
Analytes	Lab Method*	LOR	NIC									RPD%				
VOLATILE COMPOUNDS																
1,1,1-Trichloroethane	E1270	0.1		<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<1	~	<LOR	<LOR	<LOR	<LOR
1,1,1,2,2-Tetrachloroethane	E1270	0.1		<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<1	~	<LOR	<LOR	<LOR	<LOR
1,1,2-Trichloroethane	E1270	0.1		<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<1	~	<LOR	<LOR	<LOR	<LOR
1,1-Dichloroethane	E1270	0.1		<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<1	~	<LOR	<LOR	<LOR	<LOR
1,1-Dichloroethene	E1270	0.1		<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<1	~	<LOR	<LOR	<LOR	<LOR
1,2(cis)-dichloroethene	E1270	0.1		<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<1	~	<LOR	<LOR	<LOR	<LOR
1,2(trans)-dichloroethene	E1270	0.1		<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<1	~	<LOR	<LOR	<LOR	<LOR
1,2-Dichlorobenzene	E1270	0.1		<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<1	~	<LOR	<LOR	<LOR	<LOR
1,2-Dichloroethane	E1270	0.1		<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<1	~	<LOR	<LOR	<LOR	<LOR
1,2-Dichloropropane	E1270	0.1		<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<1	~	<LOR	<LOR	<LOR	<LOR
1,3(cis)-dichloropropene	E1270	0.1		<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<1	~	<LOR	<LOR	<LOR	<LOR
1,3-Dichlorobenzene	E1270	0.1		<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<1	~	<LOR	<LOR	<LOR	<LOR
1,4-Dichlorobenzene	E1270	0.1		<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<1	~	<LOR	<LOR	<LOR	<LOR
Bromodichloromethane	E1270	0.1		<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<1	~	<LOR	<LOR	<LOR	<LOR
Bromoform	E1270	0.1		<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<1	~	<LOR	<LOR	<LOR	<LOR
Carbon Tetrachloride	E1270	0.1		<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<1	~	<LOR	<LOR	<LOR	<LOR
Chlorobenzene	E1270	0.1		<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<1	~	<LOR	<LOR	<LOR	<LOR
Chloroethane	E1270	0.1		<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<1	~	<LOR	<LOR	<LOR	<LOR
Chloroform	E1270	0.1		<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<1	~	<LOR	<LOR	<LOR	<LOR
Dibromochloromethane	E1270	0.1		<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<1	~	<LOR	<LOR	<LOR	<LOR
Dichloromethane	E1270	0.1		<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<1	~	<LOR	<LOR	<LOR	<LOR
Tetrachloroethene	E1270	0.1		<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<1	~	<LOR	<LOR	<LOR	<LOR
trans-1,3-dichloropropene	E1270	0.1		<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<1	~	<LOR	<LOR	<LOR	<LOR
Trichloroethene	E1270	0.1		<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<1	~	<LOR	<LOR	<LOR	<LOR
Trichlorofluoromethane	E1270	0.1		<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<1	~	<LOR	<LOR	<LOR	<LOR
Vinyl Chloride	E1270	0.1		<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<1	~	<LOR	<LOR	<LOR	<LOR

*~ = See Lab Methods & Description Table

^ = Analysis not requested; "m" = metres

ppmV = Parts per million by volume; LOR = Limit of Reporting (= Method Detection Limit)

NE = Guideline not established; NA = Not Applicable

(a) Where results are derived from the summation of selected analytes, LOR can not be

All samples collected and analysed according to Mobil Specifications unless otherwise noted in Comments section.

SOIL ANALYTICAL RESULTS - TYPE C D ANALYTES
TRACE METALS
J307113B
(All results in mg/kg, unless specified in Notes)

Laboratory ID				0402734/159	0402734/162	0402734/165	0402734/168	0402734/171	0402734/173	0402734/176	0402734/179	0402734/182	0402734/185	0402734/188
Sample ID				GS1	GS4	GS7	GS10	GS13	GS15	GS18	GS21	GS24	GS27	GS30
Sample Depth (m)				-	-	-	-	-	-	-	-	-	-	-
Sample Collection Date				27/02/2004	27/02/2004	27/02/2004	27/02/2004	27/02/2004	27/02/2004	27/02/2004	27/02/2004	27/02/2004	27/02/2004	27/02/2004
Sample Extraction Date				1/03/2004	1/03/2004	1/03/2004	1/03/2004	1/03/2004	1/03/2004	1/03/2004	1/03/2004	1/03/2004	1/03/2004	1/03/2004
Sample Analysis Date				2/03/2004	2/03/2004	2/03/2004	2/03/2004	2/03/2004	2/03/2004	2/03/2004	2/03/2004	2/03/2004	2/03/2004	2/03/2004
Comments														
Analytes	Lab Method*	LOR	Nominated Investigation Criteria											
Type C - TRACE METALS														
Arsenic	406-MS	2	100	3.9	7.2	4.4	5.2	5.2	4.6	5.8	4.3	5.1	2.2	3.4
Barium	406-MS	1	NE	210	320	340	240	170	160	430	210	200	140	370
Cadmium	406-MS	1	20	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR
Chromium	406-MS	2	100	38	58	66	60	57	110	78	40	66	47	67
Copper	406-MS	2	1000	10	22	37	36	40	18	24	17	22	12	18
Mercury	404FIMS	0.01	15	0.02	0.01	0.03	0.03	0.04	0.02	0.02	0.03	0.13	0.03	0.05
Nickel	406-MS	2	600	32	83	52	60	43	70	82	40	57	40	57
Lead	406-MS	2	300	17	3.7	26	31	21	26	8.9	30	240	18	35
Vanadium	406-MS	2	NE	32	85	43	45	42	69	75	29	50	22	45
Zinc	406-MS	2	7000	36	25	120	91	58	43	32	61	89	26	51
Type D - TRACE METALS														
Antimony	406-MS	2	NE	-	-	-	-	-	-	-	-	-	-	-
Cobalt	406-MS	2	100	15	-	22	-	17	-	32	-	27	-	23
Molybdenum	406-MS	5	NE	<LOR	-	<LOR	-	<LOR	-	<LOR	-	<LOR	-	<LOR
Selenium	406-MS	2	NE	2.9	-	2.1	-	2.5	-	3.2	-	2.5	-	2.6
Tin	406-MS	2	NE	2	-	3.8	-	2.6	-	<LOR	-	5.4	-	2.1

m = See Lab Methods & Description Table
 - = Analysis not requested
 m = metres
 LOR = Limit of Reporting (= Method Detection Limit)
 NE = Guideline not established
 NA = Not Applicable

(a) Where results are derived from the summation of selected analytes, LOR can not be determined.

All samples collected and analysed according to Mobil Specifications unless otherwise noted in Comments section.

Nominated Investigation Criteria:
 NEPM (1999) and NSW EPA (1994)
Results Values in highlighted cells exceed nominated investigation criteria

TABLE 10. SOIL ANALYTICAL RESULTS - TYPE F ANALYTES
ORGANOCHLORINE COMPOUNDS
J307113B
(All results in mg/kg, unless specified in Notes)

Laboratory ID				0402734/159	0402734/165	0402734/171	0402734/176	0402734/182	0402734/188	
Sample ID				GS1	GS7	GS13	GS18	GS24	GS30	
Sample Depth (m)				-	-	-	-	-	-	
Headspace (ppm _v)				-	-	-	-	-	-	
Sample Collection Date				27/02/2004	27/02/2004	27/02/2004	27/02/2004	27/02/2004	27/02/2004	
Sample Extraction Date				1/03/2004	1/03/2004	1/03/2004	1/03/2004	1/03/2004	1/03/2004	
Sample Analysis Date				2/03/2004	2/03/2004	2/03/2004	2/03/2004	2/03/2004	2/03/2004	
Comments										
Analytes	Lab Method*	LOR	Nominated Investigation Criteria							
ORGANOCHLORINE COMPOUNDS										
Aldrin	E1080	0.1		<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	
alpha - BHC	E1080	0.1		<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	
beta - BHC	E1080	0.1		<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	
cis-Chlordane	E1080	0.1		-	-	-	-	-	-	
DDD	E1080	0.1		<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	
DDE	E1080	0.1		<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	
DDT	E1080	0.1		<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	
delta - BHC	E1080	0.1		<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	
Dieldrin	E1080	0.1		<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	
Endosulphan 1	E1080	0.1		-	-	-	-	-	-	
Endosulphan 2	E1080	0.1		-	-	-	-	-	-	
Endosulphan sulphate	E1080	0.1		<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	
Endrin	E1080	0.1		<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	
gamma - BHC	E1080	0.1		-	-	-	-	-	-	
Heptachlor	E1080	0.1		<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	
Heptachlorepoxyde	E1080	0.1		<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	
Hexachlorobenzene	E1080	0.1		<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	
Methoxychlor	E1080	0.1		<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	
Oxychlordane	E1080	0.1		-	-	-	-	-	-	
trans-Chlordane	E1080	0.1		-	-	-	-	-	-	
trans-Nonachlor	E1080	0.1		-	-	-	-	-	-	

Notes:

SB = Soil Bore; MW = Permanent Groundwater Monitoring Well; TW = Temporary Groundwater Monitoring Well; HA = Hand Auger Bore; RW = Remediation Well; TP = Test Pit; QC = Quality Control Sample; FD = Field Duplicate.

*M = See Lab Methods & Description Table

*H = All constituent analyte concentrations are below LOR.

* = Analysis not requested

"m" = metres

"ppmv" = Parts per million by volume

LOR = Limit of Reporting (= Method Detection Limit)

NE = Guideline not established

NA = Not Applicable

^(a) Where results are derived from the summation of selected analytes, LOR can not be determined.

All samples collected and analysed according to Mobil Specifications unless otherwise noted in Comments section.

TABLE 11. SOIL ANALYTICAL RESULTS - TYPE F ANALYTES
ORGANOPHOSPHOROUS COMPOUNDS
J307113B
(All results in mg/kg, unless specified in Notes)

Laboratory ID				0402734/159	0402734/165	0402734/171	0402734/176	0402734/182	0402734/188	
Sample ID				GS1	GS7	GS13	GS18	GS24	GS30	
Sample Depth (m)				-	-	-	-	-	-	
Headspace (ppm _v)				-	-	-	-	-	-	
Sample Collection Date				27/02/2004	27/02/2004	27/02/2004	27/02/2004	27/02/2004	27/02/2004	
Sample Extraction Date				1/03/2004	1/03/2004	1/03/2004	1/03/2004	1/03/2004	1/03/2004	
Sample Analysis Date				2/03/2004	2/03/2004	2/03/2004	2/03/2004	2/03/2004	2/03/2004	
Comments										
Analytes	Lab Method*	LOR	Nominated Investigation Criteria							
ORGANOPHOSPHOROUS COMPOUNDS										
Azinphos Methyl	E1090	0.5		-	-	-	-	-	-	
Bolstar	E1090	0.5		-	-	-	-	-	-	
Chlorpyrifos	E1090	0.5		<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	
Chlorpyrifos Methyl	E1090	0.5		<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	
Coumaphos	E1090	0.5		-	-	-	-	-	-	
Demeton-s-methyl	E1090	0.5		-	-	-	-	-	-	
Diazinon	E1090	0.5		<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	
Dichlorvos	E1090	0.5		-	-	-	-	-	-	
Disulfoton	E1090	0.5		-	-	-	-	-	-	
Ethion	E1090	0.5		<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	
Ethoprop	E1090	0.5		-	-	-	-	-	-	
Fenitrothion	E1090	0.5		<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	
Fensulfothion	E1090	0.5		-	-	-	-	-	-	
Fenthion	E1090	0.5		<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	
Malathion	E1090	0.5		<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	
Merphos	E1090	0.5		-	-	-	-	-	-	
Mevinphos	E1090	0.5		-	-	-	-	-	-	
Parathion Methyl	E1090	0.5		<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	
Phorate	E1090	0.5		-	-	-	-	-	-	
Prothiofos	E1090	0.5		-	-	-	-	-	-	
Ronnel	E1090	0.5		<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	
Stirophos	E1090	0.5		-	-	-	-	-	-	

Notes:
SB = Soil Bore; MW = Permanent Groundwater Monitoring Well; TW = Temporary Groundwater Monitoring Well; HA = Hand Auger Bore; RW = Remediation Well; TP = Test Pit; QC = Quality Control Sample; FD = Field Duplicate.
** = See Lab Methods & Description Table
"N" = All constituent analyte concentrations are below LOR.
"-" = Analysis not requested; "m" = metres
ppmV = Parts per million by volume; LOR = Limit of Reporting (= Method Detection Limit)
NE = Guideline not established; NA = Not Applicable
All samples collected and analysed according to Mobil Specifications unless otherwise noted in Comments section.

Table 1
Excavation Validation Analytical Results
Type A - TPH, BTEX and Pb
ENVIABTF070113DB - Geelong West

Sample Code	EM1108596006	EM1108596008	EM1108596010	EM1108596012	EM1108596025	EM1108596027	EM1108596031	EM1108596035	EM1108596037	EM1108596045	EM1108596039	EM1108596049	EM1108596050
Sample Date	2/08/2011	2/08/2011	2/08/2011	2/08/2011	2/08/2011	2/08/2011	2/08/2011	2/08/2011	2/08/2011	2/08/2011	2/08/2011	2/08/2011	2/08/2011
Field ID	VS01-2.0	VS01-4.0	VS02-1.0	VS02-3.0	VS08-2.0	VS08-4.0	VS09-3.0	VS010-2.0	VS010-4.0	VS11-3.0	VS013-5.0	VS15-2.0	VS15-3.0
Comments	WALL SAMPLE	WALL SAMPLE	WALL SAMPLE	WALL SAMPLE	WALL SAMPLE	WALL SAMPLE	WALL SAMPLE	WALL SAMPLE	WALL SAMPLE	WALL SAMPLE	FLOOR SAMPLE	WALL SAMPLE	WALL SAMPLE

Chemical Group	Chemical Name	Units	LOR	NEPM 1999 EIL	NEPM 1999 HIL A	NEPM 1999 HIL F	NSW EPA 1994 Health and Ecological	EXCAVATION 1													
BTEX	Moisture	%	1	NE	NE	NE	NE	19.6	10.7	14.1	10.6	16.4	25.6	11.4	8.3	13.1	11.2	15.2	13.5	17	
	Benzene	mg/kg	0.05	NE	NE	NE	NE	1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	3.5	<0.2	<0.2	
	Toluene	mg/kg	0.05	NE	NE	NE	NE	130	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	91.4	<0.5	12	
	Ethylbenzene	mg/kg	0.05	NE	NE	NE	NE	50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	39.2	<0.5	8	
	Xylene (m & p)	mg/kg	0.1	NE	NE	NE	NE	NE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	213	<0.5	82	
	Xylene (o)	mg/kg	0.05	NE	NE	NE	NE	NE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	73.2	<0.5	33.6	
TPH	Xylene Total	mg/kg	0.15	NE	NE	NE	NE	25	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	286	<0.5	116	
	TPH C6 - C9	mg/kg	10	NE	NE	NE	NE	65	<10	<10	<10	<10	<10	<10	<10	<10	<10	763	<10	378	
	TPH C10 - C14	mg/kg	20	NE	NE	NE	NE	NE	<50	<50	<50	<50	<50	<50	<50	<50	<50	400	<50	100	
	TPH C15 - C28	mg/kg	50	NE	NE	NE	NE	NE	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	
	TPH C29 - C36	mg/kg	50	NE	NE	NE	NE	NE	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	
	TPH C10 - C36 (Sum of total)	mg/kg	50	NE	NE	NE	NE	1000	<50	<50	<50	<50	<50	<50	<50	<50	<50	400	<50	100	
Metals	Lead	mg/kg	5	600	300	1500	300	19	6	11	<5	<5	<5	<5	<5	<5	<5	10	5	11	

Notes:

QC = Quality Control Sample

VS = Validation Sample

= Analysis not requested

RPD = Relative Percent Difference

LOR = Limit of Reporting (= Method Detection Limit)

= RPD% unable to be calculated because results are below detection limit

NE = Guideline not established

^(a) Where results are derived from the summation of selected analytes, LOR can not be determined.

All samples collected and analysed according to Mobil Specifications unless otherwise noted in Comments section.

RED = RPD% exceeds acceptance range

Nominated Investigation Criteria:

	National Environmental Protection Measure (1999). Ecological Investigation Level
	National Environmental Protection Measure (1999). Health investigation Level "A"
	National Environmental Protection Measure (1999). Health investigation Level "B"
	NSW EPA (1994) Health and Ecological Guidelines
< LOR	Where the LOR exceeds applicable beneficial use criteria

Table 1
Excavation Validation Analytical Results
Type A - TPH, BTEX and Pb
ENVIABTF070113DB - Geelong West

Sample Code	EM1108596051	EM1108596052	RPD%	M11-Au01923	RPD%	EM1108596055	EM1108596057	EM1108596058	EM1108596061	EM1108596066	EM1108596070	EM1108596071	EM1108596072	EM1108596077	EM1108596083
Sample Date	2/08/2011	2/08/2011		3/08/2011		2/08/2011	2/08/2011	2/08/2011	3/08/2011	3/08/2011	3/08/2011	3/08/2011	3/08/2011	3/08/2011	3/08/2011
Field ID	VS15-4.0	QC6		QC7		VS16-1.0	VS16-3.0	VS16-4.0	VS17-2.0	VS18-2.0	VS19-1.0	VS19-2.0	VS19-3.0	VS20-3.0	VS21-4.0
Comments	WALL SAMPLE	Duplicate of VS15-4.0		Triplicate of VS15-4.0		WALL SAMPLE	WALL SAMPLE	WALL SAMPLE	WALL SAMPLE	WALL SAMPLE	WALL SAMPLE - SOIL REMOVED	WALL SAMPLE - SOIL REMOVED	WALL SAMPLE - SOIL REMOVED	WALL SAMPLE	WALL SAMPLE

Chemical Group	Chemical Name	Units	LOR	NEPM 1999 EIL	NEPM 1999 HIL A	NEPM 1999 HIL F	NSW EPA 1994 Health and Ecological	EXCAVATION 1															
BTX	Moisture	%	1	NE	NE	NE	NE	13.8	11	23%	14	1%	20.4	13.4	12.8	9.3	6.9	13	10.8	16.6	19.5	12.8	
	Benzene	mg/kg	0.05	NE	NE	NE	NE	1	<0.2	#	<0.05	#	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	1.3	<0.2	<0.2	
	Toluene	mg/kg	0.05	NE	NE	NE	NE	130	<0.5	0.9	#	0.07	#	<0.5	<0.5	<0.5	<0.5	<0.5	8.4	29.7	<0.5	<0.5	
	Ethylbenzene	mg/kg	0.05	NE	NE	NE	NE	50	0.8	2.4	100%	0.21	117%	<0.5	<0.5	<0.5	<0.5	<0.5	7.3	9.8	<0.5	<0.5	
	Xylene (m & p)	mg/kg	0.1	NE	NE	NE	NE	10.6	29.8	95%	3.2	107%	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	172	172	<0.5	<0.5	
	Xylene (o)	mg/kg	0.05	NE	NE	NE	NE	4.7	13.3	96%	1.5	103%	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	79.2	65.6	<0.5	<0.5	
	Xylene Total	mg/kg	0.15	NE	NE	NE	NE	25	15.3	43.1	95%	4.7	106%	<0.5	<0.5	<0.5	<0.5	<0.5	251	238	<0.5	<0.5	
TPH	TPH C8 - C9	mg/kg	10	NE	NE	NE	NE	65	48	138	97%	<20	#	<10	<10	<10	<10	<10	459	472	<10	<10	
	TPH C10 - C14	mg/kg	20	NE	NE	NE	NE	<50	60	#	38	#	<50	<50	<50	<50	<50	<50	1320	200	<50	<50	
	TPH C15 - C28	mg/kg	50	NE	NE	NE	NE	<100	<100	#	<50	#	<100	<100	<100	<100	<100	<100	150	<100	<100	<100	
	TPH C29 - C36	mg/kg	50	NE	NE	NE	NE	<100	<100	#	<50	#	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	
	TPH C10 - C36 (Sum of total)	mg/kg	50	NE	NE	NE	NE	1000	<50	60	#	88	#	<50	<50	<50	<50	<50	<50	1470	200	<50	<50
Metals	Lead	mg/kg	5	600	300	1500	300	6	5	18%	12	67%	18	<5	<5	<5	<5	68	11	7	9	<5	

Notes:

QC = Quality Control Sample

VS = Validation Sample

- = Analysis not requested

RPD = Relative Percent Difference

LOR = Limit of Reporting (= Method Detection Limit)

= RPD% unable to be calculated because results are below detection limit

NE = Guideline not established

^(a) Where results are derived from the summation of selected analytes, LOR can not be determined.

All samples collected and analysed according to Mobil Specifications unless otherwise noted in Comments section.

RED = RPD% exceeds acceptance range

Nominated Investigation Criteria:

	National Environmental Protection Measure (1999). Ecological Investigation Level
	National Environmental Protection Measure (1999). Health Investigation Level "A"
	National Environmental Protection Measure (1999). Health Investigation Level "B"
	NSW EPA (1994) Health and Ecological Guidelines
< LOR	Where the LOR exceeds applicable beneficial use criteria

Table 1
Excavation Validation Analytical Results
Type A - TPH, BTEX and Pb
ENVIABTF070113DB - Geelong West

Sample Code	EM1108596091	EM1108596085	EM1108596090	RPD%	M11-Au01924	RPD%	EM1108861002	EM1108861004	EM1108861006	EM1108861009	EM1108861021	RPD%	M11-Au04374	RPD%	EM1108861013	EM1108861015	EM1108861017
Sample Date	3/08/2011	3/08/2011	3/08/2011		3/08/2011		9/08/2011	9/08/2011	9/08/2011	9/08/2011	9/08/2011		9/08/2011		9/08/2011	9/08/2011	9/08/2011
Field ID	VS22-5.0	VS25-5.0	QC13		QC14		VS40 1.0	VS40 3.0	VS41 2.0	VS41 3.0	QC23		QC24		VS42 2.0	VS42 4.0	VS43 5.0
Comments	FLOOR SAMPLE	FLOOR SAMPLE	Duplicate of VS25-5.0		Triplicate of VS25-5.0		WALL SAMPLE	WALL SAMPLE	WALL SAMPLE	WALL SAMPLE	Duplicate of VS41 3.0		Triplicate of VS41 3.0		WALL SAMPLE	WALL SAMPLE	FLOOR SAMPLE

Chemical Group	Chemical Name	Units	LOR	NEPM 1999 EIL	NEPM 1999 HIL A	NEPM 1999 HIL F	NSW EPA 1994 Health and Ecological	EXCAVATION 1																
BTEX	Moisture	%	1	NE	NE	NE	NE	12	17.5	16.2	8%	16	9%	11.1	7.2	21.4	10.4	9.5	9%	11	6%	27.1	15.6	12
	Benzene	mg/kg	0.05	NE	NE	NE	NE	1	15.9	0.2	0.7	111%	0.36	57%	<0.2	<0.2	<0.2	<0.2	#	<0.05	#	<0.2	<0.2	<0.2
	Toluene	mg/kg	0.05	NE	NE	NE	NE	130	269	1.5	4	91%	3.3	75%	<0.5	<0.5	<0.5	<0.5	#	<0.05	#	<0.5	<0.5	<0.5
	Ethylbenzene	mg/kg	0.05	NE	NE	NE	NE	50	105	<0.5	1.5	#	1.3	#	<0.5	<0.5	<0.5	<0.5	#	<0.05	#	<0.5	<0.5	<0.5
	Xylene (m & p)	mg/kg	0.1	NE	NE	NE	NE	624	2.4	7.5	103%	6.7	95%	<0.5	<0.5	<0.5	<0.5	<0.5	#	<0.1	#	<0.5	<0.5	<0.5
	Xylene (o)	mg/kg	0.05	NE	NE	NE	NE	281	1	3	100%	2.5	86%	<0.5	<0.5	<0.5	<0.5	<0.5	#	<0.05	#	<0.5	<0.5	<0.5
TPH	Xylene Total	mg/kg	0.15	NE	NE	NE	NE	24	105	3.4	102%	9.1 - 9.2	86%	<0.5	<0.5	<0.5	<0.5	<0.5	#	<0.15	#	<0.5	<0.5	1.3 - 1.55
	TPH C6 - C9	mg/kg	10	NE	NE	NE	NE	65	2540	<10	23	#	<20	#	<10	<10	<10	<10	#	<20	#	<10	<10	<10
	TPH C10 - C14	mg/kg	20	NE	NE	NE	NE	2740	<50	<50	#	36	#	<50	<50	<50	<50	<50	#	<20	#	<50	<50	<50
	TPH C15 - C28	mg/kg	50	NE	NE	NE	NE	<100	<100	<100	#	<50	#	<100	<100	<100	<100	<100	#	<50	#	<100	<100	<100
	TPH C29 - C36	mg/kg	50	NE	NE	NE	NE	<100	<100	<100	#	<50	#	<100	<100	<100	<100	<100	#	<50	#	<100	<100	<100
	TPH C10 - C36 (Sum of total)	mg/kg	50	NE	NE	NE	NE	1000	2740	<50	<50	86	#	<50	<50	<50	<50	<50	#	<50	#	<50	<50	<50
Metals	Lead	mg/kg	5	600	300	1500	300	9	11	10	10%	13	17%	<5	<5	6	<5	<5	#	5.7	#	6	7	<5

Notes:

QC = Quality Control Sample
VS = Validation Sample
- = Analysis not requested
RPD = Relative Percent Difference
LOR = Limit of Reporting (= Method Detection Limit)
= RPD% unable to be calculated because results are below detection limit
NE = Guideline not established

⁶⁰ Where results are derived from the summation of selected analytes, LOR can not be determined.
All samples collected and analysed according to Mobil Specifications unless otherwise noted in Comments section.
RED = RPD% exceeds acceptance range

Nominated Investigation Criteria:

	National Environmental Protection Measure (1999). Ecological Investigation Level
	National Environmental Protection Measure (1999). Health Investigation Level "A"
	National Environmental Protection Measure (1999). Health Investigation Level "B"
	NSW EPA (1994) Health and Ecological Guidelines
< LOR	Where the LOR exceeds applicable beneficial use criteria

Table 1
Excavation Validation Analytical Results
Type A - TPH, BTEX and Pb
ENVIABTF070113DB - Geelong West

Sample Code	EM1108664052	EM1108664027	EM1108664029	EM1108664031	EM1108664036	EM1108664039	EM1108664040	EM1108664044	EM1108664048	EM1108664050	EM1108664051	RPD%	M11-Au02477	RPD%
Sample Date	3/08/2011	3/08/2011	3/08/2011	3/08/2011	3/08/2011	3/08/2011	3/08/2011	3/08/2011	3/08/2011	3/08/2011	3/08/2011		3/08/2011	
Field ID	VS26-2.5	VS30-2.0	VS31-1.0	VS32-0.5	VS33-2.0	VS34-2.0	VS35-0.5	VS36-1.0	VS37-2.0	VS39-3.0	QC15		QC16	
Comments	FLOOR SAMPLE	WALL SAMPLE	WALL SAMPLE	WALL SAMPLE	WALL SAMPLE	WALL SAMPLE	WALL SAMPLE	WALL SAMPLE	WALL SAMPLE	FLOOR SAMPLE	Duplicate of VS39-3.0		Triplicate of VS39-3.0	

Chemical Group	Chemical Name	Units	LOR	NEPM 1999 EIL	NEPM 1999 HIL A	NEPM 1999 HIL F	NSW EPA 1994 Health and Ecological	EXCAVATION 2														
BTEX	Moisture	%	1	NE	NE	NE	NE	5.2	10.7	8.3	22	6.2	9.9	15.8	12.1	14.7	11.1	9.6	14%	11	1%	
	Benzene	mg/kg	0.05	NE	NE	NE	NE	1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	#	<0.05	#	
	Toluene	mg/kg	0.05	NE	NE	NE	NE	130	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	#	<0.05	#	
	Ethylbenzene	mg/kg	0.05	NE	NE	NE	NE	50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.7	6%	0.74	74%	
	Xylene (m & p)	mg/kg	0.1	NE	NE	NE	NE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	48.4	54.2	11%	44	10%
	Xylene (o)	mg/kg	0.05	NE	NE	NE	NE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	31.2	33.9	8%	33	6%
TPH	Xylene Total	mg/kg	0.15	NE	NE	NE	NE	25	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	79.6	88.1	10%	77	3%
	TPH C6 - C9	mg/kg	10	NE	NE	NE	NE	65	<10	<10	<10	<10	<10	<10	<10	<10	<10	451	411	9%	370	20%
	TPH C10 - C14	mg/kg	20	NE	NE	NE	NE	<50	1800	<50	<50	280	<50	<50	<50	<50	<50	5460	4860	12%	4800	13%
	TPH C15 - C28	mg/kg	50	NE	NE	NE	NE	<100	1170	<100	<100	690	<50	<100	<100	<100	<100	730	680	7%	770	5%
	TPH C29 - C36	mg/kg	50	NE	NE	NE	NE	<100	1420	<100	<100	770	<50	<100	<100	<100	<100	720	710	1%	750	4%
	TPH C10 - C36 (Sum of total)	mg/kg	50	NE	NE	NE	NE	1000	<50	4390	<50	<50	1740	590	<50	<50	<50	6910	6250	10%	6300	9%
Metals	Lead	mg/kg	5	600	300	1500	300	<5	7	20	9	6	<5	14	21	<5	9	10	11%	7.6	17%	

Notes:

QC = Quality Control Sample

VS = Validation Sample

- = Analysis not requested

RPD = Relative Percent Difference

LOR = Limit of Reporting (= Method Detection Limit)

= RPD% unable to be calculated because results are below detection limit

NE = Guideline not established

0# Where results are derived from the summation of selected analytes, LOR can not be determined.

All samples collected and analysed according to Mobil Specifications unless otherwise noted in Comments section.

RED = RPD% exceeds acceptance range

Nominated Investigation Criteria:

	National Environmental Protection Measure (1999). Ecological Investigation Level
	National Environmental Protection Measure (1999). Health Investigation Level "A"
	National Environmental Protection Measure (1999). Health Investigation Level "F"
	NSW EPA (1994) Health and Ecological Guidelines
< LOR	Where the LOR exceeds applicable beneficial use criteria

Table 2
Excavation Validation Analytical Results
Type B - PAHs and Phenols
ENVIABTF070113DB - Geelong West

Sample Code	EM1108596006	EM1108596008	EM1108596010	EM1108596012	EM1108596025	EM1108596027	EM1108596031	EM1108596035	EM1108596037	EM1108596045	EM1108596039	EM1108596049	EM1108596050
Sample Date	2/08/2011	2/08/2011	2/08/2011	2/08/2011	2/08/2011	2/08/2011	2/08/2011	2/08/2011	2/08/2011	2/08/2011	2/08/2011	2/08/2011	2/08/2011
Field ID	VS01-2.0	VS01-4.0	VS02-1.0	VS02-3.0	VS08-2.0	VS08-4.0	VS09-3.0	VS010-2.0	VS010-4.0	VS11-3.0	VS013-5.0	VS15-2.0	VS15-3.0
Comments													

Chemical Group	Chemical Name	Units	LOR	NEPM 1999 EIL	NEPM 1999 HIL A	NEPM 1999 HIL F	NSW EPA 1994 Health and Ecological	EXCAVATION 1													
PAHs	Moisture	%	1	NE	NE	NE	NE	19.6	10.7	14.1	10.6	16.4	25.6	11.4	8.3	13.1	11.2	15.2	13.5	17	
	Acenaphthene	mg/kg	0.1	NE	NE	NE	NE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
	Acenaphthylene	mg/kg	0.1	NE	NE	NE	NE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
	Anthracene	mg/kg	0.1	NE	NE	NE	NE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
	Benzo(a)anthracene	mg/kg	0.1	NE	NE	NE	NE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
	Benzo(a)pyrene	mg/kg	0.1	NE	1	5	1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
	Benzo(b)k)fluoranthene	mg/kg	0.5	NE	NE	NE	NE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
	Benzo(b)fluoranthene	mg/kg	0.1	NE	NE	NE	NE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
	Benzo(g,h,i)perylene	mg/kg	0.1	NE	NE	NE	NE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
	Benzo(k)fluoranthene	mg/kg	0.1	NE	NE	NE	NE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
	Chrysene	mg/kg	0.1	NE	NE	NE	NE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
	Dibenz(a,h)anthracene	mg/kg	0.1	NE	NE	NE	NE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
	Fluoranthene	mg/kg	0.1	NE	NE	NE	NE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
	Fluorene	mg/kg	0.1	NE	NE	NE	NE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	NE	NE	NE	NE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
	Naphthalene	mg/kg	0.1	NE	NE	NE	NE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	12 - 16.1	<0.5	2.8 - 5	
	PAHs (Sum of total)	mg/kg	0.1	NE	20	100	20	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	16.1 - 40	<0.5	2.8
	Phenanthrene	mg/kg	0.1	NE	NE	NE	NE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
	Pyrene	mg/kg	0.1	NE	NE	NE	NE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
	Phenols	2,3,5,6-Tetrachlorophenol	mg/kg	0.03	NE	NE	NE	NE	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4,5-trichlorophenol		mg/kg	0.05	NE	NE	NE	NE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
2,4,6-trichlorophenol		mg/kg	0.05	NE	NE	NE	NE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
2,4-dichlorophenol		mg/kg	0.03	NE	NE	NE	NE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
2,4-dimethylphenol		mg/kg	0.5	NE	NE	NE	NE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
2,4-dinitrophenol		mg/kg	5	NE	NE	NE	NE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
2,6-dichlorophenol		mg/kg	0.03	NE	NE	NE	NE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
2-chlorophenol		mg/kg	0.03	NE	NE	NE	NE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
2-methylphenol		mg/kg	0.2	NE	NE	NE	NE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
2-nitrophenol		mg/kg	0.5	NE	NE	NE	NE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
3,4-dimethylphenol		mg/kg	0.4	NE	NE	NE	NE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
4,6-Dinitro-2-methylphenol		mg/kg	5	NE	NE	NE	NE	-	-	-	-	-	-	-	-	-	-	-	-	-	
4,6-Dinitro-o-cyclohexyl phenol		mg/kg	5	NE	NE	NE	NE	-	-	-	-	-	-	-	-	-	-	-	-	-	
4-chloro-3-methylphenol		mg/kg	0.03	NE	NE	NE	NE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
4-nitrophenol		mg/kg	5	NE	NE	NE	NE	-	-	-	-	-	-	-	-	-	-	-	-	-	
Dinoseb		mg/kg	5	NE	NE	NE	NE	-	-	-	-	-	-	-	-	-	-	-	-	-	
Pentachlorophenol		mg/kg	0.2	NE	NE	NE	NE	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	
Phenol		mg/kg	0.5	NE	8500	42500	NE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
Phenols (Total Halogenated)		mg/kg	0.03	NE	NE	NE	NE	-	-	-	-	-	-	-	-	-	-	-	-	-	
Phenols (Total Non Halogenated)		mg/kg	1	NE	NE	NE	NE	-	-	-	-	-	-	-	-	-	-	-	-	-	
Phenols (non-halogenated) IWRG621	mg/kg	NA (a)	NE	NE	NE	NE	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2		
Phenols(halogenated) IWRG621	mg/kg	NA (a)	NE	NE	NE	NE	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5		
Halogenated Phenols	tetrachlorophenols	mg/kg	5	NE	NE	NE	NE	-	-	-	-	-	-	-	-	-	-	-	-	-	

Notes:

QC = Quality Control Sample

VS = Validation Sample

- = Analysis not requested

RPD = Relative Percent Difference

LOR = Limit of Reporting (= Method Detection Limit)

= RPD% unable to be calculated because results are below detection limit

NE = Guideline not established

^(a) Where results are derived from the summation of selected analytes, LOR can not be determined.

All samples collected and analysed according to Mobil Specifications unless otherwise noted in Comments section.

RED = RPD% exceeds acceptance range

Nominated Investigation Criteria:

	National Environmental Protection Measure (1999). Ecological Investigation Level
	National Environmental Protection Measure (1999). Health investigation Level "A"
	National Environmental Protection Measure (1999). Health investigation Level "F"
	NSW EPA (1994) Health and Ecological Guidelines
< LOR	Where the LOR exceeds applicable beneficial use criteria

Table 2
Excavation Validation Analytical Results
Type B - PAHs and Phenols
ENVIABTF070113DB - Geelong West

Sample Code	EM1108596051	EM1108596052	RPD%	M11-Au01923	RPD%	EM1108596055	EM1108596057	EM1108596058	EM1108596061	EM1108596066	EM1108596070	EM1108596071	EM1108596072	EM1108596077	EM1108596083
Sample Date	2/08/2011	2/08/2011		3/08/2011		2/08/2011	2/08/2011	2/08/2011	3/08/2011	3/08/2011	3/08/2011	3/08/2011	3/08/2011	3/08/2011	3/08/2011
Field ID	VS15-4.0	QC6		QC7		VS16-1.0	VS16-3.0	VS16-4.0	VS17-2.0	VS18-2.0	VS19-1.0	VS19-2.0	VS19-3.0	VS20-3.0	VS21-4.0
Comments		Duplicate of VS15-4.0		Triplicate of VS15-4.0											

Chemical Group	Chemical Name	Units	LOR	NEPM 1999 EIL	NEPM 1999 HIL A	NEPM 1999 HIL F	NSW EPA 1994 Health and Ecological	EXCAVATION 1																			
PAHs	Moisture	%	1	NE	NE	NE	NE	13.8	11	23%	14	1%	20.4	13.4	12.8	9.3	6.9	13	10.8	16.6	19.5	12.8					
	Acenaphthene	mg/kg	0.1	NE	NE	NE	NE	<0.5	<0.5	#	<0.1	#	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5					
	Acenaphthylene	mg/kg	0.1	NE	NE	NE	NE	<0.5	<0.5	#	<0.1	#	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5					
	Anthracene	mg/kg	0.1	NE	NE	NE	NE	<0.5	<0.5	#	<0.1	#	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5					
	Benzo(a)anthracene	mg/kg	0.1	NE	NE	NE	NE	<0.5	<0.5	#	<0.1	#	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5					
	Benzo(a)pyrene	mg/kg	0.1	NE	1	5	1	<0.5	<0.5	#	<0.1	#	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5					
	Benzo(b)fluoranthene	mg/kg	0.5	NE	NE	NE	NE	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5					
	Benzo(b)fluoranthene	mg/kg	0.1	NE	NE	NE	NE	<0.5	<0.5	#	<0.1	#	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5					
	Benzo(g,h,i)perylene	mg/kg	0.1	NE	NE	NE	NE	<0.5	<0.5	#	<0.1	#	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5					
	Benzo(k)fluoranthene	mg/kg	0.1	NE	NE	NE	NE	<0.5	<0.5	#	<0.1	#	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5					
	Chrysene	mg/kg	0.1	NE	NE	NE	NE	<0.5	<0.5	#	<0.1	#	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5					
	Dibenz(a,h)anthracene	mg/kg	0.1	NE	NE	NE	NE	<0.5	<0.5	#	<0.1	#	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5					
	Fluoranthene	mg/kg	0.1	NE	NE	NE	NE	<0.5	<0.5	#	<0.1	#	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5					
	Fluorene	mg/kg	0.1	NE	NE	NE	NE	<0.5	<0.5	#	<0.1	#	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5					
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	NE	NE	NE	NE	<0.5	<0.5	#	<0.1	#	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5					
	Naphthalene	mg/kg	0.1	NE	NE	NE	NE	1	3.9	118%	2.7	92%	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	27 - 30.3	7.1 - 8	<0.5	<0.5					
	PAHs (Sum of total)	mg/kg	0.1	NE	20	100	20	1	3.9	118%	2.7	92%	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	4.7	30.9	7.1	<0.5	<0.5				
	Phenanthrene	mg/kg	0.1	NE	NE	NE	NE	<0.5	<0.5	#	<0.1	#	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	<0.5	<0.5	<0.5	<0.5				
	Pyrene	mg/kg	0.1	NE	NE	NE	NE	<0.5	<0.5	#	<0.1	#	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.3	<0.5	<0.5	<0.5	<0.5				
	Phenols	2,3,5,6-Tetrachlorophenol	mg/kg	0.03	NE	NE	NE	NE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
		2,4,5-trichlorophenol	mg/kg	0.05	NE	NE	NE	NE	<0.5	<0.5	#	<1	#	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5				
		2,4,6-trichlorophenol	mg/kg	0.05	NE	NE	NE	NE	<0.5	<0.5	#	<1	#	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5				
		2,4-dichlorophenol	mg/kg	0.03	NE	NE	NE	NE	<0.5	<0.5	#	<0.5	#	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5				
2,4-dimethylphenol		mg/kg	0.5	NE	NE	NE	NE	<0.5	<0.5	#	<0.5	#	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5					
2,4-dinitrophenol		mg/kg	5	NE	NE	NE	NE	-	-	-	<5	#	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5					
2,6-dichlorophenol		mg/kg	0.03	NE	NE	NE	NE	<0.5	<0.5	#	<0.5	#	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5					
2-chlorophenol		mg/kg	0.03	NE	NE	NE	NE	<0.5	<0.5	#	<0.5	#	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5					
2-methylphenol		mg/kg	0.2	NE	NE	NE	NE	<0.5	<0.5	#	<0.2	#	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5					
2-nitrophenol		mg/kg	0.5	NE	NE	NE	NE	<0.5	<0.5	#	<1	#	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5					
3,4-dimethylphenol		mg/kg	0.4	NE	NE	NE	NE	<1	<1	#	<0.4	#	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1					
4,6-Dinitro-2-methylphenol		mg/kg	5	NE	NE	NE	NE	-	-	-	<5	#	-	-	-	-	-	-	-	-	-	-					
4,6-Dinitro-o-cyclohexyl phenol		mg/kg	5	NE	NE	NE	NE	-	-	-	<5	#	-	-	-	-	-	-	-	-	-	-					
4-chloro-3-methylphenol		mg/kg	0.03	NE	NE	NE	NE	<0.5	<0.5	#	<1	#	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5					
4-nitrophenol		mg/kg	5	NE	NE	NE	NE	-	-	-	<5	#	-	-	-	-	-	-	-	-	-	-					
Dinoseb		mg/kg	5	NE	NE	NE	NE	-	-	-	<20	#	-	-	-	-	-	-	-	-	-	-	-				
Pentachlorophenol		mg/kg	0.2	NE	NE	NE	NE	<2	<2	#	<1	#	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2					
Phenol		mg/kg	0.5	NE	8500	42500	NE	<0.5	<0.5	#	<0.5	#	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5					
Phenols (Total Halogenated)		mg/kg	0.03	NE	NE	NE	NE	-	-	-	<1	#	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5					
Phenols (Total Non Halogenated)		mg/kg	1	NE	NE	NE	NE	-	-	-	<20	#	-	-	-	-	-	-	-	-	-	-					
Phenols (non-halogenated) IWRG621		mg/kg	NA (a)	NE	NE	NE	NE	<2	<2	#	<5/2	#	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2					
Phenols(halogenated) IWRG621		mg/kg	NA (a)	NE	NE	NE	NE	<5	<5	#	<5	#	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5					
Halogenated Phenols		tetrachlorophenols	mg/kg	5	NE	NE	NE	NE	-	-	-	<5	#	-	-	-	<5	<5	<5	<5	<5	<5	<5				

Notes:
QC = Quality Control Sample
VS = Validation Sample
- = Analysis not requested
RPD = Relative Percent Difference
LOR = Limit of Reporting (= Method Detection Limit)
= RPD% unable to be calculated because results are below detection limit
NE = Guideline not established
(a) Where results are derived from the summation of selected analytes, LOR can not be determined.
All samples collected and analysed according to Mobil Specifications unless otherwise noted in Comments section.
RED = RPD% exceeds acceptance range

Nominated Investigation Criteria:
National Environmental Protection Measure (1999). Ecological Investigation Level
National Environmental Protection Measure (1999). Health investigation Level "A"
National Environmental Protection Measure (1999). Health investigation Level "F"
NSW EPA (1994) Health and Ecological Guidelines
< LOR Where the LOR exceeds applicable beneficial use criteria

Table 2
Excavation Validation Analytical Results
Type B - PAHs and Phenols
ENVIABTF07113DB - Geelong West

Sample Code	EM1108596091	EM1108596085	EM1108596090	RPD%	M11-Au01924	RPD%	EM1108861002	EM1108861004	EM1108861008	EM1108861009	EM1108861021	RPD%	M11-Au04374	RPD%	EM1108861013	EM1108861015	EM1108861017
Sample Date	3/08/2011	3/08/2011	3/08/2011		3/08/2011		9/08/2011	9/08/2011	9/08/2011	9/08/2011	9/08/2011		9/08/2011		9/08/2011	9/08/2011	9/08/2011
Field ID	VS22-5.0	VS25-5.0	QC13		QC14		VS40-1.0	VS40-3.0	VS41-2.0	VS41-3.0	QC23		QC24		VS42-2.0	VS42-4.0	VS43-5.0
Comments			Duplicate of VS25-5.0		Triplicate of VS25-5.0						Duplicate of VS41-3.0		Triplicate of VS41-3.0				

Chemical Group	Chemical Name	Units	LOR	NEPM 1999 EIL	NEPM 1999 HIL A	NEPM 1999 HIL F	NSW EPA 1994 Health and Ecological	EXCAVATION 1																							
PAHs	Moisture	%	1	NE	NE	NE	NE	12	17.5	16.2	8%	16	9%	11.1	7.2	21.4	10.4	9.5	9%	11	6%	27.1	15.6	12							
	Acenaphthene	mg/kg	0.1	NE	NE	NE	NE	<0.5	<0.5	<0.5	#	<0.1	#	<0.5	<0.5	<0.5	<0.5	<0.5	#	<0.1	#	<0.5	<0.5	<0.5							
	Acenaphthylene	mg/kg	0.1	NE	NE	NE	NE	<0.5	NE	<0.5	#	<0.1	#	<0.5	<0.5	<0.5	<0.5	<0.5	#	<0.1	#	<0.5	<0.5	<0.5							
	Anthracene	mg/kg	0.1	NE	NE	NE	NE	<0.5	<0.5	<0.5	#	<0.1	#	<0.5	<0.5	<0.5	<0.5	<0.5	#	<0.1	#	<0.5	<0.5	<0.5							
	Benzo(a)anthracene	mg/kg	0.1	NE	NE	NE	NE	<0.5	<0.5	<0.5	#	<0.1	#	<0.5	<0.5	<0.5	<0.5	<0.5	#	<0.1	#	<0.5	<0.5	<0.5							
	Benzo(a)pyrene	mg/kg	0.1	NE	1	5	1	<0.5	<0.5	<0.5	#	<0.1	#	<0.5	<0.5	<0.5	<0.5	<0.5	#	<0.1	#	<0.5	<0.5	<0.5							
	Benzo(b)fluoranthene	mg/kg	0.5	NE	NE	NE	NE	<0.5	NE	<0.5	#	<0.1	#	<0.5	<0.5	<0.5	<0.5	<0.5	#	<0.1	#	<0.5	<0.5	<0.5							
	Benzo(b)fluoranthene	mg/kg	0.1	NE	NE	NE	NE	<0.5	<0.5	<0.5	#	<0.1	#	<0.5	<0.5	<0.5	<0.5	<0.5	#	<0.1	#	<0.5	<0.5	<0.5							
	Benzo(a,h)pyrene	mg/kg	0.1	NE	NE	NE	NE	<0.5	<0.5	<0.5	#	<0.1	#	<0.5	<0.5	<0.5	<0.5	<0.5	#	<0.1	#	<0.5	<0.5	<0.5							
	Benzo(b)fluoranthene	mg/kg	0.1	NE	NE	NE	NE	<0.5	<0.5	<0.5	#	<0.1	#	<0.5	<0.5	<0.5	<0.5	<0.5	#	<0.1	#	<0.5	<0.5	<0.5							
	Chrysene	mg/kg	0.1	NE	NE	NE	NE	<0.5	<0.5	<0.5	#	<0.1	#	<0.5	<0.5	<0.5	<0.5	<0.5	#	<0.1	#	<0.5	<0.5	<0.5							
	Dibenz(a,h)anthracene	mg/kg	0.1	NE	NE	NE	NE	<0.5	<0.5	<0.5	#	<0.1	#	<0.5	<0.5	<0.5	<0.5	<0.5	#	<0.1	#	<0.5	<0.5	<0.5							
	Fluoranthene	mg/kg	0.1	NE	NE	NE	NE	<0.5	<0.5	<0.5	#	<0.1	#	<0.5	<0.5	<0.5	<0.5	<0.5	#	<0.1	#	<0.5	<0.5	<0.5							
	Fluorene	mg/kg	0.1	NE	NE	NE	NE	0.8	<0.5	<0.5	#	<0.1	#	<0.5	<0.5	<0.5	<0.5	<0.5	#	<0.1	#	<0.5	<0.5	<0.5							
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	NE	NE	NE	NE	<0.5	<0.5	<0.5	#	<0.1	#	<0.5	<0.5	<0.5	<0.5	<0.5	#	<0.1	#	<0.5	<0.5	<0.5							
	Naphthalene	mg/kg	0.1	NE	NE	NE	NE	60 - 74.3	<0.5	<1.1	#	0.7	#	<0.5	<0.5	<0.5	<0.5	<0.5	#	<0.1	#	<0.5	<0.5	<0.5							
	PAHs (Sum of total)	mg/kg	0.1	NE	20	100	20	75.9	<0.5	1.1	#	0.7	#	<0.5	<0.5	<0.5	<0.5	<0.5	#	<0.1	#	<0.5	<0.5	<0.5							
	Phenanthrene	mg/kg	0.1	NE	NE	NE	NE	0.8	<0.5	<0.5	#	<0.1	#	<0.5	<0.5	<0.5	<0.5	<0.5	#	<0.1	#	<0.5	<0.5	<0.5							
	Pyrene	mg/kg	0.1	NE	NE	NE	NE	<0.5	<0.5	<0.5	#	<0.1	#	<0.5	<0.5	<0.5	<0.5	<0.5	#	<0.1	#	<0.5	<0.5	<0.5							
	Phenols	2,3,5,6-Tetrachlorophenol	mg/kg	0.03	NE	NE	NE	NE	<0.5	<0.5	<0.5	#	<0.1	#	<0.5	<0.5	<0.5	<0.5	<0.5	#	<0.1	#	<0.5	<0.5	<0.5						
		2,4,5-trichlorophenol	mg/kg	0.05	NE	NE	NE	NE	<0.5	<0.5	<0.5	#	<1	#	<0.5	<0.5	<0.5	<0.5	<0.5	#	<1	#	<0.5	<0.5	<0.5						
		2,4,6-trichlorophenol	mg/kg	0.05	NE	NE	NE	NE	<0.5	<0.5	<0.5	#	<1	#	<0.5	<0.5	<0.5	<0.5	<0.5	#	<1	#	<0.5	<0.5	<0.5						
		2,4-dichlorophenol	mg/kg	0.03	NE	NE	NE	NE	<0.5	<0.5	<0.5	#	<0.5	#	<0.5	<0.5	<0.5	<0.5	<0.5	#	<0.5	#	<0.5	<0.5	<0.5						
		2,4-dimethylphenol	mg/kg	0.5	NE	NE	NE	NE	<0.5	<0.5	<0.5	#	<0.5	#	<0.5	<0.5	<0.5	<0.5	<0.5	#	<0.5	#	<0.5	<0.5	<0.5						
2,4-dinitrophenol		mg/kg	5	NE	NE	NE	NE	-	-	-	-	<5	#	-	-	-	-	-	-	<5	#	-	-	-							
2,6-dichlorophenol		mg/kg	0.03	NE	NE	NE	NE	<0.5	<0.5	<0.5	#	<0.5	#	<0.5	<0.5	<0.5	<0.5	<0.5	#	<0.5	#	<0.5	<0.5	<0.5							
2-chlorophenol		mg/kg	0.03	NE	NE	NE	NE	<0.5	<0.5	<0.5	#	<0.5	#	<0.5	<0.5	<0.5	<0.5	<0.5	#	<0.5	#	<0.5	<0.5	<0.5							
2-methylphenol		mg/kg	0.2	NE	NE	NE	NE	<0.5	0.6	0.7	#	<0.2	#	<0.5	<0.5	<0.5	<0.5	<0.5	#	<0.2	#	<0.5	<0.5	<0.5							
2-nitrophenol		mg/kg	0.5	NE	NE	NE	NE	<0.5	<0.5	<0.5	#	<1	#	<0.5	<0.5	<0.5	<0.5	<0.5	#	<1	#	<0.5	<0.5	<0.5							
3,4,4-methylphenol		mg/kg	0.4	NE	NE	NE	NE	<1	1	1	#	<0.4	#	<1	<1	<1	<1	<1	#	<0.4	#	<1	<1	<1							
4,6-Dinitro-2-methylphenol		mg/kg	5	NE	NE	NE	NE	-	-	-	-	<5	#	-	-	-	-	-	-	<5	#	-	-	-							
4,6-Dinitro-o-cyclohexyl phenol		mg/kg	5	NE	NE	NE	NE	NE	-	-	-	-	<20	#	-	-	-	-	-	<20	#	-	-	-							
4-chloro-3-methylphenol		mg/kg	0.03	NE	NE	NE	NE	<0.5	<0.5	<0.5	#	<1	#	<0.5	<0.5	<0.5	<0.5	<0.5	#	<1	#	<0.5	<0.5	<0.5							
4-nitrophenol		mg/kg	5	NE	NE	NE	NE	-	-	-	-	<5	#	-	-	-	-	-	-	<5	#	-	-	-							
Dinoseb		mg/kg	5	NE	NE	NE	NE	-	-	-	-	<20	#	-	-	-	-	-	-	<20	#	-	-	-							
Pentachlorophenol		mg/kg	0.2	NE	NE	NE	NE	<2	<2	<2	#	<1	#	<2	<2	<2	<2	<2	#	<1	#	<2	<2	<2							
Phenol		mg/kg	0.5	NE	8500	42500	NE	<0.5	1	1.3	#	<0.5	#	<0.5	<0.5	<0.5	<0.5	<0.5	#	<0.5	#	<0.5	<0.5	<0.5							
Phenols (Total Halogenated)		mg/kg	0.03	NE	NE	NE	NE	-	-	-	-	<1	#	-	-	-	-	-	-	<1	#	-	-	-							
Phenols (Total Non Halogenated)		mg/kg	1	NE	NE	NE	NE	-	-	-	-	<20	#	-	-	-	-	-	-	<20	#	-	-	-							
Phenols (non-halogenated) IWRG621		mg/kg	NA (a)	NE	NE	NE	NE	<2	2.1	2.5	#	<57.2	#	<2	<2	<2	<2	<2	#	<57.2	#	<2	<2	<2							
Phenols(halogenated) IWRG621		mg/kg	NA (a)	NE	NE	NE	NE	<5	<5	<5	#	<5	#	<5	<5	<5	<5	<5	#	<5	#	<5	<5	<5							
Halogenated Phenols		tetrachlorophenols	mg/kg	5	NE	NE	NE	NE	-	-	-	-	<5	-	-	-	-	-	-	-	<5	-	-	-	-						

Notes:
QC = Quality Control Sample
VS = Validation Sample
- = Analysis not requested
RPD = Relative Percent Difference
LOR = Limit of Reporting (= Method Detection Limit)
= RPD% unable to be calculated because results are below detection limit
NE = Guideline not established
(a) Where results are derived from the summation of selected analytes, LOR can not be determined.
All samples collected and analysed according to Mobil Specifications unless otherwise noted in Comments section.
RED = RPD% exceeds acceptance range

Nominated Investigation Criteria:

	National Environmental Protection Measure (1999), Ecological Investigation Level
	National Environmental Protection Measure (1999), Health Investigation Level "A"
	National Environmental Protection Measure (1999), Health Investigation Level "F"
	NSW EPA (1994) Health and Ecological Guidelines
< LOR	Where the LOR exceeds applicable beneficial use criteria

Table 2
Excavation Validation Analytical Results
Type B - PAHs and Phenols
ENVIABTF070113DB - Geelong West

Sample Code	EM1108664052	EM1108664027	EM1108664029	EM1108664031	EM1108664036	EM1108664039	EM1108664040	EM1108664044	EM1108664048	EM1108664050	EM1108664051	RPD%	M11-Au02477	RPD%
Sample Date	3/08/2011	3/08/2011	3/08/2011	3/08/2011	3/08/2011	3/08/2011	3/08/2011	3/08/2011	3/08/2011	3/08/2011	3/08/2011		3/08/2011	
Field ID	VS26-2.5	VS30-2.0	VS31-1.0	VS32-0.5	VS33-2.0	VS34-2.0	VS36-0.5	VS36-1.0	VS37-2.0	VS39-3.0	QC15		QC16	
Comments										Duplicate of VS39-3.0	Duplicate of VS39-3.0		Triplicate of VS39-3.0	

Chemical Group	Chemical Name	Units	LOR	NEPM 1999 EIL	NEPM 1999 HIL A	NEPM 1999 HIL F	NSW EPA 1994 Health and Ecological	EXCAVATION 2														
PAHs	Moisture	%	1	NE	NE	NE	NE	5.2	10.7	8.3	22	6.2	9.9	15.8	12.1	14.7	11.1	9.6	14%	11	1%	
	Acenaphthene	mg/kg	0.1	NE	NE	NE	NE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	#	<0.1	#	
	Acenaphthylene	mg/kg	0.1	NE	NE	NE	NE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	#	<0.1	#	
	Anthracene	mg/kg	0.1	NE	NE	NE	NE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	#	<0.1	#	
	Benzo(a)anthracene	mg/kg	0.1	NE	NE	NE	NE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	#	<0.1	#	
	Benzo(a)pyrene	mg/kg	0.1	NE	1	NE	1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	#	<0.1	#	
	Benzo(b)fluoranthene	mg/kg	0.5	NE	NE	NE	NE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	#	<0.1	#	
	Benzo(b)fluoranthene	mg/kg	0.1	NE	NE	NE	NE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	#	<0.1	#	
	Benzo(g,h,i)perylene	mg/kg	0.1	NE	NE	NE	NE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	#	<0.1	#	
	Benzo(k)fluoranthene	mg/kg	0.1	NE	NE	NE	NE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	#	<0.1	#	
	Chrysene	mg/kg	0.1	NE	NE	NE	NE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	#	<0.1	#	
	Dibenz(a,h)anthracene	mg/kg	0.1	NE	NE	NE	NE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	#	<0.1	#	
	Fluoranthene	mg/kg	0.1	NE	NE	NE	NE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	#	<0.1	#	
	Fluorene	mg/kg	0.1	NE	NE	NE	NE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	#	<0.1	#	
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	NE	NE	NE	NE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	#	<0.1	#	
	Naphthalene	mg/kg	0.1	NE	NE	NE	NE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	24 - 39.2	21 - 33.8	#	9.8	#	
	PAHs (Sum of total)	mg/kg	0.1	NE	20	100	20	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.8	<0.5	39.2	33.8	#	9.8	#
	Phenanthrene	mg/kg	0.1	NE	NE	NE	NE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	#	<0.1	#
	Pyrene	mg/kg	0.1	NE	NE	NE	NE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	#	<0.1	#
	Phenols	2,3,5,6-Tetrachlorophenol	mg/kg	0.03	NE	NE	NE	NE	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4,5-trichlorophenol		mg/kg	0.05	NE	NE	NE	NE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	#	<1	#	
2,4,6-trichlorophenol		mg/kg	0.05	NE	NE	NE	NE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	#	<1	#	
2,4-dichlorophenol		mg/kg	0.03	NE	NE	NE	NE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	#	<0.5	#	
2,4-dimethylphenol		mg/kg	0.5	NE	NE	NE	NE	<0.5	<1.7	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<3.4	<3.3	#	<0.5	#	
2,4-dinitrophenol		mg/kg	5	NE	NE	NE	NE	-	-	-	-	-	-	-	-	-	-	-	-	<5	#	
2,6-dichlorophenol		mg/kg	0.03	NE	NE	NE	NE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	#	<0.5	#	
2-chlorophenol		mg/kg	0.03	NE	NE	NE	NE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	#	<0.5	#	
2-methylphenol		mg/kg	0.2	NE	NE	NE	NE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	#	<1	#	
2-nitrophenol		mg/kg	0.5	NE	NE	NE	NE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	#	<1	#	
3,4,4-methylphenol		mg/kg	0.4	NE	NE	NE	NE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	#	<0.4	#	
4,6-Dinitro-2-methylphenol		mg/kg	5	NE	NE	NE	NE	-	-	-	-	-	-	-	-	-	-	-	-	<5	#	
4,6-Dinitro-o-cyclohexyl phenol		mg/kg	5	NE	NE	NE	NE	-	-	-	-	-	-	-	-	-	-	-	-	<20	#	
4-chloro-3-methylphenol		mg/kg	0.03	NE	NE	NE	NE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	#	<1	#	
4-nitrophenol		mg/kg	5	NE	NE	NE	NE	-	-	-	-	-	-	-	-	-	-	-	-	<5	#	
Dinoseb		mg/kg	5	NE	NE	NE	NE	-	-	-	-	-	-	-	-	-	-	-	-	<20	#	
Pentachlorophenol		mg/kg	0.2	NE	NE	NE	NE	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	#	<1	#	
Phenol		mg/kg	0.5	NE	8500	42500	NE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	#	<0.5	#	
Phenols (Total Halogenated)		mg/kg	0.03	NE	NE	NE	NE	-	-	-	-	-	-	-	-	-	-	-	-	<1	#	
Phenols (Total Non Halogenated)		mg/kg	1	NE	NE	NE	NE	-	-	-	-	-	-	-	-	-	-	-	-	<20	#	
Phenols (non-halogenated) IWRG621	mg/kg	NA (a)	NE	NE	NE	NE	<2	<3.2	<2	<2	<2	<2	<2	<2	<2	<4.9	<4.8	#	<58	#		
Phenols(halogenated) IWRG621	mg/kg	NA (a)	NE	NE	NE	NE	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	#	<5.9	#		
Halogenated Phenols	tetrachlorophenols	mg/kg	5	NE	NE	NE	NE	-	-	-	-	-	-	-	-	-	-	-	-	<5	#	

Notes:
QC = Quality Control Sample
VS = Validation Sample
- = Analysis not requested
RPD = Relative Percent Difference
LOR = Limit of Reporting (= Method Detection Limit)
= RPD% unable to be calculated because results are below detection limit
NE = Guideline not established
(a) Where results are derived from the summation of selected analytes, LOR can not be determined.
All samples collected and analysed according to Mobil Specifications unless otherwise noted in Comments section.
RED = RPD% exceeds acceptance range

Nominated Investigation Criteria:
 National Environmental Protection Measure (1999), Ecological Investigation Level
 National Environmental Protection Measure (1999), Health investigation Level "A"
 National Environmental Protection Measure (1999), Health investigation Level "F"
 NSW EPA (1994) Health and Ecological Guidelines
 Where the LOR exceeds applicable beneficial use criteria

APPENDIX A

PROPERTY TITLE



APPENDIX B

AUDITOR REVIEW OF BACKGROUND REPORTS



APPENDIX C

BACKGROUND REPORTS (PRE 2009)



APPENDIX D
BACKGROUND REPORTS (2009)



APPENDIX E

BACKGROUND REPORTS (2010)



APPENDIX F

BACKGROUND REPORTS (2011)



APPENDIX G
BACKGROUND REPORTS (2012)



APPENDIX H

AUDITOR CUTEF SUBMISSION AND EPA CUTEF COMMUNICATIONS

