Report

CHARTER HALL

PRELIMINARY SITE INVESTIGATION

FORMER FAIRFAX PRINTING BUILDING, 2 HUME HIGHWAY, NEW SOUTH WALES

AUGUST 2015

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The preparation of this report has been undertaken for the purpose of providing the results of a Preliminary Site Investigation at 2 Hume Highway, Chullora, New South Wales and this report cannot be used for any other purpose.

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Peter J Ramsay & Associates Pty Ltd has undertaken this environmental review and advice in accordance with Environment Protection Authority and National guidelines. The nature of this report is influenced by factors such as professional judgement and the reliability of the information relating to the site which was obtained by the methodology described in this report. Reasonable care has been taken to verify the accuracy of the data and information available to Peter J Ramsay & Associates Pty Ltd.

Our findings presented in this report are based on the information available to us during the environmental review and advice, and some of those findings could vary if the information upon which they are based is determined to be false, inaccurate, or incomplete. Peter J Ramsay & Associates Pty Ltd disclaims all liability to any person for events taking place after the time during which the preliminary site investigation was undertaken

EXECUTIVE SUMMARY

A preliminary site investigation (PSI) of the land at 2 Hume Highway, Chullora, NSW (the Site), was performed for Charter Hall. The investigation included a site inspection, site history review, review of previous assessment reports, development of a conceptual site model, and targeted soil and groundwater sampling program. The investigation was performed in accordance with the National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013).

The Site was formerly a printing facility which is owned by Fairfax Media Limited. Site operations ceased in 2013 after which a decommissioning process has been undertaken. Prior to redevelopment as a printing facility in the 1990s, the Site was used for railway related purposes from the 1950s, and prior to this was agricultural or vacant land.

A review of previous reports indicates that the site was previously subject to remediation to remove heavy metal and hydrocarbon impacted soil. Contaminated material is indicated to have been re-used on site as fill, however, the exact location of the contaminated fill that was reused is not known. Recent sampling undertaken at the site by others indicates that significant soil contamination is not present, however, there is a paucity of data relating to several portions of the site which was subsequently addressed during this PSI.

The results of the soil sampling and analysis undertaken for this PSI indicate that a recent leakage of diesel from a fuel tank and/or pump has migrated into the soil beneath the pump room and concrete hardstand immediately adjacent. There is the potential for risks to occur to workers involved in sub-surface works in this area due to vapour inhalation. The potential risk from these soils can be managed through the implementation of an Environment Management Plan (EMP). Alternatively, remediation would be necessary. The diesel contamination is indicated to currently be localised, and extensive on-site migration or off-site migration are considered unlikely.

The results of the soil sampling also indicate that the fill is variably contaminated with heavy metals and asbestos. The heavy metal contamination would not pose a risk to current and future site users based on the current site configuration. In view of the potential risks to human health due to the presence of asbestos, site management measures, including maintenance of the existing capping layer and implementation of an EMP are necessary. The procedures that would need to be included in the EMP are routine and are not considered to be onerous.

If the site configuration were to change with redevelopment or similar, then the risks to current and future site users may increase. Advice should be sought from a suitably qualified environmental consultant regarding the implications of any redevelopment of the site which results in a reduction in sealed areas of the site.

Overall, it is considered that the site is suitable for an ongoing commercial/industrial land use in its current configuration subject to the implementation of an EMP for the for the ongoing management of the hydrocarbon impacted soil in the vicinity of the pump room and asbestos in the fill. In addition, the diesel leak within the fire water diesel pump room should be repaired as a matter of priority if this has not already occurred.

LIST OF ABBREVIATIONS

ACL	Added Contaminant Limit
ADWG	Australian Drinking Water Guidelines
AGST	Above Ground Storage Tank
AHD	Australian Height Datum
ANZECC	Australian and New Zealand Environment and Conservation Council
AS	Australian Standard
ASC NEPM	National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013)
BGL	Below Ground Level
COC	Chain of Custody
CRC CARE	Co-operative Research Centre – Contamination Assessment and Remediation of the Environment
CSM	Conceptual Site Model
DBYD	Dial Before You Dig
DQO	Data Quality Objective
Eco-SSL	USEPA Ecological Soil Screening Level
EIL	Ecological Investigation Level
ESL	Ecological Screening Level
EPA	Environment Protection Authority New South Wales
HIL	Health Investigation Level
HSL	Health Screening Level
IBC	Intermediate Bulk Container
LPI	Land and Property Information
MAH	Monocyclic Aromatic Hydrocarbon
mg/kg	milligrams per kilogram
mg/L	milligrams per litre
NATA	National Association of Testing Authorities
PAH	Polycyclic Aromatic Hydrocarbon

PCB	Polychlorinated Biphenyl
PID	Photoionisation Detector
POEO	Protection of the Environment Operations Act 1997
ppm	parts per million
PSI	Preliminary Site Investigation
PVC	Polyvinyl Chloride
QA	Quality Assurance
QC	Quality Control
RPD	Relative Percent Difference
SQAP	Sampling Quality Assurance Plan
SQG	Soil Quality Guideline
SWL	Standing Water Level
TDS	Total Dissolved Solids
TPH	Total Petroleum Hydrocarbon
TRH	Total Recoverable Hydrocarbon
UPSS	Underground Petroleum Storage System
USEPA	United States Environmental Protection Agency

1. INTRODUCTION

Peter J Ramsay & Associates was engaged by Charter Hall in July 2015 to undertake a preliminary site investigation (PSI) of the former Fairfax Media printing building, 2 Hume Highway, Chullora, NSW (hereinafter referred to as the 'Site'). The location of the Site is shown in Figure 1.

It is understood that Charter Hall wishes to acquire the Site and require an environmental appraisal to assist with the acquisition. Charter Hall advised that the Site was a former printing press which ceased operation in 2003 and has been decommissioned with current activities being significantly reduced.

The PSI involved a review of previous environmental reports completed for the Site, a site inspection, update to the site history review, development of a conceptual site model (CSM), a targeted soil sampling and analytical program, groundwater sampling and preparation of this report. The objective of the project was to evaluate the environmental condition of the Site and to provide advice on the key potential environmental liabilities at the Site.

1.1 Scope

The scope of the environmental review and advice included:

- Review of the relevant documentation provided;
- Site inspection of 10 July 2015;
- Review of the previous environmental reports prepared in relation to the site, which are denoted in Section 4);
- Update historical searches (NSW EPA online database searches, review in detail existing information in detail regarding requests to third parties);
- Development of a Conceptual Site Model (CSM) including an assessment of the potential for the historical and current use of the Site and surrounding land uses to cause site contamination;
- Preparation of Safe Work Method Statement (SWMS) for the project which considered specific EH&S issues for the Site;
- Dial Before You Dig (DBYD) and underground services search;
    - Site attendance on 27 July 2015 to undertake field based activities as follows:
    - Supervision of a qualified service locator to locate underground services;
    - Drilling of seven (7) boreholes using a truck mounted geoprobe drill rig and a decontaminated hand auger to facilitate the collection of soil samples for laboratory analysis;
    - Sampling of groundwater from two (2) existing groundwater wells on site;
    - Delivery of all samples to a National Association of Testing Authorities (NATA) accredited laboratory;

  - Laboratory analysis of soil and groundwater samples for a suite of pre-determined analytes (organic and inorganic); and
  - Reinstatement of the soil sampling locations.
- Implementation of a quality assurance (QA) program in accordance with EPA guidelines;
- Assessment of analytical data and QA; and
- Preparation of a report on the results of the PSI.

2. SITE DESCRIPTION

The subject to this environmental advice is located in the Western Sydney suburb of Chullora, NSW. Chullora is located approximately 10 km to the west of Sydney CBD. The Site boundary and immediate local area are presented in Figure 2 and are described below.

2.1 Site Details

The site was inspected by Peter J Ramsay & Associates on 10 July 2015. The primary purpose of the site inspection was to observe the current condition of the Site, identify any additional potential sources of contamination on the land and surrounding area. The secondary purpose of the site inspection was to reaffirm what was previously reported within earlier environmental reports.

Photographs of the Site taken during the site inspection are presented in **Appendix A.** The findings of the inspection and information obtained in relation to the land are summarised in the following sections.

Table 1 Site Information and Features

Address:	2 Hume Highway, Chullora, New South Wales
Occupier:	Fairfax Media (Fairfax)
Current Use:	Decommissioned printing facility
Owner:	Fairfax Media
Area:	Approximately 10.28 ha
Certificate of Title:	Lot 12 in Deposited Plan (DP) 834734
Local Government Administration:	Bankstown Council and Strathfield Council
Zoning:	IN2 General Industrial (Bankstown Council LEP 2015) IN2 General Industrial (Strathfield Council LEP 2012)
Adjacent Land Uses:	*North*: Worth Street, Industrial (rail associated) *South*: Hume Highway, Low density residential, commercial *East*: Hume Highway, commercial *West*: commercial, light industrial (Australia Post)
Topography:	Regional topography slopes to the north east and east. On the Site, the topography generally slopes to the north east however smaller dips and undulating form within the Site.
Buildings and Structures:	There were several buildings on the Site at the time of the inspection consisting of the main printing building (central), security (adjacent to Worth Street) and the fire water diesel pump house, electrical room and control room (north western portion of the Site). The remainder of the Site was open space, landscaped areas and car parking. The layout of the Site is shown on Figure 2.

Surface Conditions:	The majority of the Site is building fabric (structures, asphalt and concrete) with grassed and landscaped areas located on the outer portions.
Surface Drainage:	Surface water drainage (via overland flow) at the Site is likely to drain to the local storm water drainage network or infiltrate directly into the ground. No surface water ponding was observed during the site inspection.
Vegetation:	The vegetation at the Site was restricted to grass and some weeds with some shrubs and trees close by.

2.2 Site Inspection

On 10 July 2015 Peter J Ramsay & Associates personnel attended the Site to undertake a site inspection. The site inspection was undertaken under the guidance of Mr Michael Johnson (building manager) of Fairfax.

The site layout, building fabric, nature of the works (former), storage of fuels, chemicals and waste materials were described as they were in Prensa's 2012 Phase 1 ESA and WSP's 2015 Limited ESA (refer to Sections 4.1and 4.5 respectively). The site drainage and external features were also described and referenced in previous environmental assessments.

During the site inspection a diesel leak was noted within the fire water diesel pump room (located in the north western portion of the Site). This pump serves the fire water tank located adjacent to the building. The water pump and associated infrastructure (both above and below ground) runs from both the building and the water tank. There was a strong odour (hydrocarbon) within the room as well as fuel/oil on the ground surface. Staining was also noted on the outside wall (external) of the room and the concrete surface. The concrete hardstand was noted to be in a good condition, however, a couple of minor cracks were observed.

We were advised that the leak was first identified 6-8 weeks prior to the site investigation works, however, no rectification works had been implemented to date. In view of the extent of the leak and duration, it was considered that the potential for significant contamination to have occurred is low. Nevertheless, soil sampling was recommended following the site inspection to investigate this.

An inspection of the retention ponds on site indicated that the water and immediate surrounds appeared to be in a good condition with no visible oil and grease, staining or sheen noted on the water and no vegetation dieback was noted. Elsewhere on the Site, stains and leaks were noted both within and outside of the main building on concrete hardstand, however, these were minor and were unlikely to cause significant environmental impact.

The drainage system within the building transferred waste products (liquids and inks) to the Waste Water Treatment Plant (WWTP) for treatment prior to discharge to sewer under consent. The WWTP was located within a room on the ground floor within a concrete and steel lined underground tank.

2.3 Geology

The Geological Survey of New South Wales 1:100,000 Sydney Map indicates that the site is underlain by the Middle Triassic Aged Bringelly Shale of the Wianamatta Group, which comprises “shale, carbonaceous claystone, laminite, fine to medium-grained lithic sandstone, rare coal”.

Based on our review of the previous environmental investigations (refer to Section 4) and our site investigations, the natural soil comprised residual clay and shale consistent with the Bringelly Shale. The natural soil and rock is located between approximately 2 m and 10 m below the ground surface.

2.3.1 Fill Material

The previous environmental investigations undertaken at the site indicate that the fill was present on the site at depths between 2 m in the western portion of the site and up to 6.0 m in the eastern portion of the site. During our site investigation, four boreholes (denoted BH1, BH2, BH3 and BH4) were drilled at the car park in the western portion of the site; where the fill was found to extend to a depth of 10.0 m BGL.

At the firewater diesel pump house the fill material was found to extend to a depth of 1.8 m BGL (BH05). At BH05 the fill material was characterised by sandy gravel with some clay present. The material was considered a road base type material and was assumed to be associated with backfill material around the below ground fire water infrastructure.

At BH06 the fill material extended to approximately 1.5 m BGL. At BH06 the fill was characterised by a layer of subgrade underlying the concrete with sandy clay underlying this (possibly reworked natural material).

At BH07 the fill extended to at least 0.5 m BGL and was characterised by the same subgrade material underlying the concrete hardstand. At BH07 the bore was drilled to 0.5 m BGL only due to an obstruction or compacted fill.

2.3.2 Acid Sulfate Soil Potential

The location of the Site is classified within the Strathfield LEP 2012 as 'Class 5' which indicates that the Site has a low likelihood of containing soils with Acid Sulphate Soil (ASS) potential. A review of the Australian Soil Resource Information System (ASRIS) map for ASS occurrence on 29 July 2015 indicates that the Site is located within an area which has an 'Extremely Low Probability/Very Low Confidence' of acid sulfate soil potential.

This information corroborates with that described within the WSP (2015) Limited ESA. WSP reviewed information contained within the Bankstown Council Website and was confirmed by the Australian Soil Resource Information System (ASRIS) map for ASS occurrence.

2.4 Hydrology

Information provided in Prensa's 2012 Phase 1 ESA and WSP's 2015 Limited ESA indicates that the drainage on site is directed to either the WWTP or to the local stormwater system. Information gained during the Peter J Ramsay & Associates site inspection confirms these findings.

There are two retention ponds on the Site. One pond is located along the south eastern boundary adjacent to the Hume Highway and the other pond is located in the northern portion adjacent to Worth Street. Stormwater drains located across the Site discharge to the retention pond adjacent to Hume Highway.

2.5 Hydrogeology

2.5.1 Groundwater Flow Direction

Groundwater flow direction is assumed to be towards the Cooks River located approximately 1.0 km to the east of the Site. A review of WSP's 2015 Limited ESA indicates that groundwater was only observed within the shale bedrock and that this is regional groundwater. No significant inflows were noted in both groundwater wells and this indicates that shallow or perched water is likely to be low in volume. Peter J Ramsay & Associates agrees with this assessment and observations made during the site inspection and site investigation corroborate these assumptions.

2.5.2 Groundwater Dependent Ecosystems

Groundwater dependent ecosystems (GDEs)[1] are not known to exist either on the Site or the surrounding area. This information is detailed within WSP's 2015 Limited ESA and was cross checked by Peter J Ramsay & Associates.

2.5.3 Groundwater Bore Search

A review of WSP's 2015 Limited ESA report indicates that there are four (4) groundwater bores located within 500 m of the Site. WSP report that all four (4) bores are groundwater monitoring wells with groundwater level indicated to be between 3.95 m and 5.4 m BGL. Relevant bore information is summarised within WSP's 2015 Limited ESA report. Three of the groundwater bores are located within a former service station to the south east, which is expected to be located down hydraulic gradient of the site.

2.5.4 Existing Monitoring Well Network

Two groundwater wells, BH03 and BH08 are located at the site. These are understood to have been installed by WSP in 2015. BH03 is located adjacent to the south eastern corner of the main building, close to two of the diesel powered generators. BH08 is located adjacent to the car park in the central north portion of the Site, close to the main building. These groundwater wells were sampled as part of the site investigation undertaken by Peter J Ramsay & Associates.

BH03 and BH08 are reported to have been installed into the underlying shale bedrock to depths of 16.0 m and 12.0 m BGL respectively. Groundwater levels were recorded at 8.88 m below top of casing (mb TOC) within BH03 and at 4.86 mb TOC within BH08. This information was reported by WSP as part of its 2015 Limited ESA. A review of the relevant information of this report indicates that the wells were installed appropriately and as such were useable in order to assess groundwater quality underlying the Site.

2.6 Flora and Fauna

The majority of the Site is covered in structures, asphalt and concrete surfacing. There are landscaped and grassed areas located on the outer portions of the Site. These are unlikely to have conservation value.

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[1] http://www.bom.gov.au/water/groundwater/gde/

3. SITE HISTORY

3.1 Information Sources

The site history of the land subject to the PSI was reviewed in order to identify the potential for soil and groundwater contamination to be present on the site resulting from historical activities.

The site history has been compiled from information obtained from the following sources:

- Our review of the previous environmental investigation reports prepared in relation to the site (refer to Section 4)
- Aerial photographs of the site and surrounds held by Land and Property Information (LPI), Nearmap and Google;
- WorkCover NSW records;
- Local council records.
- NSW EPA – publicly available information sources; and
- Interview with site occupant(s).

3.2 Search of Publicly Available EPA Records

The EPA compiles information including databases related to contaminated sites or other sites known to the EPA. In particular, the key sources of information relating to potentially contaminated land are the EPA Contaminated Land Public Register for sites notified to the EPA under the Contaminated Land Management Act 1997, the EPA Contaminated Land Record of Notices for sites which have been issued a notice by the EPA, and the EPA Public Register for sites licensed under the Protection of the Environment Operations Act 1997 (POEO Public Register).

3.2.1 EPA Contaminated Land Public Register

Our search of the EPA's Contaminated Land Public record on 29 July 2015 indicates that the Site is not listed on, and is not in the vicinity of a site listed on, the Contaminated Land Record of Notices.

This information corroborates with that which is detailed within WSP's 2015 Limited ESA (refer to Section 4.5).

3.2.2 EPA Contaminated Land Record of Notices

Our search of the EPA's Contaminated Land Public record 29 July 2015 indicates that the Site is not listed on, and is not in the vicinity of a site listed on, the Contaminated Land Record of Notices.

This information corroborates with that which is detailed within WSP's 2015 Limited ESA (refer to Section 4.5).

3.2.3 EPA POEO Public Register

Our search of the POEO Public Register for Environment Protection licences, applications, notices, audits, and pollution studies and reduction programs indicates that the Site is listed on the register. This information corroborates with that detailed within WSP's 2015 Limited ESA (refer to Section 4.5).

A search of the database for the general Chullora (suburb based) and surrounding areas obtained information on the sites detailed in **Appendix B.**

3.3 Historical Land Use

The previous land use has been determined from a review of aerial photographs and site history information provided within previous environmental reports. Peter J Ramsay & Associates reviewed the data and cross checked it with previous findings. A summary of the site history is provided in the following sections.

3.3.1 Aerial Photographs

Prensa completed a historical aerial photography review as part of its 2012 Phase 1 ESA, which was reviewed and summarised in WSP's 2015 Limited ESA. Peter J Ramsay & Associates reviewed the aerial photography on 13 July 2015 and found that the information is accurate.

The aerial photographs indicate that the Site appears to have been vacant land in the 1930s, with some activity noted (possibly rail related) in 1951. In 1961 a railway track was present in the northern section and this is also evident in the 1970 photograph with little change noted. In 1982 the railway is not evident and instead Worth Street is under construction. In 1994 a small building was shown, and the general site appears to be undergoing development (exposed soils evident). In 1999 the Site appears as it currently is with a large building and sealed surfaces noted.

3.3.2 WorkCover New South Wales (NSW)

A review of WSP's 2015 Limited ESA indicates that a WorkCover NSW Dangerous Goods Licence database search was requested on 21 May 2013 and documentation. WorkCover NSW responded to the request with documentation relating to the storage of acid and alkali (hydroxides and caustic soda) of volumes typically less than 1,000 L on the Site. This documentation is provided in **Appendix C**.

Further to the above, WSP carried out an inspection of the Site on 29 May 2013 where Fairfax provided more recent WorkCover NSW Notification forms (24 July 2012) in which the two sets of generators with accompanying above ground storage tanks (AGSTs) of 20,000 L (total) and an ink storage tank of 80,000 L were detailed.

Observations and discussions with Mr Michael Johnson (Fairfax building manager) during a site inspection undertaken by Peter J Ramsay & Associates (10 July 2015) confirms this information.

3.3.3 Historical Titles

Prensa completed a historical title search as part of its 2012 Phase 1 ESA, which was reviewed and summarised in WSP's 2015 Limited ESA. Peter J Ramsay & Associates reviewed the title information as part of this report and summarised it below. The title records appear to match the recent site history in that railway associated parties (State Rail and Railway Commissioners for NSW) owned the prior to purchase by Fairfax in 1999.

The Site is currently legally described as Lot 12 on Deposited Plan (DP) 834734 under both Bankstown Council Local Government Area (LGA) and Strathfield Council LGA within the Parish of Liberty Plains and County of Cumberland. Fairfax has been listed as the proprietors since 9 March 1999. Previous to this titles were held in the name of the following:

- From 17 June 1992, Lot 12 DP 792665 was owned by State Rail Authority of NSW;
- From 18 June 1992, Lot 1 DP 112162 was owned by The Commissioner for Railways;
- From 18 June 1992, Lot 60 DP 7741 was owned by Railway Commissioners for NSW;
- From 5 May 1993 a total of thirty nine (39) properties (including the above) constituted the Site. These were combined to form Lot 1 DP 816759 with the owner listed as State Rail Authority NSW.

3.4 Summary

The site history review indicates that the Site was vacant land until the 1950s when railway lines were constructed in the southern portion of the site. The remaining areas of the site appear to have been used for rail related purposes until the early 1990s when the site was sold to Fairfax and redeveloped for a commercial/industrial land use.

4. PREVIOUS ENVIRONMENTAL REPORTS

Information provided to us by Charter Hall obtained as part of its due diligence indicates that the Site has been subject to several environmental related investigations, assessments and remediation. The information are provided in the following reports:

- *Phase 1 Environmental Site Assessment and Hazardous Materials Assessment,* prepared for Fairfax Media Limited by Prensa, 13 November 2012 (2012 Phase 1 ESA and Hazmat Assessment);
- *Asbestos Building Materials Assessment, Fairfax Media, 2 Hume Highway, Chullora, NSW 2190,* prepared for International Property Group by Prensa Pty Ltd (Prensa), May 2013 (2013 Asbestos Building Material Assessment);
- *Asbestos Management Plan, Fairfax Media, 2 Hume Highway, Chullora, NSW 2190*, prepared for International Property Group by Prensa, May 2013 (2013 Asbestos Management Plan);
- *Environmental Data Review at Fairfax Chullora – 2 Hume Highway, Chullora NSW*, prepared for Fairfax Print Holdings Pty Limited by WSP Environmental Pty Ltd (WSP), 14 August 2014 (2014 Environmental Data Review);
- *Limited Environmental Site Assessment, 2 Hume Highway, Chullora, NSW*, prepared for Fairfax Media Limited by WSP, March 2015 (2015 Limited ESA);
- Settlement Environmental Report (SER) – Decommissioning Process Review and Supervision for Fairfax Printing Facility, 2 Hume Highway Chullora, NSW, prepared for Fairfax Print Holdings Pty Ltd by WSP, March 2015 (2015 Decommissioning Environmental Report); and
- *Consent to Discharge Industrial Trade Waste Water No. 13836*, letter to Fairfax Printers Pty Ltd from Sydney Water Corporation, 23 October 2014 (2014 Trade Waste Consent).

In addition, Charter Hall provided the following supplementary documentation:

- Contaminated Land Notices – Bankstown Council (LGA search)
- Contaminated Land Notices – Strathfield Council (LGA search)
- Contaminated Land Notices – Fairfax (name search)
- POEO Licences search
- POEO Prosecutions and proceedings search
- Review of various drawings, figures and other information (layout, drainage plan etc) as detailed within a data room for parties interested in the purchase of the property.

Our review of the aforementioned documents is provided following.

4.1 2012 Phase 1 ESA and Hazmat Assessment

The Phase 1 ESA comprised a review of associated land title information, a search of the Office of Environment and Heritage (OEH) online contaminated site registers, a review of historical and recent aerial photography, a review of Section 149 certificates from Bankstown Council. The Phase 1 ESA also reviewed the site features, site operations and a review of current surrounding land uses. This information was used to assess the potential for contamination to be present at the Site. The findings of the Phase 1 ESA are as follows:

- Chemicals were stored in many locations across the Site including a solvent store (ink classified as C2 combustible liquids was stored in seven (7) above ground storage tanks (AGSTs);
- Four (4) generators (2 pairs) fuelled by diesel were located in the north east and north west sections of the building. The diesel was stored in a 5,000 L AGST;
- Minor quantities of Class 2.1 (flammable gas), Class 3 (flammable liquid), Class 8 (corrosive) and diesel (C1 combustible liquid) were observed throughout the Site;
- At the time of the site inspection a hazardous chemicals register was not available for review. However, Prensa sighted notification forms provided to WorkCover NSW regarding the presence of chemicals on the Site. The notification forms were dated 12 July 2014;
- Information detailed within Prensa's report indicates that the Site is legally titled as Lot 12 of Deposited Plan 834734. Former Lots and Plans (DP) include Lot 12 DP 792665 which was cancelled, with State Rail Authority of NSW proprietor, Lot 1 DP 112162 which was cancelled (Commissioner for Railways) and Lot 60 DP 7741 which was cancelled (Railway Commissioners);
- Prensa also indicate that 39 properties were combined into one property comprising the Site which was described as Lot 1 in DP 816759;
- Spill kits were observed throughout the Site;
- The Site operates a Waste Water Treatment Plant (WWTP), which has a consent (provided by Sydney Water) to discharge to sewer. A reverse osmosis (RO) plant also exists on site which treats town water for use in some printing processes. The waste generated from this discharges to an on-site pond, which then discharges to stormwater;
- Prensa indicated that most of the operations on the Site were unlikely to significantly impact stormwater. Some areas on site however were indicated to have the potential to drain to the local stormwater network (backup solvent stores, liquid waste stored in bulk and the fuel storage for diesel generators);
- All stormwater on the Site flows to the on-site pond prior to discharge to the local stormwater network;
- Solid and liquid wastes generated at the Site were collected in bins and containers which were managed by Transpacific Industries;

- Prensa reviewed the contamination potential of the Site and indicated that it was located on land previously used for railway related activities. This corroborated the historical aerial photography which showed evidence of railway associated infrastructure observed. Prensa indicated that based on this former use, there was potential for historical contamination to be present, possibly associated with imported fill material and railway activities;
- It was noted that as part of construction of the existing facility, the Site would have been subject to cut and fill as indicated by the steep walls on the northern and western sections of the Site;
- Prensa also indicated that a significant concrete slab was required as part of the engineering specifications for construction and that a significant volume of engineered subgrade would likely be present beneath the building; and
- The most significant potential source of contamination was indicated to be the WWTP. Liquid storage across the Site was considered to be unlikely contamination sources.

With regard to the Hazardous Materials Assessment, Prensa made the following conclusions:

- Prensa indicated that no asbestos assessments were completed at the Site. Prensa indicated that it is possible that equipment and components of plant could contain ACM, such as gaskets, brake lining etc. An asbestos survey was subsequently recommended;
- Synthetic Mineral Fibres (SMF) were observed within the wall and roof insulation, acoustic ceiling tiles in office areas, insulation to various pipework and ductwork throughout the building and insulation to domestic hot water;
- Polychlorinated Biphenyls (PCBs) and lead based paints were unlikely to be present due to the age of the building;
- With respect to the cooling towers on the Site, Prensa reported that they were tested quarterly for legionella and heterotrophic colony count (HCC). A review of the results indicated that elevated legionella was not recorded, however elevated HCC was noted (February and March 2012).

4.2 2013 Asbestos Building Material Assessment

The Asbestos Building Materials Assessment (ABMA) was undertaken at the Site to identify and assess the health risk posed by asbestos building materials within the structures and fabric of the building. The assessment consisted of a visual inspection for suspected asbestos containing materials (ACMs) within nominated and accessible areas of the Site.

During the course of the assessment, Prensa collected three (3) samples of suspected ACMs. The samples were submitted to a NATA accredited laboratory for analysis. A gasket within the Unlimited Power Supply (UPS) room returned a positive result for chrysotile asbestos. Prensa concluded that it should assumed that this and other gasket materials within the pipework could contain ACM.

Generally, the ABMA found that ACM is unlikely to be present as the building was constructed post 1990 when the ban on manufacture and use of all forms of ACMs was introduced across Australia. Prensa recommended the following:

- Caution must be used around the boilers and fire doors until the presence/absence of ACM is confirmed;
- ACM that may be disturbed should be removed prior to commencement of any works;
- A destructive hazardous building materials survey (DHBMS) was recommended to be undertaken prior to any demolition or refurbishment works;
- Where asbestos removal works are required, the person undertaking the works must ensure that they are conducted by an appropriately licenced asbestos removalist and a clearance inspection is conducted at completion of the removal works; and
- During refurbishment works, if any materials that are not referenced in the ABMA report and are suspected of containing ACM are encountered, then works must cease and an asbestos hygienist should be notified.

Based on our review, it is considered that there is a low risk to the environment due to the presence of ACM within the fabric of the existing building at the site.

4.3 2013 Asbestos Management Plan

In view of the identification of ACM within the fabric of the existing building at the site, Prensa was engaged to develop an Asbestos Management Plan (AMP). The AMP was developed to manage potential risk of exposure to ACM of employees, contractors or subcontractors that work at the Site.

4.4 2014 Environmental Data Review

The environmental data review was undertaken to collate information regarding historical earthworks and commercial development of the Site in the 1990s and to review information regarding the former railway land use. The information was to be utilised to support supplementary soil and groundwater investigations at the Site prior to divestment. WSP indicated in the report that it had previously undertaken site investigative works in 2013 and a draft report has been produced. The environmental data review included a review of information provided by the following sources:

- Rail Corporation NSW;
- Urbangrowth NSW
- Douglas Partners Pty Ltd;
- Thales Australia;
- Previous consultants reports;
- Liaison with Site Auditor (Mr Andrew Lau of JBS&G Pty Ltd); and

- Fairfax (site layout information to assess ‘as built’ conditions).

These reports and related information has been reviewed by Peter J Ramsay & Associates as part of this assessment. Key information from the WSP report is summarised following:

- Information held by Fairfax provided detail on the subsurface infrastructure under the printing presses and warehouse structure. WSP’s review indicates that the printing presses have extensive piers that penetrate to at least 10 metres (m) below the presses into the natural shale bedrock underlying the Site. WSP also report the presence of a sub-surface fire exit tunnel which runs east to west under the warehouse.
- Logs provided by Coffey (September 1993) provide details of the soil profile associated with the pier design (beneath printing press). The logs indicate the presence of fill materials to 6.0 m below ground level (BGL) (including sand, clay with timber and ash pockets), with residual clays and shale underlying this.
- WSP report that the ‘as built’ plans indicate the layout of the Site in the 1990s and provide detail of an extension in 2003 (printing press area and offices). WSP report that Civil and Civic Pty Ltd (Civil and Civic) was engaged as the earthwork contractors for the development of the Site in the 1990s.
- WSP provide a summary of the information obtained from Rail Corporation NSW which revolves around environmental investigations undertaken by Johnstone Environmental Technology (JET), which include and ESA undertaken in 1990 and Environmental Management Plan (EMP) prepared in 1991.
- The JET ESA encompassed a wider area which included the Site. Test pits were progressed across the investigation area, with shallow soils, shale, ashy fill and mixed fill encountered. JET reported that methane and volatile compounds were not encountered. ACM was noted at the surface across the wider area, however, soil samples did not record the presence of ACM. Organic and heavy metal contamination was encountered. Remediation proposed by JET included removal or burial as part of the development works.
- The JET EMP (1991) for the wider area provided management considerations to minimise risks to human health and the environment. The EMP included an outline of the civil works and removal of identified contaminated fill materials from the State Rail Authority (SRA) lands. The destination of the removed material was a proposed detention basin near Lots 22 and 24 (approximately 1 km to the west of the Site).
- Correspondence from NSW EPA (22 April 1993) indicated that they were not satisfied with earlier soil JET in 1990 and an EMP prepared by JET in 1991. Australian Defence Industries (ADI) was subsequently engaged in 1993 to conduct further investigations.

- The findings of ADI's investigations indicate that heavy metals (copper, chromium and arsenic), total petroleum hydrocarbons (TPH) (C_{10}-C_{36}) up to 15,200 mg/kg, polycyclic aromatic hydrocarbons (PAHs) up to 65 mg/kg and asbestos impacts (at locations 23, 30, 32, and 40) were recorded at the Site. The NSW EPA, at that time, recommended on-site treatment or burial as the preferred remedial strategy.
- Information which relates to NSW Environmental Protection Authority (EPA) correspondence (19 August 1993) in relation to site contamination was reviewed. Further correspondence (25 October 1993) between NSW EPA and Civil and Civic indicates that a remediation action plan (RAP) was prepared for the Site by ADI, which was subsequently approved by NSW EPA on 12 October 1993.
- ADI's RAP is reported to have outlined the process for remediation of the contaminated soil. The remedial approach was to remove the contaminated soil from the Site.
- It is reported that Civil and Civic (letter dated 11 January 1994) provided a brief statement on the earthworks and validation works at the Site in that remediation of the soil was being carried out and stage 2 works will be completed by mid-January 1994.
- ADI's 1993 validation report indicates the TPH impacted soils were land farmed prior to off-site disposal (location unknown). The PAH, asbestos and heavy metal impacted soil was reported as being removed off-site for disposal (location unknown). However, residual contamination is indicated to be present at the Site with concentrations of the following remaining at the respective remediation area:
  - PAHs (total) at 149 mg/kg (location 18);
  - TPH at 9,100 mg/kg (location 42);
  - copper at 286 mg/kg (location 23);
  - Arsenic at 12 and 24 mg/kg (locations 41 and 30); and
  - Chromium at 100 mg/kg (location 41).
- WSP further report that a letter from the NSW EPA (December 1993) indicates that it agreed with ADI's opinion that the remedial areas located at the site had been remediated successfully in accordance with the RAP.
- A summary of a letter between Civil and Civic and Bankstown Council (11 January 1994) is also provided, which states that part of remedial works were completed in late 1993. WSP also note that the letter makes reference to the RAP and that it makes provision for the 'on site containment' of asbestos sheets that may be encountered during the general excavation.
- Reference is made to a validation report produced by Douglas Partners Pty Ltd (December 1995) which focused on Lot 2 Worth Road (adjacent to the Site to the west). The validation report is in reference to stockpiled material which was removed from that property and landfilled.
- WSP indicated that information held by Urbangrowth NSW was unlikely to provide relevant detail with respect to the objectives of the data review.

- In the summary sections of the WSP report, it is reported that the Site and surrounds are likely to contain fill impacted by historical rail yard maintenance practices. WSP indicate that it is likely, based on the limited information available, that some of the fill was reused within parts of the Site. No surveys were provided that may indicate where any fill or asbestos may have been buried within the Site.
- In its conclusions, WSP summarise the findings of all sources of information reviewed and state that significant earthworks across the Site occurred during the mid-1990s. During the earthworks and reshaping of the Site, some low level contaminated material is likely to have been emplaced or reused within areas of the Site that required filling and that these may remain insitu following remedial works.
- The filling of land with low level contaminated material was unlikely to have occurred under the building and printing presses due to the engineering requirements and geotechnical specification of the subgrade which was required.
- WSP recommended that a Sampling Analysis Quality Plan (SAQP) be prepared that outlines the supplementary investigations necessary to evaluate the risk associated with the buried fill at the site.

4.5 2015 Limited ESA

The 2015 Limited ESA involved progressing fifteen (15) boreholes within the soil profile at targeted locations around the Site. The objective was to investigated and assess the quality of the soil and groundwater at the Site. A copy of the borehole location plan is provided within **Appendix D**. A copy of a cross section produced as part of the report is also provided within **Appendix D**.

The results of the ESA indicate that fill material was encountered to various depths within all boreholes overlying natural soils (clay or shale). The maximum depth of fill at the Site was 6.7 m BGL in the north-eastern portion of the Site. In the northern and western portions of the site the fill was not as deep and only extended to a depth of 2.0 m BGL.

The fill was characterised by dark brown – grey gravelly clay with crushed sandstone, sand and concrete. Charcoal and ashy inclusions were encountered within fill in boreholes BH01 to BH07 in the eastern and southern portions of the site. A slight hydrocarbon odour was noted at deeper depths in BH06 (2.5 to 4.0 m BGL) and BH07 (1.7 to 6.5 m BGL) in the central eastern portion of the Site. WSP report that no significant inflow from groundwater was noted in the shallower depths. Groundwater was encountered within the deeper bedrock in two groundwater monitoring wells installed at the site.

WSP compared the analytical results to the guideline values specified in the ASC NEPM 1999, which were superseded by a set of new risk-based guidelines in April2013. The phase in period for the ASC NEPM (as amended 2013) ceased in April 2014. Therefore, comparison to the ASC NEPM 1999 criteria was inappropriate.

Our review indicates that the heavy metal, PAH, PCB, TPH, BTEX and OCP concentrations were below the health-based guidelines applicable for a commercial/industrial land use. The copper (up to 2,800 mg/kg, nickel (up to 100 mg/kg) and zinc (up to 5,900 mg/kg) are above the ecological-based guideline values for a commercial/industrial land use, which are only applicable in areas of open accessible soil. No asbestos fibres were detected in any of the soil samples collected and analysed.

The results of the groundwater assessment identified elevated concentrations of cadmium, copper, and zinc above the guidelines applicable for the protection of aquatic ecosystems, which apply at the point of groundwater discharge into the nearest receiving water body. Results of the remainder of the analytes indicates that they were recorded at concentrations below the adopted site criteria of below the laboratory detection limit.

WSP concluded that the Site "is suitable, from a human health perspective, for 'commercial / industrial' land use for areas of the site not covered by hard stand. WSP also concludes that the site is not having a deleterious effect on environmental/ecological receptors or surrounding properties in regards to contamination."

4.6 2015 Decommissioning Environmental Report

The scope of the works included a summary of the historical environmental investigation works at the Site, a review of the site decommissioning plan works methodologies (with a view towards environmental liabilities) and a review of the licencing and compliance documentation provided by Fairfax relating to the Site (MSDS, trade waste information etc). Other aspects of the work included ensuring adequate processes are in place such as emergency response procedures and on-site supervision during key decommissioning plan.

WSP supervised the decommissioning and decanting of the seven (7) ink tanks (23 to 25 July 2014), which were allowed to drain overnight. No significant spills or leaks were observed. All decanted ink was transported in 1,000 L totes to the Fairfax printing facility in North Richmond, NSW for reuse.

WSP also supervised the removal of the seven (7) ink tanks (1 to 4 December 2014) which were transported to Coopers Environmental Waste Recycling Pty Ltd (St. Marys, NSW) for reuse. Empty press wash solvent tanks were sent to a licenced waste facility (SITA) for disposal. Waste gear oil used in the printing presses was removed from the Site (approximately 7,000L) to Coopers Environmental Waste Recycling Pty Ltd. WSP noted that no significant spills or incidents were observed during the removal process.

Overall, WSP noted that not significant impact to the environment was noted during the decommissioning processes and that all works were undertaken by suitably qualified contractors.

4.7 2014 Trade Waste Consent

The letter relates to the agreement between Sydney Water and Fairfax. The letter indicates that the consent has been altered with “the period for purposes of clause 3.2 is 48 months” has increased to “96 months”. The letter indicates that the Consent expiry date is 01 July 2018.

The letter is signed by both Sydney Water (Mr Greg Staveley) and Fairfax (Mr Michael Johnson).

4.8 Summary

The previous reports prepared in relation to the site indicate that the site has been subject to extensive filling. The environmental site assessment performed by WSP indicates that the fill extends to depths of up to a depth of 6 m below ground level (BGL).

Previous contamination assessments undertaken in the early to mid-1990s by JET and ADI identified contamination at the site which was subsequently subject to remediation by off-site removal as part of the earthworks and development of the Site in 1993 and 1994.

These reports acknowledge that low level contaminated material was re-used on site where filling of land was required, however, the exact location of the contaminated fill that was reused is not known. The contamination consisted of heavy metals, PAHs and TPHs. The contaminant concentrations reported to remain on the site were reported to be below the adopted site criteria applicable at that time, however, it is noted that the assessment protocols and acceptable guideline values have changed significantly since the time that the previous remedial works were performed.

Based on its review of the previous reports, WSP progressed 15 boreholes at the site to assess the quality of the fill. This indicated that the contaminant concentration were below the adopted site criteria. However, our review indicates that despite the sampling performed, there is still some ambiguity regarding the quality of the soil underlying the car park (located in the east - south eastern portion of the Site, adjacent to Worth Street) at the Site. In view of this ambiguity and the potential for contaminated fill to have been reused as backfill.

Groundwater monitoring also undertaken at the site by WSP indicates that the contaminant concentrations in the groundwater were generally recorded below the adopted site criteria with the exception of some heavy metals. However taking into consideration the use of the site, the risks posed are considered to be low.

Prensa's 2012 Phase 1 ESA also suggests that there is a low risk of significant contamination being present. Prensa identified the WWTP as having the greatest potential to cause contamination. However, the results of the Limited ESA undertaken by WSP in 2015 indicate that soil samples (within close proximity to the WWTP) recorded concentrations of contaminants which were below the adopted site criteria.

5. CONCEPTUAL SITE MODEL

In view of the results of our review of the previous environmental assessment reports and our site inspection, a CSM has been developed in order to evaluate the potential for on-site and off-site contamination sources, exposure pathways and receptors. The CSM is also used to identify any data gaps which may require further investigation.

5.1 Summary of Site Characteristics

The characteristics of the Site are described in the preceding sections and summarised here as part of the CSM. The Site and local topography generally slopes to the north-east and east. Significant earthworks have been undertaken at the Site as part of the redevelopment prior to Fairfax purchasing the Site. This was evident during the Site inspection where steep slopes were observed along the western boundary and the obvious difference in land surface level with neighbouring sites.

The Site was vacant land (presumed agriculture) until the 1950s when it was developed for railway associated activities. The site was redeveloped in the 1990s, which involved significant earthworks including filling to of between 2 m and 10 m.

A review of previous reports indicates that the site was previously subject to remediation to remove heavy metal, TPH and PAH impacted soil. Low level contaminated material is indicated to have been re-used on site as fill, however, the exact location of the contaminated fill that was reused is not known. Recent sampling undertaken by WSP indicates that significant soil contamination is not present, however, there is a paucity of data relating to the car park in the eastern portion of the site.

The site has been occupied by Fairfax and used as a printing press/facility until 2013 when it was decommissioned. The site is currently unoccupied. The majority of the Site is covered in buildings, structures, asphalt and concrete with grass covered and landscaped areas along the outer areas. Two stormwater retention ponds were observed close to the eastern and northern boundaries of the site.

Facilities present at the site include two sets of diesel powered generators, each with its own 5,000 L AGST. No staining or leaks were observed at these generators. Elsewhere on site, there was evidence of minor leaks and spills associated with the printing press, ink storage and waste storage. An underground tank exists as part of the WWTP. This is constructed of concrete and is steel lined. There was no evidence of UPSSs observed at the time of the Site inspection.

At the time of the site inspection, there was evidence of a leak/spill within the fire water diesel pump room located in the north western section of the Site. Staining and oil were observed within the pump room on the concrete floor. Staining was evident outside along the base of the eastern wall and on the concrete hardstand.

Based on available groundwater bore information, groundwater is expected to be exist at approximately 4.86 m BGL and 8.8 m BGL (within the Shale bedrock). Regional groundwater would be expected to migrate north / north east towards the Cooks River. Shallow or perched groundwater was not encountered during the site investigation and it is considered unlikely that is it present in significant quantities within the Site.

5.2 Potential Sources, Mechanisms of Contamination and Contaminants of Concern

The potential sources of soil and groundwater contamination, mechanism and contaminants of concern identified from this environmental review are summarised in Table 2.

In addition, a risk rating has been assigned to each potential sources of contamination. The risk ratings are qualitative only and are based on the likelihood of contamination being present that would present a significant financial liability for the ongoing use of the site for commercial/industrial purposes. In most instances further investigation would be necessary to confirm the actual level of risk and quantify any liabilities. To that end, it should be noted that where a low risk has been identified, it does not indicate that there is no risk and therefore does not warrant further consideration.

Table 2 Potential Contamination Sources, Mechanisms of Contamination and Contaminants of Concern

Potential Contamination Sources	Mechanisms of Contamination	Contaminants of Concern	Risk Rating[1]	Comment
On-site Sources				
Leak / spill of fuel within diesel pump room at fire water tank	Seepage through concrete and/or foundations of building into underlying soils and subsequent downward and lateral migration through subgrade material (underlying concrete). Migration of fuel along underground infrastructure (these act as a conduit due to lesser permeability material surrounding the infrastructure). Downward migration through soil profile into underlying groundwater. Upward migration of volatile constituents in the form of soil vapour.	TRH, BTEX, PAHs, metals	Low (soil sampling is necessary to confirm this)	In view of the extent of the leak and duration (6- 8 weeks), nature of the underlying soil and depth to groundwater, the potential for significant contamination to have occurred that would be significant for a commercial/industrial land use is low. However, soil sampling is necessary to confirm this. Repair works should be instigated as a matter of priority to maintain the level of risk.
Contaminated fill which is indicated to have been historically imported onto the for levelling purposes and during redevelopment	Distributed in areas where fill has been spread across the Site. Downward migration of leachable contaminants.	A broad range of organic and inorganic contaminants depending on source, but often comprising TRH, heavy metals, PAHs and asbestos.	Low (soil sampling is necessary to confirm this)	Recent sampling undertaken by WSP indicates that significant soil contamination is not present, however, there is a paucity of data relating to the car park in the eastern portion of the site. Soil sampling is necessary to confirm the level of risk.

Potential Contamination Sources	Mechanisms of Contamination	Contaminants of Concern	Risk Rating[1]	Comment
Former use as a railway yard, including potential use of chemicals for the control of pests and weeds	Downward migration from the surface through the soil profile	Asbestos, PAHs, TRHs and heavy metals, OCPs, OPPs	Low	The former ground surface at the time that the site was used for rail related purposes is now covered in a substantial thickness of fill and the site was subject to remediation prior to redevelopment, although some residual contamination is indicated to remain.
Hazardous building materials (e.g. PCBs, lead paint and asbestos cement sheet) in existing structures	Mobilisation during historical construction and/or demolition activities, causing contamination of the near surface soil.	PCBs, heavy metals (e.g. lead) and asbestos	Low	The former ground surface at the time that the site was used for rail related purposes is now covered in a substantial thickness of fill and the site was subject to remediation prior to redevelopment, although some residual contamination is indicated to remain.
Hazardous building materials (e.g. PCBs, lead paint and asbestos cement sheet) associated with former structures	Mobilisation during historical construction and/or demolition activities, causing contamination of the near surface soil.	PCBs, heavy metals (e.g. lead) and asbestos	Low	There were no substantial structures previously located at the site, although there is the potential for building materials to have been stored at the site prior to redevelopment.
Spills and leakages of inks, oils and cleaning fluids from the printing press and associated materials storage (during operation)	Downward migration from the surface through the soil profile, and preferentially along underground conduits. Upward migration of volatile constituents in soil vapour.	TRH, BTEX, PAHs, solvents, heavy metals,	Low	The hardstand is in good condition and only minor staining was evident. The printing facility was a modern installation and is indicated to have been well maintained.

Potential Contamination Sources	Mechanisms of Contamination	Contaminants of Concern	Risk Rating[1]	Comment
Leaks and spills associated with the WWTP	Seepage through concrete and / or foundations of building into underlying soils, downward and lateral migration through subgrade material (underlying concrete). Migration of waste water along underground infrastructure (these act as a conduit due to lesser permeability material surrounding the infrastructure). Downward migration through soil profile into underlying groundwater	TRHs, BTEX, PHAs, heavy metals	Low	The WWTP is a modern installation and is constructed of concrete that is steel lined. Soil sampling undertaken by WSP in 2015 within close proximity to the WWTP did not identify any evidence of contamination.
Off-site Sources				
Railway yard and associated infrastructure located to the north of the Site	Lateral migration of contaminants in groundwater beneath the site. Lateral migration of soil gas/vapour beneath the site.	TRH, BTEX, PAHs, heavy metals, PCBs, OCPs, OPPs	Low	The previous investigations did not report any significant off-site groundwater or gas/vapour impacts. No surface evidence of potential contamination resulting from leachates or wastes entering the Site was observed.

Note: MAHs = Monocyclic Aromatic Hydrocarbons
OCP = Organochlorine Pesticides
OPP = Organophosphate Pesticides
PAHs = Polycyclic Aromatic Hydrocarbons
TRHs = Total Recoverable Hydrocarbons
VOCs = Volatile Organic Compounds
[1] Risk Ratings are qualitative only and are based on the likelihood of contamination being present that would present a significant financial liability for the site. In most instances further investigation would be necessary to quantify the liability.

5.3 Human and Ecological Receptors

Based on the existing land use, the following receptors have been identified:

- Workers within external areas of the Site;
- Maintenance and constructions workers;
- Passers-by and trespassers; and
- Plants and animals associated with areas of open, accessible soil.

In order to ensure that this investigation includes a complete assessment of potential impacts to the environment and therefore environmental liabilities, the following additional human and ecological receptors have also been considered:

- Child and adult residents/visitors of a theoretical future development living within buildings at the Site;
- Child and adult residents/visitors of a theoretical future development consuming produce grown at the Site; and
- Child and adult residents/visitors of a theoretical future development playing, working etc. in areas of open, accessible soil.

5.4 Potential Exposure Pathways

In view of the results of the site history review and site inspection, the following potential exposure pathways would be expected to occur for a commercial/industrial land use:

- Acute and sub-chronic exposure to contaminants by maintenance and construction workers involved in sub-surface excavations;
- Acute exposure to contaminants by site workers who may come into contact with contaminated soil during sub-surface excavation works at the site; and
- Acute and chronic exposure to plants and animals located within the minor areas of landscaping.

5.5 Summary

Based on our review of the previous environmental reports prepared in relation to the Site and the site inspection, there is considered to be a low risk of contamination being present that would act as an impediment to the ongoing use of the site for commercial/industrial purposes. However, some limited sampling was undertaken to confirm this.

6. DATA QUALITY OBJECTIVES

The ASC NEPM (as amended 2013) and Australian Standard (AS) 4482.1-2005 recommend that data quality objectives (DQOs) be implemented during the investigation of potentially contaminated sites. The DQO process is a systematic planning process used to define the objectives of a site assessment and to allow an appropriate sampling and analysis plan to be developed to achieve those objectives. This is necessary to ensure that an investigation is performed in a systematic, structured and efficient manner. The process involves seven distinct steps:

- Step 1: State the problem
- Step 2: Identify the decision/goal of the study
- Step 3: Identify the information inputs
- Step 4: Define the boundaries of the study
- Step 5: Develop the analytical approach
- Step 6: Specify performance or acceptance criteria
- Step 7: Develop the plan for obtaining data

DQOs regarding the amount, nature and quality of data have been established for this investigation. The DQOs have been chosen to ensure that the data obtained during the program are sufficient to adequately characterise the contamination on the site so that an appropriate assessment of health and environmental risks resulting from any contamination present on the site can be made for its current or proposed land use. The DQOs established for this investigation are provided in Table 3.

Table 3 Data Quality Objectives

DQO Step	DQO Adopted	Report Reference
Step 1: State the Problem		
• Objective	Provide a screen of the site for potential contamination so that appropriate risk-based management strategies can be developed.	Section 1
• Contamination issue(s) to be addressed	Potential legacy environmental issues associated with the former use of the site (printing facility and historical remediation).	Section 1
• Reason for investigation	To assist with the acquisition of the Site.	Section 1
• Project Team	Suitably qualified environmental scientists and engineers employed by Peter J Ramsay & Associates	
• Community concern issues	None	
• Regulatory authorities	NSW EPA	
• Local government	Bankstown Council and Strathfield Council	Section 2.1

DQO Step	DQO Adopted	Report Reference
Step 2: Identify the Decision/Goal of the Study		
• Goal of the Study	Characterisation of the natural background and anthropogenic concentrations of contaminants at the Site at two discrete locations within the boundary.	Section 9
	Consideration of the data with regard to natural background levels and acceptable guideline values.	Section 9
• Decision statements	Contaminant concentrations above natural background are not considered to be significant for all land uses, unless those naturally elevated contaminants may present an unacceptable risk to the environment (e.g. naturally occurring asbestos deposits). The 95% upper confidence limit (UCL) of the mean should not be above the relevant guideline values for human health. In addition the standard deviation must not be greater than 50% of the guideline and no single value should be greater than 250% of the health based guideline values. Individual contaminant concentrations should not be significantly above the ecological-based guideline values where there are areas of open accessible soil. Where the above conditions are not met, the soil must be demonstrated by risk assessment to not present an unacceptable risk for the proposed land use. The soil should not contain anthropogenic materials, staining or odour that would be offensive to the senses of human beings. The soil should not be corrosive to buildings and structures. Underground facilities that are potential sources of contamination should be identified and where appropriate removed.	Sections 8
Step 3: Identify the Information Inputs		
• Media to be collected	Soil and groundwater samples	Section 7
• Environmental parameters to be measured	Potential contaminants in the soil indicated by the site history review, CSM and site inspections, and EPA and ASC NEPM (as amended 2013) guidelines.	Section 5.2
• Site criteria	Natural background levels and acceptable guideline values.	Section 8

DQO Step	DQO Adopted	Report Reference
• Analytical methods	National Accredited of Testing Authorities (NATA) approved methods and methods endorsed in the ASC NEPM (as amended 2013).	
• Field screening	Presence/absence of fill or debris, use of a PID, and visual and olfactory observations.	Section 7.1.2
• Additional information to be considered	The results of previous investigations and monitoring undertaken at the Site (where available).	Section 4
Step 4: Define the Boundaries of the Study		
	Undertake the investigation within the geographic boundaries of the Site, being 2 Hume Highway, Chullora, NSW.	Figure 1
Step 5: Develop the Analytical Approach (or Decision Rule)		
• Parameter(s) of interest	Potential contaminants in the soil indicated by the site history review, CSM and site inspections, and EPA and ASC NEPM (as amended 2013) guidelines.	Section 5.2
• Action level(s)	Natural background levels and acceptable guideline values.	Section 8
• Acceptable error limits		
- Blanks	Contaminants of concern should not be detected, or should not be present above background concentrations.	Section 7.4.1
- Recovery of spikes	Recovery should range between 70% and 130%	Section 7.4.1
- Relative Percent Differences (RPDs) for field QC samples	RPDs >50% may compromise the data for inorganic analytes. RPDs >70% may compromise the data for organic analytes. The level of error must be considered when interpreting the data set relevant to the RPDs.	Section 7.4.1
- RPDs for laboratory QC sample	Method blanks should not return any positives on analysis; RPDs >35% may compromise the data for duplicate soil samples Control samples should generally give a recovery of 75-125%, depending on the chemical and medium.	Section 7.4.2
• Alternative actions	Where contaminant concentrations are above the acceptable guideline values and are not attributed to natural background, the following will be employed: • Utilisation of statistics and comparison to acceptable guideline values to evaluate potential risks to human health.	Section 9

DQO Step	DQO Adopted	Report Reference
	• Site specific risk assessments. • Evaluation of risk to other media including groundwater, surface water and air. • Evaluation of need for further investigation.	
Step 6: Specify Performance or Acceptance Criteria		
• Possible range of the parameter(s) of interest	Consideration of the possible errors involved in the decision process and acceptable error limits.	Section 10
• Decision errors	The use of conservative acceptance criteria will ensure that the site is not considered to be uncontaminated when in fact it is.	
• Null hypotheses	The site is assumed to be contaminated unless proven to be uncontaminated.	
• Possible range of values	Orders of magnitude ranges of concentrations could be expected due to point sources of contamination	
Step 7: Develop the Plan for Obtaining Data		
	A sampling and analysis plan has been developed, including targeted soil sampling in specific areas where there is the potential for contamination to exist, and also grid sampling across the site.	Section 7

7. SAMPLING AND ANALYSIS PLAN

The soil and groundwater sampling activities were undertaken by Peter J Ramsay & Associates on 27 July 2015. The field activities comprised:

- Sampling of near surface and subsurface soils from four grid based soil sampling locations within the car park (north western portion of the Site) for analysis for potential contaminants;
- Sampling of near surface and subsurface soils from three targeted soil sampling locations within the diesel powered water pump room (north western portion of the Site); and
- Sampling of groundwater from two existing groundwater wells on site for analysis of potential contaminants.

The assessment was performed according to:

- EPA guidelines;
- The ASC NEPM (as amended 2013);
- *Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites* published by the Australian and New Zealand Environment and Conservation Council/National Health and Medical Research Council, January 1992 (ANZECC Guidelines);
- Australian Standard AS 4482.2 – 1999, *Guide to the Sampling and Investigation of Potentially Contaminated Soil, Part 2: Volatile Substances*, 5 September 1999, Standards Australia; and
- Australian Standard 4482.1-2005: *Guide to the Investigation and Sampling of Sites with Potentially Contaminated Soil – Part 1: Non-volatile and Semi-volatile Compounds*, 2 November 2005, Standards Australia.

The site assessment activities followed the procedures described in Peter J Ramsay & Associates' Sampling Quality Assurance Plan (SQAP) (**Appendix E**).

7.1 Soil Sampling

7.1.1 Sample Design

The purpose of the sampling program was to screen for potential soil contamination in the areas identified during the review of environmental reports and the site inspection where there is the potential for contamination to have occurred. The sampling program was undertaken in general accordance with EPA guidelines and specifically the ASC NEPM (as amended 2013).

The locations for the soil sampling undertaken at the site were identified based on the review of environmental reports, CSM and site inspection. Sample locations were referenced to existing ground features and positioned subject to on-site services, subsurface conditions and other constraints, which were encountered during fieldwork activities.

Sample locations were also investigated by visual inspection. Indicators used to determine the presence of potential contamination included:

- Ionisable vapour detected by a Photoionisation Detector (PID);
- Odour;
- Discolouration or oily soil;
- Free product or oily sheen; and
- Industrial wastes in fill.

Soil samples were retrieved from 3 targeted and 4 grid based sample locations. The rationale for the selection of soil sample locations is provided in Table 4 and the sample locations are shown in Figure 3.

Table 4 Schedule of Soil Sample Locations

Soil Sample Location	Location / Rationale
1 – 4	Car park located in the north eastern portion of the Site where information gap existed compared to previous investigation data
5 - 7	Inside and external to the fire water diesel pump room

7.1.2 Field Testing

During the soil sampling program the concentrations of total ionisable compounds released from the soil matrix within samples collected from the Site were measured using a handheld PID. Total ionisable compounds were measured by taking headspace readings of the soil samples. This provides an initial qualitative screening of the degree of contamination of the soil with volatile organic compounds. The methodology for the headspace soil vapour survey is presented in the SQAP (Error! Reference source not found.**E**).

The concentration of ionisable vapours was determined by an Ionscience 10.6 eV Procheck PID calibrated to read "isobutylene equivalent v/v (ppm)" and recorded in our internal calibration log book. The PID readings obtained during the soil vapour survey are presented on the soil profile logs in Error! Reference source not found..

The concentrations of ionisable vapours measured in the headspace above soil samples ranged from 0.0 ppm to 20.7 ppm (v/v isobutylene equivalent). The elevated VOC concentrations were detected at BH5 at a depth of 1.5 m BGL (fire water diesel pump room) which indicates that there is a potential impact at this depth from a hydrocarbon source. A strong hydrocarbon odour was noted emanating from the subsurface soils.

7.1.3 Sampling Methodology

Qualified and experienced environmental consultants from Peter J Ramsay & Associates performed the sampling activities. This involved logging of sample locations and retrieval of soil samples. Boreholes were backfilled following soil sampling activities. Logs of soil condition, sample depth details and the soil profile in the seven boreholes were recorded in the field on standard soil profile log sheets (Error! Reference source not found.).

Soil samples of approximately between 125 grams and 250 grams were retrieved from various depths (0.1 m to 10.0 m BGL) at each sampling location. Samples were retrieved directly from the hand auger by hand or directly from the push tube liners. Fresh nitrile gloves were used to collect each sample to minimise the risk of cross contamination. One 125 mL or 250 mL glass jar sealed with a Teflon lined lid was used for each soil sample. The jars were filled with soil to minimise the headspace present above the soil sample in each jar. This method of sampling ensures that the loss of volatiles during sample storage is minimised.

Each sample container was labelled with the following information:

- A sample number (which consists of the site identifier, sample location number and sample depth); and
- Date of sample collection.

A labelling system identifies the origin of each soil sample collected, e.g. 8614/1A. The number 8614 identifies the site, the number 1 refers to the sample location number and the letter A refers to the depth at which the sample was taken. The letters used to indicate sample depths are:

- A Near surface sample (0.0 m – 0.3 m). Nominal ~ 0.1 m.
- B Subsurface sample (0.3 m – 0.7 m). Nominal ~ 0.5 m.
- C Subsurface sample (0.7 m – 1.3 m). Nominal ~ 1.0 m.
- D Subsurface sample (1.3 m – 1.7 m). Nominal ~ 1.5 m.
- E Subsurface sample (1.7 m – 2.3 m). Nominal ~ 2.0 m.
- F Subsurface sample (2.3 m – 2.7 m). Nominal ~ 2.5 m.
- G Subsurface sample (2.7 m – 3.3 m). Nominal ~ 3.0 m.
- H Subsurface sample (3.3 m – 3.7 m). Nominal ~ 3.5 m etc.

The sample numbering convention is not followed where it is necessary to conceal the identity of duplicate samples. In such cases, a fictitious sample location number is used. Identification of the soil samples together with soil sample depths are given on the chain of custody (COC) documentation in Error! Reference source not found.**G** and in the Tables of Results R1.

A total of 47 primary soil samples were collected during the soil sampling program, of which 13 were selected for analysis. Sampling equipment in contact with samples was decontaminated prior to sampling in accordance with the SQAP (Error! Reference source not found.**E**). Samples were stored in chilled and insulated containers whilst on-site, prior to delivery to the laboratories. COC documentation detailing the required analyses and detection limits (where non-standard) accompanied the samples to the laboratory. The environmental consultant signed the appropriate section of the COC form before providing the samples to the laboratories.

7.2 Groundwater Sampling

Peter J Ramsay & Associates undertook one round of groundwater sampling for this assessment. The groundwater sampling was undertaken on 27 July 2015 from existing wells BH03 and BH08. The standing water levels (SWLs) were measured in each well prior to purging. These groundwater monitoring wells were installed by WSP in 2013 as part of the site investigation reported in the 2015 Limited ESA.

For the groundwater sampling, groundwater was purged, and the wells were sampled using low-flow/minimum drawdown methods in accordance with the procedures outlined in Peter J Ramsay & Associates' SQAP (**Appendix E**) and EPA Publication 669, *Groundwater Sampling Guidelines*, April 2000. Well purging field parameter sheets showing the SWL, volumes of groundwater purged from each well prior to sampling, and the well purging parameters measured in the field (drawdown, pump rate, volume purged, pH, electrical conductivity, redox potential, temperature and dissolved oxygen) are presented in **Appendix H**. Well purging parameters were measured using calibrated meters hired specifically for the project.

Groundwater samples were carefully decanted in to sample containers directly from the collection vessel to minimised loss of any volatile contaminants and oxidation of the sample. The sample containers were provided by the primary laboratory and included both plastic and glass bottles with and without preservatives. The sample containers were filled to the brim to minimise the headspace present above the water in each container. This method of sampling ensures that the loss of volatiles during sample storage is minimised.

Each sample container was labelled with the following information:

- A sample number (which consists of the site identifier, sample location number); and
- Date of sample collection.

A labelling system identifies the origin of each groundwater sample collected, e.g. 884/BH03. The number 884 identifies the site, the BH03 refers to the sample location number and the letter.

7.3 Analytical Program

The selection of analytes was based on the review of the site history, CSM, observations during the site inspections, and EPA site assessment guidelines. The analysis for the soil and groundwater samples comprised a selection of the following analytes:

Inorganic species:	Heavy metals: arsenic, barium, cadmium, chromium, copper, lead, nickel, zinc; and Asbestos.
Organic species:	Total Recoverable Hydrocarbons (TRHs). Monocyclic Aromatic Hydrocarbons (MAHs); Polycyclic Aromatic Hydrocarbons (PAHs); Polychlorinated Biphenyls (PCBs); Organochlorine Pesticides (OCPs); Organophosphorous Pesticides (OPPs); Phenols; Semi-volatile organic compounds (SVOCs); and Volatile organic compounds (VOCs).

The analytical program for the soil and groundwater samples is outlined in the COC documentation provided in Error! Reference source not found.**G**.

SGS Australia Pty Ltd was selected as the primary laboratory. Australian Laboratory Services (ALS) Pty Ltd was used as the secondary or control laboratory for soil samples for implementation of the QA program for the assessment.

The laboratories are approved by NATA, and the analyses were performed in accordance with the laboratories' NATA registration. Final laboratory reports bear the NATA stamp. Test methods used are recognised United States Environmental Protection Agency (USEPA) and EPA procedures. Analytical detection limits were specified by me (where non-standard).

7.4 Quality Assurance

Quality assurance of data was a key component of the sampling program in order to appraise the representativeness and integrity of samples and accuracy and reliability of the analytical results. This is in accordance with the ASC NEPM (as amended 2013) and AS 4482.1-2005.

The QA procedures, actions, checks and decisions implemented during this investigation included:

- The utilisation of appropriate sampling methods in accordance with the EPA, ASC NEPM (as amended 2013) guidelines, and the SQAP (**Appendix E**);
- Calibration of field instruments;
- Use of standardised field forms including a site inspection proforma, soil profile logs and COC documentation;
- Appropriate sample handling and transportation;
- Comparison of laboratory analytical results against field observations and instrument measurements;
- The collection of QC samples;
- Implementation of internal laboratory QC analyses; and
- The use of NATA registered laboratories (primary and secondary) and methods.

7.4.1 Field Quality Control Program

Inaccuracies in sampling and analytical programs can result from many causes, including collection of unrepresentative samples, cross contamination between samples, unanticipated interferences between elements during laboratory analyses, equipment malfunctions and operator error (USEPA 1986). Inappropriate sampling, preservation, handling, storage and analytical techniques can also reduce the precision and accuracy of results.

In order to address these potential data quality issues, a QC program was undertaken to monitor and measure the effectiveness of the QA procedures by comparison with acceptance criteria. The ASC NEPM (as amended 2013) has documented procedures for QC for sampling and analysis to ensure that the required degree of accuracy and precision is obtained. The ASC NEPM (as amended 2013) and the EPA recommend the use of two laboratories for the implementation of a QC program for the analyses in addition to the QC procedures followed by the laboratories.

The accuracy of an analysis is a measure of the variation between the concentration of an analyte obtained by the method and the true concentration in the sample. This is determined by comparing the analytical results from field duplicate samples analysed at two laboratories, and by the laboratory's internal QC programs. The precision of a result is a measure of the reproducibility of the result. This is, in effect, a measure of the natural spread of data about the mean result.

According to the ASC NEPM (as amended 2013) a split of a minimum of 10% of the samples as field duplicate samples (5% split and 5% blind replicate) as well as blanks is required. Where less than 20 samples are to be analysed, a minimum of two field duplicate samples (one split and one blind replicate) and a blank is considered sufficient.

Split Samples

Split samples are used as a check on the accuracy of the field sampling and the analytical procedures. Samples are selected at random and split in the field to form primary and split samples. The primary samples are sent to the primary laboratory and split samples are sent to the secondary laboratory. The results of the analyses for the split samples (analysed by the secondary laboratory) are compared with the results from the primary laboratory to determine the accuracy of the sampling and analytical procedures.

Blind Replicate Samples

Blind replicate samples are used to determine the precision of the field sampling procedures and laboratory analyses. Samples are selected at random and split in the field to form primary and blind replicate samples. The blind replicate samples are labelled with sample identification numbers different to their primary sample numbers in order to conceal their identity. The blind replicate samples are analysed by the primary laboratory. The results for the analyses of the blind replicate samples are used to determine the precision of the sampling and analytical procedures.

Blank Samples (Rinsate Blanks and Trip Blanks)

Up to 5% of the total number of primary samples are blanks collected in the field. Blanks are comprised of trip blanks and rinsate blanks. A trip blank is a sample of deionised water prepared prior to sampling. The trip blank is carried through the sampling program, transported with the samples to the laboratory and stored with the samples. They are used to identify laboratory errors or to identify sources of contamination due to sample storage and handling.

Rinsate blanks are samples of deionised water collected from the field equipment after decontamination. They are used to determine the effectiveness of the decontamination procedures. A rinsate blank and trip blank are collected in the field for each day during the sampling program. The rinsate blank and trip blank samples are analysed by the primary laboratory.

During the field activities for the project, the following duplicate and blank samples were taken and analysed:

- One blind replicate soil sample was taken and analysed;
- One split replicate soil sample was taken and analysed;
- One rinsate blank sample for soil was taken and analysed; and
- One trip blank, one trip spike and one trip spike control samples were taken and analysed.

That is, at least 10% of the samples were QC samples as well as blank samples. The laboratories also performed internal QC programs in accordance with their NATA registration. The results of the QC program are discussed in Section 10.

7.4.2 Laboratory Quality Control Program

The laboratories perform internal QC programs in accordance with their NATA registration to ensure that the analytical procedures are followed correctly and with the required degree of accuracy. This involves the laboratories preparing and analysing their own duplicate samples, blanks and analytical standards.

The results from the laboratories internal duplicate samples are compared with the results from the primary (field) samples, in order to determine the precision of the analyses. The duplicate samples are subjected to the same preparation and analytical procedures as the primary samples. Reagent blank analyses and instrument calibrations using chemical standards are routinely conducted by the laboratories.

The laboratories also determine the accuracy of the analytical procedures used as part of their internal QC procedures. This is determined using either control samples (where the concentration of the species to be determined is known) or matrix spikes. The laboratories are required to analyse matrix spikes or control samples at a minimum frequency of 5% of the total number of primary samples. This is consistent with the approach recommended by the USEPA.

The results of analyses of method blanks, duplicates and control samples were compared by the laboratory to established quality assurance criteria for precision and accuracy. If the results did not meet the criteria, the analyses were repeated. These criteria are:

- Method blanks should not return any positives on analysis;
- Duplicate soil samples should not vary by more than 35% from the mean result; and
- Control samples should generally give a recovery of 75-125%.

8. BASIS FOR INTERPRETATION OF RESULTS

The analytical results for the soil samples are compared with the soil quality criteria in Section 9.1. The relevant criteria are discussed below.

8.1 Soil Quality Criteria

In accordance with the ASC NEPM (as amended 2013) the environmental soil quality criteria used for this investigation are:

- The ecological investigation levels (EILs) and ecological screening levels (ESLs) (ASC NEPM (as amended 2013));
- The NEPM health investigation levels (HILs) and health-screening levels (HSLs) (ASC NEPM (as amended 2013));
- The petroleum hydrocarbon management limits (ASC NEPM (as amended 2013));
- Canadian Council of Ministers for the Environment, Canadian Soil Quality Guidelines (SQGs) for the Protection of Environmental and Human Health; and
- USEPA Ecological Soil Screening Levels (Eco-SSLs).

ASC NEPM

The ASC NEPM was first made by the National Environment Protection Council on 10 December 1999 and was amended in May 2013. The ASC NEPM (as amended 2013) contains a set of the most recently reviewed and developed Australian health and ecological investigation and screening levels for soil. The ASC NEPM (as amended 2013) investigation and screening levels are the concentrations of a contaminant above which further appropriate investigation and evaluation will be required, they are not clean-up or response levels nor are they desirable soil quality criteria. The ASC NEPM (as amended 2013) investigation and screening levels comprise:

<u>HILs and HSLs</u>

HILs have been developed for a broad range of metals and organic substances. The HILs are applicable for assessing human health risk via all relevant pathways of exposure. The HILs are generic to all soil types and apply generally to a depth of 3 m below the surface for commercial/industrial land use.

HSLs have been developed for selected petroleum compounds and fractions and are applicable to assessing human health risk via the inhalation and direct contact pathways. The HSLs depend on specific soil physicochemical properties, land use scenarios, and the characteristics of building structures. They apply to different soil types, and depths below surface to >4 m BGL.

The health investigation and screening levels were developed for frequently occurring toxicologically important parameters using a risk assessment approach based on worst case exposure scenarios. The health investigation and screening levels are provided for a range of land uses including:

HIL A: Residential with garden/accessible soil (home grown produce <10% fruit and vegetable intake, (no poultry), also includes children's day care centres, preschools and primary schools;

HIL B: Residential with minimal opportunities for soil access includes dwellings with fully and permanently paved yard space such as high-rise buildings and flats;

HIL C: Public open space such as parks, playgrounds, playing fields (e.g. ovals), secondary schools and footpaths. It does not include undeveloped public open space (such as urban bushland and reserves) which should be subject to a site-specific assessment where appropriate; and

HIL D: Commercial/industrial such as shops, offices, factories and industrial sites.

*In view of the land use zoning for the site i.e. commercial/industrial land use, the environmental quality criteria used for this soil sampling program are the **HIL D**.*

EILs and ESLs

EILs have been developed for selected metals and organic substances and are applicable for assessing the potential risk to terrestrial ecosystems. Various EILs have been developed for a range of specific soil physicochemical properties and land use scenarios.

The ASC NEPM (as amended 2013) allows for site specific EILs to be derived for chromium (III), copper, nickel, lead and zinc based on the sum of the ambient background concentration (ABC) and added contaminant limit (ACL).

In addition, the ASC NEPM (as amended 2013) includes ESLs for selected petroleum hydrocarbon compounds and total petroleum hydrocarbon (TPH) fractions and is applicable for assessing the potential risk to terrestrial ecosystems. ESLs available for both coarse and fine-grained soils, and various land use scenarios.

The EILs and ESLs generally apply to the top 2 m of the soil profile, apart from in arid regions where they apply to the top 3 m where the predominant plant species may have greater root penetration.

The EILs and ESLs have been derived for different levels of percentage species protection depending on land use. The three generic land use settings and corresponding levels of percentage species protection for the application of the ecological investigation and screening levels are:

- Areas of ecological significance (99% level of species protection);
- Urban residential areas and public open space (80% level of species protection); and

- Commercial and industrial land uses (60% level of species protection).

In view of the land use zoning for the site i.e. commercial/industrial land use, the environmental quality criteria used for this soil sampling program are the 'commercial/industrial'' (60% level of species protection).

For the purposes of deriving individual EILs or ESLs as described in Schedule B1 of the ASC NEPM, the soil at the site was described as having:

- Fine texture (applicable to clay soils);
- pH of 5, based on a conservative pH value;
- Cation Exchange Capacity of 5 cmol/kg, based on the most conservative (i.e. default) value; and
- Clay content of 40%, assumed to be applicable to clay soils.

Petroleum Hydrocarbon Management Limits

The Management Limits are applicable to petroleum hydrocarbon compounds only. They represent the concentrations above which potential risks to groundwater resources, buildings and structures, and explosive risks should be evaluated, in addition to ecological and health risks. They are particularly relevant for operating sites where significant sub-surface leakage of petroleum compounds has occurred and when decommissioning industrial and commercial sites.

Canadian Soil Quality Guidelines (SQGs) and USEPA Soil Screening Levels (Eco-SSLs)

For contaminants that do not have ecological guideline values in the ASC NEPM (as amended 2013), international guideline values have been utilised as an initial screening tool. In particular, the Canadian SQGs for the Protection of Environmental and Human Health and USEPA Eco-SSLs have been considered. The Canadian SQGs have been considered in preference to the USEPA Eco-SSLs as a risk based, species sensitivity distribution methodology based on land use was used for their derivation, which is a comparable approach to that utilised for the ASC NEPM (as amended 2013). It is noted that where possible, soil quality guideline for environmental health (SQG_E) values have been adopted, as these guideline values have been derived specifically for ecological receptors.

The Canadian SQGs have been developed for four generic land uses and corresponding levels of percentage species/soil process protection. These are:

- Agricultural (75% level of species and soil process protection);
- Residential / Parkland (75% level of species and soil process protection);
- Commercial (50% level of species and soil process protection); and
- Industrial (50% level of species and soil process protection).

For contaminants which do not have relevant Canadian SQGs, the lowest of the USEPA Eco-SSLs for protection of plants, soil invertebrates, birds and mammals have been adopted. The Eco-SSLs were derived using a less preferred geometric mean method and are not risk-based. For that reason the Eco-SSLs are generally more conservative than the Canadian SQGs.

Summary of Adopted Soil Quality Criteria

For the purposes of interpreting tabulated chemical data, adopted soil quality criteria were derived to help identify soil samples that could possibly be representative of an unacceptable risk to either human health or the environment. The adopted soil quality criteria are summarised in Table **5** below. Highly conservative assumptions were used in determining these adopted soil quality criteria, and for this reason they are employed as an initial screening to help identify soil sampling location requiring further assessment or discussion. An exceedance of the adopted soil quality criteria should, therefore, not be misconstrued as an indication of an unacceptable risk affecting human health or the environment at the site.

Adopted soil quality criteria for protection of human health were derived as the minimum of the HIL D and HSL D (vapour intrusion from the ASC NEPM and direct contact from *Co-operative Research Centre – Contamination Assessment and Remediation of the Environment* (CRC CARE) Technical Report No. 10). A hierarchical approach was used for deriving soil quality criteria for protection of the environment, whereby EILs and ESLs were the preferred guideline value, followed by the Canadian SQG and finally the USEPA Eco-SSLs. Finally, management limits for commercial/industrial land use were adopted as soil quality criteria for the assessment of TRHs.

Table 5 Adopted Soil Quality Criteria

Chemical	ASC NEPM 2013 HIL D	CRC Care Direct Contact HSL[1]	ASC NEPM Vapour Intrusion HSL	Adopted Criteria for Protection of Human Health	ASC NEPM EIL Commercial and Industrial	ASC NEPM ESL Commercial and Industrial	Canadian SQG (Industrial)	USEPA Eco-SSLs	Adopted Criteria for Protection of Environment	ASC NEPM TPH Management limits
Antimony		-	-	**-**	-	-	-	0.27	**0.27**	-
Arsenic	3,000	-	-	**3,000**	160	-	26	18	**100**	-
Barium		-	-	**-**	-	-	-	330	**330**	-
Beryllium	500	-	-	**500**	-	-	-	21	**21**	-
Boron	300,000	-	-	**300,000**	-	-	-	-	**-**	-
Cadmium	900	-	-	**900**	-	-	22	32	**22**	-
Chromium (total)	3,600[3]	-	-	**3,600**	1,000[4]	-	87	-	**1,000**	-
Cobalt	4,000	-	-	**4,000**	-	-	-	13	**13**	-
Copper	240,000	-	-	**240,000**	130[5]	-	91	28	**130**	-
Lead	1,500	-	-	**1,500**	1,800	-	600	11	**1,800**	-
Manganese	60,000	-	-	**60,000**	-	-	-	220	**220**	-
Mercury (inorganic)	730	-	-	**730**	-	-	50	-	**50**	-
Methyl mercury	180	-	-	**180**	-	-	-	-	**-**	-
Nickel	6,000	-	-	**6,000**	55	-	-	38	**55**	-
Selenium	10,000	-	-	**10,000**	-	-	1	0.52	**0.52**	-
Zinc	400,000	-	-	**400,000**	210[6]	-	360	46	**210**	-
Anthracene	-	-	-	**-**	-	-	32	-	**2.5**	-
Benzo(a)pyrene	-	-	-	**-**	-	1.4	72	-	**0.7**	-
Fluoranthene	-	-	-	**-**	-	-	180	-	**-**	-
Naphthalene	-	11,000	-	**11,000**	370	-	-	-	**370**	-
Carcinogenic PAHs[2]	40	-	-	**40**	-	-	-	-	**-**	-
Total PAHs	4,000	-	-	**4,000**	-	-	-	-	**-**	-

Chemical	ASC NEPM 2013 HIL D	CRC Care Direct Contact HSL[1]	ASC NEPM Vapour Intrusion HSL	Adopted Criteria for Protection of Human Health	ASC NEPM EIL Commercial and Industrial	ASC NEPM ESL Commercial and Industrial	Canadian SQG (Industrial)	USEPA Eco-SSLs	Adopted Criteria for Protection of Environment	ASC NEPM TPH Management limits
TPH (C_6-C_{10})	-	26,000	-	**26,000**	-	170	-	-	**180**	**800**
TPH (C_{10}-C_{16})	-	20,000	-	**20,000**	-	170	-	-	**120**	**1,000**
TPH (C_{16}-C_{34})	-	27,000	-	**27,000**	-	2,500	-	-	**1,300**	**5,000**
TPH (C_{34}-C_{40})	-	38,000	-	**38,000**	-	6,600	-	-	**5,600**	**10,000**
Benzene	-	430	-	**430**	-	95	-	-	**65**	-
Toluene	-	99,000	-	**99,000**	-	135	-	-	**105**	-
Ethylbenzene	-	27,000	-	**27,000**	-	185	-	-	**125**	-
Xylenes (total)	-	81,000	-	**81,000**	-	95	-	-	**45**	-
Cyanides (free)	1,500	-	-	**1,500**	-	-	-	-	**-**	-
PCBs (total)	7	-	-	**7**	-	-	33	-	**1.3**	-
DDT+DDE+DDD	3,600	-	-	**3,600**	640	-	0.7	-	**640**	-
Aldrin and dieldrin	45	-	-	**45**	-	-	0.0024[7]	0.0049	**0.0024**	-
Chlordane	530	-	-	**530**	-	-	0.0085[7]	-	**0.0085**	-
Endosulfan	2,000	-	-	**2,000**	-	-	-	-	**-**	-
Endrin	100	-	-	**100**	-	-	0.0011[7]	-	**0.0011**	-
Heptachlor	50	-	-	**50**	-	-	0.5[7]	-	**0.5**	-
HCB	2,500	-	-	**2,500**	-	-	-	-	**-**	-
Methoxychlor	2,500	-	-	**2,500**	-	-	4120[7]	-	**4120**	-
Mirex	100	-	-	**100**	-	-	-	-	**-**	-
Toxaphene	160	-	-	**160**	-	-	-	-	**-**	-
2,4,5-T	5,000	-	-	**5,000**	-	-	-	-	**-**	-
2,4-D	9,000	-	-	**9,000**	-	-	-	-	**-**	-
MCPA	5,000	-	-	**5,000**	-	-	-	-	**-**	-

Chemical	ASC NEPM 2013 HIL D	CRC Care Direct Contact HSL[1]	ASC NEPM Vapour Intrusion HSL	Adopted Criteria for Protection of Human Health	ASC NEPM EIL Commercial and Industrial	ASC NEPM ESL Commercial and Industrial	Canadian SQG (Industrial)	USEPA Eco-SSLs	Adopted Criteria for Protection of Environment	ASC NEPM TPH Management limits
MCPB	5,000	-	-	**5,000**	-	-	-	-	**-**	-
Mecoprop	5,000	-	-	**5,000**	-	-	-	-	**-**	-
Picloram	35,000	-	-	**35,000**	-	-	-	-	**-**	-
Atrazine	2,500	-	-	**2,500**	-	-	-	-	**-**	-
Chlorpyrifos	2,000	-	-	**2,000**	-	-	-	-	**-**	-
Bifenthrin	4,500	-	-	**4,500**	-	-	-	-	**-**	-
Bonded ACM	0.05%	-	-	**0.05%**	-	-	-	-	**-**	-
Friable Asbestos	0.001	-	-	**0.001**	-	-	-	-	**-**	-
Visible Asbestos	None	-	-	**None**	-	-	-	-	**-**	-

Note:
Values expressed as mg/kg unless specified otherwise.

[1] CRC CARE Technical Report no. 10 – *Health screening levels for petroleum hydrocarbons in soil and groundwater. Part 1: Technical development document.*
[2] Expressed as benzo(a)pyrene TEQ
[3] Adopted criterion for Chromium (VI)
[4] Based on a clay content of 40% (assumed to be applicable to clay soils)
[5] Based on a pH value of 5 (conservative assumption)
[6] Based on a CEC value of 5 and pH value of 5 (conservative assumptions).
[7] Most conservative Ontario MoE Soil Standard for fine commercial/industrial soil.

8.2 Groundwater Quality Criteria

The groundwater quality criteria used for this assessment are based on criteria contained in the NSW EPA Site Auditor Guidelines, the *Guidelines for the Assessment and Management of Groundwater Contamination* (March 2007) (Groundwater Guidelines).

The water quality criteria required to meet the relevant objectives outlined in the Groundwater Guidelines are specified in other publications or sections of publications, such as:

- *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*, ANZECC 2000; and
- *Australian Drinking Water Guidelines,* NHMRC 2011 (ADWG 2011).

These criteria are approved by EPA as guidelines for the purposes of contaminated site assessment, investigation, remediation and site auditing under the *Contaminated Land Management Act 1997*.

The ANZECC 2000 criteria are threshold values that are used to provide an indication of potential adverse impacts on aquatic ecosystems. The ANZECC 2000 guidelines also provide guidance on site specific assessment and recommend a risk-based approach for protecting aquatic ecosystems.

The ADWG 2011 criteria are guideline values for chemical and physical characteristics that are used to provide an indication of potential adverse impacts on human health resulting from consumption of the water resource. The ADWG also provides guidance on aesthetic considerations for water sources, including taste, odour, corrosion and staining.

8.2.1 Relevant Environmental Values for Groundwater

EPA's Groundwater Guidelines outlines four general Relevant Environmental Values (REVs) that need to be considered when undertaking groundwater assessments. These are:

- **Aquatic Ecosystems:** Including surface water and groundwater ecosystems.
- **Human Uses:** Including potable water supply, agricultural water supply (irrigation and stock watering), industrial water use, aquaculture and human consumption of aquatic foods, recreational use (primary and secondary contact) and visual amenity.
- **Human Health in Non-Use Scenarios:** Includes consideration of health risks that may arise without direct contact between human and the groundwater, for example, exposure to volatile contaminants above groundwater contaminant plumes.
- **Buildings and Structures:** Includes protection from groundwater contaminants that can degrade building materials through contact, for example, the weakening of building footings resulting from chemically aggressive groundwater.

In accordance with EPA's Groundwater Guidelines, when assessing potential risks from groundwater contamination all REVs of the groundwater need to be identified and evaluated with regard to potential impacts. It is stated in the guidelines that when groundwater comes to the surface, whether from natural seepages or existing or potential future bores, it must not compromise the REVs.

A selection of the water quality criteria adopted for the site are summarised in Table 6. A complete summary of the adopted criteria is provided in Table R2. These are the ANZECC 2000 criteria (for 95% species protection in freshwaters) for the beneficial uses of ecosystem protection (which apply at the point of discharge into the receiving environment) and agricultural water uses (irrigation and stock watering), and the ADWG 2011 criteria for drinking water and recreation.

Groundwater quality criteria that are protective of health effects due to vapour intrusion were adopted from the ASC NEPM (Vapour Intrusion HSL).

Table 6 Water Quality Objectives

Contaminant	Guideline Values					
	Ecosystem Protection [1]	Drinking Water[2]	Irrigation[3]	Livestock Water Supply[4]	Recreation[5]	Vapour Intrusion HSL
Arsenic	0.013	0.01	0.1	0.5	0.1	
Cadmium	0.0002 (b)	0.002	0.01	0.01	0.02	
Chromium	0.001	0.05	0.1	1		
Copper	0.0014	2	0.2	0.4	20	
Lead	0.0034	0.01	0.2	0.1	0.1	
Mercury	0.00006 (b,c)	0.001	0.002	0.002	0.01	
Nickel	0.011	0.02	0.2	1	0.2	
Zinc	0.008	3	2	20		
TRHs (C_{10}-C_{40})	0.007 (a)					
Benzene	0.95	0.001		0.001	0.01	0.8
Toluene	0.18 (a)	0.8		0.8		
Ethylbenzene	0.08 (a)	0.3		0.3		
Xylenes (total)	0.075(e)	0.6		0.6		
Isopropylbenzene	0.03 (a)					
F1 - BTEX						1
F2 - Naphthalene						1
Benzo(a)pyrene	0.0001(6)					
Naphthalene	0.016					
Anthracene	0.00001					

Contaminant	Guideline Values					
	Ecosystem Protection [1]	Drinking Water[2]	Irrigation[3]	Livestock Water Supply[4]	Recreation[5]	Vapour Intrusion HSL
Flouranthene	0.001					
Phenanthrene	0.0006					
Phenols	0.32					
TDS				2,000		
pH	6.5-8.0	6.5-8.5	6-8.5		5.0-9.0	

Note: Values expressed as mg/L.
[1] Australian & New Zealand Guidelines for Fresh and Marine Water Quality, ANZECC 2000 for freshwaters in modified ecosystems (95% level of protection).
[2] Australian Drinking Water Guidelines, NHMRC 2011 for drinking water quality.
[3] Australian & New Zealand Guidelines for Fresh and Marine Water Quality, ANZECC 2000 for irrigation.
[4] Australian & New Zealand Guidelines for Fresh and Marine Water Quality, ANZECC 2000for livestock water supply.
[5] Australian Drinking Water Guidelines, NHMRC 2011 for recreational water quality.
[6] HSL for Vapour Intrusion for a clay soil and a groundwater depth of 4m to <8m
(a) In the absence of a moderate or high reliability criterion, a low reliability one was employed.
(b) Chemical with potential to bioaccumulate, 99% species protection was employed.
(c) Criterion for inorganic mercury from ANZECC 2000 was applied to mercury.
(d) National Institute of Water & Atmospheric Research 2002, Nitrate Guideline Values in ANZECC 2000.
(e) Trigger value for m-xylene.

8.3 Duty to Report Criteria

In accordance with the NSW EPA *Guidelines on the Duty to Report Contamination Under the Contaminated Land Management Act 1997*, July 2015 (Duty to Report Guidelines), property owners, or other persons (for example, a leaseholder), who have caused contamination of soil or groundwater are required to notify EPA under the provisions of the *Contaminated Land Management Act 1997* of any known or reasonably expected contamination on its land that has the potential to present a risk of harm to human-health or the environment. The requirements for determining when to notify EPA are outlined in the Duty to Report Guidelines, which define specific notification triggers for both soil and groundwater. These triggers are outlined in Section 2.3 and Appendix A of the guideline.

It is noted that there are no specific requirements regarding the level of environmental assessment that is necessary to determine whether a site is notifiable. The scope of assessment needed to determine if notifiable contamination exists therefore varies from site to site, and may range from a site inspection and preliminary review of site history only for land with a low risk of being contaminated to detailed site investigations including comprehensive soil and groundwater sampling programs for high risk sites with significant potential contamination sources.

8.3.1 Soil Notification Criteria

In accordance with the Duty to Report Guidelines, the criteria used for the notification triggers for soils are the HILs for the current or approved land use. These criteria are outlined in the ASC NEPM (as amended 2013) and discussed in detail in Section 8.1. As the site is proposed to be used for commercial/industrial land use, the HIL D criteria apply.

In order for a site to trigger a notification, the 95% upper confidence limit of the arithmetic average of the contaminant concentrations in soil (an EPA approved statistical method) must be above the relevant HIL criterion or a contaminant concentration must be greater than 2.5 times the relevant HIL criterion in one or more samples. In addition, in order to trigger a notification there must also be a pathway by which persons have been or are likely to be exposed to the contamination. That is, whilst the soil on a site may be contaminated above the HILs there may be no need to notify EPA provided that the site is sealed to prevent access to the soil and that an environmental management plan has been prepared to ensure that there are no human health or environmental exposures to the contamination should excavation works ever be required at the site.

There is also a requirement to notify EPA if off-site migration of contamination has occurred to the extent that it has, or is likely to have, resulted in soil impacts on adjacent land that exceed the above mentioned criteria and where those impacts will foreseeable remain above the criteria.

8.3.2 Groundwater Notification Criteria

For groundwater notification triggers, the ADWG 2011 and the ANZECC 2000 apply. Where a site is the source of groundwater impacts above the ADWG 2011 criteria and where that contamination will foreseeably remain above these criteria, this is an automatic trigger to notify EPA.

The presence of any phase-separated hydrocarbons also triggers a notification regardless of the measured aqueous contaminant concentrations. Further, in the case of surface water or groundwater discharging into a receiving environment, be it a water body such as lake or river or any other receptor (for example, an extraction bore used for irrigation purposes), EPA must be notified where the concentrations of contaminants have or are likely to enter the surface water or groundwater at concentrations above the ANZECC 2000 criteria for the protection of aquatic ecosystems and where that contamination will foreseeably remain above these criteria. These notification triggers for groundwater are the same regardless of the land use at a particular site.

A key point of the groundwater notification triggers is that although contaminants may be above the threshold ADWG 2011 and ANZECC 2000 criteria, it is stated in the Duty to Report Guidelines that reporting of contamination is only necessary where contamination will foreseeably continue to be above these criteria. Therefore, if following the removal of a contamination source the concentrations of contaminants in the groundwater were shown to have attenuated to below the threshold criteria, notification would not be necessary. Similarly, notification would not be required if groundwater fate and transport modelling could demonstrate that the concentrations of contaminants in groundwater would not foreseeably remain above the threshold criteria in the short term.

9. RESULTS AND INTERPRETATION

9.1 Soil

The analytical results for the soil samples from the assessment are presented in the NATA endorsed laboratory results included in Error! Reference source not found.**E** and are summarised in Table R1 of this report. These data are presented according to their location in numerical order of sample numbers. The analyte concentrations in the soil samples have been compared with soil quality criteria described in Section 8.1 and the results above the criteria are highlighted in the tables accordingly.

The results of the soil sampling program identified elevated concentrations of the following analytes above the adopted soil quality criteria:

- Elevated **cadmium** (up to 28 mg/kg), **copper** (up to 360 mg/kg), **nicke**l (up to 190 mg/kg) and **zinc** (up to 560 mg/kg) concentrations were recorded above the adopted ecological based criteria of 22 mg/kg, 130 mg/kg, 55 mg/kg and 210 mg/kg respectively;
- Elevated **TRH (C_{10}-C_{16})** (up to 2,400 mg/kg) concentrations were recorded above both the ecological based criterion of 170 mg/kg and the TPH management limit criterion of 1,000 mg/kg;
- Elevated **TRH (C_{16}-C_{34})** (up to 2,800 mg/kg) concentrations were recorded above the ecological criterion of 2,500 mg/kg; and
- Asbestos (chrysotile and crocidolite) was detected in one of the 8 soil samples analysed for asbestos.

The concentrations of PCBs, OCPs, OPPs and BTEX were below the laboratory detection limit in all soil samples analysed.

A layer of fill containing cement sheet fragments was identified in borehole BH4 at 2 m depth. Laboratory analysis has confirmed that the cement sheet contains asbestos. Asbestos bundles were also identified in the soil surrounding the asbestos cement sheet. Asbestos was not detected in the remaining 7 samples that were analysed for asbestos.

TRHs were detected within samples from borehole BH4 in the car park, however, these concentrations were below the human health and ecological criteria for a commercial/industrial land use. PAHs and heavy metals were detected throughout the fill material, however, the PAH concentrations were below the human health and ecological adopted criteria for a commercial/industrial land use, and the heavy metals below the adopted human health criteria.

Some of the heavy metals were above the adopted ecological criteria. At the car park, in BH02 and BH04, heavy metals concentrations (nickel) were recorded at a depths between 2 m and 3.0 m BGL. This depth is considered beyond the root zone of floral species and unlikely to impact on fauna. As such, these exceedances are unlikely to be significant.

Heavy metals also exceeded the adopted ecological criteria at the diesel pump room. However, as this area is fully sealed, these exceedances are not significant.

At the diesel pump room, the results of the laboratory analysis indicates that TRH concentrations were only detected in the soil at borehole BH5. This location was within close proximity to the large diameter water pipe emanating from the diesel pump room. Water was observed within BH5 at a depth of 1.7 m BGL. Globules of material (assumed to be fuel) were observed on the surface of the water. The TRH concentrations are below the adopted human health criteria, however, they are above the ecological criteria for specific hydrocarbon ranges C_{10}-C_{16} and C_{16}-C_{34}.

Specifically, the total TRH (C_{10}-C_{16}) concentrations recorded at BH5 (near surface sample) of 2,400 mg/kg is above the ecological criterion of 170 mg/kg. In addition, the TRH (C_{16}-C_{34}) concentration of 2,800 mg/kg is above the ecological criterion of 1,700 mg/kg for this fraction. These exceedences would only be significant in areas of open accessible soil.

The TRH (C_{10}-C_{16}) concentration is also above the TPH Management Limit of 1,000 mg/kg, which is indicative of potential risks to maintenance workers involved in sub-surface works at the site due to vapour inhalation.

At borehole BH6, which is located approximately 2 m to the south of BH5, the TRH concentrations were below laboratory detection limits at similar depths to those at BH5, which indicates that the impacts are currently localised. PAHs were generally detected throughout the soil in BH5, BH6 and BH7, however, these concentrations were below the adopted criteria.

9.2 Groundwater

The analytical results for the soil samples from the assessment are presented in the NATA endorsed laboratory results included in Error! Reference source not found. and are summarised in Table R2 of this report. The analyte concentrations in the groundwater samples have been compared with water quality criteria described in Section 8.2 and the results above the criteria are highlighted in the tables accordingly.

Two groundwater samples were obtained from two existing groundwater monitoring wells (BH03 and BH08). The results of the groundwater sampling program identified elevated concentrations of the following analytes above the adopted water quality objectives:

- Elevated nickel (up to 0.061 mg/L) concentrations were recorded above the protection of freshwater aquatic ecosystems criterion of 0.013 mg/l in both groundwater monitoring wells;
- Elevated zinc (up to 0.018 mg/L) concentrations were recorded above the protection of freshwater aquatic ecosystems criterion of 0.015 mg/l in BH03 only.

It is noted that the criteria for the protection of freshwater aquatic ecosystems, which apply at the point of groundwater discharge in the nearest receiving water body.

9.3 Outcomes of the Assessment

The results of the soil sampling and analysis indicate that diesel from a fuel tank and/or pump has migrated into the soil beneath the pump room and concrete hardstand immediately adjacent. The fuel appears to be accumulating in the vicinity of the underground fire water infrastructure. The fill material surrounding the fill material appears to be acting as a conduit and a sump. The results of the sampling indicate that off-site migration of this contamination is considered unlikely, as is extensive on-site migration.

Although the contaminant concentrations measured are below the adopted human health criteria for direct contact and ingestion, there is the potential for risks to occur to workers involved in sub-surface works in this area due to vapour inhalation. The potential risk from these soils can be managed through the implementation of an Environment Management Plan (EMP), which can be put into effect going into the future.

Alternatively the soil could be remediated in order to reduce or remove any potential risk. The remediation would likely involve excavation of the impacted soils and the collection of validation samples to confirm the effectiveness of the remediation. The remediation is likely to involve the removal of concrete hardstand around and within the diesel pump room and other measures to protect the structural integrity of the building walls, foundations and possibly the below ground infrastructure.

The exceedences of the ecological criteria are not significant under the current site configuration as the diesel pump room is located on top of concrete hardstand which limits access for ecological receptors and exceedances beyond this are located at depths greater than 2.0 m.

The asbestos containing material, including both cement sheet and asbestos fibre bundles at 2.0 m depth has the potential to present an unacceptable risk to the health of workers undertaking sub-surface works in this portion of site. The results from the other boreholes drilled and our review of the previous reports relating to the site indicate that the risk of widespread asbestos impacts being present is low. Nevertheless, in view of the presence of friable asbestos within 2 m of the ground surface, site management measures, including maintenance of the existing capping layer and implementation of an EMP are necessary. This is consistent with existing best practice for the management of asbestos, which is outlined in the Western Australian *Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia,* May 2009.

In terms of the groundwater exceedances, similar exceedances were reported by WSP in the 2015 Limited ESA. Given the consistency between the concentrations measured in each well, it is likely that these concentrations are related to the local and regional geology of the Wianamatta Group bedrock. In view of this and the marginal nature of the exceedences, these exceedances are unlikely to impact any off-site receptors.

10. EVALUATION OF QUALITY ASSURANCE

10.1 Results of the Quality Control Program

The analytical results for the QC samples have been compared by calculating the Relative Percent Difference (RPD) between the primary and control sample results. The RPD is a measure of the difference between the results of the duplicate analyses. The RPD is calculated by:

$$RPD = \frac{Sample\,(A) - Sample\,(B)}{Mean\ of\ \ Samples\,(A) + (B)}\ x\ 100$$

According to the USEPA methodology (USEPA 1986), the criteria for valid results for laboratory duplicates are that the RPDs are required to be <20% for waters and <35% for soil. Where the duplicate results are lower than five times the detection limit, the USEPA methodology indicates that the results are valid if the difference between the results for the duplicate soil sample is equal to or less than twice the detection limit.

For samples split in the field, the ASC NEPM (as amended 2013) specifies that where RPDs are greater 30%, the cause of the discrepancy should be investigated. Similarly, AS 4482.1-2005 specifies that an RPD of up to 50% is acceptable. RPDs of up to 50% are subsequently considered to demonstrate good correlation between duplicate analytical results. AS 4482.1-2005 also states that the variation can be expected to be higher for organic analytes than for inorganics, and for low concentrations of analytes. Based on Peter J Ramsay & Associates Pty Ltd experience RPDs up to 70% are considered to be acceptable for organic species. RPDs of 100% or more generally considered to demonstrate poor correlation.

10.1.1 Soil Split Duplicate and Blind Replicate Samples

The results of the soil duplicate samples are presented in Table R3 together with the corresponding primary laboratory results and the RPDs.

For the blind replicate soil analysis, the results show that 4 of the 51 calculated RPDs between the primary and blind replicate soil samples are above the acceptance criteria of 50% for inorganic or 70% for organic analytes.

For the split duplicate soil analysis, the results show that 2 of the 51 calculated RPDs between the primary and split duplicate soil samples are above the acceptance criteria of 50% for inorganic or 70% for organic analytes.

Our review of the analytical results indicates that these exceedances are considered not to be significant as the concentration differences between the primary and blind duplicate sample is equal to the EQL. With regards to the differences between the primary and split duplicate samples, these are attributed to the varying detection limits and subsequent cumulative affect on the calculated values for carcinogenic PAHs and total PAHs.

Therefore, the calculated RPDs are considered not to affect the outcome of the investigation. In view of this, it is considered that an acceptable level of accuracy and precision was achieved in the soil sampling and analytical program.

10.1.2 Groundwater Split Duplicate and Blind Replicate Samples

The results of the groundwater duplicate samples are presented in Table R4 together with the corresponding primary laboratory result and the RPDs.

The results show that none of the calculated RPDs between the primary and blind replicate groundwater samples, or between the primary and split duplicate groundwater samples are above the acceptance criteria of 50% for inorganic or 70% for organic analytes.

In view of the above it is considered that an acceptable level of accuracy and precision was achieved in the groundwater sampling and analytical program.

10.1.3 Quality Control Blank Samples

The results for rinsate blank are provided in Table R5 and the results of the trip blank and trip spike are presented in Table R6. The results showed that all analytes were below laboratory detection limits. Therefore, cross contamination between samples and sample locations is unlikely to have occurred.

10.1.4 Laboratory Quality Control

The QC procedures of all laboratories used for this investigation have been reviewed to ensure that the sample data is reliable and complete. COC documentation and/or sample receipts were signed and dated by the laboratories to confirm that samples were received in good condition within acceptable time limits. The analytical methods used for the laboratories' internal QC program are NATA accredited and details of the methods are provided in the laboratory reports in Error! Reference source not found.**G**. The laboratories QC programs include analysis of internal duplicate samples, spike recoveries, surrogate standards and laboratory blanks.

A review of the results of the internal QC has shown that the recoveries for spiked samples and surrogates, as well as RPDs for duplicates were generally within the laboratories' recommended range for acceptable reproducibility. Therefore, Peter J Ramsay & Associates considers that overall the laboratory data obtained in this investigation to be of acceptable precision, accuracy and reliability and representative of the site conditions encountered.

10.2 Summary of Quality Assurance

The QA of data during the soil sampling program has been acceptable, as demonstrated throughout the report. Documentation was maintained and complete, and the soil and groundwater was sampled and analysed in accordance with EPA requirements and national guidelines. The results of the QC programs demonstrate that a satisfactory level of precision and accuracy has been achieved during this investigation.

11. CONCLUSIONS AND RECOMMENDATIONS

Based on the results of the PSI of land at 2 Hume Highway, Chullora, New South Wales, the following conclusions and recommendations are made:

Conclusions

- The site history review indicates that the Site was vacant land until the 1950s when railway lines were constructed in the southern portion of the site. The remaining areas of the site appear to have been used for rail related purposes until the early 1990s when the site was sold to Fairfax and redeveloped for a commercial/industrial land use.
- A review of previous reports indicates that the site was previously subject to remediation to remove heavy metal, TPH and PAH impacted soil. Low level contaminated material is indicated to have been re-used on site as fill, however, the exact location of the contaminated fill that was reused is not known. Recent sampling undertaken by WSP indicates that significant soil contamination is not present, however, there is a paucity of data relating to several portions of the site which was subsequently addressed during this PSI.
- The results of the soil sampling and analysis undertaken for this PSI indicate that diesel from a fuel tank and/or pump has migrated into the soil beneath the pump room and concrete hardstand immediately adjacent. There is the potential for risks to occur to workers involved in sub-surface works in this area due to vapour inhalation. The potential risk from these soils can be managed through the implementation of an EMP. Alternatively, remediation would be necessary. The diesel contamination is indicated to currently be localised, and extensive on-site migration or off-site migration are considered unlikely.
- The results of the soil sampling also indicate that the fill is variably contaminated with heavy metals and asbestos. The heavy metal contamination would not pose a risk to current and future site users based on the current site configuration. In view of the potential risks to human health due to the presence of asbestos, site management measures, including maintenance of the existing capping layer and implementation of an EMP are necessary. The procedures that would need to be included in the EMP are routine and are not considered to be onerous.
- If the site configuration were to change with redevelopment or similar, then the risks to current and future site users may increase. This is of particular importance in relation to the asbestos detected at the car park and the petroleum hydrocarbon contamination at the diesel pump room.
- In view of the presence of soil contamination at the site, off-site disposal costs would be incurred in addition to transportation costs should it be necessary to dispose of contaminated soil off-site during any subsurface works or redevelopment.

- Overall, it is considered that the site is suitable for an ongoing commercial/industrial land use in its current configuration subject to the implementation of an EMP for the for the ongoing management of the hydrocarbon impacted soil in the vicinity of the pump room and asbestos in the fill, and repair of the diesel leak within the fire water diesel pump room.

Recommendations

- The diesel leak within the fire water diesel pump room should be repaired as a matter of priority if this has not already occurred.
- An EMP should be prepared for the ongoing management of the hydrocarbon impacted soil in the vicinity of the pump room and asbestos in the fill.
- Advice should be sought from a suitably qualified environmental consultant regarding the implications of any redevelopment of the site which results in a reduction in sealed areas of the site.
- Any soil to be disposed of off-site during any future redevelopment works should be appropriately tested and classified for off-site disposal.
- It would be prudent to implement a regular inspection regime of the site (if this is not already in place) to check for potential leaks and spillages, confirm the integrity of the sealed surfaces and to ensure that any major spillages that could impact the underlying soil and groundwater, and/or stormwater, are promptly addressed.

12. REFERENCES

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Figures

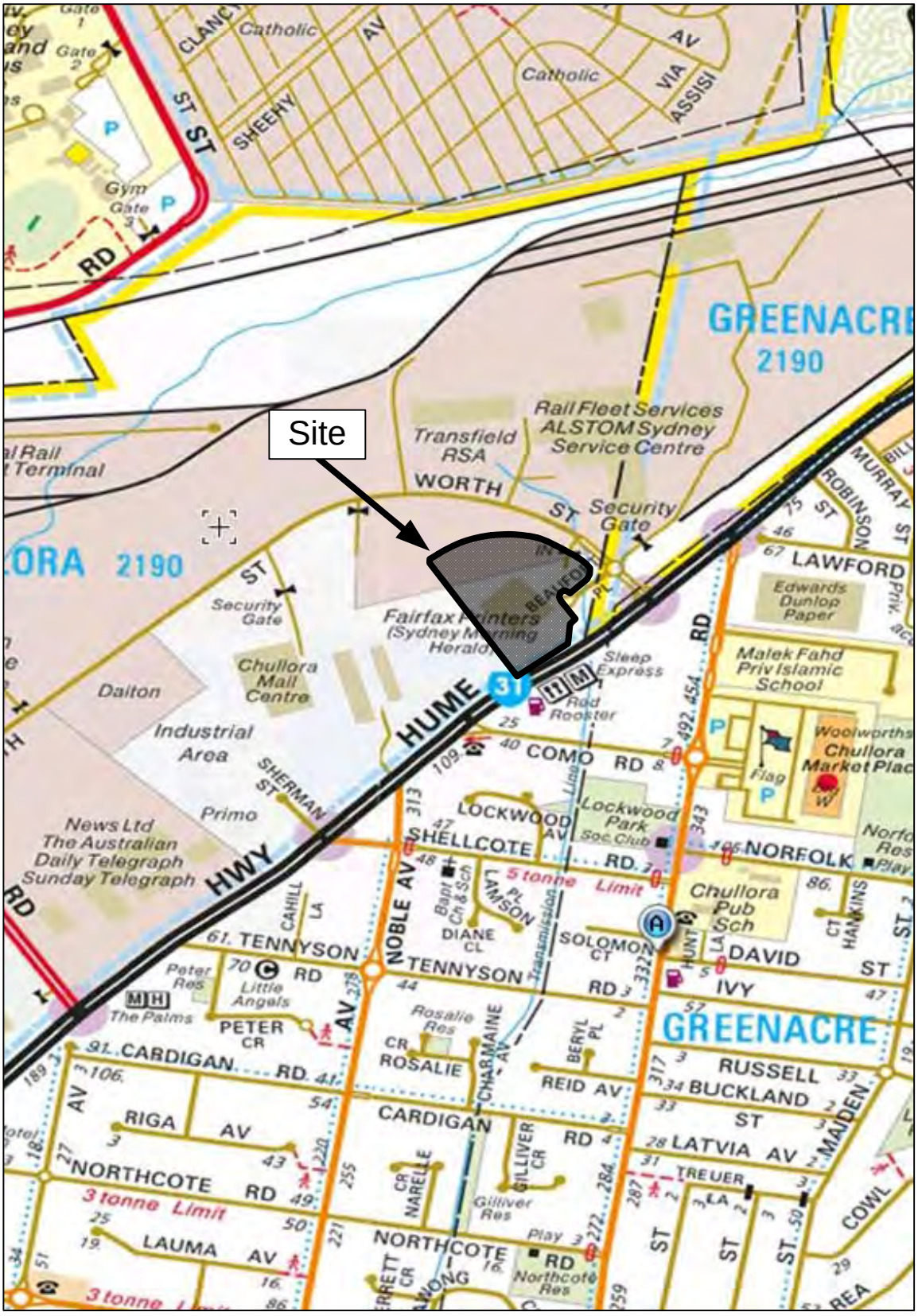

Figure 1: Locality Map		
0 300 m Approximate Scale	Copyright Melway Publishing Pty Ltd Reproduced From Melway Street Directory, Edition 38, With Permission	N
2 Hume Highway, Chullora, N.S.W 2190		PETER J RAMSAY & ASSOCIATES

Figure 2: Site Plan Showing Site Features

LEGEND

0 100 m

Approximate Scale

Boundary of Site Investigation

Approximate Location of Above Ground Storage Tank (AGST)

N

2 Hume Highway,
Chullora, N.S.W 2190

Source: *Aerial Photograph Dated 04 July 2015 Courtesy of NearMap Pty Ltd*

PETER J RAMSAY & ASSOCIATES

Figure 3: Site Plan Showing Areas of Concern and Sample Locations

LEGEND

0 100 m

Approximate Scale

Boundary of Site Investigation

Area of Concern

BH7 Borehole Number and Location

BH8 Groundwater Monitoring Well (WSP, 2011)

N

2 Hume Highway,
Chullora, N.S.W 2190

Source: *Aerial Photograph Dated 04 July 2015 Courtesy of NearMap Pty Ltd*

PETER J RAMSAY & ASSOCIATES

Tables

Table R1 - Summary of Analytical Results for Soil Samples (Page 1 of 1)

								Sample Name	884/BH01D	884/BH01M	884/BH02D	884/BH02G	884/BH03C	884/BH03I	884/BH04B	884/BH04E	884/BH05A	884/BH05C	884/BH06A	884/BH06C	884/BH07B
								Sample Date	27/07/2015	27/07/2015	27/07/2015	27/07/2015	27/07/2015	27/07/2015	27/07/2015	27/07/2015	27/07/2015	27/07/2015	27/07/2015	27/07/2015	27/07/2015
								Sample Type	FILL	DIST	FILL	FILL	FILL	NAT	FILL	FILL	FILL	FILL	FILL	FILL	FILL
Analyte	**Units**	**EQL**	ECO-SQC (Commercial/ Industrial)	Direct Contact HH-SQC D (Commercial/ Industrial)	Vapour Intrusion HH-SQC D (Commercial/ Industrial)			**TPH Mgt Limit (Commercial/ Industrial)**													
			0-2m	0-3m	0-1m	1-2m	2-4m >4m														
Metals																					
Arsenic	mg/kg	3	160[#1]	3000					10	52	9	34	5	5	37	120	4	<3	4	5	<3
Cadmium	mg/kg	0.3	22[#2]	900					0.7	0.5	0.7	1.5	0.5	0.5	1.8	28	0.9	0.9	1	0.4	0.7
Chromium (Total)	mg/kg	0.3	1000[#3]	3600[#4]					13	13	20	25	15	12	17	22	40	140	17	11	31
Copper	mg/kg	0.5	130[#5]	240000					41	41	25	71	29	7.3	89	360	95	32	91	32	59
Lead	mg/kg	1	1800[#1]	1500					45	16	21	120	24	14	150	350	55	7	44	49	4
Mercury	mg/kg	0.01	50[#6]	730[#7]					0.13	0.12	0.01	0.05	0.03	0.02	0.2	3.4	0.09	0.01	0.16	0.04	0.08
Nickel	mg/kg	0.5	55[#8]	6000					16	20	11	22	14	3.3	17	190	97	110	79	24	100
Zinc	mg/kg	0.5	210[#9]	400000					150	100	97	260	74	9.7	190	560	150	77	120	140	56
Total Recoverable Hydrocarbons (TRHs)																					
C6-C10 (F1)	mg/kg	25		26000[#10]				**800[#11]**	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25
C10-C16 (F2)	mg/kg	25	170	20000[#10]				**1000**	<25	<25	<25	<25	<25	<25	<25	33	**2,400**	<25	<25	<25	<25
C16-C34 (F3)	mg/kg	90	2500[#12]	27000[#10]				**5000[#11]**	<90	<90	<90	<90	<90	<90	420	370	2,800	<90	<90	<90	<90
C34-C40 (F4)	mg/kg	120	6600[#12]	38000[#10]				**10000**	<120	<120	<120	<120	<120	<120	<120	<120	<120	<120	<120	<120	<120
F1 minus BTEX (C6-C10)	mg/kg	25	215		310[#13]	480[#13]			<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25
F2 minus Naphthalene (C10-C16)	mg/kg	25							<25	<25	<25	<25	<25	<25	<25	33	2,400	<25	<25	<25	<25
C10-C40 (Total)	mg/kg	210							<210	<210	<210	<210	<210	<210	440	420	5,100	<210	<210	<210	<210
TRHs (Total)	mg/kg								ND	ND	ND	ND	ND	ND	420	403	5,200	ND	ND	ND	ND
Polycyclic Aromatic Hydrocarbons (PAHs)																					
1-Methylnaphthalene	mg/kg	0.1							<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1
2-Methylnaphthalene	mg/kg	0.1							<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.1	<0.1	<0.1	<0.1	0.1	<0.1
Acenaphthene	mg/kg	0.1	46000[#14]						<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.1							<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Naphthalene	mg/kg	0.1	370	11000[#10]					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1 - 0.2	<0.1 - 0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	0.1							<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	0.1	32[#2]						<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.1	180[#2]						0.3	<0.1	0.3	0.5	<0.1	<0.1	0.5	1.1	<0.1	<0.1	0.4	<0.1	<0.1
Phenanthrene	mg/kg	0.1	15.5[#14]						0.2	<0.1	0.1	0.3	<0.1	<0.1	0.2	0.5	<0.1	<0.1	0.2	<0.1	<0.1
Benz[a]anthracene	mg/kg	0.1	1.25[#14]						0.1	<0.1	0.1	0.2	<0.1	<0.1	0.3	0.6	<0.1	<0.1	0.2	<0.1	<0.1
Chrysene	mg/kg	0.1	17.5[#14]						0.1	<0.1	0.1	0.2	<0.1	<0.1	0.3	0.5	<0.1	<0.1	0.2	<0.1	<0.1
Pyrene	mg/kg	0.1	99100[#14]						0.3	<0.1	0.3	0.4	<0.1	<0.1	0.5	1.1	<0.1	<0.1	0.4	<0.1	<0.1
Benzo(k)fluoranthene	mg/kg	0.1	19[#14]						<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.2	0.3	0.1	<0.1	0.1	<0.1	<0.1
Benzo(b+j)fluoranthene	mg/kg	0.1							0.1	<0.1	0.1	0.2	<0.1	<0.1	0.4	0.6	0.2	<0.1	0.2	<0.1	<0.1
Benzo(a)pyrene	mg/kg	0.1	1.4						0.1	<0.1	0.1	0.1	<0.1	<0.1	0.3	0.6	0.1	<0.1	0.2	<0.1	<0.1
Dibenz(a,h)anthracene	mg/kg	0.1							<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo[g,h,i]perylene	mg/kg	0.1	16.5[#14]						0.1	<0.1	0.1	0.1	<0.1	<0.1	0.3	0.4	0.1	<0.1	0.2	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	0.95[#14]						0.1	<0.1	0.1	0.1	<0.1	<0.1	0.3	0.5	0.2	<0.1	0.2	<0.1	<0.1
Carcinogenic PAHs (as BaP TEQ, nd=LOR)	mg/kg			40					<0.2	<0.2	<0.2	0.3	<0.2	<0.2	0.5	0.9	<0.2	<0.2	0.3	<0.2	<0.2
Carcinogenic PAHs (as BaP TEQ, nd=zero)	mg/kg	0.2		40					<0.2	<0.2	<0.2	0.2	<0.2	<0.2	0.4	0.8	<0.2	<0.2	0.3	<0.2	<0.2
PAHs (Total)	mg/kg	0.8		4000					1.7	<0.8	1.7	2.3	<0.8	<0.8	3.9	7	1	<0.8	2.5	<0.8	<0.8
Monocyclic Aromatic Hydrocarbons (PAHs)																					
Benzene	mg/kg	0.1	95[#12]	430[#10]	4[#13]	6[#13]	9[#13] 20[#13]		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Ethylbenzene	mg/kg	0.1	185[#12]	27000[#10]					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Toluene	mg/kg	0.1	135[#12]	99000[#10]					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Xylene (o)	mg/kg	0.1							<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Xylene (m & p)	mg/kg	0.2							<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Xylene Total	mg/kg	0.3	95[#12]	81000[#10]					<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Total BTEX	mg/kg	0.6							<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6
MAHs (Total)	mg/kg								ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Halogenated Benzenes																					
Hexachlorobenzene	mg/kg	0.1	250[#14]	80					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-
Halogenated Benzenes (Total)	mg/kg								ND	ND	ND	ND	ND	ND	ND	ND	-	-	-	-	-
Organochlorine Pesticides (OCPs)																					
a-BHC	mg/kg	0.1							<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-
b-BHC	mg/kg	0.1							<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-
d-BHC	mg/kg	0.1							<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-
g-BHC (Lindane)	mg/kg	0.1	15[#14]						<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-
Aldrin	mg/kg	0.1	0.0024[#14]						<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-
Aldrin + Dieldrin	mg/kg			45					0	0	0	0	0	0	0	0	-	-	-	-	-
Chlordane	mg/kg	0.1	0.0085[#14]	530					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-
Heptachlor	mg/kg	0.1	0.5[#14]	50					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-
Heptachlor epoxide	mg/kg	0.1							<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-
trans-Nonachlor	mg/kg	0.1							<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-
DDD	mg/kg	0.1	17[#14]						<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-
o,p-DDD	mg/kg	0.1							<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-
o,p-DDE	mg/kg	0.1							<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-
4,4-DDE	mg/kg	0.1							<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-
DDT	mg/kg	0.1	640						<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-
2,4-DDT	mg/kg	0.1							<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-
DDT+DDE+DDD	mg/kg			3600					0	0	0	0	0	0	0	0	-	-	-	-	-
Dieldrin	mg/kg	0.2	0.11[#14]						<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	-	-	-	-	-
Endosulfan I	mg/kg	0.2							<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	-	-	-	-	-
Endosulfan II	mg/kg	0.2							<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	-	-	-	-	-
Endosulfan sulfate	mg/kg	0.1							<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-
Endrin	mg/kg	0.2	0.0013[#14]	100					<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	-	-	-	-	-
Endrin aldehyde	mg/kg	0.1							<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-
Endrin ketone	mg/kg	0.1							<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-
Methoxychlor	mg/kg	0.1	4120[#14]	2500					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-
OCPs (Total)	mg/kg								ND	ND	ND	ND	ND	ND	ND	ND	-	-	-	-	-
Organophosphorous Pesticides (OPPs)																					
Bromophos-ethyl	mg/kg	0.2							<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	-	-	-	-	-
Azinphos Ethyl	mg/kg	0.2							<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	-	-	-	-	-
Chlorpyrifos	mg/kg	0.2		2000					<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	-	-	-	-	-
Diazinon	mg/kg	0.5							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-
Dichlorvos	mg/kg	0.5							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-
Dimethoate	mg/kg	0.5							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-
Ethion	mg/kg	0.2							<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	-	-	-	-	-
Fenitrothion	mg/kg	0.2							<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	-	-	-	-	-
Malathion	mg/kg	0.2							<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	-	-	-	-	-
Methidathion	mg/kg	0.5							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-
Parathion	mg/kg	0.2							<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	-	-	-	-	-
OPPs (Total)	mg/kg								ND	ND	ND	ND	ND	ND	ND	ND	-	-	-	-	-
Pesticides																					
Isodrin	mg/kg	0.1							<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-
Mirex	mg/kg	0.1		100					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-
Pesticides (Total)	mg/kg								ND	ND	ND	ND	ND	ND	ND	ND	-	-	-	-	-
Polychlorinated Biphenyls (PCBs)																					
Aroclor 1016	mg/kg	0.2							<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	-	-	-	-	-
Aroclor 1221	mg/kg	0.2							<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	-	-	-	-	-
Aroclor 1232	mg/kg	0.2							<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	-	-	-	-	-
Aroclor 1242	mg/kg	0.2							<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	-	-	-	-	-
Aroclor 1248	mg/kg	0.2							<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	-	-	-	-	-
Aroclor 1254	mg/kg	0.2							<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	-	-	-	-	-
Aroclor 1260	mg/kg	0.2							<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	-	-	-	-	-
Aroclor 1268	mg/kg	0.2							<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	-	-	-	-	-
Aroclor 1262	mg/kg	0.2							<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	-	-	-	-	-
PCBs (Total)	mg/kg	1	33[#2]	7					<1	<1	<1	<1	<1	<1	<1	<1	-	-	-	-	-
Asbestos																					
Asbestos fibres	-	0							ND	ND	ND	ND	ND	ND	ND	CHR, CRO	-	-	-	-	-
Miscellaneous																					
% Moisture	%	0.5							16	17	17	13	18	19	15	14	13	9.2	12	13	5.9

Env Stds Comments
ND = No individual species was detected.
NA = No Asbestos detected.
Asbestos types: AMO = Amosite; CHR = Chrysotile; CRO = Crocidolite; and SMF = Synthetic mineral fibres.
NAT = Natural soil.
DIST = Sample retrieved from disturbed natural soil profile.
PACM = Potential Asbestos Containing Material
CCME SQC = Canadian Council of Ministers Soil Quality Criterion. Ontario MoE = Ontario Ministry of the Environment.
#1:EIL for soil with aged contamination.
#2:CCME SQC for commercial/industrial land use.
#3:EIL for Cr III was adopted for total Cr.
#4:Criterion for chromium (VI).
#5:EIL calculated based on a soil pH of 5, a CEC of 5 cmol/kg, and an organic matter content of 1 %OC.
#6:Criterion for inorganic mercury (CCME SQC for commercial/industrial land use).
#7:Criterion for inorganic mercury.
#8:EIL calculated based on a CEC of 5 cmol/kg.
#9:EIL calculated based on a soil pH of 5 and a CEC of 5 cmol/kg.
#10:Direct contact HSL (CRC CARE Technical Report no. 10).
#11:Criterion for fine soil.
#12:ESL for fine soil.
#13:Vapour intrusion HSL for clay.
#14:Most conservative Ontario MoE Soil Standard for fine commercial/industrial soil.

PETER J RAMSAY & ASSOCIATES

Table R2 - Summary of Analytical Results for Groundwater Samples (Page 1 of 2)

								Sample Name	884/BH03	884/BH08
								Sample Date	27/07/2015	27/07/2015
Analyte	**Units**	**EQL**	Maintenance of Ecosystems (95% of freshwater species)	Potable Mineral Water Supply	Agricultural Water - Irrigation	Recreation	**Vapour Intrusion HSL D**			
Metals										
Arsenic (Filtered)	mg/L	0.001	0.013[#1]	0.05	0.1[#2]	0.1			<0.001	<0.001
Cadmium (Filtered)	mg/L	0.0001	0.0002[#3]	0.005	0.01[#2]	0.02			<0.0001	<0.0001
Chromium (Total) (Filtered)	mg/L	0.001	0.001[#4]	0.05	0.1[#2]				<0.001	<0.001
Copper (Filtered)	mg/L	0.001	0.0014	1	0.2[#2]	20			<0.001	<0.001
Lead (Filtered)	mg/L	0.001	0.0034	0.05	2[#2]	0.1			<0.001	<0.001
Mercury (Filtered)	mg/L	0.0001	0.00006[#5]	0.001	0.002[#2]	0.01			<0.0001	<0.0001
Nickel (Filtered)	mg/L	0.001	0.011		0.2[#2]	0.2			0.061	0.043
Zinc (Filtered)	mg/L	0.005	0.008	5	2[#2]				0.018	0.012
Total Recoverable Hydrocarbons (TRHs)										
C6-C10 (F1)	mg/L	0.05							<0.05	<0.05
C10-C16 (F2)	mg/L	0.06							<0.06	<0.06
C16-C34 (F3)	mg/L	0.5							<0.5	<0.5
C34-C40 (F4)	mg/L	0.5							<0.5	<0.5
F1 minus BTEX (C6-C10)	mg/L	0.05							<0.05	<0.05
C10-C40 (Total)	mg/L	0.65	0.007[#6]						<0.65	<0.65
Polycyclic Aromatic Hydrocarbons (PAHs)										
1-Methylnaphthalene	mg/L	0.0001							<0.0001	<0.0001
2-Methylnaphthalene	mg/L	0.0001							<0.0001	<0.0001
Acenaphthene	mg/L	0.0001							<0.0001	<0.0001
Acenaphthylene	mg/L	0.0001							<0.0001	<0.0001
Naphthalene	mg/L	0.0001	0.016						<0.0001	<0.0001
Fluorene	mg/L	0.0001							<0.0001	<0.0001
Anthracene	mg/L	0.0001	0.00001[#6]						<0.0001	<0.0001
Fluoranthene	mg/L	0.0001	0.001[#6]						<0.0001	<0.0001
Phenanthrene	mg/L	0.0001	0.0006[#6]						<0.0001	<0.0001
Benz(a)anthracene	mg/L	0.0001							<0.0001	<0.0001
Chrysene	mg/L	0.0001							<0.0001	<0.0001
Pyrene	mg/L	0.0001							<0.0001	<0.0001
Benzo(k)fluoranthene	mg/L	0.0001							<0.0001	<0.0001
Benzo(b&j&k)fluoranthene	mg/L	0.0002							<0.0002	<0.0002
Benzo(b+j)fluoranthene	mg/L	0.0001							<0.0001	<0.0001
Benzo(a)pyrene	mg/L	0.0001	0.0001[#6]						<0.0001	<0.0001
Dibenz(a,h)anthracene	mg/L	0.0001							<0.0001	<0.0001
Benzo(g,h,i)perylene	mg/L	0.0001							<0.0001	<0.0001
Indeno(1,2,3-c,d)pyrene	mg/L	0.0001							<0.0001	<0.0001
7,12-Dimethylbenz(a)anthracene	mg/L	0.0005							<0.0005	<0.0005
PAHs (Total)	mg/L	0.001				0.0001			<0.001	<0.001
Monocyclic Aromatic Hydrocarbons (MAHs)										
Benzene	mg/L	0.0005	0.95			0.01	**30[#8]**		<0.0005	<0.0005
Ethylbenzene	mg/L	0.0005	0.08[#6]			3			<0.0005	<0.0005
Toluene	mg/L	0.0005	0.18[#6]			8			<0.0005	<0.0005
Xylene (o)	mg/L	0.0005	0.35						<0.0005	<0.0005
Xylene (m & p)	mg/L	0.001							<0.001	<0.001
Xylene Total	mg/L	0.0015	0.075[#9]			6			<0.0015	<0.0015
1,2,4-Trimethylbenzene	mg/L	0.0005							<0.0005	<0.0005
1,3,5-Trimethylbenzene	mg/L	0.0005							<0.0005	<0.0005
Isopropylbenzene (cumene)	mg/L	0.0005	0.03[#6]						<0.0005	<0.0005
n-butylbenzene	mg/L	0.0005							<0.0005	<0.0005
n-propylbenzene	mg/L	0.0005							<0.0005	<0.0005
p-isopropyltoluene	mg/L	0.0005							<0.0005	<0.0005
sec-butylbenzene	mg/L	0.0005							<0.0005	<0.0005
Styrene	mg/L	0.0005				0.3			<0.0005	<0.0005
tert-butylbenzene	mg/L	0.0005							<0.0005	<0.0005
Total BTEX	mg/L	0.003							<0.003	<0.003
Amino Aliphatics										
N-nitrosodiethylamine	mg/L	0.001							<0.001	<0.001
N-nitrosodi-n-butylamine	mg/L	0.001							<0.001	<0.001
N-nitrosodi-n-propylamine	mg/L	0.001							<0.001	<0.001
Amino Aromatics										
1-Naphthylamine	mg/L	0.002							<0.002	<0.002
2-Naphthylamine	mg/L	0.002							<0.002	<0.002
Diphenylamine	mg/L	0.001							<0.001	<0.001
Anilines										
2-Nitroaniline	mg/L	0.001							<0.001	<0.001
3-Nitroaniline	mg/L	0.001							<0.001	<0.001
4-Chloroaniline	mg/L	0.001							<0.001	<0.001
4-Nitroaniline	mg/L	0.001							<0.001	<0.001
2-Methyl-5-nitroaniline	mg/L	0.001							<0.001	<0.001
Aniline	mg/L	0.005	0.008[#10]						<0.005	<0.005
2-Methylaniline	mg/L	0.001							<0.001	<0.001
Chlorinated Hydrocarbons										
1,1,1,2-Tetrachloroethane	mg/L	0.0005							<0.0005	<0.0005
1,1,1-Trichloroethane	mg/L	0.0005	0.27[#6]						<0.0005	<0.0005
1,1,2,2-Tetrachloroethane	mg/L	0.0005	0.4[#6]						<0.0005	<0.0005
1,1,2-Trichloroethane	mg/L	0.0005	6.5						<0.0005	<0.0005
1,1-Dichloroethane	mg/L	0.0005	0.09[#6]						<0.0005	<0.0005
1,1-Dichloroethene	mg/L	0.0005	0.7[#6]			0.3			<0.0005	<0.0005
1,1-Dichloropropene	mg/L	0.0005							<0.0005	<0.0005
1,2,3-Trichloropropane	mg/L	0.0005							<0.0005	<0.0005
1,2-Dibromo-3-chloropropane	mg/L	0.0005							<0.0005	<0.0005
1,2-Dichloroethane	mg/L	0.0005	1.9[#6]			0.03			<0.0005	<0.0005
1,2-Dichloropropane	mg/L	0.0005	0.9[#6]						<0.0005	<0.0005
1,3-Dichloropropane	mg/L	0.0005	1.1[#6]						<0.0005	<0.0005
2,2-Dichloropropane	mg/L	0.0005							<0.0005	<0.0005
Bromochloromethane	mg/L	0.0005							<0.0005	<0.0005
Bromodichloromethane	mg/L	0.0005							<0.0005	<0.0005
Bromoform	mg/L	0.0005							<0.0005	<0.0005
Carbon tetrachloride	mg/L	0.0005	0.24[#6]			0.03			<0.0005	<0.0005
Chloroethane	mg/L	0.005							<0.005	<0.005
Chloroform	mg/L	0.0005	0.37[#6]						<0.0005	<0.0005
Chloromethane	mg/L	0.005							<0.005	<0.005
cis-1,2-dichloroethene	mg/L	0.0005							<0.0005	<0.0005
cis-1,3-dichloropropene	mg/L	0.0005							<0.0005	<0.0005
Dibromomethane	mg/L	0.0005							<0.0005	<0.0005
Dichloromethane	mg/L	0.005	4[#6]			0.04			<0.005	<0.005
Hexachlorobutadiene	mg/L	0.0005	0.00004[#11]			0.007			<0.0005	<0.0005
Hexachlorocyclopentadiene	mg/L	0.002	0.00005[#6]						<0.002	<0.002
Hexachloroethane	mg/L	0.0005	0.29[#12]						<0.0005	<0.0005
Tetrachloroethene (PCE)	mg/L	0.0005	0.07[#6]			0.5			<0.0005	<0.0005
Trichloroethene (TCE)	mg/L	0.0005	0.33[#6]						<0.0005	<0.0005
trans-1,2-dichloroethene	mg/L	0.0005							<0.0005	<0.0005
trans-1,3-dichloropropene	mg/L	0.0005							<0.0005	<0.0005
Vinyl chloride	mg/L	0.0003	0.1[#6]			0.003			<0.0003	<0.0003
Explosives										
1,3-Dinitrobenzene	mg/L	0.001	0.013[#6]						<0.001	<0.001
2,4-Dinitrotoluene	mg/L	0.001	0.016[#10]						<0.001	<0.001
2,6-Dinitrotoluene	mg/L	0.001	0.0003[#6]						<0.001	<0.001
Nitrobenzene	mg/L	0.001	0.55						<0.001	<0.001
Halogenated Benzenes										
1,2,3,4-tetrachlorobenzene	mg/L	0.0005	0.002[#6]						<0.0005	<0.0005
1,2,3,5 & 1,2,4,5 Tetrachlorobenzene	mg/L	0.001							<0.001	<0.001
1,2,3-Trichlorobenzene	mg/L	0.0005	0.003[#12]						<0.0005	<0.0005
1,2,4-Trichlorobenzene	mg/L	0.0005	0.085[#12]						<0.0005	<0.0005
1,2-Dichlorobenzene	mg/L	0.0005	0.16			15			<0.0005	<0.0005
1,3-Dichlorobenzene	mg/L	0.0005	0.26						<0.0005	<0.0005
1,4-Dichlorobenzene	mg/L	0.0003	0.06			0.4			<0.0003	<0.0003
2-Chlorotoluene	mg/L	0.0005							<0.0005	<0.0005
4-Chlorotoluene	mg/L	0.0005							<0.0005	<0.0005
Bromobenzene	mg/L	0.0005							<0.0005	<0.0005
Chlorobenzene	mg/L	0.0005	0.055[#6]			3			<0.0005	<0.0005
Hexachlorobenzene	mg/L	0.0001	0.00005[#6]						<0.0001	<0.0001
Pentachlorobenzene	mg/L	0.0005	0.0015[#6]						<0.0005	<0.0005
Halogenated Hydrocarbons										
1,2-Dibromoethane	mg/L	0.0005				0.01			<0.0005	<0.0005
Bromomethane	mg/L	0.01				0.01			<0.01	<0.01
Dichlorodifluoromethane (Freon 12)	mg/L	0.005							<0.005	<0.005
Iodomethane	mg/L	0.005							<0.005	<0.005
Trichlorofluoromethane (Freon 11)	mg/L	0.001							<0.001	<0.001
Halogenated Phenols										
2346&2356-Tetrachlorophenol	mg/L	0.001							<0.001	<0.001
2,4,5-Trichlorophenol	mg/L	0.0005	0.0005[#6]						<0.0005	<0.0005
2,4,6-Trichlorophenol	mg/L	0.0005	0.003[#12]			0.2			<0.0005	<0.0005
2,4-Dichlorophenol	mg/L	0.0005	0.12[#10]			2			<0.0005	<0.0005
2,6-Dichlorophenol	mg/L	0.0005	0.034[#6]						<0.0005	<0.0005
2-Chlorophenol	mg/L	0.0005	0.34[#10]			3			<0.0005	<0.0005
4-Chloro-3-methylphenol	mg/L	0.002							<0.002	<0.002
Pentachlorophenol	mg/L	0.0005	0.0036[#10]			0.1			<0.0005	<0.0005
Herbicides										
Trifluralin	mg/L	0.0005	0.0026[#12]			0.9			<0.0005	<0.0005
Nitroaromatics										
4-aminobiphenyl	mg/L	0.001							<0.001	<0.001
Pentachloronitrobenzene	mg/L	0.001				0.3			<0.001	<0.001
Organochlorine Pesticides (OCPs)										
a-BHC	mg/L	0.0001							<0.0001	<0.0001
b-BHC	mg/L	0.0001							<0.0001	<0.0001
d-BHC	mg/L	0.0001							<0.0001	<0.0001
g-BHC (Lindane)	mg/L	0.0001	0.0002			0.1			<0.0001	<0.0001
Aldrin	mg/L	0.0001	0.000001[#6]						<0.0001	<0.0001
Chlordane	mg/L	0.0001	0.00003[#12]			0.02			<0.0001	<0.0001
Heptachlor	mg/L	0.0001	0.00001[#12]			0.003			<0.0001	<0.0001
Heptachlor epoxide	mg/L	0.0001							<0.0001	<0.0001
trans-Nonachlor	mg/L	0.0001							<0.0001	<0.0001
DDD	mg/L	0.0001							<0.0001	<0.0001
o,p-DDD	mg/L	0.0001							<0.0001	<0.0001
o,p-DDE	mg/L	0.0001							<0.0001	<0.0001
4,4-DDE	mg/L	0.0001							<0.0001	<0.0001
DDT	mg/L	0.0001	0.000006[#12]			0.09			<0.0001	<0.0001
2,4-DDT	mg/L	0.0001							<0.0001	<0.0001
Dieldrin	mg/L	0.0001	0.00001[#6]						<0.0001	<0.0001

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Table R2 - Summary of Analytical Results for Groundwater Samples (Page 2 of 2)

							Sample Name	884/BH03	884/BH08
							Sample Date	27/07/2015	27/07/2015
Analyte	**Units**	**EQL**	Maintenance of Ecosystems (95% of freshwater species)	Potable Mineral Water Supply	Agricultural Water - Irrigation	Recreation	**Vapour Intrusion HSL D**		
Endosulfan I	mg/L	0.0001	0.0000002[#6]					<0.0001	<0.0001
Endosulfan II	mg/L	0.0001	0.000007[#6]					<0.0001	<0.0001
Endosulfan sulfate	mg/L	0.0001						<0.0001	<0.0001
Endrin	mg/L	0.0001	0.00001[#12]					<0.0001	<0.0001
Endrin aldehyde	mg/L	0.0001						<0.0001	<0.0001
Endrin ketone	mg/L	0.0001						<0.0001	<0.0001
Methoxychlor	mg/L	0.0001	0.000005[#6]			3		<0.0001	<0.0001
Organophosphorous Pesticides (OPPs)									
Azinophos methyl	mg/L	0.0002	0.00001[#10]			0.3		<0.0002	<0.0002
Bromophos-ethyl	mg/L	0.0002				0.1		<0.0002	<0.0002
Carbophenothion	mg/L	0.0005				0.005		<0.0005	<0.0005
Azinphos Ethyl	mg/L	0.0002						<0.0002	<0.0002
Chlorfenvinphos E	mg/L	0.0005						<0.0005	<0.0005
Chlorpyrifos	mg/L	0.0002	0.00000004[#12]			0.1		<0.0002	<0.0002
Chlorpyrifos-methyl	mg/L	0.0005						<0.0005	<0.0005
Coumaphos	mg/L	0.0005						<0.0005	<0.0005
Diazinon	mg/L	0.0005	0.00001			0.04		<0.0005	<0.0005
cis-Chlorfenvinphos	mg/L	0.005						<0.005	<0.005
Dichlorvos	mg/L	0.0005				0.05		<0.0005	<0.0005
Dimethoate	mg/L	0.0005	0.00015			0.07		<0.0005	<0.0005
Disulfoton	mg/L	0.0005				0.04		<0.0005	<0.0005
Ethion	mg/L	0.0002				0.04		<0.0002	<0.0002
Ethoprop	mg/L	0.0005				0.01		<0.0005	<0.0005
Ethyl methanesulfonate	mg/L	0.001						<0.001	<0.001
Fenitrothion	mg/L	0.0002	0.0002			0.07		<0.0002	<0.0002
Fenthion	mg/L	0.0005				0.07		<0.0005	<0.0005
Isosafrole (cis)	mg/L	0.001						<0.001	<0.001
Isosafrole (trans)	mg/L	0.001						<0.001	<0.001
Malathion	mg/L	0.0002	0.00005			0.7		<0.0002	<0.0002
Methidathion	mg/L	0.0005				0.06		<0.0005	<0.0005
Methyl methanesulfonate	mg/L	0.001						<0.001	<0.001
Methyl parathion	mg/L	0.0005				0.007		<0.0005	<0.0005
Mevinphos (Phosdrin)	mg/L	0.001				0.05		<0.001	<0.001
Parathion	mg/L	0.0002	0.000004			0.2		<0.0002	<0.0002
Phorate	mg/L	0.0005						<0.0005	<0.0005
Prothiofos	mg/L	0.0005						<0.0005	<0.0005
Ronnel	mg/L	0.0005						<0.0005	<0.0005
Safrole	mg/L	0.001						<0.001	<0.001
Tetrachlorvinphos	mg/L	0.0005				1		<0.0005	<0.0005
Pesticides									
Carbaryl	mg/L	0.0005				0.3		<0.0005	<0.0005
Carbofuran	mg/L	0.0005	0.00006[#10]			0.1		<0.0005	<0.0005
Demeton-S-methyl	mg/L	0.0005	0.004[#6]					<0.0005	<0.0005
Fenamiphos	mg/L	0.0005				0.005		<0.0005	<0.0005
Famphur	mg/L	0.0005						<0.0005	<0.0005
Isodrin	mg/L	0.0001						<0.0001	<0.0001
Mirex	mg/L	0.0001	0.00004[#6]					<0.0001	<0.0001
Pirimiphos-methyl	mg/L	0.0005				0.9		<0.0005	<0.0005
Pirimphos-ethyl	mg/L	0.0005				0.005		<0.0005	<0.0005
o,o,o-Triethylphosphorothioate	mg/L	0.0005						<0.0005	<0.0005
Profenofos	mg/L	0.0005	0.00002[#7]			0.003		<0.0005	<0.0005
Sulfotepp	mg/L	0.0005						<0.0005	<0.0005
Thionazin	mg/L	0.001						<0.001	<0.001
Phenols									
3/4-Methylphenol (m/p-cresol)	mg/L	0.001						<0.001	<0.001
2,4-Dimethylphenol	mg/L	0.0005	0.002[#6]					<0.0005	<0.0005
2,4-Dinitrophenol	mg/L	0.002	0.045					<0.002	<0.002
2-Chloronaphthalene	mg/L	0.001						<0.001	<0.001
2-Methylphenol	mg/L	0.0005						<0.0005	<0.0005
2-Nitrophenol	mg/L	0.0005	0.002[#6]					<0.0005	<0.0005
3-Methylcholanthrene	mg/L	0.0005						<0.0005	<0.0005
4-Nitrophenol	mg/L	0.001	0.058[#6]					<0.001	<0.001
Acetophenone	mg/L	0.001						<0.001	<0.001
Cresol Total	mg/L	0.0015						<0.0015	<0.0015
Phenol	mg/L	0.0005	0.32					<0.0005	<0.0005
Phthalates									
Bis(2-ethylhexyl) phthalate	mg/L	0.001	0.001[#6]			0.1		<0.001	<0.001
Butyl benzyl phthalate	mg/L	0.001						<0.001	<0.001
Diethylphthalate	mg/L	0.005	0.9[#10]					<0.005	<0.005
Dimethyl phthalate	mg/L	0.001	3.7					<0.001	<0.001
Di-n-butyl phthalate	mg/L	0.01	0.01[#12]					<0.01	<0.01
Polychlorinated Biphenyls (PCBs)									
Aroclor 1016	mg/L	0.001	0.000001[#6]					<0.001	<0.001
Aroclor 1221	mg/L	0.001	0.001[#6]					<0.001	<0.001
Aroclor 1232	mg/L	0.001	0.0003[#6]					<0.001	<0.001
Aroclor 1242	mg/L	0.001	0.0003[#12]					<0.001	<0.001
Aroclor 1248	mg/L	0.001	0.0003[#6]					<0.001	<0.001
Aroclor 1254	mg/L	0.001	0.00001[#12]					<0.001	<0.001
Aroclor 1260	mg/L	0.001	0.025[#6]					<0.001	<0.001
Aroclor 1268	mg/L	0.001	0.05[#6]					<0.001	<0.001
Aroclor 1262	mg/L	0.001	0.05[#6]					<0.001	<0.001
PCB 101	mg/L	0.0001	0.0002[#6]					<0.0001	<0.0001
PCB 118	mg/L	0.0001						<0.0001	<0.0001
PCB 138	mg/L	0.0001						<0.0001	<0.0001
PCB 153	mg/L	0.0001						<0.0001	<0.0001
PCB 180	mg/L	0.0001						<0.0001	<0.0001
PCB 28	mg/L	0.0001						<0.0001	<0.0001
PCB 52	mg/L	0.0001						<0.0001	<0.0001
PCBs (Total)	mg/L	0.005						<0.005	<0.005
Solvents									
2-Hexanone (MBK)	mg/L	0.005						<0.005	<0.005
Methyl Ethyl Ketone	mg/L	0.01						<0.01	<0.01
Acetone	mg/L	0.01						<0.01	<0.01
Acrylonitrile	mg/L	0.0005	0.008[#6]					<0.0005	<0.0005
Allyl chloride	mg/L	0.002	0.003[#6]					<0.002	<0.002
Carbon disulfide	mg/L	0.002	0.02[#6]					<0.002	<0.002
Di(2-ethylhexyl)adipate	mg/L	0.001						<0.001	<0.001
Isophorone	mg/L	0.001	0.12[#6]					<0.001	<0.001
Methyl tert-butyl ether	mg/L	0.002						<0.002	<0.002
MIBK (4-methyl-2-pentanone)	mg/L	0.005						<0.005	<0.005
Vinyl acetate	mg/L	0.01						<0.01	<0.01
Semi Volatile Organic Compounds (SVOCs)									
1,4-Naphthoquinone	mg/L	0.001						<0.001	<0.001
2-(Acetylamino) fluorene	mg/L	0.0005						<0.0005	<0.0005
4-(Dimethylamino) azobenzene	mg/L	0.001						<0.001	<0.001
4-bromophenyl phenyl ether	mg/L	0.001						<0.001	<0.001
4-chlorophenyl phenyl ether	mg/L	0.001						<0.001	<0.001
Benzyl alcohol	mg/L	0.001						<0.001	<0.001
Bis(2-chloroethoxy) methane	mg/L	0.001						<0.001	<0.001
Bis(2-chloroethyl)ether	mg/L	0.001						<0.001	<0.001
Bis(2-chloroisopropyl) ether	mg/L	0.001						<0.001	<0.001
Dibenzofuran	mg/L	0.001						<0.001	<0.001
EPN	mg/L	0.0005						<0.0005	<0.0005
Hexachloropropene	mg/L	0.0005						<0.0005	<0.0005
N-nitrosomorpholine	mg/L	0.001						<0.001	<0.001
N-nitrosopiperidine	mg/L	0.001						<0.001	<0.001
N-nitrosopyrrolidine	mg/L	0.001						<0.001	<0.001
Phenacetin	mg/L	0.001						<0.001	<0.001
Volatile Organic Compounds (VOCs)									
2-Nitropropane	mg/L	0.1						<0.1	<0.1
cis-1,4-Dichloro-2-butene	mg/L	0.001						<0.001	<0.001
trans-1,4-Dichloro-2-butene	mg/L	0.001						<0.001	<0.001
Pentachloroethane	mg/L	0.0005	0.08[#6]					<0.0005	<0.0005
Trihalomethanes	mg/L	0.0005				2.5		<0.0005	<0.0005
Miscellaneous									
Electrical Conductivity (EC - Field)	µS/cm							17,630	18.72
Redox (Field)	mV							25.4	51.7
pH (Field)	pH_Units		9.5-8[#13]			6-8.5|6-8.5|6-8.5 5-8.5|6.5-8.5|6.5-8.5		6.16	5.86
Dissolved Oxygen	ppm							0.65	0.51
Temp	oC							16.9	18.5

Comments

ND = No individual species was detected.

Unless otherwise specified, the adopted criteria for drinking water are from NHMRC (2011), those for primary contact recreation are from NHMRC (2008) and those for other environmental values are from ANZECC 2000.

Criteria for the protection of aquatic ecosystems were selected to be protective of 90% of species in fresh waters.

#1:Trigger value for arsenic (V).

#2:99% species protection trigger value adopted as recommended by ANZECC 2000.

#3:Trigger value for chromium(VI).

#4:Bioaccumulating chemical (99% species protection was adopted).Trigger value for mercury (inorganic).

#5:Low reliability trigger value adopted in the absence of a high reliability one.

#6:Low reliability trigger value adopted in the absence of a high reliability one. Bioaccumulating chemical (99% species protection was adopted).

#8:Trigger value for m-xylene.

#9:99% species protection trigger value adopted as recommended by ANZECC 2000.

#10:Environmental Concern Level adopted as a low reliability trigger value.

#11:Bioaccumulating chemical (99% species protection was adopted).

#12:Trigger value for lowland rivers in south-east Australia.

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Table R3 - Results of Quality Control - Split/Blind Replicate Samples (Page 1 of 1)

			Sample Type	Primary Sample	Blind Replicate		Primary Sample	Split Duplicate	
			Sample Number	884/BH06A	884/DUP03	RPD	884/BH06A	884/BH06A	RPD
			Sample Date	27/07/2015	27/07/2015		27/07/2015	27/07/2015	
Analyte	**Units**	**EQL**							
Metals									
Arsenic	mg/kg	3		4.0	3.0	29	4.0		
Cadmium	mg/kg	0.3		1.0	0.8	22	1.0		
Chromium (Tota	mg/kg	0.3		17.0	22.0	26	17.0		
Copper	mg/kg	0.5		91.0	82.0	10	91.0		
Lead	mg/kg	1		44.0	37.0	17	44.0		
Mercury	mg/kg	0.01		**0.16**	**0.11**	**37**	0.16		
Nickel	mg/kg	0.5		79.0	85.0	7	79.0		
Zinc	mg/kg	0.5		120.0	110.0	9	120.0		
Total Recoverable Hydrocarbons (TRHs)									
C6-C10 (F1)	mg/kg	25 (Primary): 10 (Interlab)		<25.0	<25.0	0	<25.0	<10.0	0
C10-C16 (F2)	mg/kg	25 (Primary): 50 (Interlab)		<25.0	<25.0	0	<25.0	<50.0	0
C16-C34 (F3)	mg/kg	90 (Primary): 100 (Interlab)		<90.0	<90.0	0	<90.0	<100.0	0
C34-C40 (F4)	mg/kg	120 (Primary): 100 (Interlab)		<120.0	<120.0	0	<120.0	<100.0	0
F1 minus BTEX	mg/kg	25 (Primary): 10 (Interlab)		<25.0	<25.0	0	<25.0	<10.0	0
F2 minus Naphtl	mg/kg	25 (Primary): 50 (Interlab)		<25.0	<25.0	0	<25.0	<50.0	0
C6-C9	mg/kg	20 (Primary): 10 (Interlab)		<20.0	<20.0	0	<20.0	<10.0	0
C10-C14	mg/kg	20 (Primary): 50 (Interlab)		<20.0	<20.0	0	<20.0	<50.0	0
C15-C28	mg/kg	45 (Primary): 100 (Interlab)		<45.0	<45.0	0	<45.0	<100.0	0
C29-C36	mg/kg	45 (Primary): 100 (Interlab)		<45.0	<45.0	0	<45.0	<100.0	0
C37-C40	mg/kg	100		<100.0	<100.0	0	<100.0		
C10-36 (Total)	mg/kg	110 (Primary): 50 (Interlab)		<110.0	<110.0	0	<110.0	<50.0	0
C10-C40 (Total)	mg/kg	210 (Primary): 50 (Interlab)		<210.0	<210.0	0	<210.0	<50.0	0
Polycyclic Aromatic Hydrocarbons (PAHs)									
1-Methylnaphtha	mg/kg	0.1		<0.1	<0.1	0	<0.1		
2-Methylnaphtha	mg/kg	0.1		<0.1	<0.1	0	<0.1		
Acenaphthene	mg/kg	0.1 (Primary): 0.5 (Interlab)		<0.1	<0.1	0	<0.1	<0.5	0
Acenaphthylene	mg/kg	0.1 (Primary): 0.5 (Interlab)		<0.1	<0.1	0	<0.1	<0.5	0
Naphthalene	mg/kg	0.1 (Primary): 1 (Interlab)		<0.1	<0.1	0	<0.1	<0.5	0
Naphthalene	mg/kg	0.1 (Primary): 1 (Interlab)		<0.1	<0.1	0	<0.1	<0.5	0
Fluorene	mg/kg	0.1 (Primary): 0.5 (Interlab)		<0.1	<0.1	0	<0.1	<0.5	0
Anthracene	mg/kg	0.1 (Primary): 0.5 (Interlab)		<0.1	<0.1	0	<0.1	<0.5	0
Fluoranthene	mg/kg	0.1 (Primary): 0.5 (Interlab)		0.4	0.3	29	0.4	<0.5	0
Phenanthrene	mg/kg	0.1 (Primary): 0.5 (Interlab)		**0.2**	**0.1**	**67**	0.2	<0.5	0
Benz(a)anthrace	mg/kg	0.1 (Primary): 0.5 (Interlab)		0.2	0.2	0	0.2	<0.5	0
Chrysene	mg/kg	0.1 (Primary): 0.5 (Interlab)		0.2	0.2	0	0.2	<0.5	0
Pyrene	mg/kg	0.1 (Primary): 0.5 (Interlab)		0.4	0.3	29	0.4	<0.5	0
Benzo(k)fluoran	mg/kg	0.1 (Primary): 0.5 (Interlab)		0.1	<0.1	0	0.1	<0.5	0
Benzo(b+j)fluora	mg/kg	0.1 (Primary): 0.5 (Interlab)		0.2	0.2	0	0.2	<0.5	0
Benzo(a)pyrene	mg/kg	0.1 (Primary): 0.5 (Interlab)		**0.2**	**0.1**	**67**	0.2	<0.5	0
Dibenz(a,h)anth	mg/kg	0.1 (Primary): 0.5 (Interlab)		<0.1	<0.1	0	<0.1	<0.5	0
Benzo(g,h,i)pery	mg/kg	0.1 (Primary): 0.5 (Interlab)		**0.2**	**0.1**	**67**	0.2	<0.5	0
Indeno(1,2,3-c,d	mg/kg	0.1 (Primary): 0.5 (Interlab)		**0.2**	**0.1**	**67**	0.2	<0.5	0
Carcinogenic PA	mg/kg	0.2 TEQ (mg/kg)(Primary): 0.5 (Interlab)		**0.3**	**<0.2**	**40**	**0.3**	**1.2**	**120**
Carcinogenic PA	mg/kg	0.2 (Primary): 0.5 (Interlab)		**0.3**	**<0.2**	**40**	0.3	<0.5	0
PAHs (Total)	mg/kg	0.8 (Primary): 0.5 (Interlab)		**2.5**	**1.8**	**33**	**2.5**	**<0.5**	**133**
Monocyclic Aromatic Hydrocarbons (MAHs)									
Benzene	mg/kg	0.1 (Primary): 0.2 (Interlab)		<0.1	<0.1	0	<0.1	<0.2	0
Benzene	mg/kg	0.1 (Primary): 0.2 (Interlab)		<0.1	<0.1	0	<0.1	<0.2	0
Ethylbenzene	mg/kg	0.1 (Primary): 0.5 (Interlab)		<0.1	<0.1	0	<0.1	<0.5	0
Toluene	mg/kg	0.1 (Primary): 0.5 (Interlab)		<0.1	<0.1	0	<0.1	<0.5	0
Xylene (o)	mg/kg	0.1 (Primary): 0.5 (Interlab)		<0.1	<0.1	0	<0.1	<0.5	0
Xylene (m & p)	mg/kg	0.2 (Primary): 0.5 (Interlab)		<0.2	<0.2	0	<0.2	<0.5	0
Xylene Total	mg/kg	0.3 (Primary): 0.5 (Interlab)		<0.3	<0.3	0	<0.3	<0.5	0
Total BTEX	mg/kg	0.6 (Primary): 0.2 (Interlab)		<0.6	<0.6	0	<0.6	<0.2	0
Miscellaneous									
% Moisture	%	0.5		12.0	12.0	0	12.0		

Bold RPDs exceed the ASC NEPM 1999 (as amended 2013) assessment criterion of 30%.
RPDs shaded in grey exceed the adopted acceptance criteria of 50% for inorganic compounds and 70% for organic compounds.
*RPDs have only been considered where a concentration is greater than 1 times the EQL.
**Interlab Duplicates are matched on a per compound basis as methods vary between laboratories. Any methods in the row header relate to those used in the prima

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Table R4 - Results of Quality Control - Split/Blind Replicate Samples (Page 1 of 1)

		Sample Type	Primary Sample	Blind Replicate		Primary Sample	Split Duplicate	
		Sample Number	884/BH03	884/QC01	RPD	884/BH03	884/BH03	RPD
		Sample Date	27/07/2015	27/07/2015		27/07/2015	27/07/2015	
Analyte	**Units**	**EQL**						
Metals								
Arsenic (Filtered)	mg/l	0.001	<0.001	<0.001	0	<0.001	<0.001	0
Cadmium (Filtered)	mg/l	0.0001	<0.0001	<0.0001	0	<0.0001	<0.0001	0
Chromium (Total) (Filtered)	mg/l	0.001	<0.001	<0.001	0	<0.001	<0.001	0
Copper (Filtered)	mg/l	0.001	<0.001	<0.001	0	<0.001	<0.001	0
Lead (Filtered)	mg/l	0.001	<0.001	<0.001	0	<0.001	<0.001	0
Mercury (Filtered)	mg/l	0.0001	<0.0001	<0.0001	0	<0.0001	<0.0001	0
Nickel (Filtered)	mg/l	0.001	0.061	0.056	9	0.061	0.055	10
Zinc (Filtered)	mg/l	0.005	0.018	0.018	0	**0.018**	**0.011**	**48**
Total Recoverable Hydrocarbons (TRHs)								
C6-C10 (F1)	mg/l	0.05 (Primary): 0.02 (Inte	<0.05	<0.05	0	<0.05	<0.02	0
C10-C16 (F2)	mg/l	0.06 (Primary): 0.1 (Inter	<0.06	<0.06	0	<0.06	<0.1	0
C16-C34 (F3)	mg/l	0.5 (Primary): 0.1 (Interla	<0.5	<0.5	0	<0.5	<0.1	0
C34-C40 (F4)	mg/l	0.5 (Primary): 0.1 (Interla	<0.5	<0.5	0	<0.5	<0.1	0
F1 minus BTEX (C6-C10)	mg/l	0.05 (Primary): 0.02 (Inte	<0.05	<0.05	0	<0.05	<0.02	0
C6-C9	mg/l	0.04 (Primary): 0.02 (Inte	<0.04	<0.04	0	<0.04	<0.02	0
C10-C14	mg/l	0.05	<0.05	<0.05	0	<0.05	<0.05	0
C15-C28	mg/l	0.2 (Primary): 0.1 (Interla	<0.2	<0.2	0	<0.2	<0.1	0
C29-C36	mg/l	0.2 (Primary): 0.05 (Inter	<0.2	<0.2	0	<0.2	<0.05	0
C37-C40	mg/l	0.2	<0.2	<0.2	0	<0.2		
C10-36 (Total)	mg/l	0.45 (Primary): 0.05 (Inte	<0.45	<0.45	0	<0.45	<0.05	0
C10-C40 (Total)	mg/l	0.65 (Primary): 0.1 (Inter	<0.65	<0.65	0	<0.65	<0.1	0
Polycyclic Aromatic Hydrocarbons (PAHs)								
1-Methylnaphthalene	mg/l	0.0001	<0.0001	<0.0001	0	<0.0001		
2-Methylnaphthalene	mg/l	0.0001	<0.0001	<0.0001	0	<0.0001		
Acenaphthene	mg/l	0.0001 (Primary): 0.001	<0.0001			<0.0001	<0.001	0
Acenaphthene	mg/l	0.0001 (Primary): 0.001	<0.0001	<0.0001	0	<0.0001	<0.001	0
Acenaphthylene	mg/l	0.0001 (Primary): 0.001	<0.0001			<0.0001	<0.001	0
Acenaphthylene	mg/l	0.0001 (Primary): 0.001	<0.0001	<0.0001	0	<0.0001	<0.001	0
Naphthalene	mg/l	0.0005 (Primary): 0.005	<0.0005	<0.0005	0	<0.0005	<0.001	0
Naphthalene	mg/l	0.0001 (Primary): 0.005	<0.0001	<0.0001	0	<0.0001	<0.001	0
Naphthalene	mg/l	0.0001 (Primary): 0.005	<0.0001			<0.0001	<0.001	0
Fluorene	mg/l	0.0001 (Primary): 0.001	<0.0001			<0.0001	<0.001	0
Fluorene	mg/l	0.0001 (Primary): 0.001	<0.0001	<0.0001	0	<0.0001	<0.001	0
Anthracene	mg/l	0.0001 (Primary): 0.001	<0.0001			<0.0001	<0.001	0
Anthracene	mg/l	0.0001 (Primary): 0.001	<0.0001	<0.0001	0	<0.0001	<0.001	0
Fluoranthene	mg/l	0.0001 (Primary): 0.001	<0.0001			<0.0001	<0.001	0
Fluoranthene	mg/l	0.0001 (Primary): 0.001	<0.0001	<0.0001	0	<0.0001	<0.001	0
Phenanthrene	mg/l	0.0001 (Primary): 0.001	<0.0001			<0.0001	<0.001	0
Phenanthrene	mg/l	0.0001 (Primary): 0.001	<0.0001	<0.0001	0	<0.0001	<0.001	0
Benz(a)anthracene	mg/l	0.0001 (Primary): 0.001	<0.0001			<0.0001	<0.001	0
Benz(a)anthracene	mg/l	0.0001 (Primary): 0.001	<0.0001	<0.0001	0	<0.0001	<0.001	0
Chrysene	mg/l	0.0001 (Primary): 0.001	<0.0001	<0.0001	0	<0.0001	<0.001	0
Chrysene	mg/l	0.0001 (Primary): 0.001	<0.0001			<0.0001	<0.001	0
Pyrene	mg/l	0.0001 (Primary): 0.001	<0.0001			<0.0001	<0.001	0
Pyrene	mg/l	0.0001 (Primary): 0.001	<0.0001	<0.0001	0	<0.0001	<0.001	0
Benzo(k)fluoranthene	mg/l	0.0001 (Primary): 0.001	<0.0001			<0.0001	<0.001	0
Benzo(k)fluoranthene	mg/l	0.0001 (Primary): 0.001	<0.0001	<0.0001	0	<0.0001	<0.001	0
Benzo(b+j)fluoranthene	mg/l	0.0001 (Primary): 0.001	<0.0001			<0.0001	<0.001	0
Benzo(b+j)fluoranthene	mg/l	0.0001 (Primary): 0.001	<0.0001	<0.0001	0	<0.0001	<0.001	0
Benzo(a)pyrene	mg/l	0.0001 (Primary): 0.0005	<0.0001			<0.0001	<0.0005	0
Benzo(a)pyrene	mg/l	0.0001 (Primary): 0.0005	<0.0001	<0.0001	0	<0.0001	<0.0005	0
Dibenz(a,h)anthracene	mg/l	0.0001 (Primary): 0.001	<0.0001			<0.0001	<0.001	0
Dibenz(a,h)anthracene	mg/l	0.0001 (Primary): 0.001	<0.0001	<0.0001	0	<0.0001	<0.001	0
Benzo(g,h,i)perylene	mg/l	0.0001 (Primary): 0.001	<0.0001			<0.0001	<0.001	0
Benzo(g,h,i)perylene	mg/l	0.0001 (Primary): 0.001	<0.0001	<0.0001	0	<0.0001	<0.001	0
Indeno(1,2,3-c,d)pyrene	mg/l	0.0001 (Primary): 0.001	<0.0001			<0.0001	<0.001	0
Indeno(1,2,3-c,d)pyrene	mg/l	0.0001 (Primary): 0.001	<0.0001	<0.0001	0	<0.0001	<0.001	0
PAHs (Total)	mg/l	0.001 (Primary): 0.0005	<0.001	<0.001	0	<0.001	<0.0005	0
Monocyclic Aromatic Hydrocarbons (MAHs)								
Benzene	mg/l	0.0005 (Primary): 0.001	<0.0005	<0.0005	0	<0.0005	<0.001	0
Benzene	mg/l	0.0005 (Primary): 0.001	<0.0005	<0.0005	0	<0.0005	<0.001	0
Ethylbenzene	mg/l	0.0005 (Primary): 0.002	<0.0005	<0.0005	0	<0.0005	<0.002	0
Toluene	mg/l	0.0005 (Primary): 0.002	<0.0005	<0.0005	0	<0.0005	<0.002	0
Xylene (o)	mg/l	0.0005 (Primary): 0.002	<0.0005	<0.0005	0	<0.0005	<0.002	0
Xylene (m & p)	mg/l	0.001 (Primary): 0.002 (I	<0.001	<0.001	0	<0.001	<0.002	0
Xylene Total	mg/l	0.0015 (Primary): 0.002	<0.0015	<0.0015	0	<0.0015	<0.002	0
Total BTEX	mg/l	0.003 (Primary): 0.001 (I	<0.003	<0.003	0	<0.003	<0.001	0
Halogenated Benzenes								
Hexachlorobenzene	mg/l	0.0001	<0.0001	<0.0001	0	<0.0001		
Organochlorine Pesticides (OCPs)								
a-BHC	mg/l	0.0001	<0.0001	<0.0001	0	<0.0001		
b-BHC	mg/l	0.0001	<0.0001	<0.0001	0	<0.0001		
d-BHC	mg/l	0.0001	<0.0001	<0.0001	0	<0.0001		
g-BHC (Lindane)	mg/l	0.0001	<0.0001	<0.0001	0	<0.0001		
Aldrin	mg/l	0.0001	<0.0001	<0.0001	0	<0.0001		
Chlordane	mg/l	0.0001	<0.0001	<0.0001	0	<0.0001		
Heptachlor	mg/l	0.0001	<0.0001	<0.0001	0	<0.0001		
Heptachlor epoxide	mg/l	0.0001	<0.0001	<0.0001	0	<0.0001		
trans-Nonachlor	mg/l	0.0001	<0.0001	<0.0001	0	<0.0001		
DDD	mg/l	0.0001	<0.0001	<0.0001	0	<0.0001		
o,p-DDD	mg/l	0.0001	<0.0001	<0.0001	0	<0.0001		
o,p-DDE	mg/l	0.0001	<0.0001	<0.0001	0	<0.0001		
4,4-DDE	mg/l	0.0001	<0.0001	<0.0001	0	<0.0001		
DDT	mg/l	0.0001	<0.0001	<0.0001	0	<0.0001		
2,4-DDT	mg/l	0.0001	<0.0001	<0.0001	0	<0.0001		
Dieldrin	mg/l	0.0001	<0.0001	<0.0001	0	<0.0001		
Endosulfan I	mg/l	0.0001	<0.0001	<0.0001	0	<0.0001		
Endosulfan II	mg/l	0.0001	<0.0001	<0.0001	0	<0.0001		
Endosulfan sulfate	mg/l	0.0001	<0.0001	<0.0001	0	<0.0001		
Endrin	mg/l	0.0001	<0.0001	<0.0001	0	<0.0001		
Endrin aldehyde	mg/l	0.0001	<0.0001	<0.0001	0	<0.0001		
Endrin ketone	mg/l	0.0001	<0.0001	<0.0001	0	<0.0001		
Methoxychlor	mg/l	0.0001	<0.0001	<0.0001	0	<0.0001		
Organophosphorous Pesticides (OPPs)								
Azinophos methyl	mg/l	0.0002	<0.0002	<0.0002	0	<0.0002		
Bromophos-ethyl	mg/l	0.0002	<0.0002	<0.0002	0	<0.0002		
Chlorpyrifos	mg/l	0.0002	<0.0002	<0.0002	0	<0.0002		
Diazinon	mg/l	0.0005	<0.0005	<0.0005	0	<0.0005		
Dichlorvos	mg/l	0.0005	<0.0005	<0.0005	0	<0.0005		
Dimethoate	mg/l	0.0005	<0.0005	<0.0005	0	<0.0005		
Ethion	mg/l	0.0002	<0.0002	<0.0002	0	<0.0002		
Fenitrothion	mg/l	0.0002	<0.0002	<0.0002	0	<0.0002		
Malathion	mg/l	0.0002	<0.0002	<0.0002	0	<0.0002		
Methidathion	mg/l	0.0005	<0.0005	<0.0005	0	<0.0005		
Parathion	mg/l	0.0002	<0.0002	<0.0002	0	<0.0002		
Pesticides								
Isodrin	mg/l	0.0001	<0.0001	<0.0001	0	<0.0001		
Mirex	mg/l	0.0001	<0.0001	<0.0001	0	<0.0001		
Polychlorinated Biphenyls (PCBs)								
Aroclor 1016	mg/l	0.001	<0.001	<0.001	0	<0.001		
Aroclor 1221	mg/l	0.001	<0.001	<0.001	0	<0.001		
Aroclor 1232	mg/l	0.001	<0.001	<0.001	0	<0.001		
Aroclor 1242	mg/l	0.001	<0.001	<0.001	0	<0.001		
Aroclor 1248	mg/l	0.001	<0.001	<0.001	0	<0.001		
Aroclor 1254	mg/l	0.001	<0.001	<0.001	0	<0.001		
Aroclor 1260	mg/l	0.001	<0.001	<0.001	0	<0.001		
Aroclor 1268	mg/l	0.001	<0.001	<0.001	0	<0.001		
Aroclor 1262	mg/l	0.001	<0.001	<0.001	0	<0.001		
PCBs (Total)	mg/l	0.005	<0.005	<0.005	0	<0.005		

RPDs shaded in grey exceed the adopted acceptance criteria of 50% for inorganic compounds and 70% for organic compounds.
*RPDs have only been considered where a concentration is greater than 1 times the EQL.
**Interlab Duplicates are matched on a per compound basis as methods vary between laboratories. Any methods in the row header relate to those used in the pr

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Table R5 - Results of Quality Control - Rinsate Blank

	Sample Name	RB
	Sample Date	27/07/2015
	Sample Type	Rinsate

Analyte	Units	EQL	
Monocyclic Aromatic Hydrocarbons (MAHs)			
Benzene	mg/kg	0.5	<0.5
Toluene	mg/kg	0.5	<0.5
Ethylbenzene	mg/kg	0.5	<0.5
Xylene (o)	mg/kg	0.5	<0.5
Xylene (m & p)	mg/kg	1	<1
Xylene Total	mg/kg	1.5	<1.5
Sum of BTEX	mg/kg	3	<3
Napthalene	mg/kg	0.5	<0.5

Bold values exceed the estimated quantitation limit (EQL) of the analytical procedure.

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Table R6 - Results of Quality Control - Trip Blank and Trip Spike

	Sample Name	TB	TS
	Sample Date	27/07/2015	27/07/2015
	Sample Type	Trip Blank	Trip Spike

Analyte	Units	EQL		
Monocyclic Aromatic Hydrocarbons (MAHs)				
Benzene	mg/kg	0.1	<0.1	95%
Toluene	mg/kg	0.1	<0.1	81%
Ethylbenzene	mg/kg	0.1	<0.1	82%
Xylene (o)	mg/kg	0.1	<0.1	81%
Xylene (m & p)	mg/kg	0.2	<0.2	80%
Xylene Total	mg/kg	0.3	<0.3	-
Sum of BTEX	mg/kg	0.6	<0.6	-
Napthalene	mg/kg	0.1	<0.1	<0.1

Bold values exceed the estimated quantitation limit (EQL) of the analytical procedure.

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Appendix A

Site Photographs

Plate 1: View of the former printing press room

Plate 2: View of the external loading bay with concrete hardstand

Plate 3: View of the fire water tank and diesel pump room

Plate 4: View of diesel pump room with staining on external wall

Plate 5: Typical core return from Geoprobe drill rig

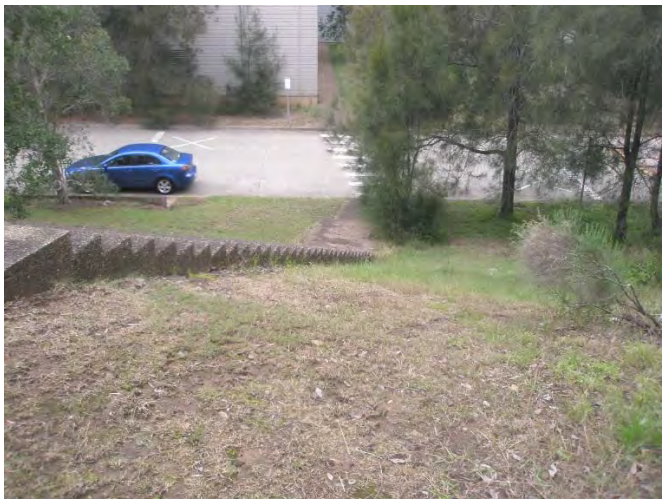


Plate 6: Embankment at the western side of the site (indicates degree of soil cut

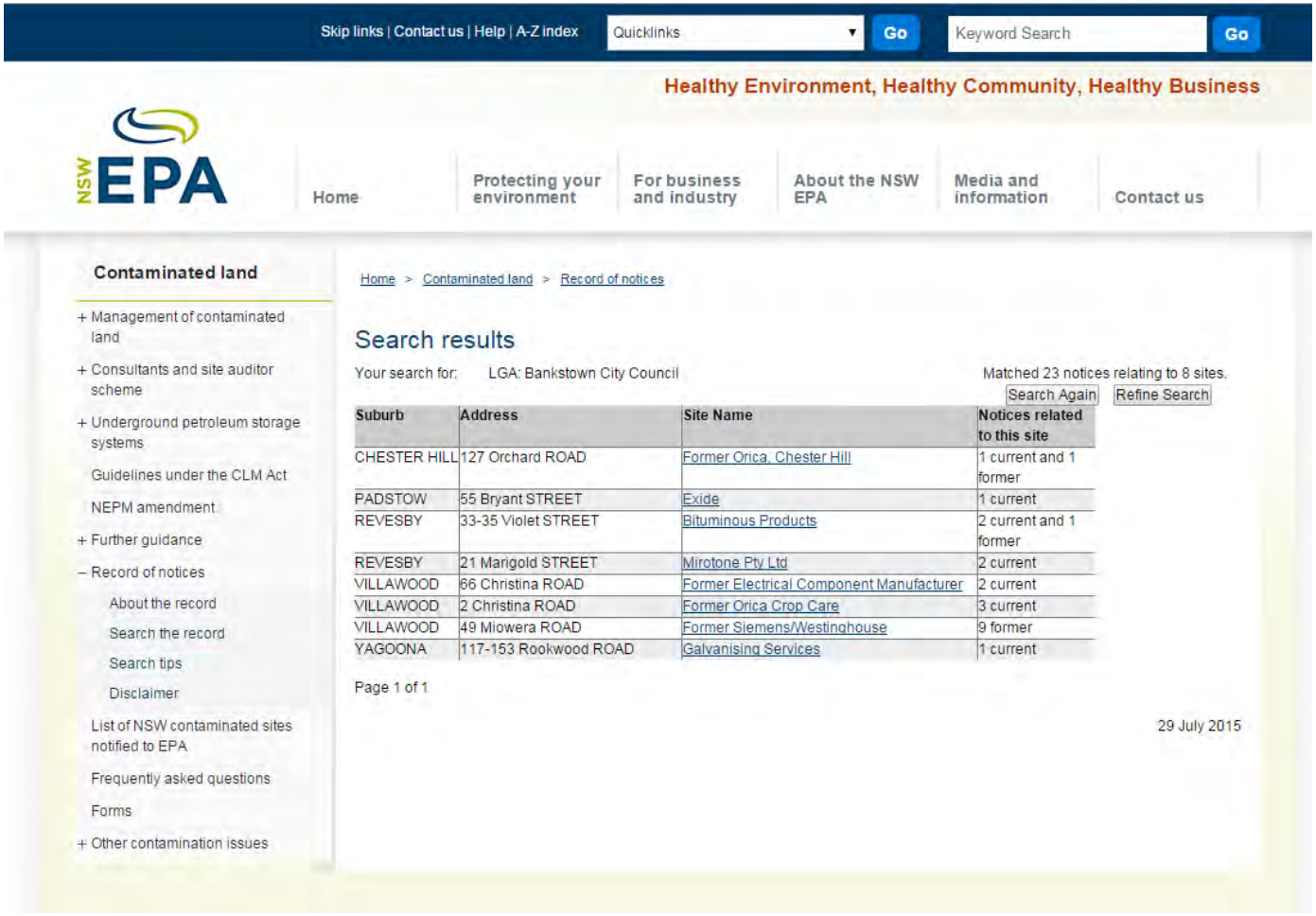
Appendix B

Site History Documentation

2920	BLUESCOPE STEEL LIMITED	73 ANZAC STREET, CHULLORA, NSW 2190	POEO licence	No longer in force	17-Apr-01
1044259	BLUESCOPE STEEL LIMITED	73 ANZAC STREET, CHULLORA, NSW 2190	s.58 Licence Variation	Issued	6-Feb-05
703	BORAL RESOURCES (NSW) PTY LTD	1-5 NORFOLK RD, CHULLORA, NSW 2190	POEO licence	No longer in force	22-Aug-00
5233	FAIRFAX PRINTERS PTY LIMITED	1 WORTH STREET , CHULLORA, NSW 2190	POEO licence	Surrendered	17-Apr-01
1044102	FAIRFAX PRINTERS PTY LIMITED	1 WORTH STREET , CHULLORA, NSW 2190	s.58 Licence Variation	Issued	31-Jan-05
1096095	FAIRFAX PRINTERS PTY LIMITED	1 WORTH STREET , CHULLORA, NSW 2190	s.58 Licence Variation	Issued	17-Apr-09
1526060	FAIRFAX PRINTERS PTY LIMITED	1 WORTH STREET , CHULLORA, NSW 2190	s.58 Licence Variation	Issued	11-Nov-14
11219	G.P.P. EXCAVATION & DEMOLITION CONTRACTORS PTY LIMITED	2 FORD STREET, CHULLORA, NSW 2190	POEO licence	Issued	8-Sep-00
1034998	G.P.P. EXCAVATION & DEMOLITION CONTRACTORS PTY LIMITED	2 FORD STREET, CHULLORA, NSW 2190	s.58 Licence Variation	Issued	1-Mar-04
1096631	G.P.P. EXCAVATION & DEMOLITION CONTRACTORS PTY LIMITED	2 FORD STREET, CHULLORA, NSW 2190	s.58 Licence Variation	Issued	15-May-09
3923	NATIONWIDE NEWS PTY. LIMITED	26-52 HUME HIGHWAY, CHULLORA, NSW 2190	POEO licence	No longer in force	15-Aug-00
1044247	NATIONWIDE NEWS PTY. LIMITED	26-52 HUME HIGHWAY, CHULLORA, NSW 2190	s.58 Licence Variation	Issued	8-Feb-05
6252	P & M QUALITY SMALLGOODS PTY LTD	18 HUME HIGHWAY, CHULLORA, NSW 2190	POEO licence	Issued	17-Aug-00
1014671	P & M QUALITY SMALLGOODS PTY LTD	18 HUME HIGHWAY, CHULLORA, NSW 2190	s.58 Licence Variation	Issued	26-Feb-02
1528433	P & M QUALITY SMALLGOODS PTY LTD	18 HUME HIGHWAY, CHULLORA, NSW 2190	s.58 Licence Variation	Issued	23-Apr-15
97	RAIL SERVICES AUSTRALIA	WORTH STREET, CHULLORA, NSW 2190	POEO licence	Surrendered	6-Jun-00
5893	SITA AUSTRALIA PTY LTD	MUIR ROAD, CHULLORA, NSW 2190	POEO licence	Issued	23-Jun-00
1017947	SITA AUSTRALIA PTY LTD	MUIR ROAD, CHULLORA, NSW 2190	s.58 Licence Variation	Issued	6-Nov-02
1034139	SITA AUSTRALIA PTY LTD	MUIR ROAD, CHULLORA, NSW 2190	s.58 Licence Variation	Issued	1-Feb-04
1051955	SITA AUSTRALIA PTY LTD	MUIR ROAD, CHULLORA, NSW 2190	s.58 Licence Variation	Issued	24-Oct-05
1053532	SITA AUSTRALIA PTY LTD	MUIR ROAD, CHULLORA, NSW 2190	s.58 Licence Variation	Issued	15-Nov-05
1093223	SITA AUSTRALIA PTY LTD	MUIR ROAD, CHULLORA, NSW 2190	s.58 Licence Variation	Issued	11-Nov-08
1106002	SITA AUSTRALIA PTY LTD	MUIR ROAD, CHULLORA, NSW 2190	s.58 Licence Variation	Issued	19-Nov-09
1501876	SITA AUSTRALIA PTY LTD	MUIR ROAD, CHULLORA, NSW 2190	s.58 Licence Variation	Issued	3-Nov-11
1517417	SITA AUSTRALIA PTY LTD	MUIR ROAD, CHULLORA, NSW 2190	s.58 Licence Variation	Issued	12-Nov-13
7515	SYDNEY TRAINS	WORTH STREET GATE 1, CHULLORA, NSW 2190	POEO licence	Issued	22-Sep-00
1037710	SYDNEY TRAINS	WORTH STREET GATE 1, CHULLORA, NSW 2190	s.58 Licence Variation	Issued	18-Oct-04
1096254	SYDNEY TRAINS	WORTH STREET GATE 1, CHULLORA, NSW 2190	s.58 Licence Variation	Issued	15-Jan-09
1515074	SYDNEY TRAINS	WORTH STREET GATE 1, CHULLORA, NSW 2190	s.58 Licence Variation	Issued	20-Jun-13
3928	TRANSFIELD SERVICES (AUSTRALIA) PTY LIMITED	2 WORTH STREET, CHULLORA, NSW 2190	POEO licence	No longer in force	9-Jun-00
1027008	TRANSFIELD SERVICES (AUSTRALIA) PTY LIMITED	2 WORTH STREET, CHULLORA, NSW 2190	s.58 Licence Variation	Issued	10-Sep-03
1036496	TRANSFIELD SERVICES (AUSTRALIA) PTY LIMITED	2 WORTH STREET, CHULLORA, NSW 2190	s.58 Licence Variation	Issued	1-Jun-04
1057186	TRANSFIELD SERVICES (AUSTRALIA) PTY LIMITED	2 WORTH STREET, CHULLORA, NSW 2190	s.58 Licence Variation	Issued	13-Jul-06
1070042	TRANSFIELD SERVICES (AUSTRALIA) PTY LIMITED	2 WORTH STREET, CHULLORA, NSW 2190	s.58 Licence Variation	Issued	27-Feb-07
11880	UNITED GROUP RAIL FLEET SERVICES LIMITED	2 WORTH STREET, CHULLORA, NSW 2190	POEO licence	No longer in force	18-Feb-04
1041955	UNITED GROUP RAIL FLEET SERVICES LIMITED	2 WORTH STREET, CHULLORA, NSW 2190	s.58 Licence Variation	Issued	13-Jan-05
1050502	UNITED GROUP RAIL FLEET SERVICES LIMITED	2 WORTH STREET, CHULLORA, NSW 2190	s.58 Licence Variation	Issued	28-Feb-07
1076641	UNITED GROUP RAIL FLEET SERVICES LIMITED	2 WORTH STREET, CHULLORA, NSW 2190	s.58 Licence Variation	Issued	13-Aug-07

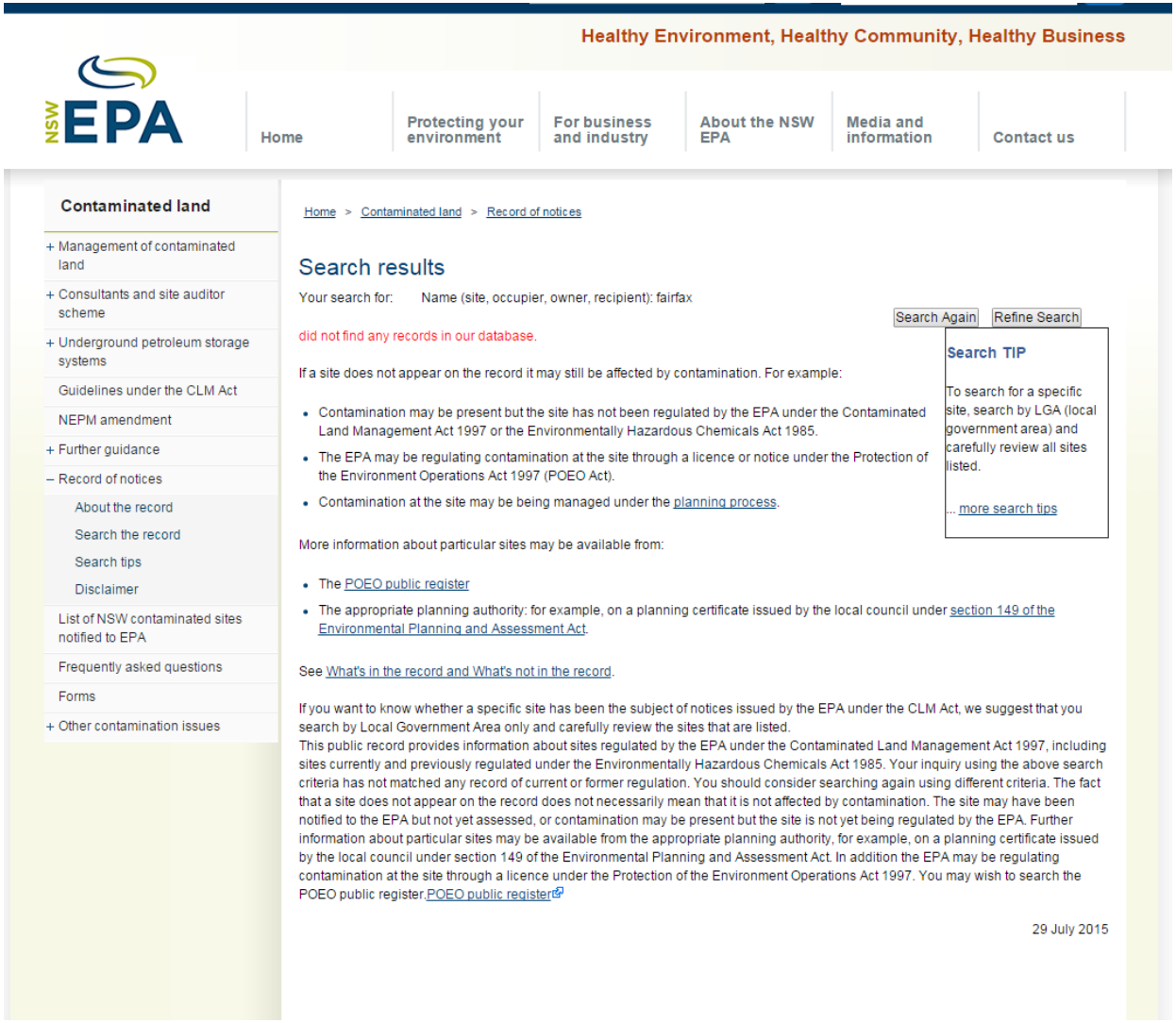
Appendix B – NSW EPA Records – Online Database Searches

NSW EPA Contaminated Land Record of Notices – 29 July 2015



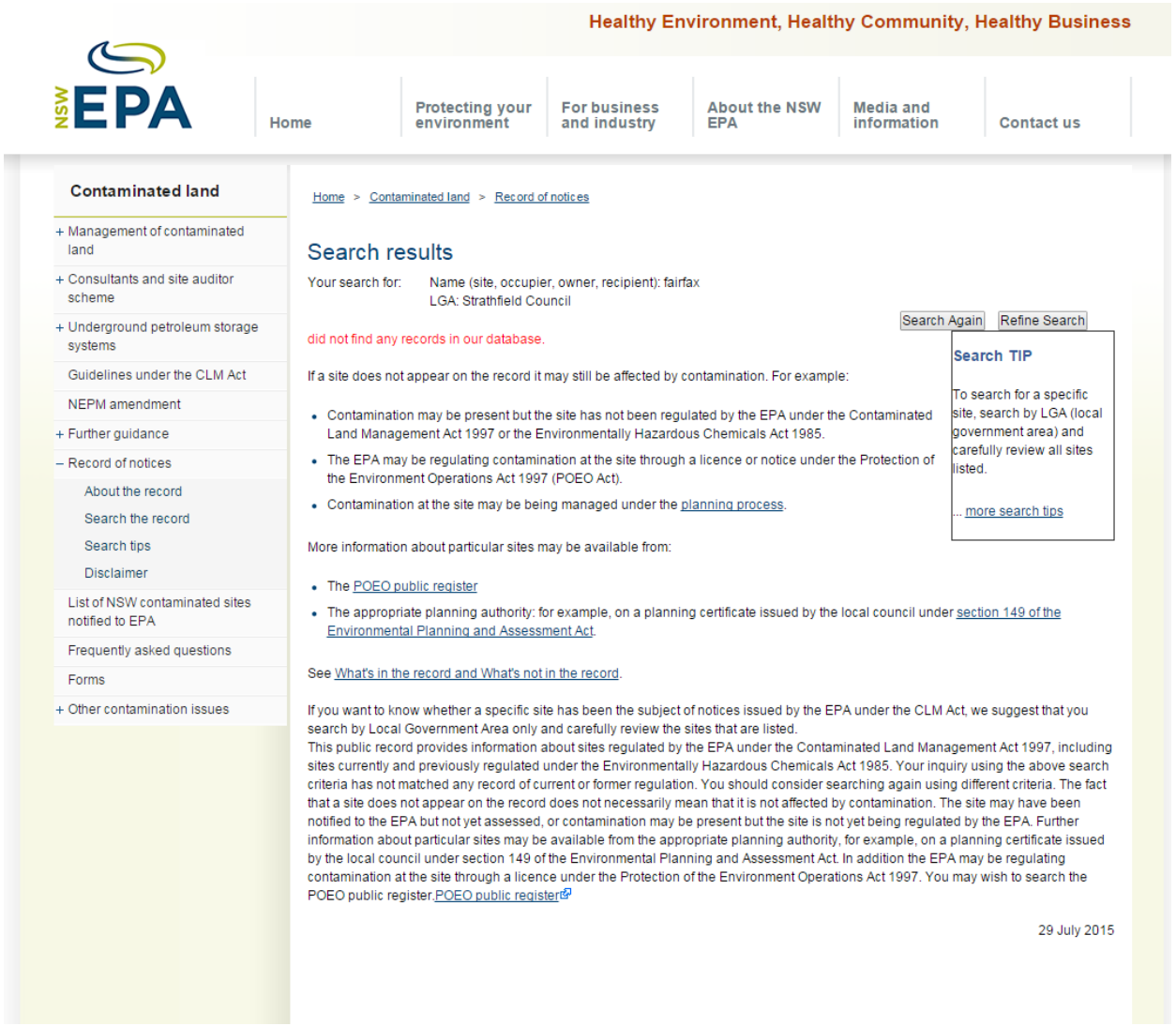
Appendix B – NSW EPA Records – Online Database Searches

NSW EPA Contaminated Land Record of Notices – 29 July 2015



Appendix B – NSW EPA Records – Online Database Searches

NSW EPA Contaminated Land Record of Notices – 29 July 2015



Appendix B – NSW EPA Records – Online Database Searches

http://www.epa.nsw.gov.au/clm/publiclist.htm

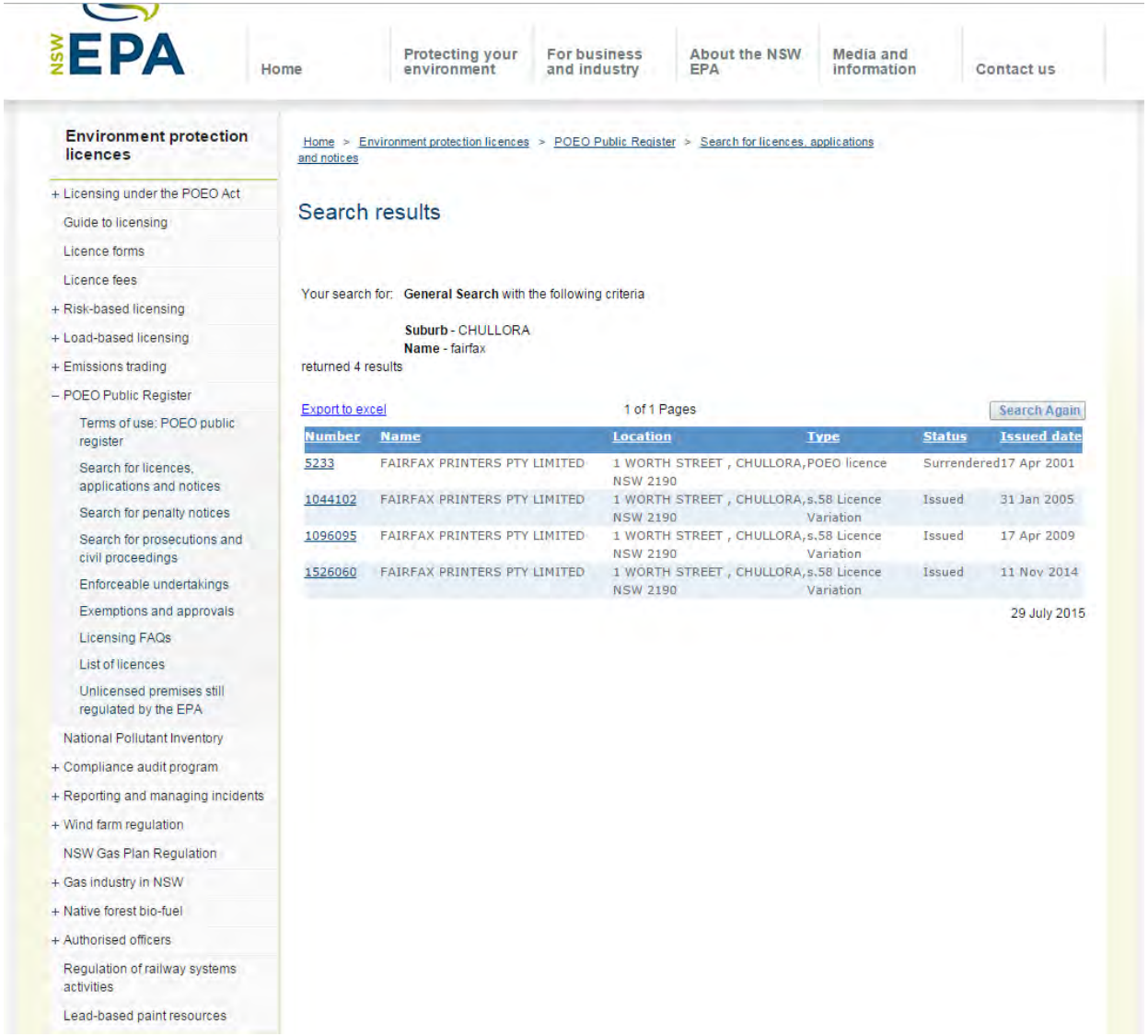
NSW EPA Contaminated Land Records – List of Notices

As of 30 June 2015 there was a notice for the Chullora Railway Workshops, Worth Street (Opposite to the Site). The information on the NSW EPA database indicated that the site was 'Under Assessment'.

This means "*The contamination is being assessed by the EPA to determine whether regulation is required. The EPA may require further information to complete the assessment. For example, the completion of management actions regulated under the planning process or Protection of the Environment Operations Act 1997. Alternatively, the EPA may require information via a notice issued under s77 of the Contaminated Land Management Act 1997 or issue a Preliminary Investigation Order*". No other information available except to state the above.

Appendix B – NSW EPA Records – Online Database Searches

NSW EPA – POEO Act Register – 29 July 2015 for Fairfax Printers, Chullora, NSW.



NSW EPA

Home | Protecting your environment | For business and industry | About the NSW EPA | Media and information | Contact us

Environment protection licences

- + Licensing under the POEO Act
- Guide to licensing
- Licence forms
- Licence fees
- + Risk-based licensing
- + Load-based licensing
- + Emissions trading
- – POEO Public Register
  - Terms of use: POEO public register
  - Search for licences, applications and notices
  - Search for penalty notices
  - Search for prosecutions and civil proceedings
  - Enforceable undertakings
  - Exemptions and approvals
  - Licensing FAQs
  - List of licences
  - Unlicensed premises still regulated by the EPA
- National Pollutant Inventory
- + Compliance audit program
- + Reporting and managing incidents
- + Wind farm regulation
- NSW Gas Plan Regulation
- + Gas industry in NSW
- + Native forest bio-fuel
- + Authorised officers
- Regulation of railway systems activities
- Lead-based paint resources

Home > Environment protection licences > POEO Public Register > Search for licences, applications and notices

Search results

Your search for: **General Search** with the following criteria

Suburb - CHULLORA
Name - fairfax
returned 4 results

Export to excel | 1 of 1 Pages | Search Again

Number	Name	Location	Type	Status	Issued date
5233	FAIRFAX PRINTERS PTY LIMITED	1 WORTH STREET , CHULLORA, NSW 2190	POEO licence	Surrendered	17 Apr 2001
1044102	FAIRFAX PRINTERS PTY LIMITED	1 WORTH STREET , CHULLORA, NSW 2190	s.58 Licence Variation	Issued	31 Jan 2005
1096095	FAIRFAX PRINTERS PTY LIMITED	1 WORTH STREET , CHULLORA, NSW 2190	s.58 Licence Variation	Issued	17 Apr 2009
1526060	FAIRFAX PRINTERS PTY LIMITED	1 WORTH STREET , CHULLORA, NSW 2190	s.58 Licence Variation	Issued	11 Nov 2014

29 July 2015

Appendix C

Workcover Notification (WSP)

NSW GOVERNMENT | WorkCover

DG – 01
June 2012

Notification of dangerous goods on premises form

This form is to be used by the occupier of a site where dangerous goods are stored and handled in quantities that, in total, exceed or are likely to exceed quantities specified in the column headed 'Manifest quantity' in schedule 5 of the *Occupational Health and Safety Regulation 2001* (OHS Regulation).

If you are taking over an existing dangerous goods site during a current notification period, do not use this form. Instead, please use the *Amendment to notification of dangerous goods on premises* (DG – 03) form (catalogue no. WC00902).

If you are notifying of the abandonment of a tank at a workplace that is underground, partially underground or fully mounded and the tank was used to store flammable gasses or flammable liquids use the *Notification of Abandonment of Tank* (NFTAT) form (catalogue no. WC03413).

For more information, please refer to the *Notification of dangerous goods on premises guide* (catalogue no. WC01385).

Fee

A $100 fee is payable when submitting this form.

How to fill in this form

Please use **black** ink only and print within the boxes in BLOCK LETTERS.

Where options are provided, please mark box(es) with an [X] to indicate selection(s).

Only persons over the age of 18 years can notify on behalf of the occupier of premises where dangerous goods are stored.

'Business name' means trading name and refers to registrations made to the Office of Fair Trading.

Enquiries – **13 10 50**

Privacy compliance statement

This information is collected by WorkCover NSW for the purposes of undertaking the evaluation, assessment and processing of a notification of dangerous goods on premises as required by the OHS Act.

WorkCover may also use this information for the purposes of confirming applicant details and it may also be used to establish and maintain a database and to assist the WorkCover inspectorate with their work generally. This information may also be made available to other state or territory or the commonwealth regulatory agencies including Trade and Investment NSW.

Except for the purpose of prosecution and unless such disclosure is otherwise required or permitted by law, the information will not be otherwise accessed by any third parties in a way that would identify the individual, without the consent of that individual. Applicants are able to gain access to personal information pertaining to their application that is held by WorkCover. You may also apply to WorkCover to access and correct any of your own personal information WorkCover holds if that information is inaccurate, incomplete, not relevant or out of date. Applications should be made in writing to the Privacy Contact Officer, WorkCover NSW, Gosford Office, Locked Bag 2906, Lisarow, NSW 2252.

Fairfax Print Site Sales Data Room
Richard Ford
Charter Hall Office Management

1. APPLICATION TYPE (select only one box)

☐ New site $100 fee applies.

☑ Further notification To be supplied every 12 months – $100 fee applies.

☐ New occupier of an existing dangerous goods notifiable site (where the notification has expired) $100 fee applies.

Please provide the following for a further notification or, if you are a new occupier of an existing dangerous goods notifiable site.

Acknowledgement number for the site (if known)
35/

Expiry date (DD/MM/YYYY)
/ / or the site address

Street number/street name (include Lot or DP number if applicable)
1

Street name
WORTH ST

Suburb
CHULLORA

State
NSW

Postcode
2190

2. SITE OCCUPIER'S DETAILS (person in control of the site)

Required for a new site or a new occupier of an existing dangerous goods notifiable site (where the notification period has expired). It is only required for a further notification where details have changed.

2.1 Individual occupier

Title

Family/Surname

Given name

Other names

Date of birth (DD/MM/YYYY)
/ /

Daytime contact number

Mobile number

Fax number

Email

Please go to section 2.4

2.2 Corporation occupier

Legal name
FAIRFAX PRINTERS PTY LTD

Registered business (trading name)
FAIRFAX PRINTERS PTY LTD

ABN
90 068 675 221

Please go to section 2.3

2.3 Contact person's details (to be completed for corporation occupiers)

Title: MR

Family/Surname: JOHNSON

Given name: MICHAEL

Other names: PATRICK

Date of birth (DD/MM/YYYY): 12/08/1968

Daytime contact number: 0297356265

Mobile number: 0409053562

Fax number: 0297356250

After hours contact number: 0409053562

Email: michael.johnson@fairfaxmedia.com.au

2.4 Postal address (the address that will be used to send information to the occupier such as the acknowledgment letter and renewal reminder)

☑ Same as the site address

Street number/street name (include Lot or DP number if applicable): PO BOX 577

Street name:

Suburb: GREENACRE

State: NSW

Postcode: 2190

Please go to section 2.5

2.5 Emergency after hours contact person's details

☑ Same as above

Title:

Family/Surname:

Given name:

Other names:

Date of birth (DD/MM/YYYY):

Daytime contact number:

Mobile number:

Fax number:

After hours contact number:

3. PREVIOUS OCCUPIER'S DETAILS (to be completed by the new occupier, if known)

Individual

Title

Family/Surname

Given name

Other names

Corporation

Legal name

Registered business (trading name)

ABN

4. SITE DETAILS (complete for a new notification)

An A4 size sketch of the site, showing all storage facilities must be submitted with this application form and a photocopy of a street directory map or other map showing the locality of the site. The site must be marked on this map with an X. Refer to the *Notification of dangerous goods on premises guide* (catalogue no. WC01385) for more information.

☑ I have attached an A4 size sketch of the site.

☑ I have attached a photocopy from a local street directory or other map showing the locality of the site. The location of the site has been marked on the map with an X.

Street number/street name (include Lot or DP number if applicable)

NO: 1

Street name

WORTH STREET

Suburb

CHULLORA

State

Postcode

Nearest cross street

HUME HIGHWAY

ANSZIC Code

1611

Description

PRINTING AND PRINTING SUPPORT SERVICES (NEWPAPERS)

Is this a coal workplace or mining workplace? ☐ Yes ☑ No

5. SITE STAFFING DETAILS (complete for a new notification or for further notifications if details have changed since the last notification)

Is the site staffed? ☑ Yes. Please complete the following ☐ No. Please go to section 6.

Number of staff on site 80 Hours per day 24

Days per week 7 DAYS

6. STORAGE DETAILS (must be completed for both new notifications and further notifications)

If space is insufficient please provide details on a separate sheet of paper.

Storage facility identifier: 3A

Type of storage facility: ABOVE GROUND TANK

Class or division: C1

Maximum storage capacity: 10,000

Unit (L or kg or number): L

UN number	Class or division	Typical quantity	Unit (L or kg or number)	Packing group
3082		10,000	L	III

Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE LIQUID N.O.S.

Product or common name: DISTILLATE (DIESEL)

UN number	Class or division	Typical quantity	Unit (L or kg or number)	Packing group

Proper shipping name:

Product or common name:

UN number	Class or division	Typical quantity	Unit (L or kg or number)	Packing group

Proper shipping name:

Product or common name:

UN number	Class or division	Typical quantity	Unit (L or kg or number)	Packing group

Proper shipping name:

Product or common name:

Fairfax Print Site Sales Data Room
Richard Ford
Charter Hall Office Management

Notification of dangerous goods on premises DG – 01

Storage facility identifier: 3B

Type of storage facility: ABOVE GROUND TANK

Class or division: C1

Maximum storage capacity: 10,000

Unit (L or kg or number): L

UN number	Class or division	Typical quantity	Unit (L or kg or number)	Packing group
3082		10,000	L	III

Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE LIQUID N.O.S.

Product or common name: DISTILLATE (DIESEL)

UN number	Class or division	Typical quantity	Unit (L or kg or number)	Packing group

Proper shipping name:

Product or common name:

UN number	Class or division	Typical quantity	Unit (L or kg or number)	Packing group

Proper shipping name:

Product or common name:

UN number	Class or division	Typical quantity	Unit (L or kg or number)	Packing group

Proper shipping name:

Product or common name:

Notification of dangerous goods on premises

DG – 01

Storage facility identifier: 6G

Type of storage facility: ABOVE GROUND TANKS

Class or division: C1

Maximum storage capacity: 118,000

Unit (L or kg or number): L

UN number	Class or division	Typical quantity	Unit (L or kg or number)	Packing group
COMB1	C1	80,000	L	

Proper shipping name: COMBUSTIBLE LIQUID C1

Product or common name: NEWSPEED COMB1 INK

UN number	Class or division	Typical quantity	Unit (L or kg or number)	Packing group

Proper shipping name:

Product or common name:

UN number	Class or division	Typical quantity	Unit (L or kg or number)	Packing group

Proper shipping name:

Product or common name:

UN number	Class or division	Typical quantity	Unit (L or kg or number)	Packing group

Proper shipping name:

Product or common name:

Notification of dangerous goods on premises DG – 01

Storage facility identifier

Type of storage facility

Class or division

Maximum storage capacity

Unit (L or kg or number)

UN number | Class or division | Typical quantity | Unit (L or kg or number) | Packing group

Proper shipping name

Product or common name

UN number | Class or division | Typical quantity | Unit (L or kg or number) | Packing group

Proper shipping name

Product or common name

UN number | Class or division | Typical quantity | Unit (L or kg or number) | Packing group

Proper shipping name

Product or common name

UN number | Class or division | Typical quantity | Unit (L or kg or number) | Packing group

Proper shipping name

Product or common name

Notification of dangerous goods on premises DG – 01

Storage facility identifier

Type of storage facility

Class or division

Maximum storage capacity

Unit (L or kg or number)

UN number | Class or division | Typical quantity | Unit (L or kg or number) | Packing group

Proper shipping name

Product or common name

UN number | Class or division | Typical quantity | Unit (L or kg or number) | Packing group

Proper shipping name

Product or common name

UN number | Class or division | Typical quantity | Unit (L or kg or number) | Packing group

Proper shipping name

Product or common name

UN number | Class or division | Typical quantity | Unit (L or kg or number) | Packing group

Proper shipping name

Product or common name

Fairfax Print Site Sales Data Room
Richard Ford
Charter Hall Office Management

7. GOODS TOO DANGEROUS TO BE TRANSPORTED (must be completed for both new notifications and further notifications)

If space is insufficient, please provide details on a separate sheet of paper.

Are there goods too dangerous to be transported stored or handled on the site?

☐ Yes. Please complete the following ☑ No. Please go to section 8.

Provide the storage facility identifier in which the dangerous goods too dangerous to transport are stored or handled.

Name as listed in the Australian Dangerous Goods Code (Appendix A)

Maximum quantity

Units (L or kg)

Name as listed in the Australian Dangerous Goods Code (Appendix A)

Maximum quantity

Units (L or kg)

Please go to section 8

8. DECLARATION (must be completed)

I, MICHAEL JOHNSON

(print name)

BUILDING SERVICES MANAGER

(print position in the corporation)

declare and understand that:

- I am 18 years of age or over
- the information provided is true and correct in every particular
- it is an offence under the WHS Regulation for a person to make a statement that the person knows to be false or misleading
- I have the authority to make this application on behalf of the occupier of the site.

Signature of person making this declaration

Date (DD/MM/YYYY) 24/07/2012

Please go to section 9

9. PAYMENT OF FEE (the $100 must be paid when this notification is submitted)

☐ Pay by cheque. Cheque made payable to WorkCover.

☐ Pay by money order. Money order made payable to WorkCover.

☑ Pay by credit card. Please charge $100 to my: ☐ MasterCard ☑ Visa
A payment processing fee applies to credit card payments of 0.40% (MasterCard and Visa).

Card number 4557016834872223

Card expiry date (MM/YYYY) 09/2012

Cardholder name (please print name as displayed on credit card) M JOHNSON

Cardholder signature

Date (DD/MM/YYYY) 24/07/2012

10. CHECKLIST TO SUBMIT YOUR APPLICATION

Attached	Document
☑	A4 size site sketch map. Refer to the *Notification of dangerous goods on premises guide* (catalogue no. WC01385).
☑	Legible photocopy from a local street directory or other map showing the locality of the site. Mark the location of the site on the map with an X.
☑	$100 fee.

11. HOW TO SUBMIT THIS FORM

The declaration signature must be visible on any applications lodged by fax. Please fax or post or hand deliver the application to WorkCover. Do not do all three.

Fax: **(02) 9287 5500**

Post: Licensing Solutions, WorkCover NSW, Locked Bag 2906, Lisarow, NSW 2252.

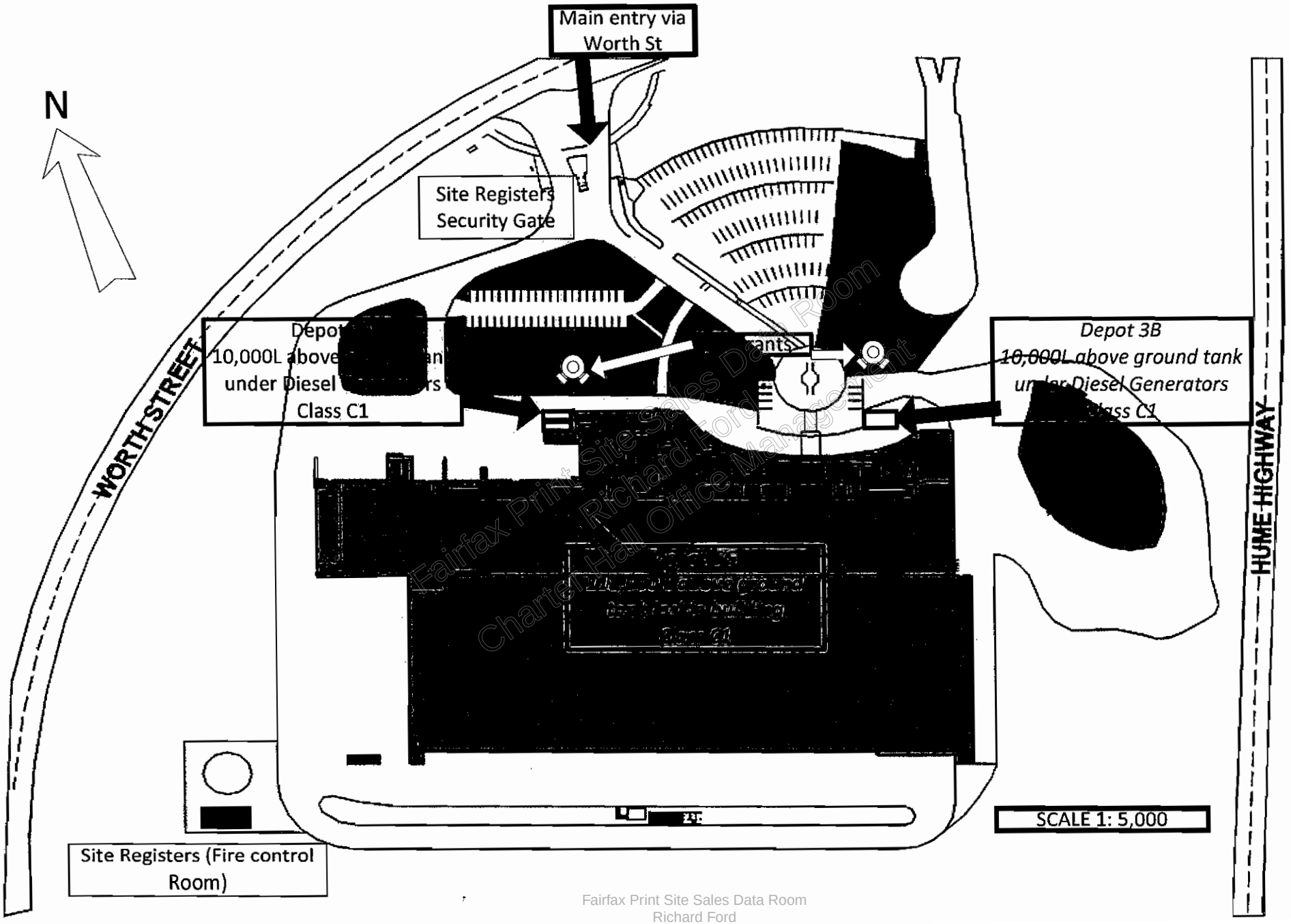
At any WorkCover NSW office. WorkCover NSW office locations are listed on the WorkCover website **workcover.nsw.gov.au**

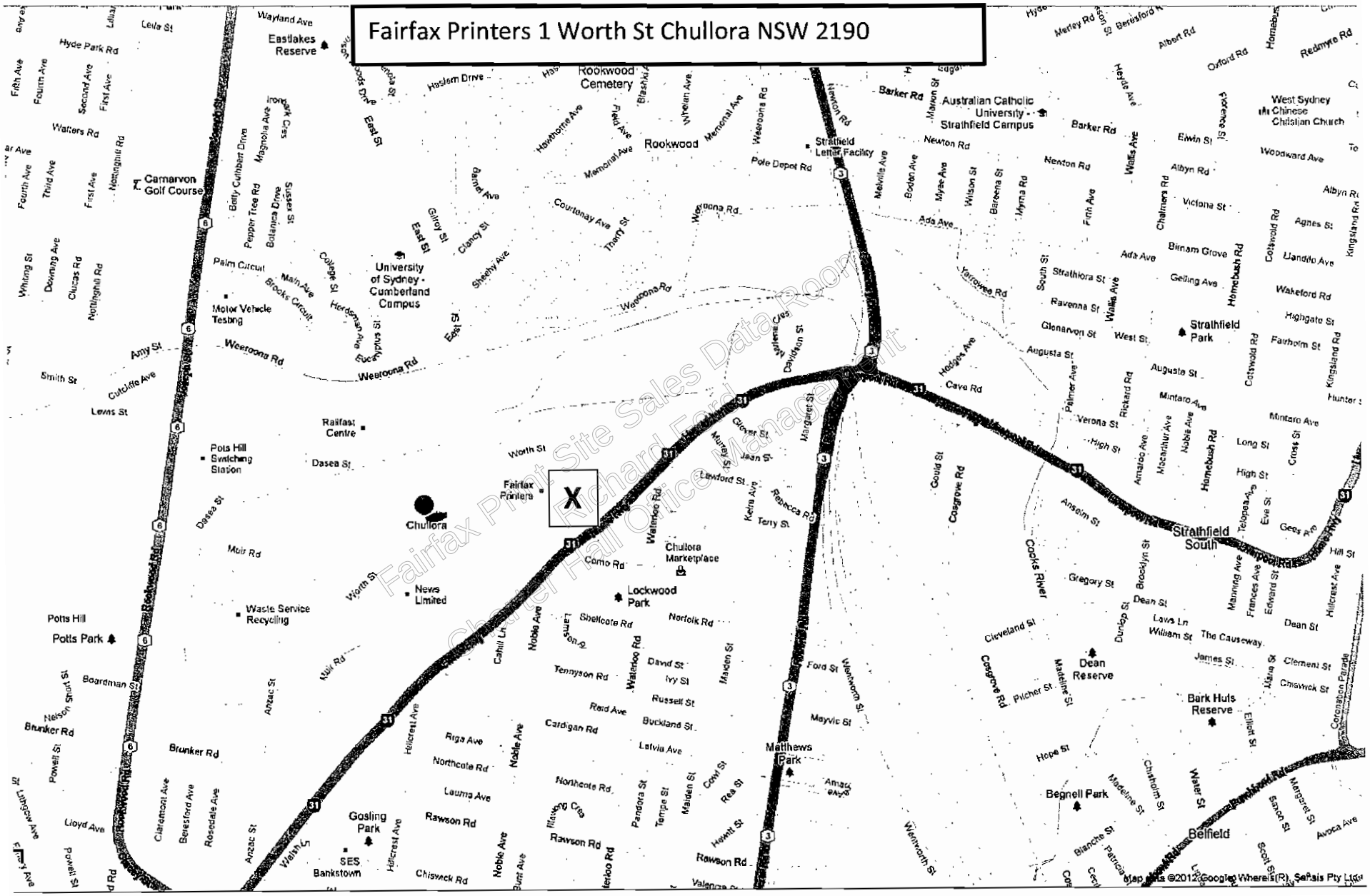
Note: it is a requirement of clause 361 Emergency Plans of the WHS Regulation that you lodge an emergency plan with Fire and Rescue NSW. For more information, please refer to the Fire and Rescue NSW website fire.nsw.gov.au

Catalogue No. WC00896 WorkCover Publications Hotline 1300 799 003
WorkCover NSW, 92-100 Donnison Street, Gosford, NSW 2250
Locked Bag 2906, Lisarow, NSW 2252 | WorkCover Assistance Service 13 10 50
Website workcover.nsw.gov.au

ISBN 978 1 74218 890 4

WorkCover DANGEROUS GOODS notification site map (SITE EXTERNAL) for Fairfax Printers 1 Worth St Chullora NSW





WorkCover NSW
92-100 Donnison Street, Gosford, NSW 2250
Locked Bag 2906, Lisarow, NSW 2252
T 02 4321 5000 F 02 4325 4145
WorkCover Assistance Service 13 10 50
DX 731 Sydney workcover.nsw.gov.au

Our Ref: D13/068370
Your Ref: Blake Dickson

24 May 2013

Attention: Blake Dickson
WSP Environment and Energy
Level 1,
41 Mclaren St
North Sydney NSW 2060

Dear Mr Dickson,

RE SITE: 2 Hume Hwy Chullora NSW

I refer to your site search request received by WorkCover NSW on 21 May 2013 requesting information on licences to keep dangerous goods for the above site.

Enclosed are copies of the documents that WorkCover NSW holds on Dangerous Goods Licence 35/031292 relating to the storage of dangerous goods at the above-mentioned premises, as listed on the Stored Chemical Information Database (SCID).

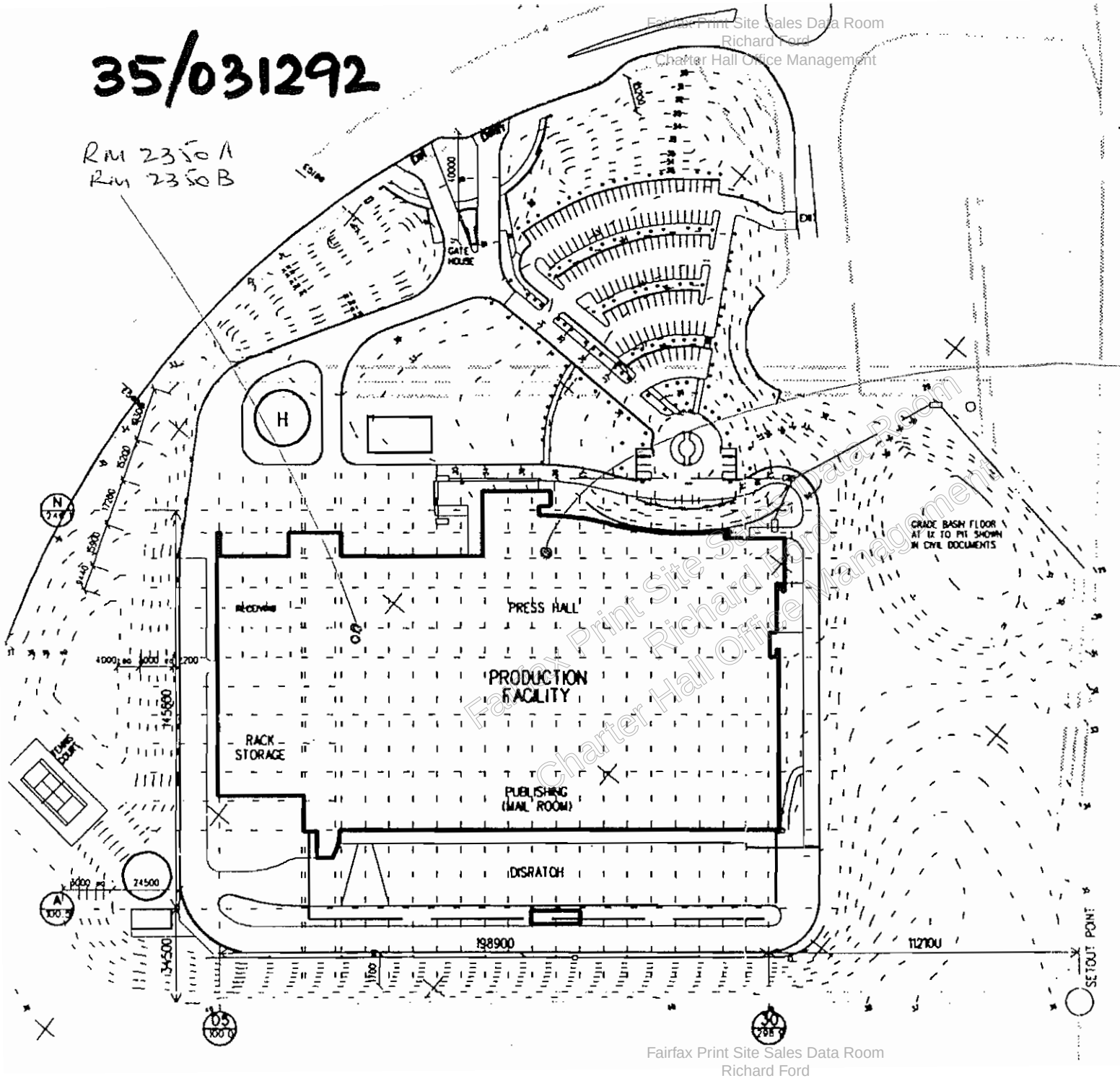
If you have any further queries please contact the Dangerous Goods Licensing Team on (02) 4321 5500.

Yours Sincerely

Brent Jones
Senior Licensing Officer
Dangerous Goods Notification Team

35/031292

RM 2350 A
RM 2350 B



This plan conforms with the Dangerous Goods Act NSW 1975 and Austr. Standard AS .....
Signed for SAFETY ENGINEERING AND TECHNICAL SERVICES PTY. LTD
..... Date: 13/12/95

Application for Licence to Keep Dangerous Goods

WorkCover NEW SOUTH WALES

Application for ☑ new licence ☐ amendment ☐ transfer ☐ renewal of expired licence

not ampc Expiry: 21.12.96

PART A – Applicant and site information

1 Name of applicant | ACN

SYDNEY PRINTERS PTY LTD | 060 569 833

2 Postal address of applicant | Suburb/Town | Postcode

PO BOX 577 | GREENACRE NSW | 2190

3 Trading name or site occupier's name

SYDNEY PRINTERS

4 Contact for licence inquiries

Phone | Fax | Name

735 6231 | 735 6300 | DAVID CANNON

RECEIVED
21 DEC 1995
SCIENTIFIC SERVICES BRANCH

5 Previous licence number (if known) 35/031292

6 Previous occupier (if known) N/K

7 Site to be licensed

No | Street

LOT 12 | HUME HIGHWAY

Suburb / Town | Postcode

GREENACRE | 2190

8 Main business of site PRINTERS / PUBLISHERS ~~9542~~ 2412

9 Site staffing: Hours per day 24 Days per week 7

10 Emergency contact

Phone | Name

735 6003 | SECURITY MANAGER

DATA ENTERED 25 JAN 1996

11 Major supplier of dangerous goods VARIOUS

12 If a new site or for amendments to depots

Plan stamped by: | Name of Accredited Consultant | Date stamped

ROSS UNDERWOOD (SETS P/L) | 13/12/95

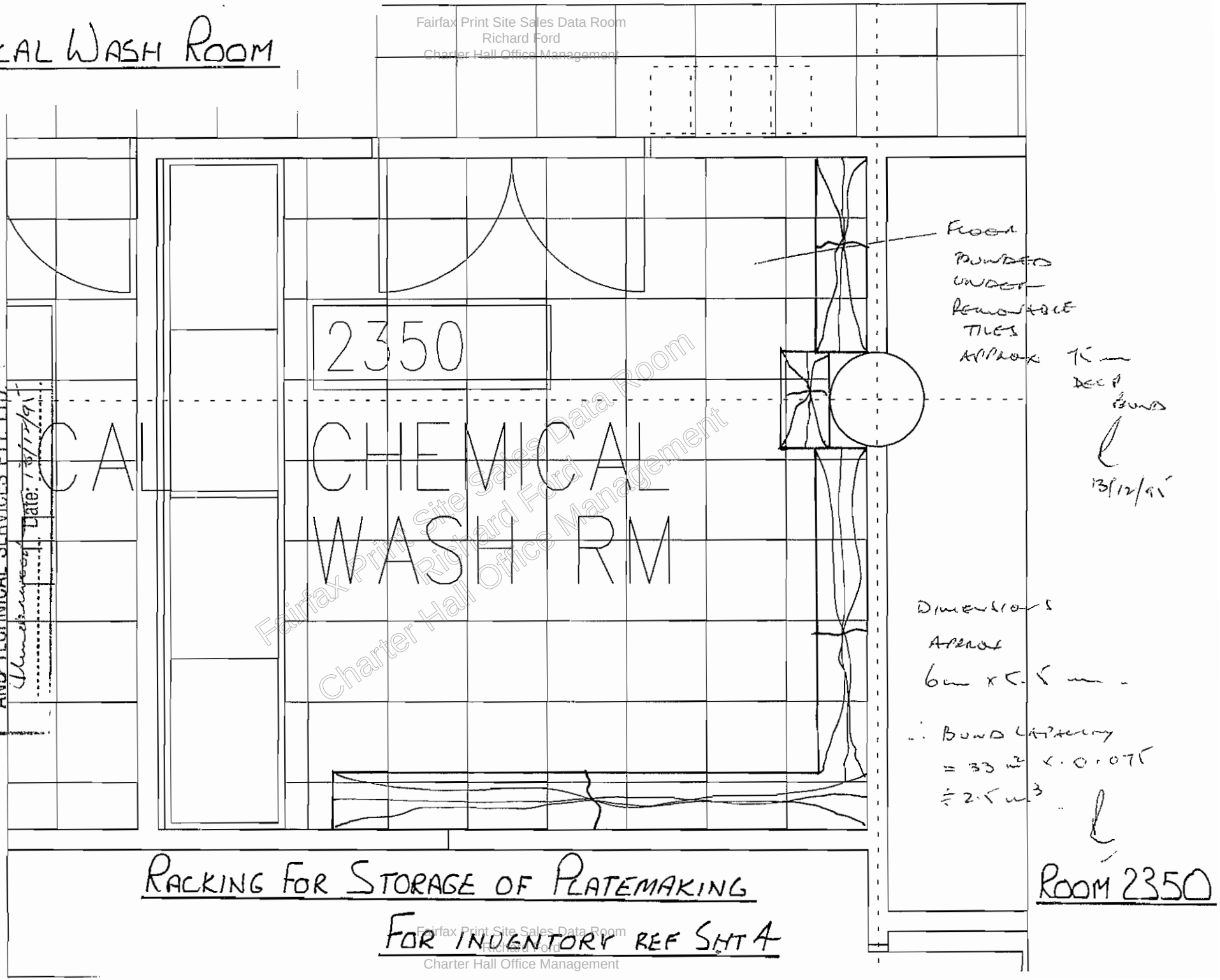
I certify that the details in this application (including any accompanying computer disk) are correct and cover all licensable quantities of dangerous goods kept on the premises.

13 Signature of applicant | Date

Please send your application, marked *CONFIDENTIAL*, to:
Dangerous Goods Licensing, Level 3, Locked Bag 10, Clarence Street, SYDNEY NSW 2000

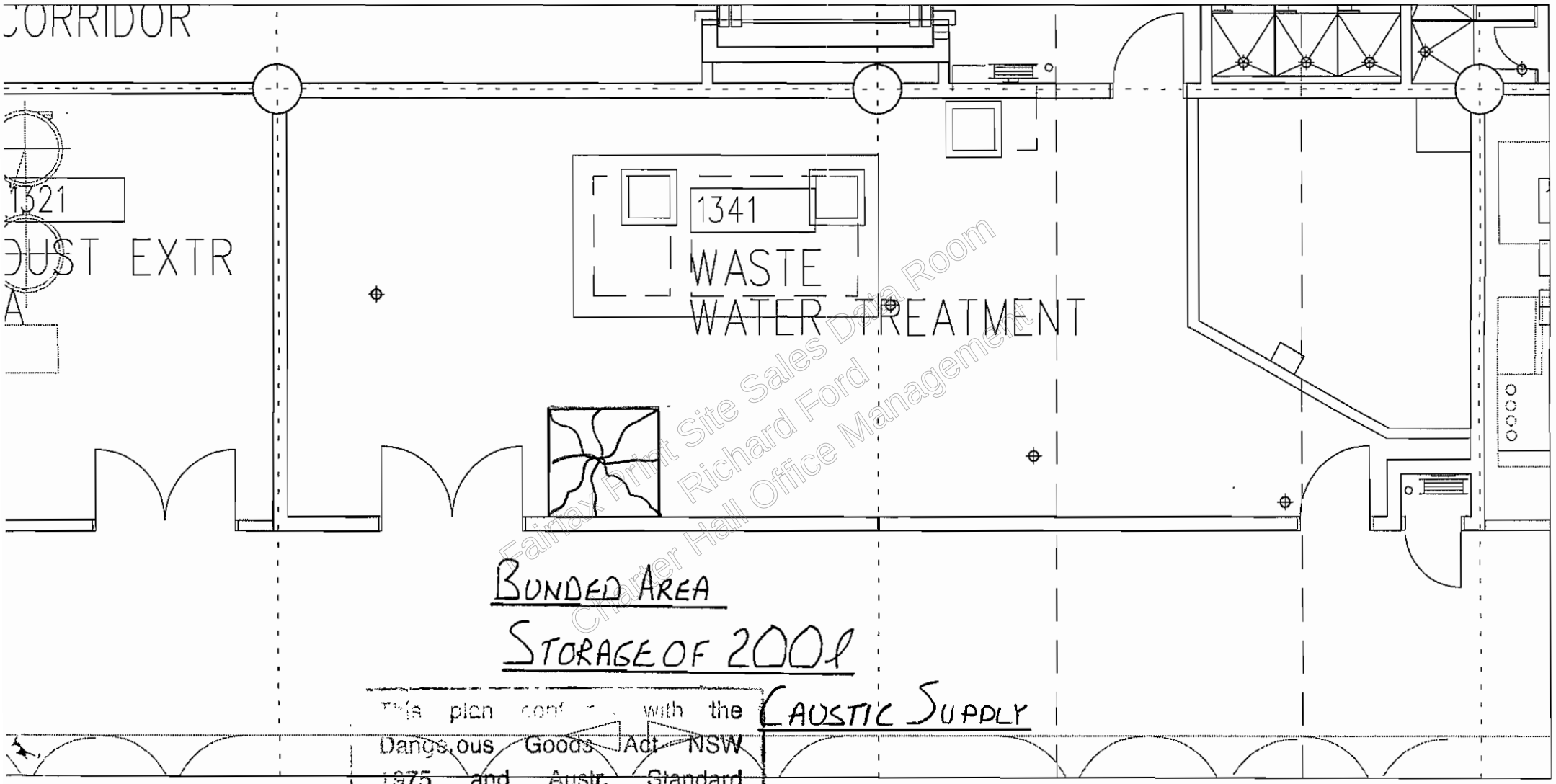
Sent 22/1/96

2. CHEMICAL WASH ROOM



This plan conforms with the Dangerous Goods Act NSW 1975 and Austr. Standard AS .....
Signed for SAFETY ENGINEERING AND TECHNICAL SERVICES PTY. LTD.
Date: 13/12/91

3. WASTE WATER TREATMENT



This plan complies with the Dangerous Goods Act NSW 1975 and Austr. Standard AS .....
Signed for SAFETY ENGINEERING AND TECHNICAL SERVICES PTY. LTD.
..... Date: 13/12/95

PART C – Dangerous Goods Storage *Complete one section per depot.*

✓ **If you have more depots than the space provided, photocopy sufficient sheets first.**

Depot Number	Type of depot	Depot Class	Maximum storage capacity
RM 23 No A	ROOFED STORE	8	1,000 L

UN Number	Correct Shipping Name	Class	PG (I, II, III)	Product or common name	Typical quantity	Unit, e.g. L, kg, m³
1760	CORROSIVE LIQUID N.O.S.	8	II	RODAC 3000 FIXER & DEVELOPER	400	L
1760	CORROSIVE LIQUID N.O.S.	8	II	AMITEC 500L FIXER	200	L
	(ACID STORE)					

Depot Number	Type of depot	Depot Class	Maximum storage capacity
RM 23 No B	ROOFED STORE	8	500 L

UN Number	Correct Shipping Name	Class	PG (I, II, III)	Product or common name	Typical quantity	Unit, e.g. L, kg, m³
1814	POTASSIUM HYDROXIDE SOLUTION	8	II	AMITEC PTS-2 DEVELOPER	200	L
	(ALKALI STORE)					
				PTO.		

PART C – Dangerous Goods Storage *Complete one section per depot.*

If you have more depots than the space provided, photocopy sufficient sheets first.

Depot Number	Type of depot	Depot Class	Maximum storage capacity
RM 1341	ROOFED PACKAGE STORE	8	400 L (BELOW EXEMPTED LIMIT)

UN Number	Correct Shipping Name	Class	PG (I, II, III)	Product or common name	Typical quantity	Unit, e.g. L, kg, m³
1824	SODIUM HYDROXIDE SOLUTION	8	II	CAUSTIC SODA	150	L

Depot Number	Type of depot	Depot Class	Maximum storage capacity

UN Number	Correct Shipping Name	Class	PG (I, II, III)	Product or common name	Typical quantity	Unit, e.g. L, kg, m³

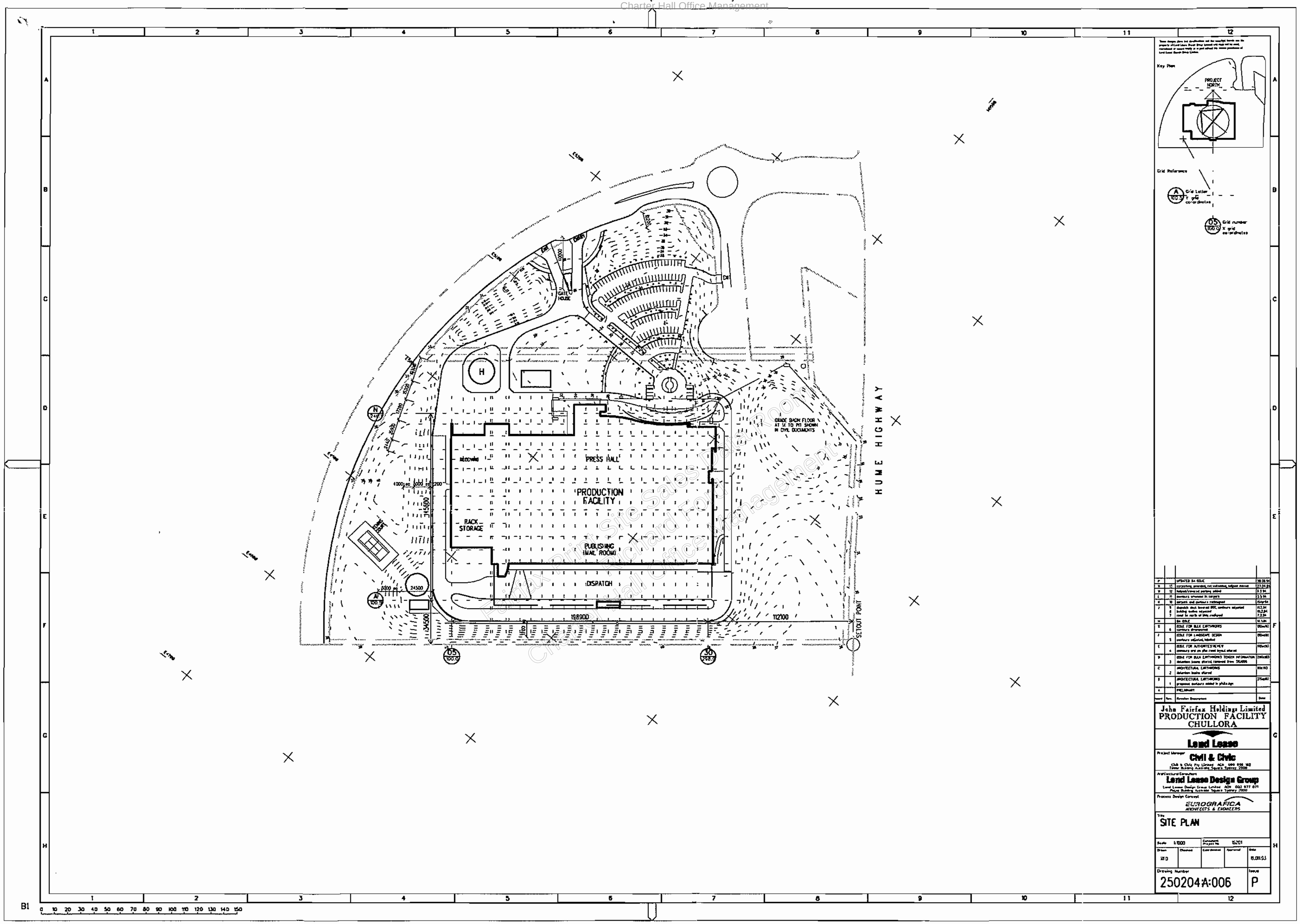
Depot Number	Type of depot	Depot Class	Maximum storage capacity

UN Number	Correct Shipping Name	Class	PG (I, II, III)	Product or common name	Typical quantity	Unit, e.g. L, kg, m³

Depot Number	Type of depot	Depot Class	Maximum storage capacity

UN Number	Correct Shipping Name	Class	PG (I, II, III)	Product or common name	Typical quantity	Unit, e.g. L, kg, m³

1. SITE PLAN



Appendix D

WSP Site Investigation Plan and Cross Section

Image Courtesy of Google Maps (2013)

Site Boundary

BH01 Soil Bore Location

BH01 Monitoring Well Location

A – – – B Cross Section Transect (refer to Figure 4)

Approximate Scale

0 100

Metres

Fairfax Print Site Sales Data Room
Richard Ford
Charter Hall Office Management

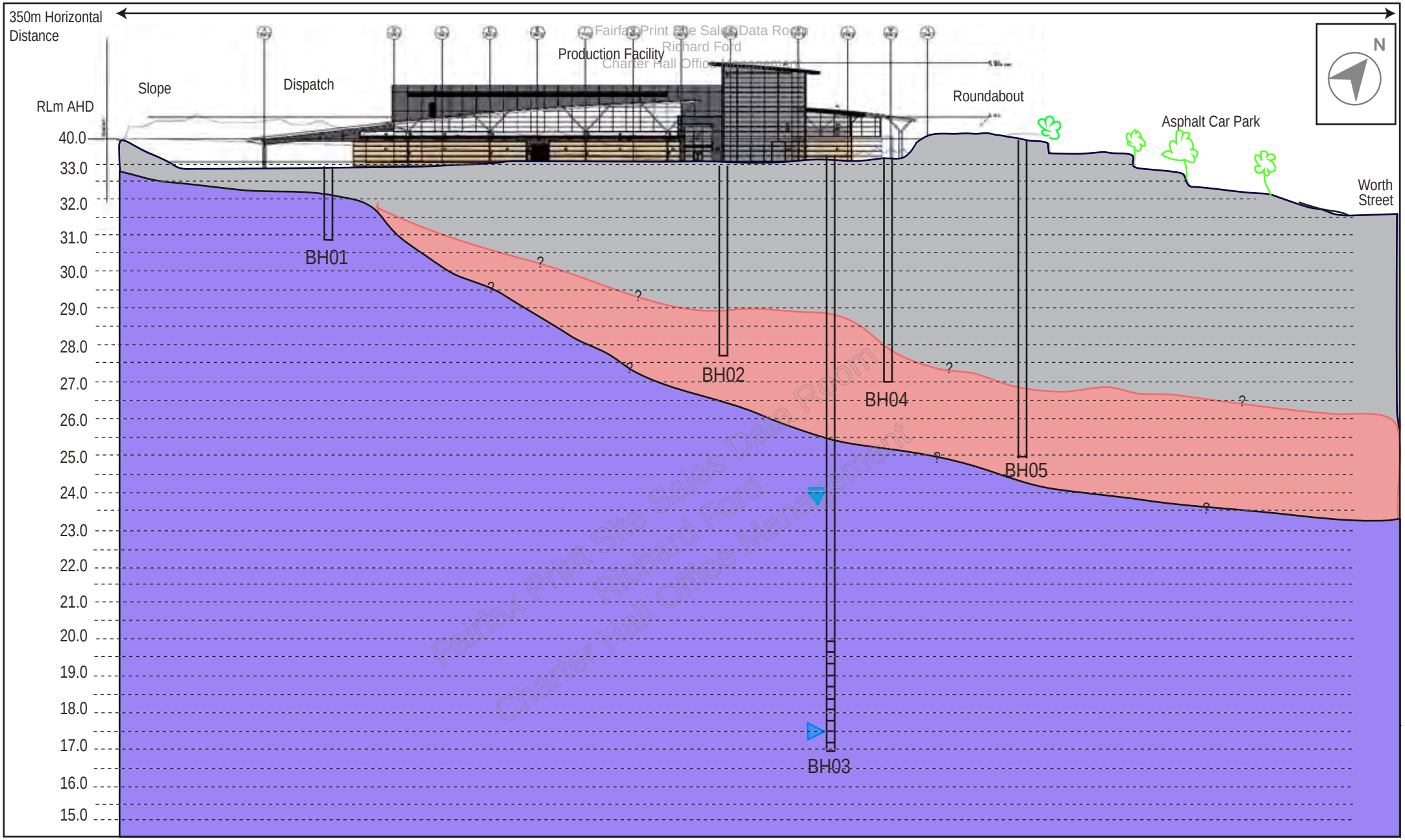
Sampling Locations

2 Hume Highway, Chullora, NSW

00038850

FIGURE 3

UNITED BY OUR DIFFERENCE WSP



Approximate scale only. Lithology infered only, boundaries are indicative. Refer to Figure 3 for transect location.

KEY:

- Fill
- Natural Clay
- Shale
- Groundwater SWL on 18/06/2013
- Groundwater inflow at 16 mbgl in BH03 on 11/06/2013

Site Conceptual Site Model - Cross Section

2 Hume Highway, Chullora, NSW
00038850
FIGURE 4

Appendix E

Peter J Ramsay & Associates SQAP

PETER J RAMSAY & ASSOCIATES PTY LTD

SAMPLING QUALITY ASSURANCE PLAN

January 2014

Printed on Recycled Paper

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1. OBJECTIVE AND SCOPE

The objective of this Sampling Quality Assurance Plan (SQAP) is to ensure that soil (which includes sediment), and groundwater samples taken during a contamination assessment or a remediation and validation program are representative of the conditions actually encountered on-site.

The scope of this SQAP is to:

- Outline the methods and procedures for the field investigations during a contamination assessment or remediation and validation program; and
- Specify methods and procedures which ensure that soil and groundwater samples recovered are representative of the actual subsurface conditions at the site, as well as ensuring that the risk of introducing external contamination to samples and to the environment is minimised.

This SQAP must be adhered to by Peter J Ramsay & Associates‟ personnel and also by sub-contractors involved in field investigations. A Work Plan may be prepared which identifies the specific equipment and sampling methods to be used and the types of samples to be collected.

2. ENVIRONMENTAL SAMPLING

Sample locations are referenced to existing ground features and positioned as indicated in the Work Plan. Some locations, however, may vary due to site and subsurface conditions encountered. Prior to the commencement of site work involving powered drilling or excavating, site plans showing the location of underground services are obtained, where available, from the client or information service. If there is uncertainty regarding the location of underground services, a pipe and cable location specialist is engaged to locate underground services in the vicinity of sample locations.

Samples are labelled with the following information:

- Sample number (which consists of the site identifier and sample location number, and the sample depth (soil samples only) or sample event (groundwater samples only)); and
- Date of sample collection.

2.1 Soil Sampling

Soil samples are retrieved using a number of methods depending on the subsurface conditions encountered, and type and quantity of sample required. In general the methods are classified as:

- Spade or trowel;
- Hand auger and hand held power auger borehole;
- Drill rig borehole; and
- Backhoe test pit and trenching.

Professional consultants supervise drilling and/or excavations and perform lithological logging of sample locations. Logging of soil characteristics is performed according to the *National Environment Protection (Assessment of Site Contamination) Measure (NEPM)* and Australian Standards *AS4482.1-2005 Guide to the Investigation and Sampling of Sites with Potentially Contaminated Soil, Part 1: Non-Volatile and Semi-volatile Compounds* and *AS1726-1993 Geotechnical Site Investigations*.

Description of grain size, visible staining, odour and colour are made where observed. Particular note is taken of the nature of possible contamination of the soil encountered and samples collected.

Drilling activities are documented according to the format contained in the Peter J Ramsay & Associates standard Soil Profile Log. Field classifications of samples with regard to the nature of potential contamination are verified against the analytical results.

Decontamination of drilling and sampling equipment is performed according to the procedures outlined in Sections 4.1 and 4.2 respectively. Sampling equipment is confined to a clean surface to prevent cross contamination of samples from different locations. A new pair of latex gloves is used to handle each sample. Contaminated materials such as disposable clothing and equipment are disposed of in accordance with environmental best practice.

Samples are generally collected from the depth ranges listed below, or as determined by the consultant in the field. The origin of each soil sample collected is identified by the sample number eg. 123/4B. The number 123 identifies the site, the number 4 is the sample location number and the letter B refers to the depth at which the sample was taken. The letters used to indicate sample depths are:

- A Near surface sample (0.0 - 0.3 m) Nominal ≈ 0.1 m.
- B (0.3 - 0.7 m). Nominal ≈ 0.5 m.
- C (0.7 - 1.3 m). Nominal ≈ 1.0 m.
- D (1.3 - 1.7 m). Nominal ≈ 1.5 m.
- E (1.7 - 2.3 m). Nominal ≈ 2.0 m.
- F (2.3 - 2.7 m). Nominal ≈ 2.5 m.
- G (2.7 - 3.3 m). Nominal ≈ 3.0 m.
- H (3.3 - 3.7 m). Nominal ≈ 3.5 m.
- I (3.7 - 4.3 m). Nominal ≈ 4.0 m.
- J (4.3 - 4.7 m). Nominal ≈ 4.5 m, etc.

Validation sampling of in-situ soil exposed in excavations is conducted by taking discrete samples from each of the walls and the base of the excavation. Samples are analysed at a laboratory for the contaminants of concern. Again, the sample number identifies the origin of each sample collected eg. 123/A2-B4C.

The number 123 identifies the site, A2 refers to the area of the site being remediated, B4 indicates the sample (the fourth in this case) is retrieved from the base of the excavation (the letters B, N, S, E and W refers to the base, north, south, east and west walls of the excavation respectively) and the letter C refers to the depth from which the sample is retrieved below ground level.

On the basis of field observations, composite soil samples may be formed for site assessments. Compositing provides the maximum amount of information while minimising analytical requirements. A maximum of three soil samples are generally retrieved from adjacent locations at the same depth from the same soil type and combined to form each composite sample. Composite samples are not analysed for pH and volatile organic analytes including petroleum hydrocarbons and chlorinated hydrocarbons, as loss of volatiles may occur during compositing, which involves thorough mixing of the samples. Stiff clay is not suitable for forming composite samples.

Samples are also generally recovered at soil or hydrogeological boundaries (eg. water table, top of natural soil layer, immediately above bedrock, or variable soil profiles). At each sample depth one either 125 ml or 250 ml glass jar with screw lid and teflon seal is used. The jar is completely filled with the sample (i.e. zero headspace sample) to minimise the potential for volatile components to be lost. Samples for volatiles analyses are retrieved in-situ as undisturbed samples using a split spoon or core sampler or ex-situ by subsampling from a bulk, undisturbed sample (i.e. from a backhoe bucket).

When collecting duplicate soil samples a stainless steel bowl is used for mixing/homogenising purposes. Duplicate samples collected for volatiles analyses are not mixed/ homogenised as this would result in loss of volatiles. The samples are split by dividing the undisturbed sample as evenly as possible to obtain two similar samples. „Volatile" samples are placed into sample jars prior to samples to be analysed for non-volatiles.

The analytical laboratories provide the appropriate sample containers to Peter J Ramsay & Associates. All laboratories engaged for the project are NATA endorsed for the analyses requested.

2.1.1 Spade or Trowel

A stainless steel spade or trowel are used when surface scrapings or shallow soil samples are collected. The sampling equipment is thoroughly cleaned between sampling events as detailed in Section 4.2. Surface vegetation, surface litter and the top few centimetres of soil are removed prior to the collection of the sample.

2.1.2 Hand Auger Borehole

Samples recovered from hand auger boreholes are collected at specific depths taking care not to cross contaminate samples, particularly between sample depths within the same auger hole. Sampling equipment is thoroughly cleaned between sampling events as detailed in Section 4.2.

Hand augered boreholes are drilled using a variety of auger bit types, depending on the soil type encountered. A split spoon sampler is used to collect undisturbed intact soil samples.
Cross contamination between sampling intervals is minimised by using a smaller diameter auger bit or split spoon sampler to recover the secondary soil sample thus eliminating borehole smearing.

The soil profile and any relevant observations are described on standard Soil Profile Logs, consistent with the NEPM and Australian Standards.

2.1.3 Drill Rig Borehole

A drill rig may be used to recover both near surface and subsurface soil samples. Material handling and quality control measures are directed towards optimum clean drilling conditions so that cross contamination between sampling locations, sampling depths and sampling/monitoring instruments is minimised. The drill rig and associated mechanical components are in sound working order and free of oil leaks prior to arrival on-site.

A decontamination station is provided on-site and is established at the commencement of the project. The station is supplied with power and water.

At locations covered by concrete or asphalt paving, drilling may be preceded by concrete coring of an appropriate diameter to accommodate both drilling activities and subsequent drilling/sampling activities, for example, installation of groundwater monitoring wells.

Accumulated drill cuttings are removed as drilling progresses over a hole so as to prevent fallback of cuttings during normal drilling operations. On completion of drilling, boreholes are backfilled with cuttings or a bentonite/cement grout. Where boreholes have been drilled through sealed surfaces on a site, these will be reinstated with either a standard concrete mix or high strength non-shrink grout, depending on the client"s specific requirements and the nature of existing pavements. Excess drill cuttings are disposed of in accordance with environmental best practice.

Petroleum based lubricants are not used on drilling and sampling equipment. Instead, teflon based greases are used where appropriate.

Drilling activities and the subsurface profile encountered are documented by a professional engineer/ hydrogeologist from Peter J Ramsay &

Associates. Logging of soil characteristics is performed according to the NEPM and the Australian Standards.

Grain size, visible staining, odour and colour are reported where observed. Particular note is taken of the nature of possible contamination of the soil and each sample collected.

The major drilling methods used in environmental investigations and sampling programs are:

- Rotary air hammer;
- Solid or hollow auger; and
- Geoprobe.

Quality assurance measures for drilling operations vary depending on the drilling methods adopted, including minimising cross contamination between samples.

2.1.3.1 Rotary Air Hammer

The use of a rotary air hammer rig has many advantages for consolidated materials (i.e. rock), these include:

- Large diameter to allow precise placement of groundwater monitoring equipment;
- No injection of additional fluids into the formation with resulting benefits in ensuring integrity of recovered samples;
- Rapid penetration rates in hard rocks;
- Reduced problems of off-site disposal of fluids; and
- Provision of reliable indications of saturated conditions whilst drilling.

The air hammer technique requires the use of synthetic blend lubricants to prevent potential contamination of the borehole if a leak were to occur. In addition, micro-filters are installed into the drilling airline to avoid contamination by hydrocarbons present in the compressed air.

Samples of rock are generally not collected. Where rock samples are needed, specialised techniques are used. These would be outlined in the relevant section of the Work Plan for the project.

2.1.3.2 Solid and Hollow Auger

Solid auger and hollow auger drilling techniques are well suited to unconsolidated materials. The main advantage of the hollow auger technique is that the drill rods allow access of sampling equipment at specified depths within the annulus of the drill rods.

Samples of soil are recovered using a split spoon sampler at specific depth intervals. The split spoon sampler is driven into the soil by the drill rig whilst attached to the end of the drill rods. The retrieved sample is then split lengthways into two halves when duplicate samples are required. A few centimetres of soil and any fallback of drill cuttings from the top and bottom of the sample is discarded. Samples for volatiles analysis are collected first, without mixing.

2.1.3.3 Geoprobe

The Geoprobe drilling unit is particularly suited to shallow unconsolidated materials above the water table. The main advantage of the Geoprobe is it allows rapid soil vapour sampling and retrieval of soil samples at relatively shallow depths. The Geoprobe is supervised by experienced field engineers from Peter J Ramsay & Associates.

The Geoprobe consists of a hydraulic power unit which "pushes" steel drill rods into the ground. A clean plastic tube is placed inside the steel drill rods and the leading steel rod is capped with a cone tip which aids penetration to the required sampling depth. As the steel drill rods penetrate into the ground, soil is collected in the inner plastic tube. Soil samples are then recovered from the plastic tube, which is split so that the soil profile can be inspected and samples collected. Essentially undisturbed soil samples are collected.

2.1.4 Backhoe Test Pit and Trench Sampling

A backhoe is used to recover relatively shallow (i.e. less than 3.5 m depth) soil samples on occasions where:

- Multiple sample locations at a site are needed;
- A description of the subsurface soil profile to approximately 3.5 m depth is required (generally in unsaturated conditions);
- The test pit site is free from known underground services and access problems;
- The test pit site is free from impenetrable surface or near surface layers including concrete and asphalt pavements; and
- An undisturbed soil sample is required, usually at multiple depths.

The backhoe and associated mechanical components are in sound working order and free from oil leaks, and decontaminated prior to arrival on-site. A decontamination station is established on-site and is used to clean the backhoe bucket between sampling locations to minimise the risk of cross contamination where significant contamination is anticipated. Power and water are provided on-site.

Petroleum based lubricants are not used on any sampling equipment and where possible the backhoe bucket.

Soil samples to a depth of 1.5 m are collected by digging into the walls and bottom of the pit with a stainless steel trowel to ensure that the first few centimetres of disturbed soil are removed and discarded. The samples are collected by entering the pit, and sampling at specific depth intervals. Pits are not entered if the depth exceeds 1.5 m below ground surface or the walls of the pit are unstable. Samples below a depth of 1.5 m are retrieved by the use of a long handled scoop, hand auger or the backhoe bucket at ground level.

If in the opinion of the field engineer the test pit walls appear unstable, unsafe or explosive conditions are expected then personnel do not enter the pit at any depth but retrieve samples from the backhoe bucket whilst at ground level. Soil samples are collected at the base of the pit first and then progressively upwards to avoid cross contamination. Water samples can be collected with precleaned bailers or dippers at points where water flows from the test pit walls. Soil Profile Logs are prepared describing the soil profile encountered.

2.2 Groundwater Sampling and Monitoring

Sampling and monitoring of groundwater from a groundwater monitoring well is undertaken in accordance with AS5667.11-1998 *Guidance on the Sampling of Groundwaters*, Victorian EPA Groundwater Sampling Guidelines, and USEPA protocols.

2.2.1 Groundwater Monitoring Well Installation

Groundwater monitoring wells are installed for the purposes of groundwater monitoring, aquifer testing and groundwater sampling. Licensed water well drillers are used to install wells greater than 3 m deep. Licence approval is received from the appropriate water authority prior to installing the wells. The Bore Construction Licence and Bore Completion Reports for the wells are presented in the report for the assessment.

Figures 1 and 2 show typical monitoring well installations. Each well consists of a 50 mm nominal diameter (internal diameter) standpipe, constructed from Class 18 high durability unplasticised polyvinyl chloride (UPVC). The length of the screened interval in the well should be between 2 m and 3 m and located specifically within the zone of interest. Longer screens may result in dilution of groundwater samples due to mixing, resulting in unrepresentative samples. High resolution sampling may require screen lengths less than 1 m in length. Slotting for the screen is nominally 0.5 to 1.0 mm width, with an average spacing of 10 mm between slots. The ends of the casing and screen lengths are threaded to avoid the use of solvent-based glues and cements.

Where light non-aqueous phase liquids (LNAPLs) are potential contaminants of concern, the screened interval is placed so that it extends approximately 1 m above the saturated zone of the aquifer. This ensures that the LNAPL is able to enter the well and to accommodate future groundwater level fluctuations. However, representative samples for analysis of dissolved phase contaminants cannot be obtained from wells with LNAPLS due to free phase contamination of the sample. When the screened interval is outside the direct influence of the LNAPLs it may be possible to sample the well for dissolved phase.

In some situations, a bore sump may be required to either allow the sampling for dense non-aqueous phase liquids (DNAPLs) or to act as a sediment trap. Sumps are placed below the screened interval and are constructed of approximately 0.6 m length of blank casing with an end cap.

Standpipes are fitted with UPVC end caps at the lower and upper ends. The end cap at the lower end of the standpipe is generally fastened using pop rivets or stainless steel self tapping screws. Where well security is required a lockable cap is used on the upper end of the standpipe.

It is a requirement of the quality assurance program that the materials placed into boreholes are free from contaminants targeted in the investigation. Decontamination of well materials is performed as described in Section 4.1. Alternatively, sections of casing, screen and end caps may be used if supplied in sealed protective plastic wrapping after pre-delivery washing at the factory. Following decontamination or removal from the protective plastic wrapping, materials are only handled by field engineers and/or drilling contractors wearing new latex gloves. During handling and assembly of the casing string it is ensured that no grease, oil or other potential contaminants of concern come into contact with the casing.

Where it is anticipated that significant contamination or free product will be intercepted in a shallow aquifer during the drilling of a borehole for the purposes of installing a well in a deep aquifer, specific staged drilling and bore construction techniques are necessary. This involves the drilling and emplacement of a grout plug to a depth below the product layer or shallow aquifer. Once the grout has set, a smaller diameter borehole is then drilled through the grout plug to the required final depth. It is imperative that the minimum well thickness of the grout plug is at least 20 mm. To facilitate this thickness and the installation of the monitoring well, it may be necessary to ream the first stage of the borehole to an increased diameter before emplacing the grout plug.

Following the drilling of the borehole, loose material is removed from around the top of the borehole prior to the installation of the well.

Monitoring well installation procedures are:

- Attach a sump to the base of the screen if required or line the base of hole with sand first;
- In conditions where the borehole will remain open the total depth of the borehole is confirmed once the drilling tools have been removed. When installing a monitoring well in an open borehole, centralisers are attached to the standpipe every six to twelve metres;
- In conditions of poor borehole stability (prone to slumping and collapse) the standpipe is installed through the drilling tool (typically hollow stem augers). With the augers left at depth, the auger tip is removed and the total depth of the borehole is confirmed. The standpipe is installed through the hollow stem of the augers. Centralisers are not required when installing through drilling tools;
- Once the screen and standpipe have been installed, a filter consisting of prewashed graded sand of nominal 2-3 mm size is immediately placed around the standpipe to a height of between 200 and 300 mm above the uppermost screen slots;
- It is crucial to prevent bridging during emplacement of the sand filter. This is accomplished via pouring the sand through a tremmie pipe. Alternatively, the sand can be slowly poured down the open annulus whilst the standpipe is agitated and periodic measurements using a tape measure are made to ensure that bridging of the filter pack has not occurred;
- If the well is being constructed through hollow augers, the augers are withdrawn as the sand is poured to prevent caving of the formation surrounding the well. When the augers are being withdrawn it is ensured that the standpipe does not vary from its emplaced position in the borehole;
- A bentonite seal is placed directly above the filter pack with a minimum thickness of 500 mm;
- The bentonite pellets are poured into the annulus very slowly to prevent bridging. Where the bentonite seal is placed above the water table, then approximately 20 L of clean water is added to the borehole via a tremmie pipe in order to begin the hydration of the bentonite. Cement/bentonite mixtures are used in saline waters;
- Boreholes are backfilled above the bentonite seals with a bentonite/cement grout to approximately 0.3 m below ground level;
- Final completion of the monitoring well involves construction of a concrete collar seal which may incorporate a steel protective cover. The cover is lockable to secure the well; and
- Drainage around the bore head is provided to avoid build up of surface water and leakage down the side of the standpipe.

Generalised design drawings of a groundwater monitoring well are shown in Figures 1 and 2 (refer to pages 14 and 15).

The depth of the sand filter and the bentonite seal are verified during their installation by direct measurement using a weighted measuring probe lowered down the annular space between the borehole wall and the outside wall of the standpipe.

Groundwater monitoring wells are surveyed for location and elevation. Where necessary, the location is determined to the nearest 0.1 m and referenced to the Australian Map Grid (AMG) coordinates or site grid coordinates.

Elevation measurements of the top of the standpipe and ground surface adjacent to the standpipe are determined to the nearest 0.01 m and referenced to an arbitrary datum selected on site or to the Australian Height Datum (AHD).

Records of procedures adopted, materials used, and the progress of the stages of well construction are kept. Information will also be recorded on the monitoring well configuration (i.e. screen location, casing length etc.) placement of sand filters and well seals, and general completion details.

2.2.2 Groundwater Monitoring Well Development

Following installation, the wells are developed. This involves removal of fluids that may have been introduced during drilling operations, fines from the sand filter and screens and fine sand, silt and clay from the aquifer around the well screen. Development of a well is performed after the installation of the well and at least 24 hours to seven days prior to sampling. Decontamination of all equipment used in well development is performed as described in Section 4.2.

Development is performed by pumping or bailing the groundwater from the well. The development process actively agitates the water column in the bore and continues until the water being removed is visibly clean and of a consistent quality (stabilisation of basic water chemistry parameters including pH, electrical conductivity (EC), redox potential (Eh), temperature and dissolved oxygen (DO)). The development process does not introduce air, water or other material into the aquifer. Qualitative measurement of sediment in removed development water may be accomplished by visual inspection of settable solids in the bottom of a container of known volume. All water removed during development is disposed of in accordance with environmental best practice. During development the well yield is estimated by monitoring the rate of recovery of water in the well after the development process. The effectiveness of development is checked by measuring the standpipe depth before and after pumping. Should any sediment be encountered within the sump after pumping has been performed, then the standpipe may require additional development or rehabilitation. A water level indicator which has been decontaminated is lowered into the monitoring well to determine the water level. The

water level elevation is referenced to the top of the standpipe and recorded to the nearest 1 mm.

2.2.3 Groundwater Monitoring Well Purging

Prior to sampling groundwater from a monitoring well, it is necessary to purge the well. The aim of the purging process is to remove the stagnant water that remains in a well between sampling rounds, while creating minimal disturbance to the groundwater flow regime. Upon completion of the purging process, it should be possible to collect groundwater samples that are representative of the aquifer.

Traditional purging techniques have involved the removal of an excess of three to five well volumes of water until the stablisation of basic water chemistry parameters (including pH, DO, EC, Eh and temperature) to within acceptable tolerance ranges has been achieved. However, this approach has typically involved the removal of large volumes of water which is often impractical or hazardous. It may also adversely effect the distribution of contaminants in the sub-surface (eg through dilution, mixing etc.) or introduce bias.

2.2.3.1 Low-Flow/Minimum Drawdown Purging

Low-flow/minimum drawdown purging is designed to minimise the disturbance of the water column and stress on the aquifer, and is the preferred purging technique. Low-flow refers to the velocity with which water enters the pump intake and that is imparted to the formation water in the immediate vicinity of the well screen. This method removes only small volumes of water, typically at rates between 0.1 and 0.5 L/min, at a discrete depth within the well.

Low-flow well purging procedures are:

- Purging and sampling occurs in a progression from least to most contaminated well, if this is known;
- Decontaminate all equipment that is used during purging in accordance with Section 4.2.
- The well, lock and the locking cap are checked for damage and tampering, and observations are noted;
- The presence of VOCs in the monument (well protector) head space is measured with a PID and the reading is noted;
- Upon removal of the well cap, the concentration of VOCs in the standpipe headspace is immediately measured using a PID;
- The depth to the standing water level in the well standpipe relative to the reference maker at the top of the bore casing is measured. The thickness of any LNAPLs floating on the standing water is measured if present (refer to Section 2.3.3.1);
- The pump is carefully and slowly lowered in the well so that the intake is located in the middle or slightly above the middle of the screened interval. Placement of the intake at the top of the water column is only recommended when the screen has been placed across the water table in an unconfined aquifer and this is the target sampling point. Placing the pump within 0.6 m of the base of the well is avoided as this may cause disturbance of sump deposits;
- The groundwater is pumped from the well using low-flow rates (<0.5 L/min) to maintain minimal drawdown in the well (<0.1 m change in the standing water level). Pump adjustments are made to obtain and stabilise the required flow rate as soon as possible. A stopwatch and graduated container are used to accurately determine flow rates;
- A flow-through cell is used to contain discharged water momentarily whilst water chemistry parameters are measured;
- The standing water level and the physical parameter readings are measured and recorded at an interval of two to three minutes. In addition, the flow rate is calculated and the drawdown in the well is measured. The pumping rate is adjusted as required. All measurements and changes to the pump flow rate are noted;
- The purging process continues until the physical parameters have stabilised. This has been achieved when the water is visibly clean (of low turbidity) and once three consecutive readings of all parameters are within the following tolerance range:
  - +/- 10% DO;
  - +/- 3% EC;
  - +/- 0.05 for pH; and
  - +/- 10 mV for Eh.

The key indicator parameter for samples to be analysed for VOCs is dissolved oxygen; for all other analytes the key parameter is turbidity.

- All appropriate purging details are recorded on the Groundwater Well Purging and Sampling Sheet;
- Throughout the purging procedure, especially when lowering pumps and water level measuring devices, efforts are focussed upon minimising the potential to mix the stagnant bore casing water with fresh screen water, and preventing of disturbance of sump deposits (which are particles that have collected over time and are the result of well development, prior purging and sampling event and natural colloidal transport and deposition);
- The total well depth is measured only after sampling has been completed; and
- The water removed during the purging process is disposed of in accordance with environmental best practice.

2.2.3.2 Low-Flow Purging in Low Permeability Formations (<0.1 L/min recharge)

The procedures for sampling in low permeability formations are as for Section 2.2.3.1, however purging is performed at low rates of <0.1 L/min.

The screen is not dewatered as this may expose the sample to air and other gases or floating substances. This may require repeated recovery of bore water

during purging while leaving the pump in place within the screened interval of the bore.

2.2.3.3 Passive Sampling

Passive sampling is the process of obtaining a sample from a well without disturbing the stagnant water within the well. This method involves permanently installing a pump in the well and allowing the water chemistry to stabilise for at least 48 hours prior to purging. During sampling no agitation of the water column in the well occurs as the pump has already been installed in the well. The measurement of stabilisation parameters during purging for passive sampling is not generally performed. However, the parameters are measured the first few times a well is sampled to enable a purge volume to be established.

2.2.3.4 Removal of a Number of Bore Volumes until Chemical Equilibrium is Reached

Though this method is significantly less desirable for purging than Low-Flow, it still does have some applications, particularly when volatiles or gas sensitive analytes are not contaminants of concern, or bailers are the only purging/sampling device available.

A number of bore volumes (commonly 3 – 5 bore volumes) may need to be withdrawn to ensure that stagnant water has been removed and the drawn water is representative of formation water. This is a guide only. In some situations 10 – 20 bore volumes may need to be removed. Bore volume may be calculated using the following formulae:

Bore Volume = casing volume + filter pack volume

$$= \Pi h_1 d_2^2/4 + n(\Pi h_1 d_1^2/4 - \Pi h_2 d_2^2/4)$$

Where: $\Pi = 3.14$

n = porosity (0.3 for most filter pack material)

h_1 = height of water column

d_1 = diameter of annulus

h_2 = length of filter pack

d_2 = diameter of casing

General well purging procedures using this approach are:

- The rate of purging is less than the rate of bore development;
- Physical parameters are measured upon removal of each bore volume to determine when stabilisation has been reached. This has been achieved when the water is visibly clean (of low turbidity) and once three consecutive readings of all parameters are within the following tolerance range:
  - +/- 10% DO;
  - +/- 3% EC;
  - +/- 0.05 for pH; and
  - +/- 10 mV for Eh.

The key indicator parameter for samples to be analysed for VOCs is dissolved oxygen; for all other analytes the key parameter is turbidity.

2.2.4 Groundwater Sampling

Groundwater samples may be collected once stabilisation of the physical parameters measured during the purging process has been achieved. The pump is not removed from the well between purging and sampling activities.

Well sampling procedures:

- A sheet of polyethylene is placed beside the well head and firmly fixed into position. Sampling equipment is placed onto the sheet to avoid cross contamination between the ground surface and the groundwater in the well;
- Ensure that appropriate PPE is used including disposable gloves, eye protection and tyvek suit (if appropriate);
- The flow cell is disconnected prior to sample collection;
- Groundwater samples are collected at the same or slightly lower flow rate used during purging (eg. 0.1-0.25 L/min) and such that the maximum allowable drawdown of 0.1 m is not exceeded. A sufficient flow rate is used to prevent cascading and/or air bubble formation in the sampling device tube line. This will minimise the loss of volatile compounds and decrease turbidity (which causes cloudy sampling);
- The sample containers for volatile (eg solvents, volatile organic compounds and fuel constituent) and gas sensitive analytes (eg CH_4, H_2S/HS, alkalinity, and Fe^{2+}) are filled first. Bottles for inorganic analytes can be filled in any order with the exception that samples requiring filtering are filled last;
- Turbulent filling of sample bottles is avoided. The groundwater is allowed to flow from the tubing gently down the inside of the container. The bottles are filled so as to almost overflow to exclude air bubbles prior to firmly screwing on the container cap. Bottles are not excessively overfilled as this may dilute the preservatives. In addition, if a bottle is spilt, it is discarded rather than refilled. An appropriate spare sample bottle is filled in lieu;
- Relevant sampling data is recorded on a Groundwater Well Purging Sheet. Such information includes sample identification number, sample type, a description of the groundwater, and the number and type of sample containers filled;
- The origin of each groundwater sample retrieved is identified by the sample number, eg. 123/GW4/5. The number 123 identifies the site, GW4 refers to the groundwater monitoring well from which the groundwater sample was taken and 5 indicates the number of the sampling event (in this case, the groundwater from well GW4 has been sampled five times);

- After the collection of the samples, the pump and tubing are removed from the well. The tubing, unless permanently installed, must either be disposed of in accordance with environmental best practice, or be dedicated to the well for resampling by hanging the tubing inside the well;
- The well depth is measured and recorded on the Groundwater Well Purging and Sampling Sheet; and
- The well is then closed and locked.

2.2.4.1 Filtration of Groundwater Samples

Filtration is a form of preservation and involves passing the groundwater sample through a filter to remove suspended solids. Filtration permits the determination of soluble (dissolved) constituents or the determination of contaminants associated with suspended matter (eg metals and hydrophobic contaminants, including PCBs and organochlorine pesticides, sorbed onto suspended particles). Though filtration should not be considered as a "fix" for poor purging and sampling practices it may, however, be necessary where it is not possible or practical to otherwise obtain a sample with low turbidity.

When filtration of a sample is required, the following guidelines are incorporated into the sampling procedure:

- Filtration occurs immediately after the collection of the sample and before chemical preservation;
- Filtration is undertaken using gravity or by applying vacuum or pump pressure. Only low pressures are applied;
- Filtering is traditionally performed using filters with a pore size of 0.45 μm. However, the use of filters with this pore size does not provide an accurate representation of truly dissolved metal concentrations. Filters with a pore size of 0.1 μm or 0.05 μm should be used as these are more appropriate under these circumstances;
- Filters are pre-rinsed following manufactures instructions;
- Filtering waters may result in a layer of „filter cake" which reduces the effective pore diameter of the filter and may introduce sample bias. It may be necessary to pre-filter samples through a larger pore size filter;
- Filters and filtering devices are cleaned in a similar manner to sample containers, and care is taken to ensure that contamination is not introduced in the field; and
- On-site (between samples) final rinses from filtration equipment should also be submitted to the laboratory as „rinsate blanks" for analysis.

Under some conditions it may not be possible to field filter a sample immediately after collection. In this situation the following procedures are to be followed:

- Collect the unfiltered sample in an appropriate container that has no preservatives;
- Overfill and immediately seal the sample container;
- Cool the sample and transport to the laboratory with minimum delay; and
- Inform the laboratory of the need to filter the sample immediately upon receipt. The laboratory should be pre-advised that they are being sent samples which have not been field filtered.

2.2.4.2 Sample Collection in the Event of Free Product LNAPL

In the event that free product LNAPL is detected when the standing water level is measured prior to purging, a sample of the LNAPL can be obtained using the following procedure:

- The well is not purged prior to collection of the free product LNAPL sample;
- A sample of the free product LNAPL is collected using either a single or double check valve (transparent) bailer;
- Based upon the depth to the free product and standing water level, the bailer is gently lowered to a depth so that the bailer bridges both the air/free product and free product/water interfaces;
- The bailer is removed; and
- The product/water interface is observed prior to draining the water from the bailer. The sample of free product is collected from the bailer once the water has been drained.

2.2.5 Pump Methods

2.2.5.1 Bladder Pump

When collecting a water sample using the bladder pump, an airline (thin tube) is connected to the pump from an air compressor or carbon dioxide gas bottle via a control box. The control box regulates the flow of air/gas into the pump. A water discharge line (thick tube) is connected to the pump.

The procedure for using the bladder pump is:

- Connect the airline from the air compressor/gas bottle to the control box and the control box to the bladder pump. Connect the water discharge line to the bladder pump. A nylon safety line is also to be securely tied to the pump designated anchor point;
- Using the safety line attached to the bladder pump (not the air or water discharge lines) slowly lower the bladder pump into the well so that the intake for the pump is within the required screened interval. This is generally slightly above the middle of the screened interval if the whole screen is submerged. The pump intake is not lowered any closer than approximately 0.6 m to the bottom of the well to prevent disturbance of sump sediment. The safety line is securely tied off to the well monument or other temporary fixture; and
- The compressor/gas bottle regulator and control box are turned on. The dials in the control box are adjusted to position such that a steady flow of discharge water from the bladder pump is achieved. The dial settings will vary depending on the head of water in the well, the well yield and flow rate required.

2.2.5.2 Bailer

When collecting a water sample using a bailer, the bailer is lowered gently into the well, until it is within the screened interval. The bailer is then steadily withdrawn, to minimise agitation of water in the well and disturbance of the surrounding sand filter and formation material.

The procedure for using the bailer is:

- Slowly lower the bailer into the water and allow it to sink and fill with a minimum of disturbance. Discard the first bailer sample into a container in order to rinse the bailer with well water; and
- Collect samples for semi-volatile organics first, followed by other organics and then inorganics. The samples are collected by emptying the bailer through the bottom emptying device (BED). The sample is discharged down the side of the sample bottle to minimise entry turbulence. The flow from the BED is adjusted so that a relatively low flowrate is maintained.

2.2.5.3 Inertia Pump

The intake of the inertia pump is placed within the well screen when collecting a water sample or purging a well.

The procedure for using the inertia pump is:

- Securely fasten the inertia pump to the discharge tube without using any glues or solvent based adhesive tapes;
- Slowly lower the inertia pump and discharge tube into the well to the full depth of the well;
- Carefully pull the discharge tube approximately 0.5 m off the base of the well and cut the discharge tube with approximately 1.0 m of tubing extending out of the well; and
- Commence agitation of the inertia pump and direct the discharge tube into a volume measurement vessel for a few moments to rinse the discharge tube; The flow from the inertia pump is adjusted so that a relatively low flowrate is maintained.

2.3 PID Measurements

A PID is used on-site to measure the concentration of total ionisable compounds released from the matrix of soil and water samples. Total ionisable compounds are measured by taking a headspace reading of the sample. This provides an initial qualitative screening of the degree of contamination of the sample with VOCs. The PID specifications are listed in Section 3.1.1.

Background concentrations of total ionisable compounds in the ambient air in the general vicinity of the work area are established prior to the commencement of site activities. Background measurements are normally taken approximately 5-10 m upwind of the work area. The PID readings are observed before and after each measurement of a sample to ensure that the PID is operating correctly. Readings of PID maximums, fluctuations and general comments of observation are recorded.

2.3.1 Field Headspace

During a field headspace analysis the entrapped volatile ionisable vapours which are released from the soil matrix or water in the headspace of a sealed container are measured using a PID. The screening of recovered samples provides a semi quantitative assessment of the concentration of VOCs.

The procedures followed in performing field headspace on soil samples are:

- Fill a small sealable plastic sample bag with the recovered soil sample to no more than ¾ full;
- Keep samples out of direct sunlight as this may affect the readings;
- Approximately 20 minutes to one hour after placing the sample into the bag, check that the PID reading is constant and similar to the background. Insert the tip of the PID through the wall of the plastic bag and measure the airspace above the sample;
- Monitor and record the PID readings noting fluctuations and maximum readings;
- Monitor the readings after returning the PID to a location with background concentrations; and
- If perforations are present in the bag prior to analysis transfer the sample to a new plastic bag and test after one hour.

2.4 Sample Containers, Preservation and Holding Times

The type of sample containers, preservation techniques and holding times required by the analyses are selected on the basis of the analyte of interest and sample matrix according to Australian and USEPA protocols.

Sample preservation techniques are required to ensure that degradation of the sample does not occur. Most analytes have a finite stability in a sample matrix. Therefore, published holding times are not exceeded prior to extraction and/or analysis of the samples.

2.5 Sample Documentation and Custody

The name of the field consultant is recorded on the Soil Profile Logs. All sample containers are labelled as previously described (beginning of Section 2).

The method for the collection of the soil or water samples is described, and the depths from which the soil samples are recovered is stated on the logs.

Chain of Custody (COC) documentation is prepared by the field consultant prior to delivery of samples to the laboratory. Information recorded on the COC form includes:

- Site identifier (referred to as job number on the COC);

- Sample number;
- Sample type;
- Chemical analyses required;
- Date of sample collection;
- Laboratory address;
- Date and time that COC is sent to laboratory;
- Receival time at laboratory (completed by laboratory);
- Due date for preliminary and final results;
- Person sending samples;
- Person receiving samples;
- Method of delivery to laboratory;
- Analytical methods used for each analyte;
- Detection limits required; and
- Notes to the laboratory which outline specific instructions.

Relevant works and major activities carried out on-site are recorded on Record of Progress Reports. Records of groundwater sampling activities will include details of well materials installed, as well as details of sampling, measurement of groundwater parameters and the field tests performed.

3. FIELD INSTRUMENTATION / MEASUREMENT

3.1 Equipment and Calibration

3.1.1 Photoionisation Detector (PID)

A PID is used on-site to measure the presence of VOCs. The PID generally used by Peter J Ramsay & Associates has the following specifications:

- Type: MiniRae 2000 (intrinsically safe)
- Type of lamp: 10.2 eV
- Calibration gas: Isobutylene
- Gas concentration: 102 ppm

The PID is calibrated and its battery charge checked prior to site work. It is recalibrated on a daily basis, using standard laboratory grade calibration quality gas. Interchangeable, clean, in-line filters for the PID probe are available to allow rapid decontamination of the unit in the field if background readings measured by the instrument are significantly greater than the background air concentration initially established. The battery in the PID unit is recharged after every day's use in the field.

3.1.2 pH Meter

For groundwater monitoring and development/purging purposes, surface water and wastewater monitoring, a portable water quality meter is used to measure pH levels, temperature, conductivity, TDS, DO and redox potential. The water meter used in field measurements has the following specifications:

- Type: TPS Field Lab Analyser
- Model: 90-FLMV
- Range: pH 0.00 to 14.00
Temp – 10.0 to 110.0 ^{o}C
0 to 200 mS
0 to 100 ppk
0 to 32 ppm
–1999 to +1999 mV
- Resolution: pH 0.01
Temp 0.1 ^{o}C
0.025 mS
0.1 ppk
0.01 ppm
1.0 mV
- Accuracy: pH ±0.01
Temp (including sensor error) ±0.2 ^{o}C
0.25 ppk
0.5 ppm
±1.0 mV
- Temperature compensation: All readings autonormalised to 25 ^{o}C at -2.2%/ ^{o}C
- Calibration: Two point automatic in pH 4.01, pH 6.86, pH 7.00, pH 9.18 and pH 10.01 buffered solution.
All other probes automatic to user defined standard

The water quality meter is hired from ThemoFisher Scientific and is calibrated prior to hire using user defined standards as described above. An equipment certification report is provided with the water quality meter detailing the calibration of the meter. The meter readings, measuring maximums and general comments of observations made during monitoring are recorded.

3.1.3 Bladder Pump

For groundwater sampling from monitoring wells a bladder pump may be used. The bladder pump used has the following specifications:

- Type: QED Micropurge Sample Pro
- Description: Stainless steel pump (47 mm OD) 6.4 mm OD air fitting and 9.5 mm OD fluid discharge polyethylene tubing low density (food grade)
- Model: QS-P6-PSD

The bladder pump is hired from ThermoFisher Scientific and an equipment report is provided on hire. The bladder pump is disassembled and decontaminated between wells. The bladder is replaced should it become damaged or is used to sample significantly contaminated groundwater.

3.1.4 Teflon Bailer

For groundwater monitoring well development/ purging and sampling of groundwater from monitoring wells an opaque Teflon bailer may be used. The

bailer is fitted with a Teflon bottom emptying device to minimise sample turbulence. The bailer used in field measurements has the following specifications:

- Type: Timco regular bailer
- Description: Opaque Teflon 42.2 mm OD.

The Teflon bailer is solvent free. This type of bailer can be easily decontaminated and the Teflon material will not introduce contamination to the sample.

3.1.5 Inertia Pump

An inertia pump may be used for groundwater monitoring well development/ purging prior to sampling. The typical inertial pump has the following specifications:

- Type: Waterra PowerPack PP-1, Inertial Pump Actuator
- Description: Delrin (acetal thermoplastic or stainless steel) foot valve (16 mm ID, 23 mm OD) 12 mm ID, 16 mm OD polyethylene tubing low density (food grade).

The pump and tubing are dedicated to the development/purging of a well, eliminating the need to decontaminate the equipment between sampling events. The pump rate is variable depending on the vigour of the agitation.

4. DECONTAMINATION PROCEDURES

4.1 Drilling/Excavating Equipment and Materials

Drilling/excavating equipment and materials that are decontaminated include:

- Equipment which is used directly in soil boring/ excavation and sampling activities prior to mobilisation onto the site;
- Any part of drilling equipment, trailer or other vehicle which operate above or immediately adjacent to the sample location;
- Down-hole drilling equipment (eg. augers, down-hole hammer, rods, bits etc.);
- Sampling equipment (eg. split spoon samplers, push tubes, bailers etc.);
- In-line micro-filters in compressor lines used when down-hole hammer techniques are deployed;
- Groundwater monitoring well materials where appropriate; and
- Backhoe buckets.

Decontamination procedures comprise:

- Removal of encrusted material;
- High pressure water scrubbing using laboratory grade detergent;
- Rinsing with water of potable quality; and
- Final rinsing with deionised water.

Decontamination is undertaken at a specified cleaning station located on-site, comprising:

- Appropriate drainage and bunding if available;
- A grassed area if bunded area is not available;
- Power and water services; and
- Soil removed from decontaminated equipment is collected and disposed of in accordance with environmental best practice.

Large machinery or equipment are decontaminated at this location so as not to disrupt site activities or potentially contaminate other areas.

4.2 Sampling Equipment

Sampling equipment is cleaned prior to sampling to prevent cross contamination. The cleaning procedure is:

- Wash and brush scrub with phosphate free laboratory grade detergent;
- Rinse with water of potable quality; and
- Rinse with deionised water.

4.3 Personnel

Personnel involved with site activities are required to comply with the Peter J Ramsay & Associates" Health and Safety Plan for the project. Decontamination requirements as outlined in the Health and Safety Plan refer to:

- The use of proper and effective clothing and personal protective equipment during sampling and site activities; and
- The proper and appropriate disposal of contaminated clothing that is not reusable (eg. disposable gloves, respirator cartridges, tyvek suits, etc.).

Reusable personal protective equipment (eg. steel cap boots, face mask, hard hat etc.) are decontaminated on a daily basis and on the conclusion of the site activities by:

- Removing encrusted material;
- Washing and brush scrubbing with detergent; and
- Rinsing with potable quality water.

4.4 General Site

Sample locations are backfilled and excess material is disposed of appropriately off-site and if necessary, inside sealed containers. Wash down of sealed areas (eg. concrete, bitumen etc.) is carried out subject to availability of water, site drainage considerations and site activity constraints.

5. QUALITY CONTROL (QC) SAMPLES AND ANALYSIS

Inaccuracies in sampling and analytical programs can result from many causes, including collection of unrepresentative samples, cross contamination between samples, unanticipated interferences between elements during laboratory analyses, equipment malfunctions and operator error

(USEPA 1986). Inappropriate sampling, preservation, handling, storage and analytical techniques can also reduce the precision and accuracy of results.

The NEPM has documented quality assurance procedures to be implemented during an environmental investigation. An integral component of this is a QC program for sampling and analysis to ensure that the required degree of accuracy and precision is obtained. The NEPM and EPA recommend the use of two laboratories for the implementation of a QC program for the analyses in addition to the QC procedures followed by the laboratories.

Peter J Ramsay & Associates initiate a QC program to monitor and measure the effectiveness of the QA procedures by comparison with acceptance criteria, and to appraise the accuracy and reproducibility of the analyses. The accuracy of an analysis is a measure of the variation between the concentration of an analyte obtained by the method and the true concentration in the sample. This is determined by comparing the analytical results from field duplicate samples analysed at two laboratories, and by the laboratory's internal QC programs. The precision of a result is a measure of the reproducibility of the result. This is, in effect, a measure of the natural spread of data about the mean result.

According to the NEPM a split of a minimum of 10% of the samples and field duplicate samples (5% split/inter-laboratory and 5% blind replicate/intra-laboratory) as well as blanks is required. Where less than 20 samples are to be analysed, a minimum of two field duplicate samples (one split/inter-laboratory and one blind replicate/intra-laboratory) and a blank is considered appropriate.

5.1 Peter J Ramsay & Associates' Quality Control Program

The QC program undertaken by Peter J Ramsay & Associates is in accordance with the recommendations of the environmental agencies, and follows the protocols in the NEPM. Samples are retrieved and analysed in accordance with the NEPM recommendations for the use of containers, preservation techniques and holding times.

5.1.1 Field Split/Inter-Laboratory Samples

Split/inter-laboratory samples are used as a check on the accuracy of the field sampling and analytical procedures. The QC program implemented by Peter J Ramsay & Associates involves sending duplicates of approximately 5% of the primary samples analysed at the primary laboratory to a second laboratory. Primary soil and groundwater samples are selected at random. Each of these samples is split in the field to form a primary sample and a split/ inter-laboratory sample. The results of the analyses of the split/inter-laboratory samples (analysed by the secondary laboratory) are compared with the results from the primary laboratory to determine the accuracy of the sampling and analytical procedures.

5.1.2 Blind/Intra-Laboratory Replicate Samples

Blind replicate/intra-laboratory samples are used to determine the precision of the field sampling procedures and laboratory analyses. The QC program for the sampling and analytical program are implemented by sending duplicate samples at a frequency of approximately 5% of the total number of primary samples for analysis by the primary laboratory. Primary soil and groundwater samples are selected at random. Each of these samples is split in the field to form a primary sample and a blind replicate/intra-laboratory sample. Each blind replicate/intra-laboratory sample is dispatched to the primary laboratory with a sample identification number different to its primary sample number in order to conceal its identity. The results of the blind replicate/intra-laboratory sample are used to determine the precision of the sampling and analytical procedures.

5.1.3 Blank Samples (Rinsate Blanks and Trip Blanks)

Up to 5% of the total number of primary samples are blanks collected in the field. Blanks are comprised of trip blanks and rinsate blanks. A trip blank is a sample of deionised water prepared prior to sampling. The trip blank is carried through the sampling program, transported with the samples to the laboratory and stored with the samples. They are used to identify laboratory errors or to identify sources of contamination due to sample storage and handling.

Rinsate blanks are samples of deionised water collected from the field equipment after decontamination. They are used to determine the effectiveness of the decontamination procedures.

5.1.4 Relative Percentage Difference

The analytical results of the split/inter-laboratory and blind replicate/intra-laboratory analyses are compared using the Relative Percent Difference (RPD). The RPD is a measure of the difference between the results of the duplicate analyses. The RPD is calculated by:

$$RPD = \frac{Sample(A) - Sample(B)}{Mean of Samples(A) + (B)} x100$$

According to the USEPA methodology (USEPA 1986) the criteria for valid results for laboratory duplicates are that the RPDs are required to be <20% for water and <35% for soil. Where the duplicate results are lower than five times the detection limit, the USEPA methodology indicates that the results are valid if the difference between the results for the duplicate soil sample is equal to or less than twice the detection limit.

For samples split in the field, the NEPM refers to Australian Standard AS4482.1-2005 which provides a guide to the validity of the data obtained from duplicate samples. According to the Australian Standard an RPD of up to 50% is the acceptance criteria. RPDs of up to 50% are considered to demonstrate good correlation between duplicate analytical results. The Australian Standard also states that the variation can be expected to be higher for organic analytes than for inorganics, and for low concentrations of analytes. Based on Peter J Ramsay & Associates" experience RPDs up to 70% are considered to be acceptable for organic species. RPDs of 100% or more are generally considered to demonstrate poor correlation.

5.2 Laboratory Quality Control Program

The laboratories perform internal QC programs in accordance with their NATA registration to ensure that the analytical procedures are followed correctly and with the required degree of accuracy. This involves the laboratories preparing and analysing their own duplicate samples, blanks and analytical standards.

The results from the laboratories" internal duplicate samples are compared with the results from the primary (field) samples, in order to determine the precision of the analyses. The duplicate samples are subjected to the same preparation and analytical procedures as the primary samples.

Reagent blank analyses and instrument calibrations using chemical standards are routinely conducted by the laboratories.

The laboratories will also determine the accuracy of the analytical procedures used as part of their internal quality control procedures. This is determined using either control samples (where the concentration of the species to be determined is known) or matrix spikes.

The laboratories are required to analyse matrix spikes or control samples at a minimum frequency of 5% of the total number of primary samples. The results of the analysis of the laboratory spiked samples are compared with the theoretical recovery. This is consistent with the approach recommended by the USEPA.

The results of analyses of method blanks, duplicates and control samples are compared to established laboratory quality assurance criteria for precision and accuracy. If the results do not meet the criteria the analyses are repeated. These criteria are:

- Method blanks should not return any positives on analysis;
- Duplicate soil samples should not vary by more than 35% from the mean result;
- Duplicate water samples should not vary by more than 20% from the mean result; and
- Control samples should generally give a recovery of 75-125%, depending on the chemical and medium.

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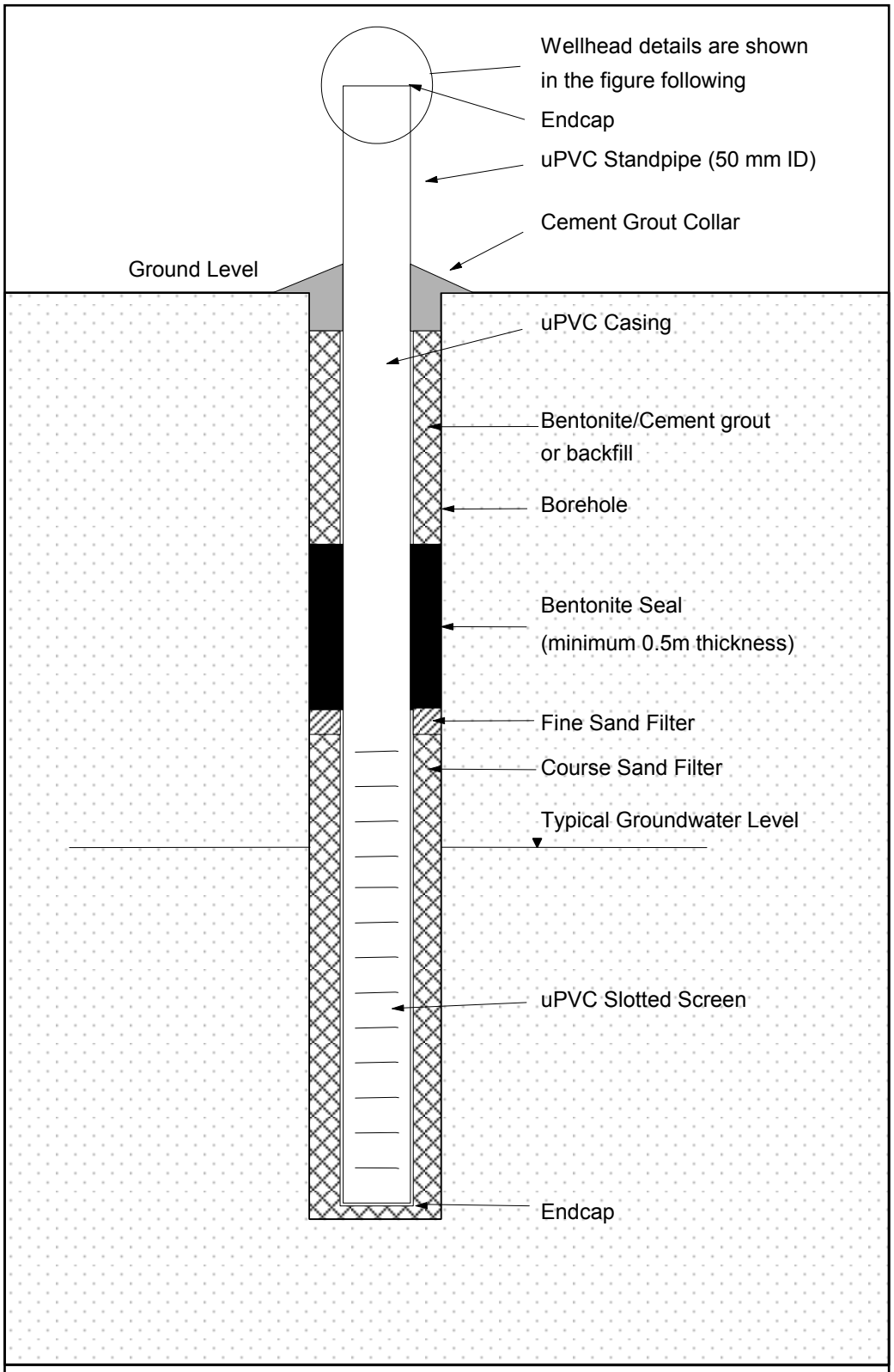
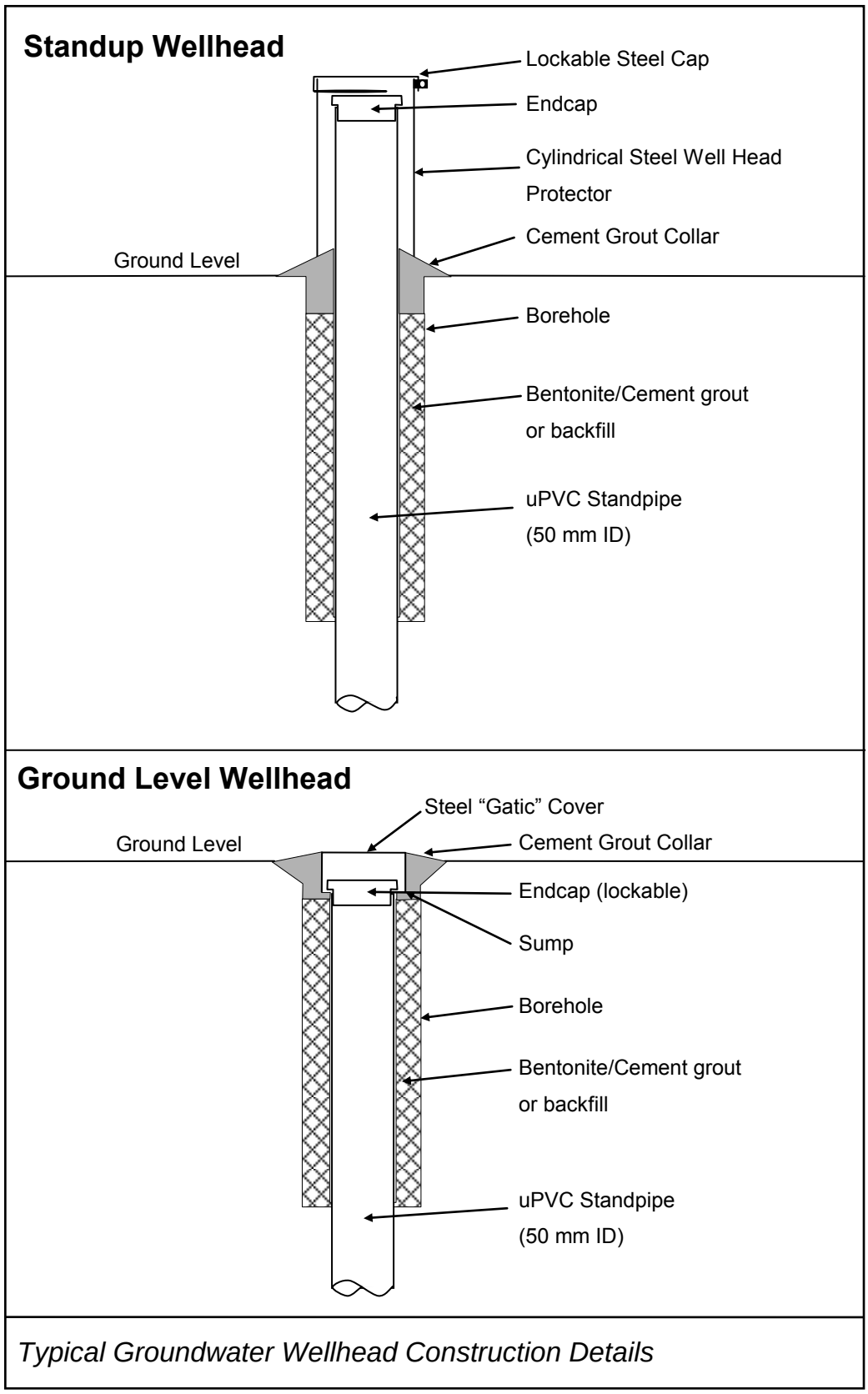
Figure 1 Groundwater Monitoring Well Construction Details



Typical Groundwater Monitoring Well Construction Details

Figure 2 Groundwater Wellhead Construction Details



Typical Groundwater Wellhead Construction Details

Appendix F

Soil Profile Logs

PETER J RAMSAY & ASSOCIATES
www.pjra.com.au

Borehole Log: BH1

Client: Charter Hall
Project: Targeted Site Investigation
Job Number: 884.1
Site Address: 2 Hume Highway, Chullora NSW

Locate Method:
Coordinates: **N** 6248335
E 320301
Borehole Location: SE Car Park

Drill Contractor: Terratest
Drill Model: Geoprobe
Drill Fluid: NA
Total Depth: 3.8 m
Bore Diameter: 100 mm

Logged By: BH
Start Date: 27 July 2015
End Date: 27 July 2015
Checked By: BH

DEPTH (mBGL)	STRATIGRAPHY	GRAIN SIZE	PLASTICITY	MOISTURE	WATER STRIKES	GROUNDWATER	DRILL METHOD	SAMPLES	ODOUR	PID (ppm)	COMMENTS
0.00	FILL: topsoil, clay, brown, roots		L				HA	DS 884/BH1A	NP		
0.50	FILL: gravelly clay, brown-grey		M					DS 884/BH1B	NP		
	angular gravel, coarse		M					DS 884/BH1C	NP		
1.00											
1.50							PT	DS 884/BH1D	NP		
2.00	increasing sand content		L					DS 884/BH1E	NP		
2.50											
3.00								DS 884/BH1G	NP		
3.50								DS 884/BH1I	NP		
	Borehole Terminated at 3.8 m due to refusal on SANDSTONE - borehole abandoned										
4.00											
4.50											

GRAIN SIZE
F Fine
M Medium
C Coarse

PLASTICITY
L Low
M Medium
H High

MOISTURE
D Dry
M Moist
W Wet

WATER STRIKES
▼ Observation During Drilling

GROUNDWATER
▼ Standing Water Level on completion of drilling

SAMPLE TYPE
D Disturbed Sample
U Undisturbed Sample
D/I Intact Sample Disturbed

DRILL METHOD
HA Hand Auger
SP Split Spoon
SS Solid Stem Auger
HS Hollow Stem Auger
PT Push Tube
AK Air Knife
HQ Diamond Core - 63 mm
NMLC Diamond Core - 52 mm
NQ Diamond Core - 47 mm
WB Washbore
NDD Non Destructive Drilling
CC Concrete Core

ODOUR
NP Not Perceptible
W Weak (Type)
D Distinct (Type)
S Strong (Type)
VS Very Strong (Type)

OTHER
PID Photoionisation Detector
ppm parts per million
h/c Hydrocarbon

Photoionisation Detector (PID) Measurements
All PID readings are headspace unless otherwise indicated as per below
I In situ
A Above soil
- No measurment recorded

PETER J RAMSAY & ASSOCIATES
www.pjra.com.au

Borehole Log: BH1R

Client: Charter Hall
Project: Targeted Site Investigation
Job Number: 884.1
Site Address: 2 Hume Highway, Chullora NSW

Locate Method:
Coordinates: **N** 6248335
E 320301
Borehole Location: SE Car Park

Drill Contractor: Terratest
Drill Model: Geoprobe
Drill Fluid: NA
Total Depth: 10.0 m
Bore Diameter: 100 mm

Logged By: RD
Start Date: 27 July 2015
End Date: 27 July 2015
Checked By: BH

DEPTH (mBGL)	STRATIGRAPHY	GRAIN SIZE	PLASTICITY	MOISTURE	DRILL METHOD	SAMPLES	ODOUR	PID (ppm)	COMMENTS
0.00	FILL: clayey silt, brown				HA				
0.50	FILL: gravelly clay, light brown, common sand, concretions and sandstone lenses								
4.50			M	D	PT	DS 884/BH1J	NP	0.1	
5.50			M	D		DS 884/BH1K	NP	0.2	
6.00	FILL: clay, red-brown								Disturbed Natural Soil
6.50	FILL: gravelly silt, grey, white mottles, common angular concretions	F		D		DS 884/BH1L	NP	0.0	
7.50	FILL: silty clay, red-brown, siltstone lenses, common organic matter		L	D		DS 884/BH1M	NP	0.1	Disturbed Natural Soil
8.00	FILL: gravelly silt, grey								
	FILL: gravelly clay, red-orange								
8.50						DS 884/BH1N	NP	0.1	
9.00	FILL: gravelly silt, grey								
	CLAY: red-orange-brown					DS 884/BH1O	NP	0.1	Natural Soil
9.50						DS 884/BH1P	NP	0.1	
10.00	Borehole Terminated at 10.0 m in NATURAL SOIL - limit of investigation								
10.50									

GRAIN SIZE
F Fine
M Medium
C Coarse

PLASTICITY
L Low
M Medium
H High

MOISTURE
D Dry
M Moist
W Wet

WATER STRIKES
▼ Observation During Drilling

GROUNDWATER
▼ Standing Water Level on completion of drilling

SAMPLE TYPE
D Disturbed Sample
U Undisturbed Sample
D/I Intact Sample Disturbed

DRILL METHOD
HA Hand Auger
SP Split Spoon
SS Solid Stem Auger
HS Hollow Stem Auger
PT Push Tube
AK Air Knife
HQ Diamond Core - 63 mm
NMLC Diamond Core - 52 mm
NQ Diamond Core - 47 mm
WB Washbore
NDD Non Destructive Drilling
CC Concrete Core

ODOUR
NP Not Perceptible
W Weak (Type)
D Distinct (Type)
S Strong (Type)
VS Very Strong (Type)

OTHER
PID Photoionisation Detector
ppm parts per million
h/c Hydrocarbon

Photoionisation Detector (PID) Measurements
All PID readings are headspace unless otherwise indicated as per below
I In situ
A Above soil
- No measurment recorded

PETER J RAMSAY & ASSOCIATES
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Borehole Log: BH2

Client: Charter Hall
Project: Targeted Site Investigation
Job Number: 884.1
Site Address: 2 Hume Highway, Chullora NSW

Locate Method:
Coordinates: **N** 6248374
E 320290
Borehole Location: W Car Park

Drill Contractor: Terratest
Drill Model: Geoprobe
Drill Fluid: NA
Total Depth: 7.0 m
Bore Diameter: 100 mm

Logged By: RD
Start Date: 27 July 2015
End Date: 27 July 2015
Checked By: BH

DEPTH (mBGL)	STRATIGRAPHY	GRAIN SIZE	PLASTICITY	MOISTURE	DRILL METHOD	SAMPLES	ODOUR	PID (ppm)	COMMENTS
0.00	FILL: loam, brown, organic	F		D	HA	DS 884/BH2A	NP	0.1	
0.50	FILL: clay, red-orange, common gravels		M	D		DS 884/BH2B x2 [QC=DUP01]	NP	0.1	Disturbed Natural Soil
1.00	FILL: gravelly clay, brown, glass, plastic, plaster, organic fragments		M	D		DS 884/BH2C	NP	0.1	
1.50						DS 884/BH2D	NP	0.1	
2.00									
2.50	becoming silty		L	D		DS 884/BH2E	NP	0.2	
3.00									
3.50			L	D	PT	DS 884/BH2F	NP	0.2	
4.00									
4.50			L	D		DS 884/BH2G	NP	0.4	
5.00									
5.50			L	D		DS 884/BH2H	NP	0.4	
6.00									
6.50	CLAY: red-orange		L	D		DS 884/BH2I	NP	0.2	Natural Soil
7.00	Borehole Terminated at 7.0 m in NATURAL SOIL - limit of investigation								
7.50									

GRAIN SIZE
F Fine
M Medium
C Coarse

PLASTICITY
L Low
M Medium
H High

MOISTURE
D Dry
M Moist
W Wet

WATER STRIKES
▼ Observation During Drilling

GROUNDWATER
▼ Standing Water Level on completion of drilling

SAMPLE TYPE
D Disturbed Sample
U Undisturbed Sample
D/I Intact Sample Disturbed

DRILL METHOD
HA Hand Auger
SP Split Spoon
SS Solid Stem Auger
HS Hollow Stem Auger
PT Push Tube
AK Air Knife
HQ Diamond Core - 63 mm
NMLC Diamond Core - 52 mm
NQ Diamond Core - 47 mm
WB Washbore
NDD Non Destructive Drilling
CC Concrete Core

ODOUR
NP Not Perceptible
W Weak (Type)
D Distinct (Type)
S Strong (Type)
VS Very Strong (Type)

OTHER
PID Photoionisation Detector
ppm parts per million
h/c Hydrocarbon

Photoionisation Detector (PID) Measurements
All PID readings are headspace unless otherwise indicated as per below
I In situ
A Above soil
- No measurment recorded

PETER J RAMSAY & ASSOCIATES
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Borehole Log: BH3

Client: Charter Hall
Project: Targeted Site Investigation
Job Number: 884.1
Site Address: 2 Hume Highway, Chullora NSW

Locate Method:
Coordinates: **N** 6248359
E 320333
Borehole Location: NE Car park

Drill Contractor: Terratest
Drill Model: Geoprobe
Drill Fluid: NA
Total Depth: 7.0 m
Bore Diameter: 100 mm

Logged By: RD
Start Date: 27 July 2015
End Date: 27 July 2015
Checked By: BH

DEPTH (mBGL)	STRATIGRAPHY	GRAIN SIZE	PLASTICITY	MOISTURE	DRILL METHOD	SAMPLES	ODOUR	PID (ppm)	COMMENTS
0.00	FILL: loam, brown, organic	F		D	HA	DS 884/BH3A	NP	0.1	
	FILL: clay, red-orange, common gravels, few cobbles, plant matter		M	D					Disturbed Natural Soil
0.50						DS 884/BH3B	NP	0.1	
	FILL: gravelly clay, red-orange, charcoal fragments, white mottles		L	D					
1.00						DS 884/BH3C	NP	0.1	
1.50			L	D		DS 884/BH3D	NP	0.2	
2.00									
2.50			L	D		DS 884/BH3E	NP	0.2	
3.00									
3.50			L	D	PT	DS 884/BH3F	NP	0.2	
4.00									
4.50	FILL: gravelly silt, brown-black, white mottls	F		D		DS 884/BH3G	NP	0.1	
5.00									
5.50						DS 884/BH3H	NP	0.3	
	becoming clayey, red-orange		M	D					
6.00									
6.50	CLAY: red-brown		H	M-W		DS 884/BH3I	W(organic)	0.1	Natural Soil
7.00	Borehole Terminated at 7.0 m in NATURAL SOIL - limit of investigation								
7.50									

GRAIN SIZE
F Fine
M Medium
C Coarse

PLASTICITY
L Low
M Medium
H High

MOISTURE
D Dry
M Moist
W Wet

WATER STRIKES
▼ Observation During Drilling

GROUNDWATER
▼ Standing Water Level on completion of drilling

SAMPLE TYPE
D Disturbed Sample
U Undisturbed Sample
D/I Intact Sample Disturbed

DRILL METHOD
HA Hand Auger
SP Split Spoon
SS Solid Stem Auger
HS Hollow Stem Auger
PT Push Tube
AK Air Knife
HQ Diamond Core - 63 mm
NMLC Diamond Core - 52 mm
NQ Diamond Core - 47 mm
WB Washbore
NDD Non Destructive Drilling
CC Concrete Core

ODOUR
NP Not Perceptible
W Weak (Type)
D Distinct (Type)
S Strong (Type)
VS Very Strong (Type)

OTHER
PID Photoionisation Detector
ppm parts per million
h/c Hydrocarbon

Photoionisation Detector (PID) Measurements
All PID readings are headspace unless otherwise indicated as per below
I In situ
A Above soil
- No measurment recorded

PETER J RAMSAY & ASSOCIATES
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Borehole Log: BH4

Client: Charter Hall
Project: Targeted Site Investigation
Job Number: 884.1
Site Address: 2 Hume Highway, Chullora NSW

Locate Method:
Coordinates: **N** 6248414
E 320309
Borehole Location: NW Car Park

Drill Contractor: Terratest
Drill Model: Geoprobe
Drill Fluid: NA
Total Depth: 5.0 m
Bore Diameter: 100 mm

Logged By: RD
Start Date: 27 July 2015
End Date: 27 July 2015
Checked By: BH

DEPTH (mBGL)	STRATIGRAPHY	GRAIN SIZE	PLASTICITY	MOISTURE	WATER STRIKES	GROUNDWATER	DRILL METHOD	SAMPLES	ODOUR	PID (ppm)	COMMENTS
0.00	FILL: sand, orange	F		M			HA	DS 884/BH4A	NP	0.0	
	FILL: clayey sand, brown-orange, common gravels, bitumen	F		D							
0.50								DS 884/BH4B x2 [QC=DUP02]	NP	0.0	
1.00	FILL: gravelly clay, red-brown		L	D				DS 884/BH4C	NP	0.1	
1.50							PT	DS 884/BH4D	NP	0.1	
2.00											
	FILL: gravelly silt, black, potential ACM fragments	F		D							
2.50								884/BH4E	NP		
	FILL: gravelly clay, red-brown		M	D							
3.00											
	CLAY: red-brown		H	D							Natural Soil
3.50								DS 884/BH4F	NP	0.2	
4.00	becoming orange-red, mottled siltstone fragments		L	D							
4.50								DS 884/BH4G	NP	0.1	
5.00	Borehole Terminated at 5.0 m in NATURAL SOIL - limit of investigation										

GRAIN SIZE
F Fine
M Medium
C Coarse

PLASTICITY
L Low
M Medium
H High

MOISTURE
D Dry
M Moist
W Wet

WATER STRIKES
▼ Observation During Drilling

GROUNDWATER
▼ Standing Water Level on completion of drilling

SAMPLE TYPE
D Disturbed Sample
U Undisturbed Sample
D/I Intact Sample Disturbed

DRILL METHOD
HA Hand Auger
SP Split Spoon
SS Solid Stem Auger
HS Hollow Stem Auger
PT Push Tube
AK Air Knife
HQ Diamond Core - 63 mm
NMLC Diamond Core - 52 mm
NQ Diamond Core - 47 mm
WB Washbore
NDD Non Destructive Drilling
CC Concrete Core

ODOUR
NP Not Perceptible
W Weak (Type)
D Distinct (Type)
S Strong (Type)
VS Very Strong (Type)

OTHER
PID Photoionisation Detector
ppm parts per million
h/c Hydrocarbon

Photoionisation Detector (PID) Measurements
All PID readings are headspace unless otherwise indicated as per below
I In situ
A Above soil
- No measurment recorded

PETER J RAMSAY & ASSOCIATES
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Borehole Log: BH5

Client: Charter Hall
Project: Targeted Site Investigation
Job Number: 884.1
Site Address: 2 Hume Highway, Chullora NSW

Locate Method:
Coordinates: **N** 6248360
E 320015
Borehole Location: Diesel Pump

Drill Contractor: NA
Drill Model: Hand Auger
Drill Fluid: NA
Total Depth: 1.8 m
Bore Diameter: 100 mm

Logged By: BH/RD
Start Date: 27 July 2015
End Date: 27 July 2015
Checked By: BH

DEPTH (mBGL)	GRAPHIC LOG	STRATIGRAPHY	GRAIN SIZE	PLASTICITY	MOISTURE	WATER STRIKES	GROUNDWATER	DRILL METHOD	SAMPLES	ODOUR	PID (ppm)	COMMENTS
0.00		CONCRETE										
		FILL: clayey gravel, brown (subgrade)	C		M			HA	DS 884/BH5A	D(HC)	9.5	
0.50									DS 884/BH5B	D(HC)	0.8	
1.00									DS 884/BH5C	D(HC)	0.4	
1.50									DS 884/BH5D	S(HC)	20.7	
		Borehole Terminated at 1.8 m in FILL - limit of investigation										
2.00												

GRAIN SIZE
F Fine
M Medium
C Coarse

PLASTICITY
L Low
M Medium
H High

MOISTURE
D Dry
M Moist
W Wet

WATER STRIKES
▼ Observation During Drilling

GROUNDWATER
▼ Standing Water Level on completion of drilling

SAMPLE TYPE
D Disturbed Sample
U Undisturbed Sample
D/I Intact Sample Disturbed

DRILL METHOD
HA Hand Auger
SP Split Spoon
SS Solid Stem Auger
HS Hollow Stem Auger
PT Push Tube
AK Air Knife
HQ Diamond Core - 63 mm
NMLC Diamond Core - 52 mm
NQ Diamond Core - 47 mm
WB Washbore
NDD Non Destructive Drilling
CC Concrete Core

ODOUR
NP Not Perceptible
W Weak (Type)
D Distinct (Type)
S Strong (Type)
VS Very Strong (Type)

OTHER
PID Photoionisation Detector
ppm parts per million
h/c Hydrocarbon

Photoionisation Detector (PID) Measurements
All PID readings are headspace unless otherwise indicated as per below
I In situ
A Above soil
- No measurment recorded

PETER J RAMSAY & ASSOCIATES
www.pjra.com.au

Borehole Log: BH6

Client: Charter Hall
Project: Targeted Site Investigation
Job Number: 884.1
Site Address: 2 Hume Highway, Chullora NSW

Locate Method:
Coordinates: **N** 6248356
E 320017
Borehole Location: Diesel Pump

Drill Contractor: NA
Drill Model: Hand Auger
Drill Fluid: NA
Total Depth: 1.5 m
Bore Diameter: 100 mm

Logged By: BH/RD
Start Date: 27 July 2015
End Date: 27 July 2015
Checked By: BH

DEPTH (mBGL)	GRAPHIC LOG	STRATIGRAPHY	GRAIN SIZE	PLASTICITY	MOISTURE	WATER STRIKES	GROUNDWATER	DRILL METHOD	SAMPLES	ODOUR	PID (ppm)	COMMENTS
0.00		CONCRETE										
		FILL: clayey gravel, brown, common cobbles (subgrade)	C		M				DS 884/BH6A x2 [QC=DUP03]	NP	1.6	
0.50									DS 884/BH6B	NP	0.8	
1.00		FILL: gravelly clay, brown		H	M			HA	DS 884/BH6C	NP	0.6	
1.50		Borehole Terminated at 1.5 m in FILL - limit of investigation										

GRAIN SIZE
F Fine
M Medium
C Coarse

PLASTICITY
L Low
M Medium
H High

MOISTURE
D Dry
M Moist
W Wet

WATER STRIKES
▼ Observation During Drilling

GROUNDWATER
▼ Standing Water Level on completion of drilling

SAMPLE TYPE
D Disturbed Sample
U Undisturbed Sample
D/I Intact Sample Disturbed

DRILL METHOD
HA Hand Auger
SP Split Spoon
SS Solid Stem Auger
HS Hollow Stem Auger
PT Push Tube
AK Air Knife
HQ Diamond Core - 63 mm
NMLC Diamond Core - 52 mm
NQ Diamond Core - 47 mm
WB Washbore
NDD Non Destructive Drilling
CC Concrete Core

ODOUR
NP Not Perceptible
W Weak (Type)
D Distinct (Type)
S Strong (Type)
VS Very Strong (Type)

OTHER
PID Photoionisation Detector
ppm parts per million
h/c Hydrocarbon

Photoionisation Detector (PID) Measurements
All PID readings are headspace unless otherwise indicated as per below
I In situ
A Above soil
- No measurment recorded

PETER J RAMSAY & ASSOCIATES
www.pjra.com.au

Borehole Log: BH7

Client: Charter Hall
Project: Targeted Site Investigation
Job Number: 884.1
Site Address: 2 Hume Highway, Chullora NSW

Locate Method:
Coordinates: **N** 6248355
E 320013
Borehole Location: Diesel Pump

Drill Contractor: NA
Drill Model: Hand Auger
Drill Fluid: NA
Total Depth: 0.8 m
Bore Diameter: 100 mm

Logged By: BH/RD
Start Date: 27 July 2015
End Date: 27 July 2015
Checked By: BH

DEPTH (mBGL)	GRAPHIC LOG	STRATIGRAPHY	GRAIN SIZE	PLASTICITY	MOISTURE	WATER STRIKES	GROUNDWATER	DRILL METHOD	SAMPLES	ODOUR	PID (ppm)	COMMENTS
0.00		CONCRETE										
		FILL: gravel, brown	C		W			HA	DS 884/BH7A	S(HC)	0.8	
0.50									DS 884/BH7B	NP	0.2	
		Borehole Refusal at 0.8 m on HARD FILL										
1.00												

GRAIN SIZE
F Fine
M Medium
C Coarse

PLASTICITY
L Low
M Medium
H High

MOISTURE
D Dry
M Moist
W Wet

WATER STRIKES
▼ Observation During Drilling

GROUNDWATER
▼ Standing Water Level on completion of drilling

SAMPLE TYPE
D Disturbed Sample
U Undisturbed Sample
D/I Intact Sample Disturbed

DRILL METHOD
HA Hand Auger
SP Split Spoon
SS Solid Stem Auger
HS Hollow Stem Auger
PT Push Tube
AK Air Knife
HQ Diamond Core - 63 mm
NMLC Diamond Core - 52 mm
NQ Diamond Core - 47 mm
WB Washbore
NDD Non Destructive Drilling
CC Concrete Core

ODOUR
NP Not Perceptible
W Weak (Type)
D Distinct (Type)
S Strong (Type)
VS Very Strong (Type)

OTHER
PID Photoionisation Detector
ppm parts per million
h/c Hydrocarbon

Photoionisation Detector (PID) Measurements
All PID readings are headspace unless otherwise indicated as per below
I In situ
A Above soil
- No measurment recorded

Appendix G

Laboratory Associated Information

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1527220**	Page	: 1 of 6
Client	: **PETER J RAMSAY & ASSOCIATES**	Laboratory	: Environmental Division Sydney
Contact	: MR BARRY HOUSTON	Contact	:
Address	: Unit 3, 538 Gardeners Road ALEXANDRIA NSW, AUSTRALIA 2015	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: barry.houston@pjra.com.au	E-mail	:
Telephone	: +61 02 8338 1655	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 8338 1755	Facsimile	: +61-2-8784 8500
Project	: 884.1	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: ----	Date Samples Received	: 30-Jul-2015 10:50
C-O-C number	: SCOC1	Date Analysis Commenced	: 30-Jul-2015
Sampler	: ----	Issue Date	: 05-Aug-2015 15:56
Site	: ----		
		No. of samples received	: 2
Quote number	: ----	No. of samples analysed	: 2

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

NATA Accredited Laboratory 825

Accredited for compliance with ISO/IEC 17025.

Signatories

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

Signatories	*Position*	*Accreditation Category*
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics
Pabi Subba	Senior Organic Chemist	Sydney Inorganics
Pabi Subba	Senior Organic Chemist	Sydney Organics
Ravineel Chand		Sydney Organics

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

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

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

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

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

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

- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	BH6A	----	----	----	----
				Client sampling date / time	[27-Jul-2015]	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1527220-002	--------	--------	--------	--------
					Result	Result	Result	Result	Result
EA055: Moisture Content									
^ **Moisture Content (dried @ 103°C)**	----	1	%		**12.4**	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		<0.5	----	----	----	----
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	----	----	----	----
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	----	----	----	----
Fluorene	86-73-7	0.5	mg/kg		<0.5	----	----	----	----
Phenanthrene	85-01-8	0.5	mg/kg		<0.5	----	----	----	----
Anthracene	120-12-7	0.5	mg/kg		<0.5	----	----	----	----
Fluoranthene	206-44-0	0.5	mg/kg		<0.5	----	----	----	----
Pyrene	129-00-0	0.5	mg/kg		<0.5	----	----	----	----
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	----	----	----	----
Chrysene	218-01-9	0.5	mg/kg		<0.5	----	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.5	----	----	----	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	----	----	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	----	----	----	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	----	----	----	----
^ **Sum of polycyclic aromatic hydrocarbons**	----	0.5	mg/kg		<0.5	----	----	----	----
^ **Benzo(a)pyrene TEQ (zero)**	----	0.5	mg/kg		<0.5	----	----	----	----
^ **Benzo(a)pyrene TEQ (half LOR)**	----	0.5	mg/kg		**0.6**	----	----	----	----
^ **Benzo(a)pyrene TEQ (LOR)**	----	0.5	mg/kg		**1.2**	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	----	----	----	----
C10 - C14 Fraction	----	50	mg/kg		<50	----	----	----	----
C15 - C28 Fraction	----	100	mg/kg		<100	----	----	----	----
C29 - C36 Fraction	----	100	mg/kg		<100	----	----	----	----
^ **C10 - C36 Fraction (sum)**	----	50	mg/kg		<50	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	----	----	----	----
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	10	mg/kg		<10	----	----	----	----
>C10 - C16 Fraction	>C10_C16	50	mg/kg		<50	----	----	----	----
>C16 - C34 Fraction	----	100	mg/kg		<100	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	BH6A	----	----	----	----
				Client sampling date / time	[27-Jul-2015]	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1527220-002	--------	--------	--------	--------
					Result	Result	Result	Result	Result
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
>C34 - C40 Fraction	----	100	mg/kg		<100	----	----	----	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		<50	----	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	----	----	----	----
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	----	----	----	----
Toluene	108-88-3	0.5	mg/kg		<0.5	----	----	----	----
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	----	----	----	----
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	----	----	----	----
^ Sum of BTEX	----	0.2	mg/kg		<0.2	----	----	----	----
^ Total Xylenes	1330-20-7	0.5	mg/kg		<0.5	----	----	----	----
Naphthalene	91-20-3	1	mg/kg		<1	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		**87.9**	----	----	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%		**88.1**	----	----	----	----
2.4.6-Tribromophenol	118-79-6	0.5	%		**78.3**	----	----	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		**86.3**	----	----	----	----
Anthracene-d10	1719-06-8	0.5	%		**90.6**	----	----	----	----
4-Terphenyl-d14	1718-51-0	0.5	%		**85.0**	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**96.4**	----	----	----	----
Toluene-D8	2037-26-5	0.2	%		**102**	----	----	----	----
4-Bromofluorobenzene	460-00-4	0.2	%		**86.4**	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BH3	----	----	----	----
				Client sampling date / time	[27-Jul-2015]	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1527220-001	--------	--------	--------	--------
					Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS									
Arsenic	7440-38-2	0.001	mg/L		<0.001	----	----	----	----
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	----	----	----	----
Chromium	7440-47-3	0.001	mg/L		<0.001	----	----	----	----
Copper	7440-50-8	0.001	mg/L		<0.001	----	----	----	----
Lead	7439-92-1	0.001	mg/L		<0.001	----	----	----	----
Nickel	7440-02-0	0.001	mg/L		**0.055**	----	----	----	----
Zinc	7440-66-6	0.005	mg/L		**0.011**	----	----	----	----
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	1	µg/L		<1.0	----	----	----	----
Acenaphthylene	208-96-8	1	µg/L		<1.0	----	----	----	----
Acenaphthene	83-32-9	1	µg/L		<1.0	----	----	----	----
Fluorene	86-73-7	1	µg/L		<1.0	----	----	----	----
Phenanthrene	85-01-8	1	µg/L		<1.0	----	----	----	----
Anthracene	120-12-7	1	µg/L		<1.0	----	----	----	----
Fluoranthene	206-44-0	1	µg/L		<1.0	----	----	----	----
Pyrene	129-00-0	1	µg/L		<1.0	----	----	----	----
Benz(a)anthracene	56-55-3	1	µg/L		<1.0	----	----	----	----
Chrysene	218-01-9	1	µg/L		<1.0	----	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L		<1.0	----	----	----	----
Benzo(k)fluoranthene	207-08-9	1	µg/L		<1.0	----	----	----	----
Benzo(a)pyrene	50-32-8	0.5	µg/L		<0.5	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L		<1.0	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	1	µg/L		<1.0	----	----	----	----
Benzo(g.h.i)perylene	191-24-2	1	µg/L		<1.0	----	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L		<0.5	----	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L		<0.5	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		<20	----	----	----	----
C10 - C14 Fraction	----	50	µg/L		<50	----	----	----	----
C15 - C28 Fraction	----	100	µg/L		<100	----	----	----	----
C29 - C36 Fraction	----	50	µg/L		<50	----	----	----	----
^ C10 - C36 Fraction (sum)	----	50	µg/L		<50	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BH3	----	----	----	----
				Client sampling date / time	[27-Jul-2015]	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1527220-001	--------	--------	--------	--------
					Result	Result	Result	Result	Result
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		<20	----	----	----	----
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	20	µg/L		<20	----	----	----	----
>C10 - C16 Fraction	>C10_C16	100	µg/L		<100	----	----	----	----
>C16 - C34 Fraction	----	100	µg/L		<100	----	----	----	----
>C34 - C40 Fraction	----	100	µg/L		<100	----	----	----	----
^ **>C10 - C40 Fraction (sum)**	----	100	µg/L		<100	----	----	----	----
^ **>C10 - C16 Fraction minus Naphthalene (F2)**	----	100	µg/L		<100	----	----	----	----
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		<1	----	----	----	----
Toluene	108-88-3	2	µg/L		<2	----	----	----	----
Ethylbenzene	100-41-4	2	µg/L		<2	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	----	----	----	----
ortho-Xylene	95-47-6	2	µg/L		<2	----	----	----	----
^ **Total Xylenes**	1330-20-7	2	µg/L		<2	----	----	----	----
^ **Sum of BTEX**	----	1	µg/L		<1	----	----	----	----
Naphthalene	91-20-3	5	µg/L		<5	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	1	%		**30.0**	----	----	----	----
2-Chlorophenol-D4	93951-73-6	1	%		**57.2**	----	----	----	----
2.4.6-Tribromophenol	118-79-6	1	%		**67.7**	----	----	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	1	%		**76.3**	----	----	----	----
Anthracene-d10	1719-06-8	1	%		**83.1**	----	----	----	----
4-Terphenyl-d14	1718-51-0	1	%		**69.3**	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		**89.2**	----	----	----	----
Toluene-D8	2037-26-5	2	%		**112**	----	----	----	----
4-Bromofluorobenzene	460-00-4	2	%		**99.0**	----	----	----	----

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **ES1527220**	Page	: 1 of 9
Client	: **PETER J RAMSAY & ASSOCIATES**	Laboratory	: Environmental Division Sydney
Contact	: MR BARRY HOUSTON	Contact	:
Address	: Unit 3, 538 Gardeners Road ALEXANDRIA NSW, AUSTRALIA 2015	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: barry.houston@pjra.com.au	E-mail	:
Telephone	: +61 02 8338 1655	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 8338 1755	Facsimile	: +61-2-8784 8500
Project	: 884.1	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: ----	Date Samples Received	: 30-Jul-2015
C-O-C number	: SCOC1	Date Analysis Commenced	: 30-Jul-2015
Sampler	: ----	Issue Date	: 05-Aug-2015
Site	: ----	No. of samples received	: 2
Quote number	: ----	No. of samples analysed	: 2

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted.

This Quality Control Report contains the following information:

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

NATA WORLD RECOGNISED ACCREDITATION

NATA Accredited Laboratory 825

Accredited for compliance with ISO/IEC 17025.

Signatories

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

Signatories	*Position*	*Accreditation Category*
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics
Pabi Subba	Senior Organic Chemist	Sydney Inorganics
Pabi Subba	Senior Organic Chemist	Sydney Organics
Ravineel Chand		Sydney Organics

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

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

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

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

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EA055: Moisture Content (QC Lot: 170480)									
ES1527225-002	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	27.1	27.5	1.36	0% - 20%
ES1527241-008	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	4.1	3.2	24.7	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 168849)									
ES1527225-001	Anonymous	EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 168847)									
ES1527225-001	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 168848)									
ES1527225-001	Anonymous	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 168847)									
ES1527225-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 168848)									
ES1527225-001	Anonymous	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C10 - C16 Fraction	>C10_C16	50	mg/kg	<50	<50	0.00	No Limit

Sub-Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP080: BTEXN (QC Lot: 168847)									
ES1527225-001	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 171061)									
ES1527101-001	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	0.003	0.003	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
ES1527255-004	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.006	0.007	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.018	0.020	9.79	0% - 20%
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
EG035F: Dissolved Mercury by FIMS (QC Lot: 171062)									
ES1527255-004	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 169486)									
ES1527220-001	BH3	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
ES1527262-006	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 169486)									
ES1527220-001	BH3	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
ES1527262-006	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP080: BTEXN (QC Lot: 169486)									
ES1527220-001	BH3	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP080: BTEXN (QC Lot: 169486) - continued									
ES1527220-001	BH3	EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
ES1527262-006	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit

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

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

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 168849)								
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	6 mg/kg	99.7	79	123
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	6 mg/kg	96.6	77	123
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	6 mg/kg	98.4	79	123
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	6 mg/kg	95.6	73	121
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	6 mg/kg	90.4	76	122
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	6 mg/kg	89.5	70	118
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	6 mg/kg	89.4	72	114
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	6 mg/kg	98.6	77	123
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	6 mg/kg	94.9	81	123
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	6 mg/kg	87.5	72	113
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	6 mg/kg	93.1	79	123
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	6 mg/kg	97.9	77	123
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	6 mg/kg	87.1	71	113
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	6 mg/kg	94.7	80	124
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	6 mg/kg	93.2	79	123
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	6 mg/kg	93.4	79	125
EP080/071: Total Petroleum Hydrocarbons (QCLot: 168847)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	26 mg/kg	93.3	68	128
EP080/071: Total Petroleum Hydrocarbons (QCLot: 168848)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	200 mg/kg	115	71	131
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	250 mg/kg	119	74	138
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	200 mg/kg	122	64	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 168847)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	31 mg/kg	94.7	68	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 168848)								
EP071: >C10 - C16 Fraction	>C10_C16	50	mg/kg	<50	250 mg/kg	118	70	130
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	350 mg/kg	122	74	138
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	200 mg/kg	97.4	63	131
EP080: BTEXN (QCLot: 168847)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	93.3	62	116
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	84.2	58	118
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	2 mg/kg	84.7	60	120

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EP080: BTEXN (QCLot: 168847) - continued								
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	85.8	62	138
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	86.0	60	120
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	85.8	62	128

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EG020F: Dissolved Metals by ICP-MS (QCLot: 171061)								
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	91.4	85	115
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	89.9	85	115
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	90.0	85	115
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	91.4	85	115
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	93.8	85	115
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	90.1	85	115
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	93.0	85	115
EG035F: Dissolved Mercury by FIMS (QCLot: 171062)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	105	78	114
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 168845)								
EP075(SIM): Acenaphthene	83-32-9	1	µg/L	<1.0	5 µg/L	62.7	62	113
EP075(SIM): Acenaphthylene	208-96-8	1	µg/L	<1.0	5 µg/L	69.6	64	114
EP075(SIM): Anthracene	120-12-7	1	µg/L	<1.0	5 µg/L	67.5	64	116
EP075(SIM): Benz(a)anthracene	56-55-3	1	µg/L	<1.0	5 µg/L	70.6	64	117
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	5 µg/L	70.7	63	117
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	<1.0	5 µg/L	68.5	62	119
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	1	µg/L	<1.0	5 µg/L	72.2	59	118
EP075(SIM): Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	5 µg/L	71.3	62	117
EP075(SIM): Chrysene	218-01-9	1	µg/L	<1.0	5 µg/L	71.1	63	116
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	1	µg/L	<1.0	5 µg/L	73.2	61	117
EP075(SIM): Fluoranthene	206-44-0	1	µg/L	<1.0	5 µg/L	68.3	64	118
EP075(SIM): Fluorene	86-73-7	1	µg/L	<1.0	5 µg/L	68.4	64	115
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	5 µg/L	72.2	60	118
EP075(SIM): Naphthalene	91-20-3	1	µg/L	<1.0	5 µg/L	67.6	59	119
EP075(SIM): Phenanthrene	85-01-8	1	µg/L	<1.0	5 µg/L	83.0	63	116
EP075(SIM): Pyrene	129-00-0	1	µg/L	<1.0	5 µg/L	68.5	63	118
EP080/071: Total Petroleum Hydrocarbons (QCLot: 168843)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	2000 µg/L	98.9	59	129
EP071: C15 - C28 Fraction	----	100	µg/L	<100	3000 µg/L	100	71	131
EP071: C29 - C36 Fraction	----	50	µg/L	<50	2000 µg/L	92.1	62	120

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 169486)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	97.5	75	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 168843)								
EP071: >C10 - C16 Fraction	>C10_C16	100	µg/L	<100	2500 µg/L	91.9	59	131
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	3500 µg/L	96.4	74	138
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	1500 µg/L	98.4	67	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 169486)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	96.9	75	127
EP080: BTEXN (QCLot: 169486)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	106	70	124
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	102	70	120
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	10 µg/L	98.0	69	121
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	103	70	124
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	102	72	122
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	103	65	129

Matrix Spike (MS) Report

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

Sub-Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Recovery Limits (%): Low	Recovery Limits (%): High
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 168849)							
ES1527225-001	Anonymous	EP075(SIM): Acenaphthene	83-32-9	10 mg/kg	88.8	70	130
		EP075(SIM): Pyrene	129-00-0	10 mg/kg	92.4	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 168847)							
ES1527225-001	Anonymous	EP080: C6 - C9 Fraction	----	32.5 mg/kg	84.2	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 168848)							
ES1527225-001	Anonymous	EP071: C10 - C14 Fraction	----	523 mg/kg	94.5	73	137
		EP071: C15 - C28 Fraction	----	2319 mg/kg	102	53	131
		EP071: C29 - C36 Fraction	----	1714 mg/kg	120	52	132
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 168847)							
ES1527225-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	81.6	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 168848)							
ES1527225-001	Anonymous	EP071: >C10 - C16 Fraction	>C10_C16	860 mg/kg	98.4	73	137
		EP071: >C16 - C34 Fraction	----	3223 mg/kg	121	53	131

Sub-Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	Matrix Spike (MS) Report: SpikeRecovery(%) MS	Recovery Limits (%): Low	Recovery Limits (%): High
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 168848) - continued							
ES1527225-001	Anonymous	EP071: >C34 - C40 Fraction	----	1058 mg/kg	115	52	132
EP080: BTEXN (QCLot: 168847)							
ES1527225-001	Anonymous	EP080: Benzene	71-43-2	2.5 mg/kg	74.8	70	130
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	76.2	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2.5 mg/kg	75.0	70	130
		EP080: Naphthalene	91-20-3	2.5 mg/kg	74.4	70	130
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	75.9	70	130
		EP080: Toluene	108-88-3	2.5 mg/kg	72.8	70	130

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	Matrix Spike (MS) Report: SpikeRecovery(%) MS	Recovery Limits (%): Low	Recovery Limits (%): High
EG020F: Dissolved Metals by ICP-MS (QCLot: 171061)							
ES1527101-002	Anonymous	EG020A-F: Arsenic	7440-38-2	0.2 mg/L	104	70	130
		EG020A-F: Cadmium	7440-43-9	0.05 mg/L	102	70	130
		EG020A-F: Chromium	7440-47-3	0.2 mg/L	93.4	70	130
		EG020A-F: Copper	7440-50-8	0.2 mg/L	97.5	70	130
		EG020A-F: Lead	7439-92-1	0.2 mg/L	94.7	70	130
		EG020A-F: Nickel	7440-02-0	0.2 mg/L	93.4	70	130
		EG020A-F: Zinc	7440-66-6	0.2 mg/L	103	70	130
EG035F: Dissolved Mercury by FIMS (QCLot: 171062)							
ES1527220-001	BH3	EG035F: Mercury	7439-97-6	0.01 mg/L	89.9	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 169486)							
ES1527220-001	BH3	EP080: C6 - C9 Fraction	----	325 µg/L	83.8	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 169486)							
ES1527220-001	BH3	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	81.5	70	130
EP080: BTEXN (QCLot: 169486)							
ES1527220-001	BH3	EP080: Benzene	71-43-2	25 µg/L	72.7	70	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	79.0	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	25 µg/L	74.9	70	130
		EP080: Naphthalene	91-20-3	25 µg/L	89.0	70	130
		EP080: ortho-Xylene	95-47-6	25 µg/L	77.4	70	130
		EP080: Toluene	108-88-3	25 µg/L	72.6	70	130

ALS Environmental

QA/QC Compliance Assessment for DQO Reporting

Work Order	: **ES1527220**	Page	: 1 of 6
Client	: **PETER J RAMSAY & ASSOCIATES**	Laboratory	: Environmental Division Sydney
Contact	: MR BARRY HOUSTON	Telephone	: +61-2-8784 8555
Project	: 884.1	Date Samples Received	: 30-Jul-2015
Site	: ----	Issue Date	: 05-Aug-2015
Sampler	: ----	No. of samples received	: 2
Order number	: ----	No. of samples analysed	: 2

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

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

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type / Method	Count QC	Count Regular	Rate (%) Actual	Rate (%) Expected	Quality Control Specification
Laboratory Duplicates (DUP)					
PAH/Phenols (GC/MS - SIM)	0	1	0.00	10.00	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	0	6	0.00	10.00	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)					
PAH/Phenols (GC/MS - SIM)	0	1	0.00	5.00	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	0	6	0.00	5.00	NEPM 2013 Schedule B(3) and ALS QCS3 requirement

Analysis Holding Time Compliance

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

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

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

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation: Date extracted	Extraction / Preparation: Due for extraction	Extraction / Preparation: Evaluation	Analysis: Date analysed	Analysis: Due for analysis	Analysis: Evaluation
EA055: Moisture Content							
Soil Glass Jar - Unpreserved (EA055-103)							
BH6A	**27-Jul-2015**	**----**	----	----	**31-Jul-2015**	10-Aug-2015	✓
EP080/071: Total Petroleum Hydrocarbons							
Soil Glass Jar - Unpreserved (EP071)							
BH6A	**27-Jul-2015**	**30-Jul-2015**	10-Aug-2015	✓	**03-Aug-2015**	08-Sep-2015	✓
EP075(SIM)T: PAH Surrogates							
Soil Glass Jar - Unpreserved (EP075(SIM))							
BH6A	**27-Jul-2015**	**30-Jul-2015**	10-Aug-2015	✓	**03-Aug-2015**	08-Sep-2015	✓
EP080S: TPH(V)/BTEX Surrogates							
Soil Glass Jar - Unpreserved (EP080)							
BH6A	**27-Jul-2015**	**30-Jul-2015**	10-Aug-2015	✓	**03-Aug-2015**	10-Aug-2015	✓

Matrix: **WATER**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation: Date extracted	Extraction / Preparation: Due for extraction	Extraction / Preparation: Evaluation	Analysis: Date analysed	Analysis: Due for analysis	Analysis: Evaluation
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F)							
BH3	**27-Jul-2015**	**----**	----	----	**03-Aug-2015**	23-Jan-2016	✓
EG035F: Dissolved Mercury by FIMS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG035F)							
BH3	**27-Jul-2015**	**----**	----	----	**04-Aug-2015**	24-Aug-2015	✓

Matrix: **WATER**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080/071: Total Petroleum Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP071)							
BH3	**27-Jul-2015**	**30-Jul-2015**	03-Aug-2015	✓	**03-Aug-2015**	08-Sep-2015	✓
EP075(SIM)T: PAH Surrogates							
Amber Glass Bottle - Unpreserved (EP075(SIM))							
BH3	**27-Jul-2015**	**30-Jul-2015**	03-Aug-2015	✓	**03-Aug-2015**	08-Sep-2015	✓
EP080S: TPH(V)/BTEX Surrogates							
Amber Glass Bottle - Unpreserved (EP080)							
BH3	**27-Jul-2015**	**31-Jul-2015**	03-Aug-2015	✓	**31-Jul-2015**	03-Aug-2015	✓

Quality Control Parameter Frequency Compliance

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

Matrix: **SOIL**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Moisture Content	EA055-103	2	14	**14.29**	**10.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (SIM)	EP075(SIM)	1	6	**16.67**	**10.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	1	8	**12.50**	**10.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	8	**12.50**	**10.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
PAH/Phenols (SIM)	EP075(SIM)	1	6	**16.67**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	1	8	**12.50**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	8	**12.50**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
PAH/Phenols (SIM)	EP075(SIM)	1	6	**16.67**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	1	8	**12.50**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	8	**12.50**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
PAH/Phenols (SIM)	EP075(SIM)	1	6	**16.67**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	1	8	**12.50**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	8	**12.50**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement

Matrix: **WATER**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Dissolved Mercury by FIMS	EG035F	1	8	**12.50**	**10.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	10	**20.00**	**10.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	1	**0.00**	**10.00**	×	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	0	6	**0.00**	**10.00**	×	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	2	19	**10.53**	**10.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Dissolved Mercury by FIMS	EG035F	1	8	**12.50**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	10	**10.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	1	**100.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	1	6	**16.67**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	19	**5.26**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Dissolved Mercury by FIMS	EG035F	1	8	**12.50**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	10	**10.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	1	**100.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement

Matrix: **WATER**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Method Blanks (MB) - Continued							
TRH - Semivolatile Fraction	EP071	1	6	**16.67**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	19	**5.26**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Dissolved Mercury by FIMS	EG035F	1	8	**12.50**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	10	**10.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	1	**0.00**	**5.00**	×	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	0	6	**0.00**	**5.00**	×	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	19	**5.26**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement

Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
Moisture Content	EA055-103	SOIL	In-house. A gravimetric procedure based on weight loss over a 12 hour drying period at 103-105 degrees C. This method is compliant with NEPM (2013) Schedule B(3) Section 7.1 and Table 1 (14 day holding time).
TRH - Semivolatile Fraction	EP071	SOIL	(USEPA SW 846 - 8015A) Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C40.
PAH/Phenols (SIM)	EP075(SIM)	SOIL	(USEPA SW 846 - 8270B) Extracts are analysed by Capillary GC/MS in Selective Ion Mode (SIM) and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3) (Method 502 and 507)
TRH Volatiles/BTEX	EP080	SOIL	(USEPA SW 846 - 8260B) Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve.
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45 um filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Mercury by FIMS	EG035F	WATER	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) Samples are 0.45 um filtered prior to analysis. FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the filtered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
TRH - Semivolatile Fraction	EP071	WATER	USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	WATER	USEPA SW 846 - 8270D Sample extracts are analysed by Capillary GC/MS in SIM Mode and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)

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

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **ES1527220**

Client	: **PETER J RAMSAY & ASSOCIATES**	Laboratory	: Environmental Division Sydney
Contact	: MR BARRY HOUSTON	Contact	:
Address	: Unit 3, 538 Gardeners Road ALEXANDRIA NSW, AUSTRALIA 2015	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: barry.houston@pjra.com.au	E-mail	:
Telephone	: +61 02 8338 1655	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 8338 1755	Facsimile	: +61-2-8784 8500
Project	: 884.1	Page	: 1 of 3
Order number	: ----	Quote number	: ES2014PETRAM0066 (SY/513/14)
C-O-C number	: SCOC1	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
Sampler	:		

Dates

Date Samples Received	: 30-Jul-2015 10:50 AM	Issue Date	: 30-Jul-2015
Client Requested Due Date	: 05-Aug-2015	Scheduled Reporting Date	: **05-Aug-2015**

Delivery Details

Mode of Delivery	: Undefined	Security Seal	: Intact.
No. of coolers/boxes	: 1	Temperature	: 5.5'C - Ice Bricks present
Receipt Detail	:	No. of samples received / analysed	: 2 / 2

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- **Sample(s) requiring volatile organic compound analysis received in airtight containers (ZHE).**
- Please direct any queries you have regarding this work order to the above ALS laboratory contact.
- Analytical work for this work order will be conducted at ALS Sydney.
- Sample Disposal - Aqueous (14 days), Solid (60 days) from date of completion of work order.

Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

Method Client sample ID	Sample Container Received	Preferred Sample Container for Analysis
TRH Volatiles/BTEX : EP080		
BH3	- Amber Glass Bottle - Unpreserved	- Amber VOC Vial - Sulfuric Acid

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

Matrix: **SOIL**

Laboratory sample ID	Client sampling date / time	Client sample ID	SOIL - EA055-103 Moisture Content	SOIL - S-07 TRH/BTEXN/PAH (SIM)
ES1527220-002	[27-Jul-2015]	BH6A	✓	✓

Matrix: **WATER**

Laboratory sample ID	Client sampling date / time	Client sample ID	WATER - W-26 TRH/BTEXN/PAH/8 Metals
ES1527220-001	[27-Jul-2015]	BH3	✓

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

ACCOUNTS PAYABLE

- A4 - AU Tax Invoice (INV)	Email	accounts@pjra.com.au

BARRY HOUSTON

- *AU Certificate of Analysis - NATA (COA)	Email	barry.houston@pjra.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	barry.houston@pjra.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	barry.houston@pjra.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	barry.houston@pjra.com.au
- A4 - AU Tax Invoice (INV)	Email	barry.houston@pjra.com.au
- Chain of Custody (CoC) (COC)	Email	barry.houston@pjra.com.au
- EDI Format - ENMRG (ENMRG)	Email	barry.houston@pjra.com.au
- EDI Format - ESDAT (ESDAT)	Email	barry.houston@pjra.com.au

CHAIN OF CUSTODY RECORD

Peter J. Ramsay & Associates Pty Ltd
Environmental Engineering Consultants ACN 005 842 393
Unit 3 / 538 Gardeners Road, NSW, 2015
Telephone: 02 8338 1655 Fax: 02 8338 1755
E-Mail: barry.houston@pjra.com.au Contact: Barry Houston

Job No: 884.1

Laboratory: **ALS Laboratory - Sydney**
277 - 289 Woodpark Road, SMITHFIELD 2164
Telephone: (02) 8784 8555 Fax: (02) 8784 8500 Contact: Brenda Hong

To acknowledge receipt of samples, please sign and transmit this sheet by return facsimile to (02 83381755)

ANALYSIS

Environmental Division
Sydney
Work Order Reference
ES1527220

Telephone : +61-2-8784 8555

Laboratory number	Sample number	jar/ bottle	vial	Date sampled	Composite number	Sample type	Comments	TRH/BTEXN, PAHs (s7)	TRH/BTEXN/8 Metals, PAH
1	BH3	2	2	27/07/2015		Water			x
2	BH6A	1		27/07/2015		Soil		x	
TOTAL		3	2					1	1

Released by PJR&A. BARRY HOUSTON Signed:	Date: 30/7/15	Time: 9.AM	Method of shipment: Courier Esky number:
Received by: Frank Signed:	Date: 30/7/15	Time: 1050	Your quotation: SY-513- 14- PJ Ramsey
			Preliminary results by:

CoC Number: SCOC1

Final results by:

Comments: Please store samples for three months unless otherwise requested.

Standard Detection Limits Apply

Note: Purge & Trap GC/MS for C6-C9 fraction and BTEX. C10-C36 fractions by GC/FID.
Metals by ICP/AES. Tin extraction by Aqua Regia.

ANALYTICAL REPORT

WORLD RECOGNISED ACCREDITATION

CLIENT DETAILS

Contact	Barry Houston
Client	PETER J RAMSAY & ASSOCIATES
Address	Environmental Engineering Consultants 3/538, Gardeners Road Alexandria NSW 2015
Telephone	02 8338 1655
Facsimile	02 8338 1755
Email	barry.houston@pjra.com.au
Project	**884.1**
Order Number	**PCOC1**
Samples	20
Date Received	28/7/2015

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
SGS Reference	**SE141822 R0**
Report Number	0000116750
Date Reported	30/7/2015
Date Started	29/7/2015

COMMENTS

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

No respirable fibres detected in all samples using trace analysis technique.
Sample # 8:1-6 mm length fibre bundles found in 5x3 mm cement sheet fragments and found loose in sample.
Asbestos analysed by Approved Identifier Yusuf Kuthpudin.

SIGNATORIES

Andy Sutton
Senior Organic Chemist

Dong Liang
Metals/Inorganics Team Leader

Kamrul Ahsan
Senior Chemist

Ravee Sivasubramaniam
Asbestos Analyst / Hygiene Team Leader

VOC's in Soil [AN433/AN434] Tested: 28/7/2015

PARAMETER	UOM	LOR	BH1/D SOIL - 27/7/2015 SE141822.001	BH1/M SOIL - 27/7/2015 SE141822.002	BH2/D SOIL - 27/7/2015 SE141822.003	BH2/G SOIL - 27/7/2015 SE141822.004	BH3/C SOIL - 27/7/2015 SE141822.005
Benzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Toluene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Ethylbenzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
m/p-xylene	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
o-xylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Xylenes*	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Total BTEX*	mg/kg	0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1

PARAMETER	UOM	LOR	BH3/I SOIL - 27/7/2015 SE141822.006	BH4/B SOIL - 27/7/2015 SE141822.007	BH4/E SOIL - - 27/7/2015 SE141822.008	BH5/A SOIL - - 27/7/2015 SE141822.009	BH5/C SOIL - - 27/7/2015 SE141822.010
Benzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Toluene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Ethylbenzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
m/p-xylene	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
o-xylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Xylenes*	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Total BTEX*	mg/kg	0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Naphthalene	mg/kg	0.1	<0.1	**0.2**	**0.1**	<0.1	<0.1

PARAMETER	UOM	LOR	BH6/A SOIL - 27/7/2015 SE141822.011	BH6/C SOIL - 27/7/2015 SE141822.012	BH7/B SOIL - 27/7/2015 SE141822.013	DUP03 SOIL - 27/7/2015 SE141822.014	Trip Blank SAND - 27/7/2015 SE141822.019
Benzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Toluene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Ethylbenzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
m/p-xylene	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
o-xylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Xylenes*	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Total BTEX*	mg/kg	0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1

PARAMETER	UOM	LOR	Trip Spike SAND - 27/7/2015 SE141822.020
Benzene	mg/kg	0.1	[95%]
Toluene	mg/kg	0.1	[81%]
Ethylbenzene	mg/kg	0.1	[82%]
m/p-xylene	mg/kg	0.2	[80%]
o-xylene	mg/kg	0.1	[81%]
Total Xylenes*	mg/kg	0.3	-
Total BTEX*	mg/kg	0.6	-
Naphthalene	mg/kg	0.1	<0.1

Volatile Petroleum Hydrocarbons in Soil [AN433/AN434/AN410] Tested: 28/7/2015

PARAMETER	UOM	LOR	BH1/D SOIL - 27/7/2015 SE141822.001	BH1/M SOIL - 27/7/2015 SE141822.002	BH2/D SOIL - 27/7/2015 SE141822.003	BH2/G SOIL - 27/7/2015 SE141822.004	BH3/C SOIL - 27/7/2015 SE141822.005
TRH C6-C9	mg/kg	20	<20	<20	<20	<20	<20
Benzene (F0)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TRH C6-C10	mg/kg	25	<25	<25	<25	<25	<25
TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	<25	<25	<25

PARAMETER	UOM	LOR	BH3/I SOIL - 27/7/2015 SE141822.006	BH4/B SOIL - 27/7/2015 SE141822.007	BH4/E SOIL - 27/7/2015 SE141822.008	BH5/A SOIL - 27/7/2015 SE141822.009	BH5/C SOIL - 27/7/2015 SE141822.010
TRH C6-C9	mg/kg	20	<20	<20	<20	<20	<20
Benzene (F0)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TRH C6-C10	mg/kg	25	<25	<25	<25	<25	<25
TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	<25	<25	<25

PARAMETER	UOM	LOR	BH6/A SOIL - 27/7/2015 SE141822.011	BH6/C SOIL - 27/7/2015 SE141822.012	BH7/B SOIL - 27/7/2015 SE141822.013	DUP03 SOIL - 27/7/2015 SE141822.014	Trip Blank SAND - 27/7/2015 SE141822.019
TRH C6-C9	mg/kg	20	<20	<20	<20	<20	<20
Benzene (F0)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TRH C6-C10	mg/kg	25	<25	<25	<25	<25	<25
TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	<25	<25	<25

TRH (Total Recoverable Hydrocarbons) in Soil [AN403] Tested: 29/7/2015

PARAMETER	UOM	LOR	BH1/D SOIL - 27/7/2015 SE141822.001	BH1/M SOIL - 27/7/2015 SE141822.002	BH2/D SOIL - 27/7/2015 SE141822.003	BH2/G SOIL - 27/7/2015 SE141822.004	BH3/C SOIL - 27/7/2015 SE141822.005
TRH C10-C14	mg/kg	20	<20	<20	<20	<20	<20
TRH C15-C28	mg/kg	45	<45	<45	<45	**57**	<45
TRH C29-C36	mg/kg	45	<45	<45	<45	<45	<45
TRH C37-C40	mg/kg	100	<100	<100	<100	<100	<100
TRH >C10-C16 (F2)	mg/kg	25	<25	<25	<25	<25	<25
TRH >C10-C16 (F2) - Naphthalene	mg/kg	25	<25	<25	<25	<25	<25
TRH >C16-C34 (F3)	mg/kg	90	<90	<90	<90	<90	<90
TRH >C34-C40 (F4)	mg/kg	120	<120	<120	<120	<120	<120
TRH C10-C36 Total	mg/kg	110	<110	<110	<110	<110	<110
TRH C10-C40 Total	mg/kg	210	<210	<210	<210	<210	<210

PARAMETER	UOM	LOR	BH3/I SOIL - 27/7/2015 SE141822.006	BH4/B SOIL - 27/7/2015 SE141822.007	BH4/E SOIL - 27/7/2015 SE141822.008	BH5/A SOIL - 27/7/2015 SE141822.009	BH5/C SOIL - 27/7/2015 SE141822.010
TRH C10-C14	mg/kg	20	<20	<20	**22**	**1300**	<20
TRH C15-C28	mg/kg	45	<45	**270**	**240**	**3800**	<45
TRH C29-C36	mg/kg	45	<45	**170**	**160**	<45	<45
TRH C37-C40	mg/kg	100	<100	<100	<100	<100	<100
TRH >C10-C16 (F2)	mg/kg	25	<25	<25	**33**	**2400**	<25
TRH >C10-C16 (F2) - Naphthalene	mg/kg	25	<25	<25	**33**	**2400**	<25
TRH >C16-C34 (F3)	mg/kg	90	<90	**420**	**370**	**2800**	<90
TRH >C34-C40 (F4)	mg/kg	120	<120	<120	<120	<120	<120
TRH C10-C36 Total	mg/kg	110	<110	**440**	**420**	**5100**	<110
TRH C10-C40 Total	mg/kg	210	<210	**440**	**420**	**5100**	<210

PARAMETER	UOM	LOR	BH6/A SOIL - 27/7/2015 SE141822.011	BH6/C SOIL - 27/7/2015 SE141822.012	BH7/B SOIL - 27/7/2015 SE141822.013	DUP03 SOIL - 27/7/2015 SE141822.014
TRH C10-C14	mg/kg	20	<20	<20	<20	<20
TRH C15-C28	mg/kg	45	<45	<45	<45	<45
TRH C29-C36	mg/kg	45	<45	<45	<45	<45
TRH C37-C40	mg/kg	100	<100	<100	<100	<100
TRH >C10-C16 (F2)	mg/kg	25	<25	<25	<25	<25
TRH >C10-C16 (F2) - Naphthalene	mg/kg	25	<25	<25	<25	<25
TRH >C16-C34 (F3)	mg/kg	90	<90	<90	<90	<90
TRH >C34-C40 (F4)	mg/kg	120	<120	<120	<120	<120
TRH C10-C36 Total	mg/kg	110	<110	<110	<110	<110
TRH C10-C40 Total	mg/kg	210	<210	<210	<210	<210

PAH (Polynuclear Aromatic Hydrocarbons) in Soil [AN420] Tested: 29/7/2015

PARAMETER	UOM	LOR	BH1/D SOIL - 27/7/2015 SE141822.001	BH1/M SOIL - 27/7/2015 SE141822.002	BH2/D SOIL - 27/7/2015 SE141822.003	BH2/G SOIL - 27/7/2015 SE141822.004	BH3/C SOIL - 27/7/2015 SE141822.005
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.1	0.2	<0.1	0.1	0.3	<0.1
Anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.1	0.3	<0.1	0.3	0.5	<0.1
Pyrene	mg/kg	0.1	0.3	<0.1	0.3	0.4	<0.1
Benzo(a)anthracene	mg/kg	0.1	0.1	<0.1	0.1	0.2	<0.1
Chrysene	mg/kg	0.1	0.1	<0.1	0.1	0.2	<0.1
Benzo(b&j)fluoranthene	mg/kg	0.1	0.1	<0.1	0.1	0.2	<0.1
Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	mg/kg	0.1	0.1	<0.1	0.1	0.1	<0.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	0.1	<0.1	0.1	0.1	<0.1
Dibenzo(a&h)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	mg/kg	0.1	0.1	<0.1	0.1	0.1	<0.1
Carcinogenic PAHs, BaP TEQ <LOR=0*	TEQ	0.2	<0.2	<0.2	<0.2	0.2	<0.2
Carcinogenic PAHs, BaP TEQ <LOR=LOR*	TEQ (mg/kg)	0.3	<0.3	<0.3	<0.3	0.3	<0.3
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2*	TEQ (mg/kg)	0.2	0.2	<0.2	0.2	0.3	<0.2
Total PAH	mg/kg	0.8	1.7	<0.8	1.7	2.3	<0.8

PARAMETER	UOM	LOR	BH3/I SOIL - 27/7/2015 SE141822.006	BH4/B SOIL - 27/7/2015 SE141822.007	BH4/E SOIL - 27/7/2015 SE141822.008	BH5/A SOIL - 27/7/2015 SE141822.009	BH5/C SOIL - 27/7/2015 SE141822.010
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-methylnaphthalene	mg/kg	0.1	<0.1	0.1	0.1	<0.1	<0.1
1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.1	<0.1	<0.1	0.1	<0.1	<0.1
Acenaphthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.1	<0.1	0.2	0.5	<0.1	<0.1
Anthracene	mg/kg	0.1	<0.1	<0.1	0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.1	<0.1	0.5	1.1	<0.1	<0.1
Pyrene	mg/kg	0.1	<0.1	0.5	1.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	0.1	<0.1	0.3	0.6	<0.1	<0.1
Chrysene	mg/kg	0.1	<0.1	0.3	0.5	<0.1	<0.1
Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	0.4	0.6	0.2	<0.1
Benzo(k)fluoranthene	mg/kg	0.1	<0.1	0.2	0.3	0.1	<0.1
Benzo(a)pyrene	mg/kg	0.1	<0.1	0.3	0.6	0.1	<0.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	0.3	0.5	0.2	<0.1
Dibenzo(a&h)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	mg/kg	0.1	<0.1	0.3	0.4	0.1	<0.1
Carcinogenic PAHs, BaP TEQ <LOR=0*	TEQ	0.2	<0.2	0.4	0.8	<0.2	<0.2
Carcinogenic PAHs, BaP TEQ <LOR=LOR*	TEQ (mg/kg)	0.3	<0.3	0.5	0.9	<0.3	<0.3
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2*	TEQ (mg/kg)	0.2	<0.2	0.5	0.9	0.2	<0.2
Total PAH	mg/kg	0.8	<0.8	3.9	7.0	1.0	<0.8

PAH (Polynuclear Aromatic Hydrocarbons) in Soil [AN420] Tested: 29/7/2015 (continued)

PARAMETER	UOM	LOR	BH6/A SOIL - 27/7/2015 SE141822.011	BH6/C SOIL - 27/7/2015 SE141822.012	BH7/B SOIL - 27/7/2015 SE141822.013	DUP03 SOIL - 27/7/2015 SE141822.014
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
2-methylnaphthalene	mg/kg	0.1	<0.1	**0.1**	<0.1	<0.1
1-methylnaphthalene	mg/kg	0.1	<0.1	**0.1**	<0.1	<0.1
Acenaphthylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.1	**0.2**	<0.1	<0.1	**0.1**
Anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.1	**0.4**	<0.1	<0.1	**0.3**
Pyrene	mg/kg	0.1	**0.4**	<0.1	<0.1	**0.3**
Benzo(a)anthracene	mg/kg	0.1	**0.2**	<0.1	<0.1	**0.2**
Chrysene	mg/kg	0.1	**0.2**	<0.1	<0.1	**0.2**
Benzo(b&j)fluoranthene	mg/kg	0.1	**0.2**	<0.1	<0.1	**0.2**
Benzo(k)fluoranthene	mg/kg	0.1	**0.1**	<0.1	<0.1	<0.1
Benzo(a)pyrene	mg/kg	0.1	**0.2**	<0.1	<0.1	**0.1**
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	**0.2**	<0.1	<0.1	**0.1**
Dibenzo(a&h)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	mg/kg	0.1	**0.2**	<0.1	<0.1	**0.1**
Carcinogenic PAHs, BaP TEQ <LOR=0*	TEQ	0.2	**0.3**	<0.2	<0.2	<0.2
Carcinogenic PAHs, BaP TEQ <LOR=LOR*	TEQ (mg/kg)	0.3	**0.4**	<0.3	<0.3	<0.3
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2*	TEQ (mg/kg)	0.2	**0.3**	<0.2	<0.2	**0.2**
Total PAH	mg/kg	0.8	**2.5**	<0.8	<0.8	**1.8**

OC Pesticides in Soil [AN400/AN420] Tested: 29/7/2015

PARAMETER	UOM	LOR	BH1/D SOIL - 27/7/2015 SE141822.001	BH1/M SOIL - 27/7/2015 SE141822.002	BH2/D SOIL - 27/7/2015 SE141822.003	BH2/G SOIL - 27/7/2015 SE141822.004	BH3/C SOIL - 27/7/2015 SE141822.005
Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Alpha BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Lindane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Beta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Delta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor epoxide	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
o,p'-DDE	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Alpha Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Gamma Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Alpha Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
trans-Nonachlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
p,p'-DDE	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Endrin	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
o,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
o,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Beta Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
p,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
p,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Ketone	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Isodrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Mirex	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1

OC Pesticides in Soil [AN400/AN420] Tested: 29/7/2015 (continued)

PARAMETER	UOM	LOR	BH3/I SOIL - 27/7/2015 SE141822.006	BH4/B SOIL - 27/7/2015 SE141822.007	BH4/E SOIL - 27/7/2015 SE141822.008
Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	<0.1	<0.1
Alpha BHC	mg/kg	0.1	<0.1	<0.1	<0.1
Lindane	mg/kg	0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	0.1	<0.1	<0.1	<0.1
Beta BHC	mg/kg	0.1	<0.1	<0.1	<0.1
Delta BHC	mg/kg	0.1	<0.1	<0.1	<0.1
Heptachlor epoxide	mg/kg	0.1	<0.1	<0.1	<0.1
o,p'-DDE	mg/kg	0.1	<0.1	<0.1	<0.1
Alpha Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2
Gamma Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1
Alpha Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1
trans-Nonachlor	mg/kg	0.1	<0.1	<0.1	<0.1
p,p'-DDE	mg/kg	0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	0.2	<0.2	<0.2	<0.2
Endrin	mg/kg	0.2	<0.2	<0.2	<0.2
o,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1
o,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1
Beta Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2
p,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1
p,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1
Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	0.1	<0.1	<0.1	<0.1
Endrin Ketone	mg/kg	0.1	<0.1	<0.1	<0.1
Isodrin	mg/kg	0.1	<0.1	<0.1	<0.1
Mirex	mg/kg	0.1	<0.1	<0.1	<0.1

OP Pesticides in Soil [AN400/AN420] Tested: 29/7/2015

PARAMETER	UOM	LOR	BH1/D SOIL - 27/7/2015 SE141822.001	BH1/M SOIL - 27/7/2015 SE141822.002	BH2/D SOIL - 27/7/2015 SE141822.003	BH2/G SOIL - 27/7/2015 SE141822.004	BH3/C SOIL - 27/7/2015 SE141822.005
Dichlorvos	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dimethoate	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Diazinon (Dimpylate)	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Fenitrothion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Malathion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Bromophos Ethyl	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Methidathion	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2

PARAMETER	UOM	LOR	BH3/I SOIL - 27/7/2015 SE141822.006	BH4/B SOIL - 27/7/2015 SE141822.007	BH4/E SOIL - 27/7/2015 SE141822.008
Dichlorvos	mg/kg	0.5	<0.5	<0.5	<0.5
Dimethoate	mg/kg	0.5	<0.5	<0.5	<0.5
Diazinon (Dimpylate)	mg/kg	0.5	<0.5	<0.5	<0.5
Fenitrothion	mg/kg	0.2	<0.2	<0.2	<0.2
Malathion	mg/kg	0.2	<0.2	<0.2	<0.2
Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2	<0.2	<0.2
Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2	<0.2	<0.2
Bromophos Ethyl	mg/kg	0.2	<0.2	<0.2	<0.2
Methidathion	mg/kg	0.5	<0.5	<0.5	<0.5
Ethion	mg/kg	0.2	<0.2	<0.2	<0.2
Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2	<0.2	<0.2

PCBs in Soil [AN400/AN420] Tested: 29/7/2015

PARAMETER	UOM	LOR	BH1/D SOIL - 27/7/2015 SE141822.001	BH1/M SOIL - 27/7/2015 SE141822.002	BH2/D SOIL - 27/7/2015 SE141822.003	BH2/G SOIL - 27/7/2015 SE141822.004	BH3/C SOIL - 27/7/2015 SE141822.005
Arochlor 1016	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1221	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1232	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1242	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1248	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1254	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1260	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1262	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1268	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Total PCBs (Arochlors)	mg/kg	1	<1	<1	<1	<1	<1

PARAMETER	UOM	LOR	BH3/I SOIL - 27/7/2015 SE141822.006	BH4/B SOIL - 27/7/2015 SE141822.007	BH4/E SOIL - 27/7/2015 SE141822.008
Arochlor 1016	mg/kg	0.2	<0.2	<0.2	<0.2
Arochlor 1221	mg/kg	0.2	<0.2	<0.2	<0.2
Arochlor 1232	mg/kg	0.2	<0.2	<0.2	<0.2
Arochlor 1242	mg/kg	0.2	<0.2	<0.2	<0.2
Arochlor 1248	mg/kg	0.2	<0.2	<0.2	<0.2
Arochlor 1254	mg/kg	0.2	<0.2	<0.2	<0.2
Arochlor 1260	mg/kg	0.2	<0.2	<0.2	<0.2
Arochlor 1262	mg/kg	0.2	<0.2	<0.2	<0.2
Arochlor 1268	mg/kg	0.2	<0.2	<0.2	<0.2
Total PCBs (Arochlors)	mg/kg	1	<1	<1	<1

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest [AN040/AN320] Tested: 29/7/2015

PARAMETER	UOM	LOR	BH1/D SOIL - 27/7/2015 SE141822.001	BH1/M SOIL - 27/7/2015 SE141822.002	BH2/D SOIL - 27/7/2015 SE141822.003	BH2/G SOIL - 27/7/2015 SE141822.004	BH3/C SOIL - 27/7/2015 SE141822.005
Arsenic, As	mg/kg	3	10	52	9	34	5
Cadmium, Cd	mg/kg	0.3	0.7	0.5	0.7	1.5	0.5
Chromium, Cr	mg/kg	0.3	13	13	20	25	15
Copper, Cu	mg/kg	0.5	41	41	25	71	29
Lead, Pb	mg/kg	1	45	16	21	120	24
Nickel, Ni	mg/kg	0.5	16	20	11	22	14
Zinc, Zn	mg/kg	0.5	150	100	97	260	74

PARAMETER	UOM	LOR	BH3/I SOIL - 27/7/2015 SE141822.006	BH4/B SOIL - 27/7/2015 SE141822.007	BH4/E SOIL - 27/7/2015 SE141822.008	BH5/A SOIL - 27/7/2015 SE141822.009	BH5/C SOIL - 27/7/2015 SE141822.010
Arsenic, As	mg/kg	3	5	37	120	4	<3
Cadmium, Cd	mg/kg	0.3	0.5	1.8	28	0.9	0.9
Chromium, Cr	mg/kg	0.3	12	17	22	40	140
Copper, Cu	mg/kg	0.5	7.3	89	360	95	32
Lead, Pb	mg/kg	1	14	150	350	55	7
Nickel, Ni	mg/kg	0.5	3.3	17	190	97	110
Zinc, Zn	mg/kg	0.5	9.7	190	560	150	77

PARAMETER	UOM	LOR	BH6/A SOIL - 27/7/2015 SE141822.011	BH6/C SOIL - 27/7/2015 SE141822.012	BH7/B SOIL - 27/7/2015 SE141822.013	DUP03 SOIL - 27/7/2015 SE141822.014
Arsenic, As	mg/kg	3	4	5	<3	3
Cadmium, Cd	mg/kg	0.3	1.0	0.4	0.7	0.8
Chromium, Cr	mg/kg	0.3	17	11	31	22
Copper, Cu	mg/kg	0.5	91	32	59	82
Lead, Pb	mg/kg	1	44	49	4	37
Nickel, Ni	mg/kg	0.5	79	24	100	85
Zinc, Zn	mg/kg	0.5	120	140	56	110

Mercury in Soil [AN312] Tested: 29/7/2015

PARAMETER	UOM	LOR	BH1/D SOIL - 27/7/2015 SE141822.001	BH1/M SOIL - 27/7/2015 SE141822.002	BH2/D SOIL - 27/7/2015 SE141822.003	BH2/G SOIL - 27/7/2015 SE141822.004	BH3/C SOIL - 27/7/2015 SE141822.005
Mercury	mg/kg	0.01	0.13	0.12	0.01	0.05	0.03

PARAMETER	UOM	LOR	BH3/I SOIL - 27/7/2015 SE141822.006	BH4/B SOIL - 27/7/2015 SE141822.007	BH4/E SOIL - 27/7/2015 SE141822.008	BH5/A SOIL - 27/7/2015 SE141822.009	BH5/C SOIL - 27/7/2015 SE141822.010
Mercury	mg/kg	0.01	0.02	0.20	3.4	0.09	0.01

PARAMETER	UOM	LOR	BH6/A SOIL - 27/7/2015 SE141822.011	BH6/C SOIL - 27/7/2015 SE141822.012	BH7/B SOIL - 27/7/2015 SE141822.013	DUP03 SOIL - 27/7/2015 SE141822.014
Mercury	mg/kg	0.01	0.16	0.04	0.08	0.11

Moisture Content [AN002] Tested: 28/7/2015

PARAMETER	UOM	LOR	BH1/D SOIL - 27/7/2015 SE141822.001	BH1/M SOIL - 27/7/2015 SE141822.002	BH2/D SOIL - 27/7/2015 SE141822.003	BH2/G SOIL - 27/7/2015 SE141822.004	BH3/C SOIL - 27/7/2015 SE141822.005
% Moisture	%w/w	0.5	16	17	17	13	18

PARAMETER	UOM	LOR	BH3/I SOIL - 27/7/2015 SE141822.006	BH4/B SOIL - 27/7/2015 SE141822.007	BH4/E SOIL - 27/7/2015 SE141822.008	BH5/A SOIL - 27/7/2015 SE141822.009	BH5/C SOIL - 27/7/2015 SE141822.010
% Moisture	%w/w	0.5	19	15	14	13	9.2

PARAMETER	UOM	LOR	BH6/A SOIL - 27/7/2015 SE141822.011	BH6/C SOIL - 27/7/2015 SE141822.012	BH7/B SOIL - 27/7/2015 SE141822.013	DUP03 SOIL - 27/7/2015 SE141822.014	Trip Blank SAND - 27/7/2015 SE141822.019
% Moisture	%w/w	0.5	12	13	5.9	12	<0.5

Fibre Identification in soil [AN602] Tested: 29/7/2015

PARAMETER	UOM	LOR	BH1/D SOIL - 27/7/2015 SE141822.001	BH1/M SOIL - 27/7/2015 SE141822.002	BH2/D SOIL - 27/7/2015 SE141822.003	BH2/G SOIL - 27/7/2015 SE141822.004	BH3/C SOIL - 27/7/2015 SE141822.005
Asbestos Detected	No unit	-	No	No	No	No	No

PARAMETER	UOM	LOR	BH3/I SOIL - 27/7/2015 SE141822.006	BH4/B SOIL - 27/7/2015 SE141822.007	BH4/E SOIL - 27/7/2015 SE141822.008
Asbestos Detected	No unit	-	No	No	Yes

VOCs in Water [AN433/AN434] Tested: 29/7/2015

PARAMETER	UOM	LOR	BH03 WATER - 27/7/2015 SE141822.015	BH08 WATER - 27/7/2015 SE141822.016	QC01 WATER - 27/7/2015 SE141822.017	RB1 WATER - 27/7/2015 SE141822.018
Benzene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5
Toluene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5
m/p-xylene	µg/L	1	<1	<1	<1	<1
o-xylene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5
Total Xylenes	µg/L	1.5	<1.5	<1.5	<1.5	<1.5
Total BTEX	µg/L	3	<3	<3	<3	<3
Naphthalene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5
Dichlorodifluoromethane (CFC-12)	µg/L	5	<5	<5	-	-
Chloromethane	µg/L	5	<5	<5	-	-
Vinyl chloride (Chloroethene)	µg/L	0.3	<0.3	<0.3	-	-
Bromomethane	µg/L	10	<10	<10	-	-
Chloroethane	µg/L	5	<5	<5	-	-
Trichlorofluoromethane	µg/L	1	<1	<1	-	-
Acetone (2-propanone)	µg/L	10	<10	<10	-	-
Iodomethane	µg/L	5	<5	<5	-	-
1,1-dichloroethene	µg/L	0.5	<0.5	<0.5	-	-
Acrylonitrile	µg/L	0.5	<0.5	<0.5	-	-
Dichloromethane (Methylene chloride)	µg/L	5	<5	<5	-	-
Allyl chloride	µg/L	2	<2	<2	-	-
Carbon disulfide	µg/L	2	<2	<2	-	-
trans-1,2-dichloroethene	µg/L	0.5	<0.5	<0.5	-	-
MtBE (Methyl-tert-butyl ether)	µg/L	2	<2	<2	-	-
1,1-dichloroethane	µg/L	0.5	<0.5	<0.5	-	-
Vinyl acetate	µg/L	10	<10	<10	-	-
MEK (2-butanone)	µg/L	10	<10	<10	-	-
cis-1,2-dichloroethene	µg/L	0.5	<0.5	<0.5	-	-
Bromochloromethane	µg/L	0.5	<0.5	<0.5	-	-
Chloroform (THM)	µg/L	0.5	<0.5	<0.5	-	-
2,2-dichloropropane	µg/L	0.5	<0.5	<0.5	-	-
1,2-dichloroethane	µg/L	0.5	<0.5	<0.5	-	-
1,1,1-trichloroethane	µg/L	0.5	<0.5	<0.5	-	-
1,1-dichloropropene	µg/L	0.5	<0.5	<0.5	-	-
Carbon tetrachloride	µg/L	0.5	<0.5	<0.5	-	-
Dibromomethane	µg/L	0.5	<0.5	<0.5	-	-
1,2-dichloropropane	µg/L	0.5	<0.5	<0.5	-	-
Trichloroethene (Trichloroethylene,TCE)	µg/L	0.5	<0.5	<0.5	-	-
2-nitropropane	µg/L	100	<100	<100	-	-
Bromodichloromethane (THM)	µg/L	0.5	<0.5	<0.5	-	-
MIBK (4-methyl-2-pentanone)	µg/L	5	<5	<5	-	-
cis-1,3-dichloropropene	µg/L	0.5	<0.5	<0.5	-	-
trans-1,3-dichloropropene	µg/L	0.5	<0.5	<0.5	-	-
1,1,2-trichloroethane	µg/L	0.5	<0.5	<0.5	-	-
1,3-dichloropropane	µg/L	0.5	<0.5	<0.5	-	-
Dibromochloromethane (THM)	µg/L	0.5	<0.5	<0.5	-	-
2-hexanone (MBK)	µg/L	5	<5	<5	-	-
1,2-dibromoethane (EDB)	µg/L	0.5	<0.5	<0.5	-	-
Tetrachloroethene (Perchloroethylene,PCE)	µg/L	0.5	<0.5	<0.5	-	-
1,1,1,2-tetrachloroethane	µg/L	0.5	<0.5	<0.5	-	-
Chlorobenzene	µg/L	0.5	<0.5	<0.5	-	-
Bromoform (THM)	µg/L	0.5	<0.5	<0.5	-	-
cis-1,4-dichloro-2-butene	µg/L	1	<1	<1	-	-
Styrene (Vinyl benzene)	µg/L	0.5	<0.5	<0.5	-	-
1,1,2,2-tetrachloroethane	µg/L	0.5	<0.5	<0.5	-	-
1,2,3-trichloropropane	µg/L	0.5	<0.5	<0.5	-	-
trans-1,4-dichloro-2-butene	µg/L	1	<1	<1	-	-

VOCs in Water [AN433/AN434] Tested: 29/7/2015 (continued)

PARAMETER	UOM	LOR	BH03 WATER - 27/7/2015 SE141822.015	BH08 WATER - 27/7/2015 SE141822.016	QC01 WATER - 27/7/2015 SE141822.017	RB1 WATER - 27/7/2015 SE141822.018
Isopropylbenzene (Cumene)	µg/L	0.5	<0.5	<0.5	-	-
Bromobenzene	µg/L	0.5	<0.5	<0.5	-	-
n-propylbenzene	µg/L	0.5	<0.5	<0.5	-	-
2-chlorotoluene	µg/L	0.5	<0.5	<0.5	-	-
4-chlorotoluene	µg/L	0.5	<0.5	<0.5	-	-
1,3,5-trimethylbenzene	µg/L	0.5	<0.5	<0.5	-	-
tert-butylbenzene	µg/L	0.5	<0.5	<0.5	-	-
1,2,4-trimethylbenzene	µg/L	0.5	<0.5	<0.5	-	-
sec-butylbenzene	µg/L	0.5	<0.5	<0.5	-	-
1,3-dichlorobenzene	µg/L	0.5	<0.5	<0.5	-	-
1,4-dichlorobenzene	µg/L	0.3	<0.3	<0.3	-	-
p-isopropyltoluene	µg/L	0.5	<0.5	<0.5	-	-
1,2-dichlorobenzene	µg/L	0.5	<0.5	<0.5	-	-
n-butylbenzene	µg/L	0.5	<0.5	<0.5	-	-
1,2-dibromo-3-chloropropane	µg/L	0.5	<0.5	<0.5	-	-
1,2,4-trichlorobenzene	µg/L	0.5	<0.5	<0.5	-	-
Hexachlorobutadiene	µg/L	0.5	<0.5	<0.5	-	-
1,2,3-trichlorobenzene	µg/L	0.5	<0.5	<0.5	-	-
Total VOC	µg/L	10	-	-	-	-

Volatile Petroleum Hydrocarbons in Water [AN433/AN434/AN410] Tested: 29/7/2015

PARAMETER	UOM	LOR	BH03 WATER - 27/7/2015 SE141822.015	BH08 WATER - 27/7/2015 SE141822.016	QC01 WATER - 27/7/2015 SE141822.017	RB1 WATER - 27/7/2015 SE141822.018
Benzene (F0)	µg/L	0.5	<0.5	<0.5	<0.5	<0.5
TRH C6-C9	µg/L	40	<40	<40	<40	<40
TRH C6-C10	µg/L	50	<50	<50	<50	<50
TRH C6-C10 minus BTEX (F1)	µg/L	50	<50	<50	<50	<50

TRH (Total Recoverable Hydrocarbons) in Water [AN403] Tested: 29/7/2015

PARAMETER	UOM	LOR	BH03 WATER - 27/7/2015 SE141822.015	BH08 WATER - 27/7/2015 SE141822.016	QC01 WATER - 27/7/2015 SE141822.017	RB1 WATER - 27/7/2015 SE141822.018
TRH C10-C14	µg/L	50	<50	<50	<50	<50
TRH C15-C28	µg/L	200	<200	<200	<200	<200
TRH C29-C36	µg/L	200	<200	<200	<200	<200
TRH C37-C40	µg/L	200	<200	<200	<200	<200
TRH >C10-C16 (F2)	µg/L	60	<60	<60	<60	<60
TRH >C16-C34 (F3)	µg/L	500	<500	<500	<500	<500
TRH >C34-C40 (F4)	µg/L	500	<500	<500	<500	<500
TRH C10-C36	µg/L	450	<450	<450	<450	<450
TRH C10-C40	µg/L	650	<650	<650	<650	<650

PAH (Polynuclear Aromatic Hydrocarbons) in Water [AN420] Tested: 29/7/2015

PARAMETER	UOM	LOR	BH03 WATER - 27/7/2015 SE141822.015	BH08 WATER - 27/7/2015 SE141822.016	QC01 WATER - 27/7/2015 SE141822.017	RB1 WATER - 27/7/2015 SE141822.018
Naphthalene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
2-methylnaphthalene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
1-methylnaphthalene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b&j)fluoranthene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-cd)pyrene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a&h)anthracene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Total PAH (18)	µg/L	1	<1	<1	<1	<1

Speciated Phenols in Water [AN420] Tested: 29/7/2015

PARAMETER	UOM	LOR	BH03 WATER - 27/7/2015 SE141822.015	BH08 WATER - 27/7/2015 SE141822.016
Phenol	µg/L	0.5	<0.5	<0.5
2-methyl phenol (o-cresol)	µg/L	0.5	<0.5	<0.5
3/4-methyl phenol (m/p-cresol)	µg/L	1	<1	<1
Total Cresol	µg/L	1.5	<1.5	<1.5
2-chlorophenol	µg/L	0.5	<0.5	<0.5
2,4-dimethylphenol	µg/L	0.5	<0.5	<0.5
2,6-dichlorophenol	µg/L	0.5	<0.5	<0.5
2,4-dichlorophenol	µg/L	0.5	<0.5	<0.5
2,4,6-trichlorophenol	µg/L	0.5	<0.5	<0.5
2-nitrophenol	µg/L	0.5	<0.5	<0.5
4-nitrophenol	µg/L	1	<1	<1
2,4,5-trichlorophenol	µg/L	0.5	<0.5	<0.5
2,3,4,6/2,3,5,6-tetrachlorophenol	µg/L	1	<1	<1
Pentachlorophenol	µg/L	0.5	<0.5	<0.5
2,4-dinitrophenol	µg/L	2	<2	<2
4-chloro-3-methylphenol	µg/L	2	<2	<2

OC Pesticides in Water [AN400/AN420] Tested: 29/7/2015

PARAMETER	UOM	LOR	BH03 WATER - 27/7/2015 SE141822.015	BH08 WATER - 27/7/2015 SE141822.016	QC01 WATER - 27/7/2015 SE141822.017
Alpha BHC	µg/L	0.1	<0.1	<0.1	<0.1
Hexachlorobenzene (HCB)	µg/L	0.1	<0.1	<0.1	<0.1
Beta BHC	µg/L	0.1	<0.1	<0.1	<0.1
Lindane (gamma BHC)	µg/L	0.1	<0.1	<0.1	<0.1
Delta BHC	µg/L	0.1	<0.1	<0.1	<0.1
Heptachlor	µg/L	0.1	<0.1	<0.1	<0.1
Aldrin	µg/L	0.1	<0.1	<0.1	<0.1
Heptachlor epoxide	µg/L	0.1	<0.1	<0.1	<0.1
Gamma Chlordane	µg/L	0.1	<0.1	<0.1	<0.1
Alpha Chlordane	µg/L	0.1	<0.1	<0.1	<0.1
Alpha Endosulfan	µg/L	0.1	<0.1	<0.1	<0.1
o,p'-DDE	µg/L	0.1	<0.1	<0.1	<0.1
p,p'-DDE	µg/L	0.1	<0.1	<0.1	<0.1
Dieldrin	µg/L	0.1	<0.1	<0.1	<0.1
Endrin	µg/L	0.1	<0.1	<0.1	<0.1
Beta Endosulfan	µg/L	0.1	<0.1	<0.1	<0.1
o,p'-DDD	µg/L	0.1	<0.1	<0.1	<0.1
p,p'-DDD	µg/L	0.1	<0.1	<0.1	<0.1
Endosulfan sulphate	µg/L	0.1	<0.1	<0.1	<0.1
o,p'-DDT	µg/L	0.1	<0.1	<0.1	<0.1
p,p'-DDT	µg/L	0.1	<0.1	<0.1	<0.1
Endrin ketone	µg/L	0.1	<0.1	<0.1	<0.1
Methoxychlor	µg/L	0.1	<0.1	<0.1	<0.1
trans-Nonachlor	µg/L	0.1	<0.1	<0.1	<0.1
Endrin aldehyde	µg/L	0.1	<0.1	<0.1	<0.1
Isodrin	µg/L	0.1	<0.1	<0.1	<0.1
Mirex	µg/L	0.1	<0.1	<0.1	<0.1

OP Pesticides in Water [AN400/AN420] Tested: 29/7/2015

PARAMETER	UOM	LOR	BH03 WATER - 27/7/2015 SE141822.015	BH08 WATER - 27/7/2015 SE141822.016	QC01 WATER - 27/7/2015 SE141822.017
Dichlorvos	µg/L	0.5	<0.5	<0.5	<0.5
Dimethoate	µg/L	0.5	<0.5	<0.5	<0.5
Diazinon (Dimpylate)	µg/L	0.5	<0.5	<0.5	<0.5
Fenitrothion	µg/L	0.2	<0.2	<0.2	<0.2
Malathion	µg/L	0.2	<0.2	<0.2	<0.2
Chlorpyrifos (Chlorpyrifos Ethyl)	µg/L	0.2	<0.2	<0.2	<0.2
Parathion-ethyl (Parathion)	µg/L	0.2	<0.2	<0.2	<0.2
Bromophos Ethyl	µg/L	0.2	<0.2	<0.2	<0.2
Methidathion	µg/L	0.5	<0.5	<0.5	<0.5
Ethion	µg/L	0.2	<0.2	<0.2	<0.2
Azinphos-methyl	µg/L	0.2	<0.2	<0.2	<0.2

PCBs in Water [AN400/AN420] Tested: 29/7/2015

PARAMETER	UOM	LOR	BH03 WATER - 27/7/2015 SE141822.015	BH08 WATER - 27/7/2015 SE141822.016	QC01 WATER - 27/7/2015 SE141822.017
Arochlor 1016	µg/L	1	<1	<1	<1
Arochlor 1221	µg/L	1	<1	<1	<1
Arochlor 1232	µg/L	1	<1	<1	<1
Arochlor 1242	µg/L	1	<1	<1	<1
Arochlor 1248	µg/L	1	<1	<1	<1
Arochlor 1254	µg/L	1	<1	<1	<1
Arochlor 1260	µg/L	1	<1	<1	<1
Arochlor 1262	µg/L	1	<1	<1	<1
Arochlor 1268	µg/L	1	<1	<1	<1
Total Arochlors*	µg/L	5	<5	<5	<5

Full 8270 SVOC in Water [AN420] Tested: 29/7/2015

PARAMETER	UOM	LOR	BH03 WATER - 27/7/2015 SE141822.015	BH08 WATER - 27/7/2015 SE141822.016
Acenaphthene	µg/L	0.1	<0.1	<0.1
Acenaphthylene	µg/L	0.1	<0.1	<0.1
Anthracene	µg/L	0.1	<0.1	<0.1
Benzo(a)anthracene	µg/L	0.1	<0.1	<0.1
Total Benzofluoranthenes (b&j&k)	µg/L	0.2	<0.2	<0.2
Benzo(b&j)fluoranthene	µg/L	0.1	<0.1	<0.1
Benzo(k)fluoranthene	µg/L	0.1	<0.1	<0.1
Benzo(ghi)perylene	µg/L	0.1	<0.1	<0.1
Benzo(a)pyrene	µg/L	0.1	<0.1	<0.1
Chrysene	µg/L	0.1	<0.1	<0.1
Dibenzo(ah)anthracene	µg/L	0.1	<0.1	<0.1
Fluoranthene	µg/L	0.1	<0.1	<0.1
Fluorene	µg/L	0.1	<0.1	<0.1
Indeno(1,2,3-cd)pyrene	µg/L	0.1	<0.1	<0.1
1-methylnaphthalene	µg/L	0.1	<0.1	<0.1
2-methylnaphthalene	µg/L	0.1	<0.1	<0.1
Naphthalene	µg/L	0.1	<0.1	<0.1
Phenanthrene	µg/L	0.1	<0.1	<0.1
Pyrene	µg/L	0.1	<0.1	<0.1
2-acetylaminofluorene	µg/L	0.5	<0.5	<0.5
7,12-dimethyl-benz(a)anthracene	µg/L	0.5	<0.5	<0.5
3-methylcholanthrene	µg/L	0.5	<0.5	<0.5
Aldrin	µg/L	0.1	<0.1	<0.1
Alpha-BHC	µg/L	0.1	<0.1	<0.1
Beta-BHC	µg/L	0.1	<0.1	<0.1
Delta-BHC	µg/L	0.1	<0.1	<0.1
Gamma-BHC (Lindane)	µg/L	0.1	<0.1	<0.1
p,p-DDD	µg/L	0.1	<0.1	<0.1
p,p-DDE	µg/L	0.1	<0.1	<0.1
p,p-DDT	µg/L	0.1	<0.1	<0.1
Dieldrin	µg/L	0.1	<0.1	<0.1
Alpha-endosulfan	µg/L	0.1	<0.1	<0.1
Beta-endosulfan	µg/L	0.1	<0.1	<0.1
Endosulfan sulphate	µg/L	0.1	<0.1	<0.1
Endrin	µg/L	0.1	<0.1	<0.1
Heptachlor	µg/L	0.1	<0.1	<0.1
Heptachlor epoxide	µg/L	0.1	<0.1	<0.1
Isodrin	µg/L	0.1	<0.1	<0.1
Methoxychlor	µg/L	0.1	<0.1	<0.1
Mirex	µg/L	0.1	<0.1	<0.1
Alpha-chlordane	µg/L	0.1	<0.1	<0.1
Gamma-chlordane	µg/L	0.1	<0.1	<0.1
Endrin ketone	µg/L	0.1	<0.1	<0.1
Azinphos-methyl (Guthion)	µg/L	0.2	<0.2	<0.2
Bromophos ethyl	µg/L	0.2	<0.2	<0.2
Carbophenothion	µg/L	0.5	<0.5	<0.5
Chlorfenvinphos-cis	µg/L	5	<5	<5
Chlorfenvinphos-trans	µg/L	0.5	<0.5	<0.5
Chlorpyrifos (Chlorpyrifos Ethyl)	µg/L	0.2	<0.2	<0.2
Chlorpyrifos-methyl	µg/L	0.5	<0.5	<0.5
Co-Ral (Coumaphos)	µg/L	0.5	<0.5	<0.5
Diazinon (Dimpylate)	µg/L	0.5	<0.5	<0.5
Dichlorvos	µg/L	0.5	<0.5	<0.5
1/2-Chloronaphthalene	µg/L	1	<1	<1
Demeton-S-methyl	µg/L	0.5	<0.5	<0.5
Dimethoate	µg/L	0.5	<0.5	<0.5

Full 8270 SVOC in Water [AN420] Tested: 29/7/2015 (continued)

PARAMETER	UOM	LOR	BH03 WATER - 27/7/2015 SE141822.015	BH08 WATER - 27/7/2015 SE141822.016
Disulfoton (Di-syston)	µg/L	0.5	<0.5	<0.5
EPN*	µg/L	0.5	<0.5	<0.5
Ethion	µg/L	0.2	<0.2	<0.2
Ethoprophos (Ethoprop or Prophos)	µg/L	0.5	<0.5	<0.5
Famphur (Famophos)	µg/L	0.5	<0.5	<0.5
Fenamiphos (Phenamiphos)	µg/L	0.5	<0.5	<0.5
Fenchlorophos (Ronnel)	µg/L	0.5	<0.5	<0.5
Fenitrothion	µg/L	0.2	<0.2	<0.2
Fenthion	µg/L	0.5	<0.5	<0.5
Malathion (Maldison)	µg/L	0.2	<0.2	<0.2
Methidathion	µg/L	0.5	<0.5	<0.5
Mevinphos-cis/trans	µg/L	1	<1	<1
o,o,o-triethyl phosphorothioate	µg/L	0.5	<0.5	<0.5
Parathion ethyl (Parathion)	µg/L	0.2	<0.2	<0.2
Parathion methyl	µg/L	0.5	<0.5	<0.5
Phorate	µg/L	0.5	<0.5	<0.5
Pirimiphos-ethyl	µg/L	0.5	<0.5	<0.5
Pirimiphos-methyl	µg/L	0.5	<0.5	<0.5
Profenofos	µg/L	0.5	<0.5	<0.5
Prothiophos (Tokuthion)*	µg/L	0.5	<0.5	<0.5
Sulfotepp	µg/L	0.5	<0.5	<0.5
Tetrachlorvinphos (Stirophos)*	µg/L	0.5	<0.5	<0.5
PCB Congener C28	µg/L	0.1	<0.1	<0.1
PCB Congener C52	µg/L	0.1	<0.1	<0.1
PCB Congener C101	µg/L	0.1	<0.1	<0.1
PCB Congener C118	µg/L	0.1	<0.1	<0.1
PCB Congener C138	µg/L	0.1	<0.1	<0.1
PCB Congener C153	µg/L	0.1	<0.1	<0.1
PCB Congener C180	µg/L	0.1	<0.1	<0.1
Hexachlorobenzene (HCB)	µg/L	0.1	<0.1	<0.1
1,2-dichlorobenzene	µg/L	0.5	<0.5	<0.5
1,3-dichlorobenzene	µg/L	0.5	<0.5	<0.5
1,4-dichlorobenzene	µg/L	0.5	<0.5	<0.5
Hexachlorobutadiene	µg/L	0.5	<0.5	<0.5
Hexachlorocyclopentadiene	µg/L	2	<2	<2
Hexachloroethane	µg/L	0.5	<0.5	<0.5
Hexachloroproprene	µg/L	0.5	<0.5	<0.5
Pentachlorobenzene	µg/L	0.5	<0.5	<0.5
Pentachloroethane	µg/L	0.5	<0.5	<0.5
1,2,3,5 and 1,2,4,5-tetrachlorobenzene	µg/L	1	<1	<1
1,2,3,4-tetrachlorobenzene	µg/L	0.5	<0.5	<0.5
1,2,4-trichlorobenzene	µg/L	0.5	<0.5	<0.5
Bis(2-ethylhexyl)phthalate	µg/L	50	<50	<50
Bis(2-ethylhexyl)adipate	µg/L	1	<1	<1
Butyl benzyl phthalate	µg/L	1	<1	<1
Di-n-butyl phthalate	µg/L	10	<10	<10
Diethyl phthalate	µg/L	5	<5	<5
Dimethyl phthalate	µg/L	1	<1	<1
Dioctyl phthalate	µg/L	1	<1	<1
Carbofuran	µg/L	0.5	<0.5	<0.5
Carbaryl	µg/L	0.5	<0.5	<0.5
Trifluralin	µg/L	0.5	<0.5	<0.5
N-nitroso-di-n-butylamine (NDBA)	µg/L	1	<1	<1
N-nitroso-diethylamine (NDEA)	µg/L	1	<1	<1
N-nitroso-di-n-propylamine (NDPA)	µg/L	1	<1	<1
N-nitroso-morpholine (NMOR)	µg/L	1	<1	<1

Full 8270 SVOC in Water [AN420] Tested: 29/7/2015 (continued)

PARAMETER	UOM	LOR	BH03 WATER - 27/7/2015 SE141822.015	BH08 WATER - 27/7/2015 SE141822.016
N-nitroso-piperidine (NPIP)	µg/L	1	<1	<1
N-nitroso-pyrrolidine (NPYR)	µg/L	1	<1	<1
4-amino biphenyl	µg/L	1	<1	<1
Acetophenone	µg/L	1	<1	<1
1,3-dinitrobenzene	µg/L	1	<1	<1
2,4-dinitrotoluene	µg/L	1	<1	<1
2,6-dinitrotoluene	µg/L	1	<1	<1
Isophorone	µg/L	1	<1	<1
Nitrobenzene	µg/L	1	<1	<1
p-(dimethylamino) azobenzene	µg/L	1	<1	<1
Phenacetin	µg/L	1	<1	<1
Pentachloronitrobenzene (quintozene)	µg/L	1	<1	<1
Aniline	µg/L	5	<5	<5
4-chloroaniline	µg/L	1	<1	<1
2-nitroaniline	µg/L	1	<1	<1
3-nitroaniline	µg/L	1	<1	<1
4-nitroaniline	µg/L	1	<1	<1
Diphenylamine	µg/L	1	<1	<1
o-Toluidine	µg/L	1	<1	<1
5-nitro-o-toluidine	µg/L	1	<1	<1
1-naphthylamine	µg/L	2	<2	<2
2-naphthylamine	µg/L	2	<2	<2
Bis(2-chloroethoxy) methane	µg/L	1	<1	<1
Bis(2-chloroethyl) ether	µg/L	1	<1	<1
Bis(2-chloroisopropyl) ether	µg/L	1	<1	<1
4-chlorophenyl phenyl ether	µg/L	1	<1	<1
4-bromophenyl phenyl ether	µg/L	1	<1	<1
Methyl methanesulfonate	µg/L	1	<1	<1
Ethyl methanesulfonate	µg/L	1	<1	<1
Dibenzofuran	µg/L	1	<1	<1
Benzyl alcohol	µg/L	1	<1	<1
Safrole	µg/L	1	<1	<1
Isosafrole Isomer 1	µg/L	1	<1	<1
Isosafrole Isomer 2	µg/L	1	<1	<1
1,4-naphthoquinone	µg/L	1	<1	<1
Thionazin	µg/L	1	<1	<1
3/4-methyl phenol (m/p-cresol)	µg/L	1	<1	<1
2-methyl phenol (o-cresol)	µg/L	0.5	<0.5	<0.5
2,6-dichlorophenol	µg/L	0.5	<0.5	<0.5
2,3,4,6 and 2,3,5,6-tetrachlorophenol	µg/L	1	<1	<1
2,4,5-trichlorophenol	µg/L	0.5	<0.5	<0.5
4-chloro-3-methylphenol	µg/L	2	<2	<2
2-chlorophenol	µg/L	0.5	<0.5	<0.5
2,4-dichlorophenol	µg/L	0.5	<0.5	<0.5
2,4-dimethylphenol	µg/L	0.5	<0.5	<0.5
2-nitrophenol	µg/L	0.5	<0.5	<0.5
Phenol	µg/L	0.5	<0.5	<0.5
2,4,6-trichlorophenol	µg/L	0.5	<0.5	<0.5
Pentachlorophenol	µg/L	0.5	<0.5	<0.5
4-nitrophenol	µg/L	1	<1	<1

Trace Metals (Dissolved) in Water by ICPMS [AN318] Tested: 28/7/2015

PARAMETER	UOM	LOR	BH03 WATER - 27/7/2015 SE141822.015	BH08 WATER - 27/7/2015 SE141822.016	QC01 WATER - 27/7/2015 SE141822.017	RB1 WATER - 27/7/2015 SE141822.018
Arsenic, As	µg/L	1	<1	<1	<1	<1
Cadmium, Cd	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Chromium, Cr	µg/L	1	<1	<1	<1	<1
Copper, Cu	µg/L	1	<1	<1	<1	<1
Lead, Pb	µg/L	1	<1	<1	<1	<1
Nickel, Ni	µg/L	1	**61**	**43**	**56**	<1
Zinc, Zn	µg/L	5	**18**	**12**	**18**	<5

Mercury (dissolved) in Water [AN311/AN312] Tested: 29/7/2015

PARAMETER	UOM	LOR	BH03 WATER - 27/7/2015 SE141822.015	BH08 WATER - 27/7/2015 SE141822.016	QC01 WATER - 27/7/2015 SE141822.017	RB1 WATER - 27/7/2015 SE141822.018
Mercury	mg/L	0.0001	<0.0001	<0.0001	<0.0001	<0.0001

METHOD	METHODOLOGY SUMMARY
AN002	The test is carried out by drying (at either 40°C or 105°C) a known mass of sample in a weighed evaporating basin. After fully dry the sample is re-weighed. Samples such as sludge and sediment having high percentages of moisture will take some time in a drying oven for complete removal of water.
AN020	Unpreserved water sample is filtered through a 0.45µm membrane filter and acidified with nitric acid similar to APHA3030B.
AN040/AN320	A portion of sample is digested with nitric acid to decompose organic matter and hydrochloric acid to complete the digestion of metals. The digest is then analysed by ICP OES with metals results reported on the dried sample basis. Based on USEPA method 200.8 and 6010C.
AN040	A portion of sample is digested with Nitric acid to decompose organic matter and Hydrochloric acid to complete the digestion of metals and then filtered for analysis by ASS or ICP as per USEPA Method 200.8.
AN083	Separatory funnels are used for aqueous samples and extracted by transferring an appropriate volume (mass) of liquid into a separatory funnel and adding 3 serial aliquots of dichloromethane. Samples receive a single extraction at pH 7 to recover base / neutral analytes and two extractions at pH < 2 to recover acidic analytes. QC samples are prepared by spiking organic free water with target analytes and extracting as per samples.
AN088	Orbital rolling for Organic pollutants are extracted from soil/sediment by transferring an appropriate mass of sample to a clear soil jar and extracting with 1:1 Dichloromethane/Acetone. Orbital Rolling method is intended for the extraction of semi-volatile organic compounds from soil/sediment samples, and is based somewhat on USEPA method 3570 (Micro Organic extraction and sample preparation). Method 3700.
AN311/AN312	Mercury by Cold Vapour AAS in Waters: Mercury ions are reduced by stannous chloride reagent in acidic solution to elemental mercury. This mercury vapour is purged by nitrogen into a cold cell in an atomic absorption spectrometer or mercury analyser. Quantification is made by comparing absorbances to those of the calibration standards. Reference APHA 3112/3500.
AN312	Mercury by Cold Vapour AAS in Soils: After digestion with nitric acid, hydrogen peroxide and hydrochloric acid, mercury ions are reduced by stannous chloride reagent in acidic solution to elemental mercury. This mercury vapour is purged by nitrogen into a cold cell in an atomic absorption spectrometer or mercury analyser. Quantification is made by comparing absorbances to those of the calibration standards. Reference APHA 3112/3500
AN318	Determination of elements at trace level in waters by ICP-MS technique, in accordance with USEPA 6020A.
AN400	OC and OP Pesticides by GC-ECD: The determination of organochlorine (OC) and organophosphorus (OP) pesticides and polychlorinated biphenyls (PCBs) in soils, sludges and groundwater. (Based on USEPA methods 3510, 3550, 8140 and 8080.)
AN403	Total Recoverable Hydrocarbons: Determination of Hydrocarbons by gas chromatography after a solvent extraction. Detection is by flame ionisation detector (FID) that produces an electronic signal in proportion to the combustible matter passing through it. Total Recoverable Hydrocarbons (TRH) are routinely reported as four alkane groupings based on the carbon chain length of the compounds: C6-C9, C10-C14, C15-C28 and C29-C36 and in recognition of the NEPM 1999 (2013), >C10-C16 (F2), >C16-C34 (F3) and >C34-C40 (F4). F2 is reported directly and also corrected by subtracting Naphthalene (from VOC method AN433) where available. Additionally, the volatile C6-C9 fraction may be determined by a purge and trap technique and GC/MS because of the potential for volatiles loss. Total Petroleum Hydrocarbons (TPH) follows the same method of analysis after silica gel cleanup of the solvent extract. Aliphatic/Aromatic Speciation follows the same method of analysis after fractionation of the solvent extract over silica with differential polarity of the eluent solvents . The GC/FID method is not well suited to the analysis of refined high boiling point materials (ie lubricating oils or greases) but is particularly suited for measuring diesel, kerosene and petrol if care to control volatility is taken. This method will detect naturally occurring hydrocarbons, lipids, animal fats, phenols and PAHs if they are present at sufficient levels, dependent on the use of specific cleanup/fractionation techniques. Reference USEPA 3510B, 8015B.
AN420	(SVOCs) including OC, OP, PCB, Herbicides, PAH, Phthalates and Speciated Phenols (etc) in soils, sediments and waters are determined by GCMS/ECD technique following appropriate solvent extraction process (Based on USEPA 3500C and 8270D). SVOC Compounds: Semi-Volatile Organic Compounds (SVOCs) including OC, OP, PCB, Herbicides, PAH, Phthalates and Speciated Phenols in soils, sediments and waters are determined by GCMS/ECD technique following appropriate solvent extraction process (Based on USEPA 3500C and 8270D).
AN433/AN434/AN410	VOCs and C6-C9/C6-C10 Hydrocarbons by GC-MS P&T: VOC`s are volatile organic compounds. The sample is presented to a gas chromatograph via a purge and trap (P&T) concentrator and autosampler and is detected with a Mass Spectrometer (MSD). Solid samples are initially extracted with methanol whilst liquid samples are processed directly. References: USEPA 5030B, 8020A, 8260.
AN433/AN434	VOCs and C6-C9 Hydrocarbons by GC-MS P&T: VOC`s are volatile organic compounds. The sample is presented to a gas chromatograph via a purge and trap (P&T) concentrator and autosampler and is detected with a Mass Spectrometer (MSD). Solid samples are initially extracted with methanol whilst liquid samples are processed directly. References: USEPA 5030B, 8020A, 8260.

AN602	Qualitative identification of chrysotile, amosite and crocidolite in bulk samples by polarised light microscopy (PLM) in conjunction with dispersion staining (DS). AS4964 provides the basis for this document. Unequivocal identification of the asbestos minerals present is made by obtaining sufficient diagnostic `clues`, which provide a reasonable degree of certainty, dispersion staining is a mandatory `clue` for positive identification. If sufficient `clues` are absent, then positive identification of asbestos is not possible. This procedure requires removal of suspect fibres/bundles from the sample which cannot be returned. Fibres/material that cannot be unequivocably identified as one of the three asbestos forms, will be reported as unknown mineral fibres (umf). AS4964.2004 Method for the Qualitative Identification of Asbestos in Bulk Samples, Section 8.4, Trace Analysis Criteria, Note 4 states:"Depending upon sample condition and fibre type, the detection limit of this technique has been found to lie generally in the range of 1 in 1,000 to 1 in 10,000 parts by weight, equivalent to 1 to 0.1 g/kg." The sample can be reported “no asbestos found at the reporting limit of 0.1 g/kg” (<0.01%w/w) where AN602 section 4.5 of this method has been followed, and if- (a) no trace asbestos fibres have been detected (i.e. no ‘respirable’ fibres): (b) the estimated weight of non-respirable asbestos fibre bundles and/or the estimated weight of asbestos in asbestos-containing materials are found to be less than 0.1g/kg: and (c) these non-respirable asbestos fibre bundles and/or the asbestos containing materials are only visible under stereo-microscope viewing conditions.

FOOTNOTES

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

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

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

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

STATEMENT OF QA/QC PERFORMANCE

SE141822 R0

CLIENT DETAILS

Contact	Barry Houston
Client	PETER J RAMSAY & ASSOCIATES
Address	Environmental Engineering Consultants 3/538, Gardeners Road Alexandria NSW 2015
Telephone	02 8338 1655
Facsimile	02 8338 1755
Email	barry.houston@pjra.com.au
Project	**884.1**
Order Number	**PCOC1**
Samples	20

LABORATORY DETAILS

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Laboratory	SGS Alexandria Environmental
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SGS Reference	SE141822 R0
Report Number	0000116755
Date Reported	30 Jul 2015

COMMENTS

All the laboratory data for each environmental matrix was compared to SGS Environmental Services' stated Data Quality Objectives (DQO). Comments arising from the comparison were made and are reported below.

The data relating to sampling was taken from the Chain of Custody document and was supplied by the Client.
This QA/QC Statement must be read in conjunction with the referenced Analytical Report.
The Statement and the Analytical Report must not be reproduced except in full.

All Data Quality Objectives were met with the exception of the following:

Matrix Spike	Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest	1 item

SAMPLE SUMMARY

Sample counts by matrix	16 Soils, 4 Waters	Type of documentation received	COC
Date documentation received	28/7/2015	Samples received in good order	Yes
Samples received without headspace	Yes	Sample temperature upon receipt	6.0°C
Sample container provider	Other Lab	Turnaround time requested	Two Days
Samples received in correct containers	Yes	Sufficient sample for analysis	Yes
Sample cooling method	Ice Bricks	Samples clearly labelled	Yes
Complete documentation received	Yes	Number of eskies/boxes received	

HOLDING TIME SUMMARY

SE141822 R0

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS “Field Sampling Guide for Containers and Holding Time” (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the sampled date is not supplied then compliance with criteria cannot be determined. If the received date is after one or both due dates then holding time will fail by default.

Fibre Identification in soil

Method: ME-(AU)-[ENV]AN602

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1/D	SE141822.001	LB081886	27 Jul 2015	28 Jul 2015	26 Jul 2016	29 Jul 2015	26 Jul 2016	30 Jul 2015
BH1/M	SE141822.002	LB081886	27 Jul 2015	28 Jul 2015	26 Jul 2016	29 Jul 2015	26 Jul 2016	30 Jul 2015
BH2/D	SE141822.003	LB081886	27 Jul 2015	28 Jul 2015	26 Jul 2016	29 Jul 2015	26 Jul 2016	30 Jul 2015
BH2/G	SE141822.004	LB081886	27 Jul 2015	28 Jul 2015	26 Jul 2016	29 Jul 2015	26 Jul 2016	30 Jul 2015
BH3/C	SE141822.005	LB081886	27 Jul 2015	28 Jul 2015	26 Jul 2016	29 Jul 2015	26 Jul 2016	30 Jul 2015
BH3/I	SE141822.006	LB081886	27 Jul 2015	28 Jul 2015	26 Jul 2016	29 Jul 2015	26 Jul 2016	30 Jul 2015
BH4/B	SE141822.007	LB081886	27 Jul 2015	28 Jul 2015	26 Jul 2016	29 Jul 2015	26 Jul 2016	30 Jul 2015
BH4/E	SE141822.008	LB081886	27 Jul 2015	28 Jul 2015	26 Jul 2016	29 Jul 2015	26 Jul 2016	30 Jul 2015

Full 8270 SVOC in Water

Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH03	SE141822.015	LB081872	27 Jul 2015	28 Jul 2015	03 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
BH08	SE141822.016	LB081872	27 Jul 2015	28 Jul 2015	03 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
QC01	SE141822.017	LB081872	27 Jul 2015	28 Jul 2015	03 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
RB1	SE141822.018	LB081872	27 Jul 2015	28 Jul 2015	03 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015

Mercury (dissolved) in Water

Method: ME-(AU)-[ENV]AN311/AN312

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH03	SE141822.015	LB081892	27 Jul 2015	28 Jul 2015	24 Aug 2015	29 Jul 2015	24 Aug 2015	29 Jul 2015
BH08	SE141822.016	LB081892	27 Jul 2015	28 Jul 2015	24 Aug 2015	29 Jul 2015	24 Aug 2015	29 Jul 2015
QC01	SE141822.017	LB081892	27 Jul 2015	28 Jul 2015	24 Aug 2015	29 Jul 2015	24 Aug 2015	29 Jul 2015
RB1	SE141822.018	LB081892	27 Jul 2015	28 Jul 2015	24 Aug 2015	29 Jul 2015	24 Aug 2015	29 Jul 2015

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1/D	SE141822.001	LB081893	27 Jul 2015	28 Jul 2015	24 Aug 2015	29 Jul 2015	24 Aug 2015	30 Jul 2015
BH1/M	SE141822.002	LB081893	27 Jul 2015	28 Jul 2015	24 Aug 2015	29 Jul 2015	24 Aug 2015	30 Jul 2015
BH2/D	SE141822.003	LB081893	27 Jul 2015	28 Jul 2015	24 Aug 2015	29 Jul 2015	24 Aug 2015	30 Jul 2015
BH2/G	SE141822.004	LB081893	27 Jul 2015	28 Jul 2015	24 Aug 2015	29 Jul 2015	24 Aug 2015	30 Jul 2015
BH3/C	SE141822.005	LB081893	27 Jul 2015	28 Jul 2015	24 Aug 2015	29 Jul 2015	24 Aug 2015	30 Jul 2015
BH3/I	SE141822.006	LB081893	27 Jul 2015	28 Jul 2015	24 Aug 2015	29 Jul 2015	24 Aug 2015	30 Jul 2015
BH4/B	SE141822.007	LB081893	27 Jul 2015	28 Jul 2015	24 Aug 2015	29 Jul 2015	24 Aug 2015	30 Jul 2015
BH4/E	SE141822.008	LB081893	27 Jul 2015	28 Jul 2015	24 Aug 2015	29 Jul 2015	24 Aug 2015	30 Jul 2015
BH5/A	SE141822.009	LB081893	27 Jul 2015	28 Jul 2015	24 Aug 2015	29 Jul 2015	24 Aug 2015	30 Jul 2015
BH5/C	SE141822.010	LB081893	27 Jul 2015	28 Jul 2015	24 Aug 2015	29 Jul 2015	24 Aug 2015	30 Jul 2015
BH6/A	SE141822.011	LB081893	27 Jul 2015	28 Jul 2015	24 Aug 2015	29 Jul 2015	24 Aug 2015	30 Jul 2015
BH6/C	SE141822.012	LB081893	27 Jul 2015	28 Jul 2015	24 Aug 2015	29 Jul 2015	24 Aug 2015	30 Jul 2015
BH7/B	SE141822.013	LB081893	27 Jul 2015	28 Jul 2015	24 Aug 2015	29 Jul 2015	24 Aug 2015	30 Jul 2015
DUP03	SE141822.014	LB081893	27 Jul 2015	28 Jul 2015	24 Aug 2015	29 Jul 2015	24 Aug 2015	30 Jul 2015

Moisture Content

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1/D	SE141822.001	LB081856	27 Jul 2015	28 Jul 2015	10 Aug 2015	28 Jul 2015	02 Aug 2015	30 Jul 2015
BH1/M	SE141822.002	LB081856	27 Jul 2015	28 Jul 2015	10 Aug 2015	28 Jul 2015	02 Aug 2015	30 Jul 2015
BH2/D	SE141822.003	LB081856	27 Jul 2015	28 Jul 2015	10 Aug 2015	28 Jul 2015	02 Aug 2015	30 Jul 2015
BH2/G	SE141822.004	LB081856	27 Jul 2015	28 Jul 2015	10 Aug 2015	28 Jul 2015	02 Aug 2015	30 Jul 2015
BH3/C	SE141822.005	LB081856	27 Jul 2015	28 Jul 2015	10 Aug 2015	28 Jul 2015	02 Aug 2015	30 Jul 2015
BH3/I	SE141822.006	LB081856	27 Jul 2015	28 Jul 2015	10 Aug 2015	28 Jul 2015	02 Aug 2015	30 Jul 2015
BH4/B	SE141822.007	LB081856	27 Jul 2015	28 Jul 2015	10 Aug 2015	28 Jul 2015	02 Aug 2015	30 Jul 2015
BH4/E	SE141822.008	LB081856	27 Jul 2015	28 Jul 2015	10 Aug 2015	28 Jul 2015	02 Aug 2015	30 Jul 2015
BH5/A	SE141822.009	LB081856	27 Jul 2015	28 Jul 2015	10 Aug 2015	28 Jul 2015	02 Aug 2015	30 Jul 2015
BH5/C	SE141822.010	LB081856	27 Jul 2015	28 Jul 2015	10 Aug 2015	28 Jul 2015	02 Aug 2015	30 Jul 2015
BH6/A	SE141822.011	LB081856	27 Jul 2015	28 Jul 2015	10 Aug 2015	28 Jul 2015	02 Aug 2015	30 Jul 2015
BH6/C	SE141822.012	LB081856	27 Jul 2015	28 Jul 2015	10 Aug 2015	28 Jul 2015	02 Aug 2015	30 Jul 2015
BH7/B	SE141822.013	LB081856	27 Jul 2015	28 Jul 2015	10 Aug 2015	28 Jul 2015	02 Aug 2015	30 Jul 2015
DUP03	SE141822.014	LB081856	27 Jul 2015	28 Jul 2015	10 Aug 2015	28 Jul 2015	02 Aug 2015	30 Jul 2015
Trip Blank	SE141822.019	LB081856	27 Jul 2015	28 Jul 2015	10 Aug 2015	28 Jul 2015	02 Aug 2015	30 Jul 2015

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN400/AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1/D	SE141822.001	LB081869	27 Jul 2015	28 Jul 2015	10 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
BH1/M	SE141822.002	LB081869	27 Jul 2015	28 Jul 2015	10 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015

HOLDING TIME SUMMARY

SE141822 R0

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS “Field Sampling Guide for Containers and Holding Time” (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the sampled date is not supplied then compliance with criteria cannot be determined. If the received date is after one or both due dates then holding time will fail by default.

OC Pesticides in Soil (continued)

Method: ME-(AU)-[ENV]AN400/AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH2/D	SE141822.003	LB081869	27 Jul 2015	28 Jul 2015	10 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
BH2/G	SE141822.004	LB081869	27 Jul 2015	28 Jul 2015	10 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
BH3/C	SE141822.005	LB081869	27 Jul 2015	28 Jul 2015	10 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
BH3/I	SE141822.006	LB081869	27 Jul 2015	28 Jul 2015	10 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
BH4/B	SE141822.007	LB081869	27 Jul 2015	28 Jul 2015	10 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
BH4/E	SE141822.008	LB081869	27 Jul 2015	28 Jul 2015	10 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
BH5/A	SE141822.009	LB081869	27 Jul 2015	28 Jul 2015	10 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
BH5/C	SE141822.010	LB081869	27 Jul 2015	28 Jul 2015	10 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
BH6/A	SE141822.011	LB081869	27 Jul 2015	28 Jul 2015	10 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
BH6/C	SE141822.012	LB081869	27 Jul 2015	28 Jul 2015	10 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
BH7/B	SE141822.013	LB081869	27 Jul 2015	28 Jul 2015	10 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
DUP03	SE141822.014	LB081869	27 Jul 2015	28 Jul 2015	10 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015

OC Pesticides in Water

Method: ME-(AU)-[ENV]AN400/AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH03	SE141822.015	LB081872	27 Jul 2015	28 Jul 2015	03 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
BH08	SE141822.016	LB081872	27 Jul 2015	28 Jul 2015	03 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
QC01	SE141822.017	LB081872	27 Jul 2015	28 Jul 2015	03 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
RB1	SE141822.018	LB081872	27 Jul 2015	28 Jul 2015	03 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015

OP Pesticides in Soil

Method: ME-(AU)-[ENV]AN400/AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1/D	SE141822.001	LB081869	27 Jul 2015	28 Jul 2015	10 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
BH1/M	SE141822.002	LB081869	27 Jul 2015	28 Jul 2015	10 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
BH2/D	SE141822.003	LB081869	27 Jul 2015	28 Jul 2015	10 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
BH2/G	SE141822.004	LB081869	27 Jul 2015	28 Jul 2015	10 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
BH3/C	SE141822.005	LB081869	27 Jul 2015	28 Jul 2015	10 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
BH3/I	SE141822.006	LB081869	27 Jul 2015	28 Jul 2015	10 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
BH4/B	SE141822.007	LB081869	27 Jul 2015	28 Jul 2015	10 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
BH4/E	SE141822.008	LB081869	27 Jul 2015	28 Jul 2015	10 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
BH5/A	SE141822.009	LB081869	27 Jul 2015	28 Jul 2015	10 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
BH5/C	SE141822.010	LB081869	27 Jul 2015	28 Jul 2015	10 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
BH6/A	SE141822.011	LB081869	27 Jul 2015	28 Jul 2015	10 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
BH6/C	SE141822.012	LB081869	27 Jul 2015	28 Jul 2015	10 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
BH7/B	SE141822.013	LB081869	27 Jul 2015	28 Jul 2015	10 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
DUP03	SE141822.014	LB081869	27 Jul 2015	28 Jul 2015	10 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015

OP Pesticides in Water

Method: ME-(AU)-[ENV]AN400/AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH03	SE141822.015	LB081872	27 Jul 2015	28 Jul 2015	03 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
BH08	SE141822.016	LB081872	27 Jul 2015	28 Jul 2015	03 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
QC01	SE141822.017	LB081872	27 Jul 2015	28 Jul 2015	03 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
RB1	SE141822.018	LB081872	27 Jul 2015	28 Jul 2015	03 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1/D	SE141822.001	LB081869	27 Jul 2015	28 Jul 2015	10 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
BH1/M	SE141822.002	LB081869	27 Jul 2015	28 Jul 2015	10 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
BH2/D	SE141822.003	LB081869	27 Jul 2015	28 Jul 2015	10 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
BH2/G	SE141822.004	LB081869	27 Jul 2015	28 Jul 2015	10 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
BH3/C	SE141822.005	LB081869	27 Jul 2015	28 Jul 2015	10 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
BH3/I	SE141822.006	LB081869	27 Jul 2015	28 Jul 2015	10 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
BH4/B	SE141822.007	LB081869	27 Jul 2015	28 Jul 2015	10 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
BH4/E	SE141822.008	LB081869	27 Jul 2015	28 Jul 2015	10 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
BH5/A	SE141822.009	LB081869	27 Jul 2015	28 Jul 2015	10 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
BH5/C	SE141822.010	LB081869	27 Jul 2015	28 Jul 2015	10 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
BH6/A	SE141822.011	LB081869	27 Jul 2015	28 Jul 2015	10 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
BH6/C	SE141822.012	LB081869	27 Jul 2015	28 Jul 2015	10 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
BH7/B	SE141822.013	LB081869	27 Jul 2015	28 Jul 2015	10 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
DUP03	SE141822.014	LB081869	27 Jul 2015	28 Jul 2015	10 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015

HOLDING TIME SUMMARY

SE141822 R0

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS “Field Sampling Guide for Containers and Holding Time” (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the sampled date is not supplied then compliance with criteria cannot be determined. If the received date is after one or both due dates then holding time will fail by default.

PAH (Polynuclear Aromatic Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH03	SE141822.015	LB081872	27 Jul 2015	28 Jul 2015	03 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
BH08	SE141822.016	LB081872	27 Jul 2015	28 Jul 2015	03 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
QC01	SE141822.017	LB081872	27 Jul 2015	28 Jul 2015	03 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
RB1	SE141822.018	LB081872	27 Jul 2015	28 Jul 2015	03 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015

PCBs in Soil

Method: ME-(AU)-[ENV]AN400/AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1/D	SE141822.001	LB081869	27 Jul 2015	28 Jul 2015	10 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
BH1/M	SE141822.002	LB081869	27 Jul 2015	28 Jul 2015	10 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
BH2/D	SE141822.003	LB081869	27 Jul 2015	28 Jul 2015	10 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
BH2/G	SE141822.004	LB081869	27 Jul 2015	28 Jul 2015	10 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
BH3/C	SE141822.005	LB081869	27 Jul 2015	28 Jul 2015	10 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
BH3/I	SE141822.006	LB081869	27 Jul 2015	28 Jul 2015	10 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
BH4/B	SE141822.007	LB081869	27 Jul 2015	28 Jul 2015	10 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
BH4/E	SE141822.008	LB081869	27 Jul 2015	28 Jul 2015	10 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
BH5/A	SE141822.009	LB081869	27 Jul 2015	28 Jul 2015	10 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
BH5/C	SE141822.010	LB081869	27 Jul 2015	28 Jul 2015	10 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
BH6/A	SE141822.011	LB081869	27 Jul 2015	28 Jul 2015	10 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
BH6/C	SE141822.012	LB081869	27 Jul 2015	28 Jul 2015	10 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
BH7/B	SE141822.013	LB081869	27 Jul 2015	28 Jul 2015	10 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
DUP03	SE141822.014	LB081869	27 Jul 2015	28 Jul 2015	10 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015

PCBs in Water

Method: ME-(AU)-[ENV]AN400/AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH03	SE141822.015	LB081872	27 Jul 2015	28 Jul 2015	03 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
BH08	SE141822.016	LB081872	27 Jul 2015	28 Jul 2015	03 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
QC01	SE141822.017	LB081872	27 Jul 2015	28 Jul 2015	03 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
RB1	SE141822.018	LB081872	27 Jul 2015	28 Jul 2015	03 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015

Speciated Phenols in Water

Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH03	SE141822.015	LB081872	27 Jul 2015	28 Jul 2015	17 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
BH08	SE141822.016	LB081872	27 Jul 2015	28 Jul 2015	17 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
QC01	SE141822.017	LB081872	27 Jul 2015	28 Jul 2015	17 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
RB1	SE141822.018	LB081872	27 Jul 2015	28 Jul 2015	17 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest

Method: ME-(AU)-[ENV]AN040/AN320

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1/D	SE141822.001	LB081888	27 Jul 2015	28 Jul 2015	23 Jan 2016	29 Jul 2015	23 Jan 2016	30 Jul 2015
BH1/M	SE141822.002	LB081888	27 Jul 2015	28 Jul 2015	23 Jan 2016	29 Jul 2015	23 Jan 2016	30 Jul 2015
BH2/D	SE141822.003	LB081888	27 Jul 2015	28 Jul 2015	23 Jan 2016	29 Jul 2015	23 Jan 2016	30 Jul 2015
BH2/G	SE141822.004	LB081888	27 Jul 2015	28 Jul 2015	23 Jan 2016	29 Jul 2015	23 Jan 2016	30 Jul 2015
BH3/C	SE141822.005	LB081888	27 Jul 2015	28 Jul 2015	23 Jan 2016	29 Jul 2015	23 Jan 2016	30 Jul 2015
BH3/I	SE141822.006	LB081888	27 Jul 2015	28 Jul 2015	23 Jan 2016	29 Jul 2015	23 Jan 2016	30 Jul 2015
BH4/B	SE141822.007	LB081888	27 Jul 2015	28 Jul 2015	23 Jan 2016	29 Jul 2015	23 Jan 2016	30 Jul 2015
BH4/E	SE141822.008	LB081888	27 Jul 2015	28 Jul 2015	23 Jan 2016	29 Jul 2015	23 Jan 2016	30 Jul 2015
BH5/A	SE141822.009	LB081888	27 Jul 2015	28 Jul 2015	23 Jan 2016	29 Jul 2015	23 Jan 2016	30 Jul 2015
BH5/C	SE141822.010	LB081888	27 Jul 2015	28 Jul 2015	23 Jan 2016	29 Jul 2015	23 Jan 2016	30 Jul 2015
BH6/A	SE141822.011	LB081888	27 Jul 2015	28 Jul 2015	23 Jan 2016	29 Jul 2015	23 Jan 2016	30 Jul 2015
BH6/C	SE141822.012	LB081888	27 Jul 2015	28 Jul 2015	23 Jan 2016	29 Jul 2015	23 Jan 2016	30 Jul 2015
BH7/B	SE141822.013	LB081888	27 Jul 2015	28 Jul 2015	23 Jan 2016	29 Jul 2015	23 Jan 2016	30 Jul 2015
DUP03	SE141822.014	LB081888	27 Jul 2015	28 Jul 2015	23 Jan 2016	29 Jul 2015	23 Jan 2016	30 Jul 2015

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH03	SE141822.015	LB081860	27 Jul 2015	28 Jul 2015	23 Jan 2016	28 Jul 2015	23 Jan 2016	30 Jul 2015
BH08	SE141822.016	LB081860	27 Jul 2015	28 Jul 2015	23 Jan 2016	28 Jul 2015	23 Jan 2016	30 Jul 2015
QC01	SE141822.017	LB081860	27 Jul 2015	28 Jul 2015	23 Jan 2016	28 Jul 2015	23 Jan 2016	30 Jul 2015
RB1	SE141822.018	LB081860	27 Jul 2015	28 Jul 2015	23 Jan 2016	28 Jul 2015	23 Jan 2016	30 Jul 2015

TRH (Total Recoverable Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN403

Sample Name	Sample No.	QC Ref

HOLDING TIME SUMMARY

SE141822 R0

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS “Field Sampling Guide for Containers and Holding Time” (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the sampled date is not supplied then compliance with criteria cannot be determined. If the received date is after one or both due dates then holding time will fail by default.

TRH (Total Recoverable Hydrocarbons) in Soil (continued)

Method: ME-(AU)-[ENV]AN403

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1/D	SE141822.001	LB081869	27 Jul 2015	28 Jul 2015	10 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
BH1/M	SE141822.002	LB081869	27 Jul 2015	28 Jul 2015	10 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
BH2/D	SE141822.003	LB081869	27 Jul 2015	28 Jul 2015	10 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
BH2/G	SE141822.004	LB081869	27 Jul 2015	28 Jul 2015	10 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
BH3/C	SE141822.005	LB081869	27 Jul 2015	28 Jul 2015	10 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
BH3/I	SE141822.006	LB081869	27 Jul 2015	28 Jul 2015	10 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
BH4/B	SE141822.007	LB081869	27 Jul 2015	28 Jul 2015	10 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
BH4/E	SE141822.008	LB081869	27 Jul 2015	28 Jul 2015	10 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
BH5/A	SE141822.009	LB081869	27 Jul 2015	28 Jul 2015	10 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
BH5/C	SE141822.010	LB081869	27 Jul 2015	28 Jul 2015	10 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
BH6/A	SE141822.011	LB081869	27 Jul 2015	28 Jul 2015	10 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
BH6/C	SE141822.012	LB081869	27 Jul 2015	28 Jul 2015	10 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
BH7/B	SE141822.013	LB081869	27 Jul 2015	28 Jul 2015	10 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
DUP03	SE141822.014	LB081869	27 Jul 2015	28 Jul 2015	10 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015

TRH (Total Recoverable Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN403

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH03	SE141822.015	LB081872	27 Jul 2015	28 Jul 2015	03 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
BH08	SE141822.016	LB081872	27 Jul 2015	28 Jul 2015	03 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
QC01	SE141822.017	LB081872	27 Jul 2015	28 Jul 2015	03 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
RB1	SE141822.018	LB081872	27 Jul 2015	28 Jul 2015	03 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015

VOC's in Soil

Method: ME-(AU)-[ENV]AN433/AN434

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1/D	SE141822.001	LB081855	27 Jul 2015	28 Jul 2015	10 Aug 2015	28 Jul 2015	06 Sep 2015	30 Jul 2015
BH1/M	SE141822.002	LB081855	27 Jul 2015	28 Jul 2015	10 Aug 2015	28 Jul 2015	06 Sep 2015	30 Jul 2015
BH2/D	SE141822.003	LB081855	27 Jul 2015	28 Jul 2015	10 Aug 2015	28 Jul 2015	06 Sep 2015	30 Jul 2015
BH2/G	SE141822.004	LB081855	27 Jul 2015	28 Jul 2015	10 Aug 2015	28 Jul 2015	06 Sep 2015	30 Jul 2015
BH3/C	SE141822.005	LB081855	27 Jul 2015	28 Jul 2015	10 Aug 2015	28 Jul 2015	06 Sep 2015	30 Jul 2015
BH3/I	SE141822.006	LB081855	27 Jul 2015	28 Jul 2015	10 Aug 2015	28 Jul 2015	06 Sep 2015	30 Jul 2015
BH4/B	SE141822.007	LB081855	27 Jul 2015	28 Jul 2015	10 Aug 2015	28 Jul 2015	06 Sep 2015	30 Jul 2015
BH4/E	SE141822.008	LB081855	27 Jul 2015	28 Jul 2015	10 Aug 2015	28 Jul 2015	06 Sep 2015	30 Jul 2015
BH5/A	SE141822.009	LB081855	27 Jul 2015	28 Jul 2015	10 Aug 2015	28 Jul 2015	06 Sep 2015	30 Jul 2015
BH5/C	SE141822.010	LB081855	27 Jul 2015	28 Jul 2015	10 Aug 2015	28 Jul 2015	06 Sep 2015	30 Jul 2015
BH6/A	SE141822.011	LB081855	27 Jul 2015	28 Jul 2015	10 Aug 2015	28 Jul 2015	06 Sep 2015	30 Jul 2015
BH6/C	SE141822.012	LB081855	27 Jul 2015	28 Jul 2015	10 Aug 2015	28 Jul 2015	06 Sep 2015	30 Jul 2015
BH7/B	SE141822.013	LB081855	27 Jul 2015	28 Jul 2015	10 Aug 2015	28 Jul 2015	06 Sep 2015	30 Jul 2015
DUP03	SE141822.014	LB081855	27 Jul 2015	28 Jul 2015	10 Aug 2015	28 Jul 2015	06 Sep 2015	30 Jul 2015
Trip Blank	SE141822.019	LB081855	27 Jul 2015	28 Jul 2015	10 Aug 2015	28 Jul 2015	06 Sep 2015	30 Jul 2015
Trip Spike	SE141822.020	LB081855	27 Jul 2015	28 Jul 2015	10 Aug 2015	28 Jul 2015	06 Sep 2015	30 Jul 2015

VOCs in Water

Method: ME-(AU)-[ENV]AN433/AN434

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH03	SE141822.015	LB081906	27 Jul 2015	28 Jul 2015	03 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
BH08	SE141822.016	LB081906	27 Jul 2015	28 Jul 2015	03 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
QC01	SE141822.017	LB081906	27 Jul 2015	28 Jul 2015	03 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
RB1	SE141822.018	LB081906	27 Jul 2015	28 Jul 2015	03 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433/AN434/AN410

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1/D	SE141822.001	LB081855	27 Jul 2015	28 Jul 2015	10 Aug 2015	28 Jul 2015	06 Sep 2015	30 Jul 2015
BH1/M	SE141822.002	LB081855	27 Jul 2015	28 Jul 2015	10 Aug 2015	28 Jul 2015	06 Sep 2015	30 Jul 2015
BH2/D	SE141822.003	LB081855	27 Jul 2015	28 Jul 2015	10 Aug 2015	28 Jul 2015	06 Sep 2015	30 Jul 2015
BH2/G	SE141822.004	LB081855	27 Jul 2015	28 Jul 2015	10 Aug 2015	28 Jul 2015	06 Sep 2015	30 Jul 2015
BH3/C	SE141822.005	LB081855	27 Jul 2015	28 Jul 2015	10 Aug 2015	28 Jul 2015	06 Sep 2015	30 Jul 2015
BH3/I	SE141822.006	LB081855	27 Jul 2015	28 Jul 2015	10 Aug 2015	28 Jul 2015	06 Sep 2015	30 Jul 2015
BH4/B	SE141822.007	LB081855	27 Jul 2015	28 Jul 2015	10 Aug 2015	28 Jul 2015	06 Sep 2015	30 Jul 2015
BH4/E	SE141822.008	LB081855	27 Jul 2015	28 Jul 2015	10 Aug 2015	28 Jul 2015	06 Sep 2015	30 Jul 2015
BH5/A	SE141822.009	LB081855	27 Jul 2015	28 Jul 2015	10 Aug 2015	28 Jul 2015	06 Sep 2015	30 Jul 2015
BH5/C	SE141822.010	LB081855	27 Jul 2015	28 Jul 2015	10 Aug 2015	28 Jul 2015	06 Sep 2015	30 Jul 2015
BH6/A	SE141822.011	LB081855	27 Jul 2015	28 Jul 2015	10 Aug 2015	28 Jul 2015	06 Sep 2015	30 Jul 2015
BH6/C	SE141822.012	LB081855	27 Jul 2015	28 Jul 2015	10 Aug 2015	28 Jul 2015	06 Sep 2015	30 Jul 2015

HOLDING TIME SUMMARY

SE141822 R0

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS “Field Sampling Guide for Containers and Holding Time” (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the sampled date is not supplied then compliance with criteria cannot be determined. If the received date is after one or both due dates then holding time will fail by default.

Volatile Petroleum Hydrocarbons in Soil (continued)

Method: ME-(AU)-[ENV]AN433/AN434/AN410

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH7/B	SE141822.013	LB081855	27 Jul 2015	28 Jul 2015	10 Aug 2015	28 Jul 2015	06 Sep 2015	30 Jul 2015
DUP03	SE141822.014	LB081855	27 Jul 2015	28 Jul 2015	10 Aug 2015	28 Jul 2015	06 Sep 2015	30 Jul 2015
Trip Blank	SE141822.019	LB081855	27 Jul 2015	28 Jul 2015	10 Aug 2015	28 Jul 2015	06 Sep 2015	30 Jul 2015
Trip Spike	SE141822.020	LB081855	27 Jul 2015	28 Jul 2015	10 Aug 2015	28 Jul 2015	06 Sep 2015	30 Jul 2015

Volatile Petroleum Hydrocarbons in Water

Method: ME-(AU)-[ENV]AN433/AN434/AN410

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH03	SE141822.015	LB081906	27 Jul 2015	28 Jul 2015	03 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
BH08	SE141822.016	LB081906	27 Jul 2015	28 Jul 2015	03 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
QC01	SE141822.017	LB081906	27 Jul 2015	28 Jul 2015	03 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015
RB1	SE141822.018	LB081906	27 Jul 2015	28 Jul 2015	03 Aug 2015	29 Jul 2015	07 Sep 2015	30 Jul 2015

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Full 8270 SVOC in Water

Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
2,4,6-Tribromophenol (Surrogate)	BH03	SE141822.015	%	40 - 130%	44
	BH08	SE141822.016	%	40 - 130%	42
2-fluorobiphenyl (Surrogate)	BH03	SE141822.015	%	40 - 130%	60
	BH08	SE141822.016	%	40 - 130%	40
d14-p-terphenyl (Surrogate)	BH03	SE141822.015	%	40 - 130%	40
	BH08	SE141822.016	%	40 - 130%	40
d5-nitrobenzene (Surrogate)	BH03	SE141822.015	%	40 - 130%	80
	BH08	SE141822.016	%	40 - 130%	60
d5-phenol (Surrogate)	BH03	SE141822.015	%	20 - 130%	45
	BH08	SE141822.016	%	20 - 130%	40

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN400/AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Tetrachloro-m-xylene (TCMX) (Surrogate)	BH1/D	SE141822.001	%	60 - 130%	87
	BH1/M	SE141822.002	%	60 - 130%	107
	BH2/D	SE141822.003	%	60 - 130%	103
	BH2/G	SE141822.004	%	60 - 130%	102
	BH3/C	SE141822.005	%	60 - 130%	108
	BH3/I	SE141822.006	%	60 - 130%	109
	BH4/B	SE141822.007	%	60 - 130%	103
	BH4/E	SE141822.008	%	60 - 130%	107

OC Pesticides in Water

Method: ME-(AU)-[ENV]AN400/AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Tetrachloro-m-xylene (TCMX) (Surrogate)	BH03	SE141822.015	%	40 - 130%	79
	BH08	SE141822.016	%	40 - 130%	73
	QC01	SE141822.017	%	40 - 130%	76

OP Pesticides in Soil

Method: ME-(AU)-[ENV]AN400/AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
2-fluorobiphenyl (Surrogate)	BH1/D	SE141822.001	%	60 - 130%	82
	BH1/M	SE141822.002	%	60 - 130%	84
	BH2/D	SE141822.003	%	60 - 130%	74
	BH2/G	SE141822.004	%	60 - 130%	80
	BH3/C	SE141822.005	%	60 - 130%	76
	BH3/I	SE141822.006	%	60 - 130%	74
	BH4/B	SE141822.007	%	60 - 130%	80
	BH4/E	SE141822.008	%	60 - 130%	78
d14-p-terphenyl (Surrogate)	BH1/D	SE141822.001	%	60 - 130%	104
	BH1/M	SE141822.002	%	60 - 130%	106
	BH2/D	SE141822.003	%	60 - 130%	96
	BH2/G	SE141822.004	%	60 - 130%	98
	BH3/C	SE141822.005	%	60 - 130%	98
	BH3/I	SE141822.006	%	60 - 130%	94
	BH4/B	SE141822.007	%	60 - 130%	98
	BH4/E	SE141822.008	%	60 - 130%	96

OP Pesticides in Water

Method: ME-(AU)-[ENV]AN400/AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
2-fluorobiphenyl (Surrogate)	BH03	SE141822.015	%	40 - 130%	60
	BH08	SE141822.016	%	40 - 130%	40
	QC01	SE141822.017	%	40 - 130%	40
d14-p-terphenyl (Surrogate)	BH03	SE141822.015	%	40 - 130%	40
	BH08	SE141822.016	%	40 - 130%	40
	QC01	SE141822.017	%	40 - 130%	60

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
2-fluorobiphenyl (Surrogate)	BH1/D	SE141822.001	%	70 - 130%	82
	BH1/M	SE141822.002	%	70 - 130%	84
	BH2/D	SE141822.003	%	70 - 130%	74
	BH2/G	SE141822.004	%	70 - 130%	80
	BH3/C	SE141822.005	%	70 - 130%	76

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

PAH (Polynuclear Aromatic Hydrocarbons) in Soil (continued)

Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
2-fluorobiphenyl (Surrogate)	BH3/I	SE141822.006	%	70 - 130%	74
	BH4/B	SE141822.007	%	70 - 130%	80
	BH4/E	SE141822.008	%	70 - 130%	78
	BH5/A	SE141822.009	%	70 - 130%	98
	BH5/C	SE141822.010	%	70 - 130%	78
	BH6/A	SE141822.011	%	70 - 130%	94
	BH6/C	SE141822.012	%	70 - 130%	84
	BH7/B	SE141822.013	%	70 - 130%	80
	DUP03	SE141822.014	%	70 - 130%	80
d14-p-terphenyl (Surrogate)	BH1/D	SE141822.001	%	70 - 130%	104
	BH1/M	SE141822.002	%	70 - 130%	106
	BH2/D	SE141822.003	%	70 - 130%	96
	BH2/G	SE141822.004	%	70 - 130%	98
	BH3/C	SE141822.005	%	70 - 130%	98
	BH3/I	SE141822.006	%	70 - 130%	94
	BH4/B	SE141822.007	%	70 - 130%	98
	BH4/E	SE141822.008	%	70 - 130%	96
	BH5/A	SE141822.009	%	70 - 130%	124
	BH5/C	SE141822.010	%	70 - 130%	100
	BH6/A	SE141822.011	%	70 - 130%	114
	BH6/C	SE141822.012	%	70 - 130%	102
	BH7/B	SE141822.013	%	70 - 130%	102
	DUP03	SE141822.014	%	70 - 130%	100
d5-nitrobenzene (Surrogate)	BH1/D	SE141822.001	%	70 - 130%	88
	BH1/M	SE141822.002	%	70 - 130%	92
	BH2/D	SE141822.003	%	70 - 130%	80
	BH2/G	SE141822.004	%	70 - 130%	88
	BH3/C	SE141822.005	%	70 - 130%	86
	BH3/I	SE141822.006	%	70 - 130%	84
	BH4/B	SE141822.007	%	70 - 130%	84
	BH4/E	SE141822.008	%	70 - 130%	86
	BH5/A	SE141822.009	%	70 - 130%	112
	BH5/C	SE141822.010	%	70 - 130%	88
	BH6/A	SE141822.011	%	70 - 130%	104
	BH6/C	SE141822.012	%	70 - 130%	92
	BH7/B	SE141822.013	%	70 - 130%	88
	DUP03	SE141822.014	%	70 - 130%	84

PAH (Polynuclear Aromatic Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
2-fluorobiphenyl (Surrogate)	BH03	SE141822.015	%	40 - 130%	60
	BH08	SE141822.016	%	40 - 130%	40
	QC01	SE141822.017	%	40 - 130%	40
	RB1	SE141822.018	%	40 - 130%	58
d14-p-terphenyl (Surrogate)	BH03	SE141822.015	%	40 - 130%	40
	BH08	SE141822.016	%	40 - 130%	40
	QC01	SE141822.017	%	40 - 130%	60
	RB1	SE141822.018	%	40 - 130%	58
d5-nitrobenzene (Surrogate)	BH03	SE141822.015	%	40 - 130%	80
	BH08	SE141822.016	%	40 - 130%	60
	QC01	SE141822.017	%	40 - 130%	60
	RB1	SE141822.018	%	40 - 130%	58

PCBs in Soil

Method: ME-(AU)-[ENV]AN400/AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Tetrachloro-m-xylene (TCMX) (Surrogate)	BH1/D	SE141822.001	%	60 - 130%	87
	BH1/M	SE141822.002	%	60 - 130%	107
	BH2/D	SE141822.003	%	60 - 130%	103
	BH2/G	SE141822.004	%	60 - 130%	102
	BH3/C	SE141822.005	%	60 - 130%	108
	BH3/I	SE141822.006	%	60 - 130%	109
	BH4/B	SE141822.007	%	60 - 130%	103

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

PCBs in Soil (continued)

Method: ME-(AU)-[ENV]AN400/AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Tetrachloro-m-xylene (TCMX) (Surrogate)	BH4/E	SE141822.008	%	60 - 130%	107

PCBs in Water

Method: ME-(AU)-[ENV]AN400/AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Tetrachloro-m-xylene (Surrogate)	BH03	SE141822.015	%	40 - 130%	79
	BH08	SE141822.016	%	40 - 130%	73
	QC01	SE141822.017	%	40 - 130%	76

Speciated Phenols in Water

Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
2,4,6-Tribromophenol (Surrogate)	BH03	SE141822.015	%	40 - 130%	44
	BH08	SE141822.016	%	40 - 130%	42
d5-phenol (Surrogate)	BH03	SE141822.015	%	20 - 90%	45
	BH08	SE141822.016	%	20 - 90%	40

VOC's in Soil

Method: ME-(AU)-[ENV]AN433/AN434

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	BH1/D	SE141822.001	%	60 - 130%	95
	BH1/M	SE141822.002	%	60 - 130%	100
	BH2/D	SE141822.003	%	60 - 130%	97
	BH2/G	SE141822.004	%	60 - 130%	95
	BH3/C	SE141822.005	%	60 - 130%	97
	BH3/I	SE141822.006	%	60 - 130%	98
	BH4/B	SE141822.007	%	60 - 130%	98
	BH4/E	SE141822.008	%	60 - 130%	96
	BH5/A	SE141822.009	%	60 - 130%	93
	BH5/C	SE141822.010	%	60 - 130%	96
	BH6/A	SE141822.011	%	60 - 130%	100
	BH6/C	SE141822.012	%	60 - 130%	97
	BH7/B	SE141822.013	%	60 - 130%	95
	DUP03	SE141822.014	%	60 - 130%	97
	Trip Blank	SE141822.019	%	60 - 130%	98
	Trip Spike	SE141822.020	%	60 - 130%	98
d4-1,2-dichloroethane (Surrogate)	BH1/D	SE141822.001	%	60 - 130%	107
	BH1/M	SE141822.002	%	60 - 130%	110
	BH2/D	SE141822.003	%	60 - 130%	120
	BH2/G	SE141822.004	%	60 - 130%	113
	BH3/C	SE141822.005	%	60 - 130%	106
	BH3/I	SE141822.006	%	60 - 130%	106
	BH4/B	SE141822.007	%	60 - 130%	114
	BH4/E	SE141822.008	%	60 - 130%	112
	BH5/A	SE141822.009	%	60 - 130%	114
	BH5/C	SE141822.010	%	60 - 130%	99
	BH6/A	SE141822.011	%	60 - 130%	116
	BH6/C	SE141822.012	%	60 - 130%	102
	BH7/B	SE141822.013	%	60 - 130%	107
	DUP03	SE141822.014	%	60 - 130%	104
	Trip Blank	SE141822.019	%	60 - 130%	113
	Trip Spike	SE141822.020	%	60 - 130%	101
d8-toluene (Surrogate)	BH1/D	SE141822.001	%	60 - 130%	114
	BH1/M	SE141822.002	%	60 - 130%	121
	BH2/D	SE141822.003	%	60 - 130%	123
	BH2/G	SE141822.004	%	60 - 130%	120
	BH3/C	SE141822.005	%	60 - 130%	116
	BH3/I	SE141822.006	%	60 - 130%	112
	BH4/B	SE141822.007	%	60 - 130%	123
	BH4/E	SE141822.008	%	60 - 130%	124
	BH5/A	SE141822.009	%	60 - 130%	119
	BH5/C	SE141822.010	%	60 - 130%	117
	BH6/A	SE141822.011	%	60 - 130%	122
	BH6/C	SE141822.012	%	60 - 130%	123
	BH7/B	SE141822.013	%	60 - 130%	124

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

VOC's in Soil (continued)

Method: ME-(AU)-[ENV]AN433/AN434

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
d8-toluene (Surrogate)	DUP03	SE141822.014	%	60 - 130%	119
	Trip Blank	SE141822.019	%	60 - 130%	124
	Trip Spike	SE141822.020	%	60 - 130%	120
Dibromofluoromethane (Surrogate)	BH1/D	SE141822.001	%	60 - 130%	106
	BH1/M	SE141822.002	%	60 - 130%	113
	BH2/D	SE141822.003	%	60 - 130%	118
	BH2/G	SE141822.004	%	60 - 130%	112
	BH3/C	SE141822.005	%	60 - 130%	108
	BH3/I	SE141822.006	%	60 - 130%	106
	BH4/B	SE141822.007	%	60 - 130%	114
	BH4/E	SE141822.008	%	60 - 130%	115
	BH5/A	SE141822.009	%	60 - 130%	113
	BH5/C	SE141822.010	%	60 - 130%	102
	BH6/A	SE141822.011	%	60 - 130%	115
	BH6/C	SE141822.012	%	60 - 130%	106
	BH7/B	SE141822.013	%	60 - 130%	107
	DUP03	SE141822.014	%	60 - 130%	104
	Trip Blank	SE141822.019	%	60 - 130%	116
	Trip Spike	SE141822.020	%	60 - 130%	101

VOCs in Water

Method: ME-(AU)-[ENV]AN433/AN434

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	BH03	SE141822.015	%	40 - 130%	91
	BH08	SE141822.016	%	40 - 130%	90
	QC01	SE141822.017	%	40 - 130%	78
	RB1	SE141822.018	%	40 - 130%	78
d4-1,2-dichloroethane (Surrogate)	BH03	SE141822.015	%	40 - 130%	124
	BH08	SE141822.016	%	40 - 130%	125
	QC01	SE141822.017	%	40 - 130%	119
	RB1	SE141822.018	%	40 - 130%	112
d8-toluene (Surrogate)	BH03	SE141822.015	%	40 - 130%	102
	BH08	SE141822.016	%	40 - 130%	107
	QC01	SE141822.017	%	40 - 130%	92
	RB1	SE141822.018	%	40 - 130%	86
Dibromofluoromethane (Surrogate)	BH03	SE141822.015	%	40 - 130%	120
	BH08	SE141822.016	%	40 - 130%	120
	QC01	SE141822.017	%	40 - 130%	114
	RB1	SE141822.018	%	40 - 130%	111

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433/AN434/AN410

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	BH1/D	SE141822.001	%	60 - 130%	95
	BH1/M	SE141822.002	%	60 - 130%	100
	BH2/D	SE141822.003	%	60 - 130%	97
	BH2/G	SE141822.004	%	60 - 130%	95
	BH3/C	SE141822.005	%	60 - 130%	97
	BH3/I	SE141822.006	%	60 - 130%	98
	BH4/B	SE141822.007	%	60 - 130%	98
	BH4/E	SE141822.008	%	60 - 130%	96
	BH5/A	SE141822.009	%	60 - 130%	93
	BH5/C	SE141822.010	%	60 - 130%	96
	BH6/A	SE141822.011	%	60 - 130%	100
	BH6/C	SE141822.012	%	60 - 130%	97
	BH7/B	SE141822.013	%	60 - 130%	95
	DUP03	SE141822.014	%	60 - 130%	97
	Trip Blank	SE141822.019	%	60 - 130%	98
d4-1,2-dichloroethane (Surrogate)	BH1/D	SE141822.001	%	60 - 130%	107
	BH1/M	SE141822.002	%	60 - 130%	110
	BH2/D	SE141822.003	%	60 - 130%	120
	BH2/G	SE141822.004	%	60 - 130%	113
	BH3/C	SE141822.005	%	60 - 130%	106
	BH3/I	SE141822.006	%	60 - 130%	106

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Volatile Petroleum Hydrocarbons in Soil (continued)

Method: ME-(AU)-[ENV]AN433/AN434/AN410

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
d4-1,2-dichloroethane (Surrogate)	BH4/B	SE141822.007	%	60 - 130%	114
	BH4/E	SE141822.008	%	60 - 130%	112
	BH5/A	SE141822.009	%	60 - 130%	114
	BH5/C	SE141822.010	%	60 - 130%	99
	BH6/A	SE141822.011	%	60 - 130%	116
	BH6/C	SE141822.012	%	60 - 130%	102
	BH7/B	SE141822.013	%	60 - 130%	107
	DUP03	SE141822.014	%	60 - 130%	104
	Trip Blank	SE141822.019	%	60 - 130%	113
d8-toluene (Surrogate)	BH1/D	SE141822.001	%	60 - 130%	114
	BH1/M	SE141822.002	%	60 - 130%	121
	BH2/D	SE141822.003	%	60 - 130%	123
	BH2/G	SE141822.004	%	60 - 130%	120
	BH3/C	SE141822.005	%	60 - 130%	116
	BH3/I	SE141822.006	%	60 - 130%	112
	BH4/B	SE141822.007	%	60 - 130%	123
	BH4/E	SE141822.008	%	60 - 130%	124
	BH5/A	SE141822.009	%	60 - 130%	119
	BH5/C	SE141822.010	%	60 - 130%	117
	BH6/A	SE141822.011	%	60 - 130%	122
	BH6/C	SE141822.012	%	60 - 130%	123
	BH7/B	SE141822.013	%	60 - 130%	124
	DUP03	SE141822.014	%	60 - 130%	119
	Trip Blank	SE141822.019	%	60 - 130%	124
Dibromofluoromethane (Surrogate)	BH1/D	SE141822.001	%	60 - 130%	106
	BH1/M	SE141822.002	%	60 - 130%	113
	BH2/D	SE141822.003	%	60 - 130%	118
	BH2/G	SE141822.004	%	60 - 130%	112
	BH3/C	SE141822.005	%	60 - 130%	108
	BH3/I	SE141822.006	%	60 - 130%	106
	BH4/B	SE141822.007	%	60 - 130%	114
	BH4/E	SE141822.008	%	60 - 130%	115
	BH5/A	SE141822.009	%	60 - 130%	113
	BH5/C	SE141822.010	%	60 - 130%	102
	BH6/A	SE141822.011	%	60 - 130%	115
	BH6/C	SE141822.012	%	60 - 130%	106
	BH7/B	SE141822.013	%	60 - 130%	107
	DUP03	SE141822.014	%	60 - 130%	104
	Trip Blank	SE141822.019	%	60 - 130%	116

Volatile Petroleum Hydrocarbons in Water

Method: ME-(AU)-[ENV]AN433/AN434/AN410

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	BH03	SE141822.015	%	40 - 130%	79
	BH08	SE141822.016	%	40 - 130%	75
	QC01	SE141822.017	%	40 - 130%	78
	RB1	SE141822.018	%	40 - 130%	78
d4-1,2-dichloroethane (Surrogate)	BH03	SE141822.015	%	60 - 130%	122
	BH08	SE141822.016	%	60 - 130%	122
	QC01	SE141822.017	%	60 - 130%	119
	RB1	SE141822.018	%	60 - 130%	112
d8-toluene (Surrogate)	BH03	SE141822.015	%	40 - 130%	94
	BH08	SE141822.016	%	40 - 130%	85
	QC01	SE141822.017	%	40 - 130%	92
	RB1	SE141822.018	%	40 - 130%	86
Dibromofluoromethane (Surrogate)	BH03	SE141822.015	%	40 - 130%	115
	BH08	SE141822.016	%	40 - 130%	114
	QC01	SE141822.017	%	40 - 130%	114
	RB1	SE141822.018	%	40 - 130%	111

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Full 8270 SVOC in Water — **Method: ME-(AU)-[ENV]AN420**

Sample Number		Parameter	Units	LOR	Result
LB081872.001	01-PAHs	Acenaphthene	µg/L	0.1	<0.1
		Acenaphthylene	µg/L	0.1	<0.1
		Anthracene	µg/L	0.1	<0.1
		Benzo(a)anthracene	µg/L	0.1	<0.1
		Total Benzofluoranthenes (b&j&k)	µg/L	0.2	<0.2
		Benzo(ghi)perylene	µg/L	0.1	<0.1
		Benzo(a)pyrene	µg/L	0.1	<0.1
		Chrysene	µg/L	0.1	<0.1
		Dibenzo(ah)anthracene	µg/L	0.1	<0.1
		Fluoranthene	µg/L	0.1	<0.1
		Fluorene	µg/L	0.1	<0.1
		Indeno(1,2,3-cd)pyrene	µg/L	0.1	<0.1
		1-methylnaphthalene	µg/L	0.1	<0.1
		2-methylnaphthalene	µg/L	0.1	<0.1
		Naphthalene	µg/L	0.1	<0.1
		Phenanthrene	µg/L	0.1	<0.1
		Pyrene	µg/L	0.1	<0.1
		2-acetylaminofluorene	µg/L	0.5	<0.5
		7,12-dimethyl-benz(a)anthracene	µg/L	0.5	<0.5
		3-methylcholanthrene	µg/L	0.5	<0.5
	02-OCs	Aldrin	µg/L	0.1	<0.1
		Alpha-BHC	µg/L	0.1	<0.1
		Beta-BHC	µg/L	0.1	<0.1
		Delta-BHC	µg/L	0.1	<0.1
		Gamma-BHC (Lindane)	µg/L	0.1	<0.1
		p,p-DDD	µg/L	0.1	<0.1
		p,p-DDE	µg/L	0.1	<0.1
		p,p-DDT	µg/L	0.1	<0.1
		Dieldrin	µg/L	0.1	<0.1
		Alpha-endosulfan	µg/L	0.1	<0.1
		Beta-endosulfan	µg/L	0.1	<0.1
		Endosulfan sulphate	µg/L	0.1	<0.1
		Endrin	µg/L	0.1	<0.1
		Heptachlor	µg/L	0.1	<0.1
		Heptachlor epoxide	µg/L	0.1	<0.1
		Isodrin	µg/L	0.1	<0.1
		Methoxychlor	µg/L	0.1	<0.1
		Mirex	µg/L	0.1	<0.1
		Alpha-chlordane	µg/L	0.1	<0.1
		Gamma-chlordane	µg/L	0.1	<0.1
		Endrin ketone	µg/L	0.1	<0.1
	03-OPs	Azinphos-methyl (Guthion)	µg/L	0.2	<0.2
		Bromophos ethyl	µg/L	0.2	<0.2
		Carbophenothion	µg/L	0.5	<0.5
		Chlorfenvinphos-cis	µg/L	5	<5
		Chlorfenvinphos-trans	µg/L	0.5	<0.5
		Chlorpyrifos (Chlorpyrifos Ethyl)	µg/L	0.2	<0.2
		Chlorpyrifos-methyl	µg/L	0.5	<0.5
		Co-Ral (Coumaphos)	µg/L	0.5	<0.5
		Diazinon (Dimpylate)	µg/L	0.5	<0.5
		Dichlorvos	µg/L	0.5	<0.5
		Demeton-S-methyl	µg/L	0.5	<0.5
		Dimethoate	µg/L	0.5	<0.5
		Disulfoton (Di-syston)	µg/L	0.5	<0.5
		EPN*	µg/L	0.5	<0.5
		Ethion	µg/L	0.2	<0.2
		Ethoprophos (Ethoprop or Prophos)	µg/L	0.5	<0.5
		Famphur (Famophos)	µg/L	0.5	<0.5
		Fenamiphos (Phenamiphos)	µg/L	0.5	<0.5
		Fenchlorophos (Ronnel)	µg/L	0.5	<0.5
		Fenitrothion	µg/L	0.2	<0.2

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Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Full 8270 SVOC in Water (continued) — **Method: ME-(AU)-[ENV]AN420**

Sample Number		Parameter	Units	LOR	Result
LB081872.001	03-OPs	Fenthion	µg/L	0.5	<0.5
		Malathion (Maldison)	µg/L	0.2	<0.2
		Methidathion	µg/L	0.5	<0.5
		Mevinphos-cis/trans	µg/L	1	<1
		o,o,o-triethyl phosphorothioate	µg/L	0.5	<0.5
		Parathion ethyl (Parathion)	µg/L	0.2	<0.2
		Parathion methyl	µg/L	0.5	<0.5
		Phorate	µg/L	0.5	<0.5
		Pirimiphos-ethyl	µg/L	0.5	<0.5
		Pirimiphos-methyl	µg/L	0.5	<0.5
		Profenofos	µg/L	0.5	<0.5
		Prothiophos (Tokuthion)*	µg/L	0.5	<0.5
		Sulfotepp	µg/L	0.5	<0.5
		Tetrachlorvinphos (Stirophos)*	µg/L	0.5	<0.5
	04-PCB UPAC(7) Congeners	PCB Congener C28	µg/L	0.1	<0.1
		PCB Congener C52	µg/L	0.1	<0.1
		PCB Congener C101	µg/L	0.1	<0.1
		PCB Congener C118	µg/L	0.1	<0.1
		PCB Congener C138	µg/L	0.1	<0.1
		PCB Congener C153	µg/L	0.1	<0.1
		PCB Congener C180	µg/L	0.1	<0.1
	05-SVCH (Cl Benzenes, Hydrocarbons & VOCs)	1/2-Chloronaphthalene	µg/L	1	<1
		Hexachlorobenzene (HCB)	µg/L	0.1	<0.1
		1,2-dichlorobenzene	µg/L	0.5	<0.5
		1,3-dichlorobenzene	µg/L	0.5	<0.5
		1,4-dichlorobenzene	µg/L	0.5	<0.5
		Hexachlorobutadiene	µg/L	0.5	<0.5
		Hexachlorocyclopentadiene	µg/L	2	<2
		Hexachloroethane	µg/L	0.5	<0.5
		Hexachloroproprene	µg/L	0.5	<0.5
		Pentachlorobenzene	µg/L	0.5	<0.5
		Pentachloroethane	µg/L	0.5	<0.5
		1,2,3,5 and 1,2,4,5-tetrachlorobenzene	µg/L	1	<1
		1,2,3,4-tetrachlorobenzene	µg/L	0.5	<0.5
		1,2,4-trichlorobenzene	µg/L	0.5	<0.5
	06-Phthalates	Bis(2-ethylhexyl)phthalate	µg/L	50	<50
		Bis(2-ethylhexyl)adipate	µg/L	1	<1
		Butyl benzyl phthalate	µg/L	1	<1
		Di-n-butyl phthalate	µg/L	10	<10
		Diethyl phthalate	µg/L	5	<5
		Dimethyl phthalate	µg/L	1	<1
		Dioctyl phthalate	µg/L	1	<1
	07-Carbamates	Carbofuran	µg/L	0.5	<0.5
		Carbaryl	µg/L	0.5	<0.5
	08-Herbicides (normal)	Trifluralin	µg/L	0.5	<0.5
	09-Nitrosamines	N-nitroso-di-n-butylamine (NDBA)	µg/L	1	<1
		N-nitroso-diethylamine (NDEA)	µg/L	1	<1
		N-nitroso-di-n-propylamine (NDPA)	µg/L	1	<1
		N-nitroso-morpholine (NMOR)	µg/L	1	<1
		N-nitroso-piperidine (NPIP)	µg/L	1	<1
		N-nitroso-pyrrolidine (NPYR)	µg/L	1	<1
		4-amino biphenyl	µg/L	1	<1
	10-Nitroaromatics and Ketones	Acetophenone	µg/L	1	<1
		1,3-dinitrobenzene	µg/L	1	<1
		2,4-dinitrotoluene	µg/L	1	<1
		2,6-dinitrotoluene	µg/L	1	<1
		Isophorone	µg/L	1	<1
		Nitrobenzene	µg/L	1	<1
		p-(dimethylamino) azobenzene	µg/L	1	<1
		Phenacetin	µg/L	1	<1
		Pentachloronitrobenzene (quintozene)	µg/L	1	<1

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Full 8270 SVOC in Water (continued)

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result
LB081872.001	11-Anilines and Amines	Aniline	µg/L	5	<5
		4-chloroaniline	µg/L	1	<1
		2-nitroaniline	µg/L	1	<1
		3-nitroaniline	µg/L	1	<1
		4-nitroaniline	µg/L	1	<1
		Diphenylamine	µg/L	1	<1
		o-Toluidine	µg/L	1	<1
		5-nitro-o-toluidine	µg/L	1	<1
		1-naphthylamine	µg/L	2	<2
		2-naphthylamine	µg/L	2	<2
	12-Haloethers	Bis(2-chloroethoxy) methane	µg/L	1	<1
		Bis(2-chloroethyl) ether	µg/L	1	<1
		Bis(2-chloroisopropyl) ether	µg/L	1	<1
		4-chlorophenyl phenyl ether	µg/L	1	<1
		4-bromophenyl phenyl ether	µg/L	1	<1
	13-Other SVOCs	Methyl methanesulfonate	µg/L	1	<1
		Ethyl methanesulfonate	µg/L	1	<1
		Dibenzofuran	µg/L	1	<1
		Benzyl alcohol	µg/L	1	<1
		Safrole	µg/L	1	<1
		Isosafrole Isomer 1	µg/L	1	<1
		Isosafrole Isomer 2	µg/L	1	<1
		1,4-naphthoquinone	µg/L	1	<1
		Thionazin	µg/L	1	<1
	14-Speciated Routine	3/4-methyl phenol (m/p-cresol)	µg/L	1	<1
	Phenols	2-methyl phenol (o-cresol)	µg/L	0.5	<0.5
		2,6-dichlorophenol	µg/L	0.5	<0.5
		2,3,4,6 and 2,3,5,6-tetrachlorophenol	µg/L	1	<1
		2,4,5-trichlorophenol	µg/L	0.5	<0.5
		4-chloro-3-methylphenol	µg/L	2	<2
		2-chlorophenol	µg/L	0.5	<0.5
		2,4-dichlorophenol	µg/L	0.5	<0.5
		2,4-dimethylphenol	µg/L	0.5	<0.5
		2-nitrophenol	µg/L	0.5	<0.5
		Phenol	µg/L	0.5	<0.5
		2,4,6-trichlorophenol	µg/L	0.5	<0.5
		Pentachlorophenol	µg/L	0.5	<0.5
		4-nitrophenol	µg/L	1	<1
	Surrogates	d5-phenol (Surrogate)	%	-	45
		d5-nitrobenzene (Surrogate)	%	-	100
		2-fluorobiphenyl (Surrogate)	%	-	100
		2,4,6-Tribromophenol (Surrogate)	%	-	78
		d14-p-terphenyl (Surrogate)	%	-	100

Mercury (dissolved) in Water

Method: ME-(AU)-[ENV]AN311/AN312

Sample Number	Parameter	Units	LOR	Result
LB081892.001	Mercury	mg/L	0.0001	<0.0001

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

Sample Number	Parameter	Units	LOR	Result
LB081893.001	Mercury	mg/kg	0.01	<0.01

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN400/AN420

Sample Number	Parameter	Units	LOR	Result
LB081869.001	Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1
	Alpha BHC	mg/kg	0.1	<0.1
	Lindane	mg/kg	0.1	<0.1
	Heptachlor	mg/kg	0.1	<0.1

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OC Pesticides in Soil (continued)

Method: ME-(AU)-[ENV]AN400/AN420

Sample Number		Parameter	Units	LOR	Result
LB081869.001		Aldrin	mg/kg	0.1	<0.1
		Beta BHC	mg/kg	0.1	<0.1
		Delta BHC	mg/kg	0.1	<0.1
		Heptachlor epoxide	mg/kg	0.1	<0.1
		Alpha Endosulfan	mg/kg	0.2	<0.2
		Gamma Chlordane	mg/kg	0.1	<0.1
		Alpha Chlordane	mg/kg	0.1	<0.1
		p,p'-DDE	mg/kg	0.1	<0.1
		Dieldrin	mg/kg	0.2	<0.2
		Endrin	mg/kg	0.2	<0.2
		Beta Endosulfan	mg/kg	0.2	<0.2
		p,p'-DDD	mg/kg	0.1	<0.1
		p,p'-DDT	mg/kg	0.1	<0.1
		Endosulfan sulphate	mg/kg	0.1	<0.1
		Endrin Aldehyde	mg/kg	0.1	<0.1
		Methoxychlor	mg/kg	0.1	<0.1
		Endrin Ketone	mg/kg	0.1	<0.1
		Isodrin	mg/kg	0.1	<0.1
		Mirex	mg/kg	0.1	<0.1
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	90

OC Pesticides in Water

Method: ME-(AU)-[ENV]AN400/AN420

Sample Number		Parameter	Units	LOR	Result
LB081872.001		Alpha BHC	µg/L	0.1	<0.1
		Hexachlorobenzene (HCB)	µg/L	0.1	<0.1
		Beta BHC	µg/L	0.1	<0.1
		Lindane (gamma BHC)	µg/L	0.1	<0.1
		Delta BHC	µg/L	0.1	<0.1
		Heptachlor	µg/L	0.1	<0.1
		Aldrin	µg/L	0.1	<0.1
		Heptachlor epoxide	µg/L	0.1	<0.1
		Gamma Chlordane	µg/L	0.1	<0.1
		Alpha Chlordane	µg/L	0.1	<0.1
		Alpha Endosulfan	µg/L	0.1	<0.1
		p,p'-DDE	µg/L	0.1	<0.1
		Dieldrin	µg/L	0.1	<0.1
		Endrin	µg/L	0.1	<0.1
		Beta Endosulfan	µg/L	0.1	<0.1
		p,p'-DDD	µg/L	0.1	<0.1
		Endosulfan sulphate	µg/L	0.1	<0.1
		p,p'-DDT	µg/L	0.1	<0.1
		Endrin ketone	µg/L	0.1	<0.1
		Methoxychlor	µg/L	0.1	<0.1
		Endrin aldehyde	µg/L	0.1	<0.1
		Isodrin	µg/L	0.1	<0.1
		Mirex	µg/L	0.1	<0.1
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	70

OP Pesticides in Soil

Method: ME-(AU)-[ENV]AN400/AN420

Sample Number		Parameter	Units	LOR	Result
LB081869.001		Dichlorvos	mg/kg	0.5	<0.5
		Dimethoate	mg/kg	0.5	<0.5
		Diazinon (Dimpylate)	mg/kg	0.5	<0.5
		Fenitrothion	mg/kg	0.2	<0.2
		Malathion	mg/kg	0.2	<0.2
		Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2
		Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2
		Bromophos Ethyl	mg/kg	0.2	<0.2
		Methidathion	mg/kg	0.5	<0.5
		Ethion	mg/kg	0.2	<0.2
		Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2
	Surrogates	2-fluorobiphenyl (Surrogate)	%	-	76

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

OP Pesticides in Soil (continued)

Method: ME-(AU)-[ENV]AN400/AN420

Sample Number		Parameter	Units	LOR	Result
LB081869.001	Surrogates	d14-p-terphenyl (Surrogate)	%	-	72

OP Pesticides in Water

Method: ME-(AU)-[ENV]AN400/AN420

Sample Number		Parameter	Units	LOR	Result
LB081872.001		Dichlorvos	µg/L	0.5	<0.5
		Dimethoate	µg/L	0.5	<0.5
		Diazinon (Dimpylate)	µg/L	0.5	<0.5
		Fenitrothion	µg/L	0.2	<0.2
		Malathion	µg/L	0.2	<0.2
		Chlorpyrifos (Chlorpyrifos Ethyl)	µg/L	0.2	<0.2
		Parathion-ethyl (Parathion)	µg/L	0.2	<0.2
		Bromophos Ethyl	µg/L	0.2	<0.2
		Methidathion	µg/L	0.5	<0.5
		Ethion	µg/L	0.2	<0.2
		Azinphos-methyl	µg/L	0.2	<0.2
	Surrogates	2-fluorobiphenyl (Surrogate)	%	-	100
		d14-p-terphenyl (Surrogate)	%	-	100

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result
LB081869.001		Naphthalene	mg/kg	0.1	<0.1
		2-methylnaphthalene	mg/kg	0.1	<0.1
		1-methylnaphthalene	mg/kg	0.1	<0.1
		Acenaphthylene	mg/kg	0.1	<0.1
		Acenaphthene	mg/kg	0.1	<0.1
		Fluorene	mg/kg	0.1	<0.1
		Phenanthrene	mg/kg	0.1	<0.1
		Anthracene	mg/kg	0.1	<0.1
		Fluoranthene	mg/kg	0.1	<0.1
		Pyrene	mg/kg	0.1	<0.1
		Benzo(a)anthracene	mg/kg	0.1	<0.1
		Chrysene	mg/kg	0.1	<0.1
		Benzo(a)pyrene	mg/kg	0.1	<0.1
		Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1
		Dibenzo(a&h)anthracene	mg/kg	0.1	<0.1
		Benzo(ghi)perylene	mg/kg	0.1	<0.1
		Total PAH	mg/kg	0.8	<0.8
	Surrogates	d5-nitrobenzene (Surrogate)	%	-	76
		2-fluorobiphenyl (Surrogate)	%	-	76
		d14-p-terphenyl (Surrogate)	%	-	72

PAH (Polynuclear Aromatic Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result
LB081872.001		Naphthalene	µg/L	0.1	<0.1
		2-methylnaphthalene	µg/L	0.1	<0.1
		1-methylnaphthalene	µg/L	0.1	<0.1
		Acenaphthylene	µg/L	0.1	<0.1
		Acenaphthene	µg/L	0.1	<0.1
		Fluorene	µg/L	0.1	<0.1
		Phenanthrene	µg/L	0.1	<0.1
		Anthracene	µg/L	0.1	<0.1
		Fluoranthene	µg/L	0.1	<0.1
		Pyrene	µg/L	0.1	<0.1
		Benzo(a)anthracene	µg/L	0.1	<0.1
		Chrysene	µg/L	0.1	<0.1
		Benzo(a)pyrene	µg/L	0.1	<0.1
		Indeno(1,2,3-cd)pyrene	µg/L	0.1	<0.1
		Dibenzo(a&h)anthracene	µg/L	0.1	<0.1
		Benzo(ghi)perylene	µg/L	0.1	<0.1
	Surrogates	d5-nitrobenzene (Surrogate)	%	-	82
		2-fluorobiphenyl (Surrogate)	%	-	72
		d14-p-terphenyl (Surrogate)	%	-	92

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PCBs in Soil

Method: ME-(AU)-[ENV]AN400/AN420

Sample Number		Parameter	Units	LOR	Result
LB081869.001		Arochlor 1016	mg/kg	0.2	<0.2
		Arochlor 1221	mg/kg	0.2	<0.2
		Arochlor 1232	mg/kg	0.2	<0.2
		Arochlor 1242	mg/kg	0.2	<0.2
		Arochlor 1248	mg/kg	0.2	<0.2
		Arochlor 1254	mg/kg	0.2	<0.2
		Arochlor 1260	mg/kg	0.2	<0.2
		Arochlor 1262	mg/kg	0.2	<0.2
		Arochlor 1268	mg/kg	0.2	<0.2
		Total PCBs (Arochlors)	mg/kg	1	<1
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	90

PCBs in Water

Method: ME-(AU)-[ENV]AN400/AN420

Sample Number		Parameter	Units	LOR	Result
LB081872.001		Arochlor 1016	µg/L	1	<1
		Arochlor 1221	µg/L	1	<1
		Arochlor 1232	µg/L	1	<1
		Arochlor 1242	µg/L	1	<1
		Arochlor 1248	µg/L	1	<1
		Arochlor 1254	µg/L	1	<1
		Arochlor 1260	µg/L	1	<1
		Arochlor 1262	µg/L	1	<1
		Arochlor 1268	µg/L	1	<1

Speciated Phenols in Water

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result
LB081872.001		Phenol	µg/L	0.5	<0.5
		2-methyl phenol (o-cresol)	µg/L	0.5	<0.5
		3/4-methyl phenol (m/p-cresol)	µg/L	1	<1
		2-chlorophenol	µg/L	0.5	<0.5
		2,4-dimethylphenol	µg/L	0.5	<0.5
		2,6-dichlorophenol	µg/L	0.5	<0.5
		2,4-dichlorophenol	µg/L	0.5	<0.5
		2,4,6-trichlorophenol	µg/L	0.5	<0.5
		2-nitrophenol	µg/L	0.5	<0.5
		4-nitrophenol	µg/L	1	<1
		2,4,5-trichlorophenol	µg/L	0.5	<0.5
		2,3,4,6/2,3,5,6-tetrachlorophenol	µg/L	1	<1
		Pentachlorophenol	µg/L	0.5	<0.5
		2,4-dinitrophenol	µg/L	2	<2
		4-chloro-3-methylphenol	µg/L	2	<2
	Surrogates	2,4,6-Tribromophenol (Surrogate)	%	-	80
		d5-phenol (Surrogate)	%	-	40

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest

Method: ME-(AU)-[ENV]AN040/AN320

Sample Number	Parameter	Units	LOR	Result
LB081888.001	Arsenic, As	mg/kg	3	<3
	Cadmium, Cd	mg/kg	0.3	<0.3
	Chromium, Cr	mg/kg	0.3	<0.3
	Copper, Cu	mg/kg	0.5	<0.5
	Lead, Pb	mg/kg	1	<1
	Nickel, Ni	mg/kg	0.5	<0.5
	Zinc, Zn	mg/kg	0.5	<0.5

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

Sample Number	Parameter	Units	LOR	Result
LB081860.001	Arsenic, As	µg/L	1	<1
	Cadmium, Cd	µg/L	0.1	<0.1
	Chromium, Cr	µg/L	1	<1
	Copper, Cu	µg/L	1	<1
	Lead, Pb	µg/L	1	<1
	Nickel, Ni	µg/L	1	<1
	Zinc, Zn	µg/L	5	<5

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

TRH (Total Recoverable Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN403

Sample Number	Parameter	Units	LOR	Result
LB081869.001	TRH C10-C14	mg/kg	20	<20
	TRH C15-C28	mg/kg	45	<45
	TRH C29-C36	mg/kg	45	<45
	TRH C37-C40	mg/kg	100	<100
	TRH C10-C36 Total	mg/kg	110	<110

TRH (Total Recoverable Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN403

Sample Number	Parameter	Units	LOR	Result
LB081872.001	TRH C10-C14	µg/L	50	<50
	TRH C15-C28	µg/L	200	<200
	TRH C29-C36	µg/L	200	<200
	TRH C37-C40	µg/L	200	<200

VOC's in Soil

Method: ME-(AU)-[ENV]AN433/AN434

Sample Number		Parameter	Units	LOR	Result
LB081855.001	Monocyclic Aromatic Hydrocarbons	Benzene	mg/kg	0.1	<0.1
		Toluene	mg/kg	0.1	<0.1
		Ethylbenzene	mg/kg	0.1	<0.1
		m/p-xylene	mg/kg	0.2	<0.2
		o-xylene	mg/kg	0.1	<0.1
	Polycyclic VOCs	Naphthalene	mg/kg	0.1	<0.1
	Surrogates	Dibromofluoromethane (Surrogate)	%	-	126
		d4-1,2-dichloroethane (Surrogate)	%	-	119
		d8-toluene (Surrogate)	%	-	108
		Bromofluorobenzene (Surrogate)	%	-	96
	Totals	Total BTEX*	mg/kg	0.6	<0.6

VOCs in Water

Method: ME-(AU)-[ENV]AN433/AN434

Sample Number		Parameter	Units	LOR	Result
LB081906.001	Fumigants	2,2-dichloropropane	µg/L	0.5	<0.5
		1,2-dichloropropane	µg/L	0.5	<0.5
		cis-1,3-dichloropropene	µg/L	0.5	<0.5
		trans-1,3-dichloropropene	µg/L	0.5	<0.5
		1,2-dibromoethane (EDB)	µg/L	0.5	<0.5
	Halogenated Aliphatics	Dichlorodifluoromethane (CFC-12)	µg/L	5	<5
		Chloromethane	µg/L	5	<5
		Vinyl chloride (Chloroethene)	µg/L	0.3	<0.3
		Bromomethane	µg/L	10	<10
		Chloroethane	µg/L	5	<5
		Trichlorofluoromethane	µg/L	1	<1
		Iodomethane	µg/L	5	<5
		1,1-dichloroethene	µg/L	0.5	<0.5
		Dichloromethane (Methylene chloride)	µg/L	5	<5
		Allyl chloride	µg/L	2	<2
		trans-1,2-dichloroethene	µg/L	0.5	<0.5
		1,1-dichloroethane	µg/L	0.5	<0.5
		cis-1,2-dichloroethene	µg/L	0.5	<0.5
		Bromochloromethane	µg/L	0.5	<0.5
		1,2-dichloroethane	µg/L	0.5	<0.5
		1,1,1-trichloroethane	µg/L	0.5	<0.5
		1,1-dichloropropene	µg/L	0.5	<0.5
		Carbon tetrachloride	µg/L	0.5	<0.5
		Dibromomethane	µg/L	0.5	<0.5
		Trichloroethene (Trichloroethylene,TCE)	µg/L	0.5	<0.5
		1,1,2-trichloroethane	µg/L	0.5	<0.5
		1,3-dichloropropane	µg/L	0.5	<0.5
		Tetrachloroethene (Perchloroethylene,PCE)	µg/L	0.5	<0.5
		1,1,1,2-tetrachloroethane	µg/L	0.5	<0.5
		cis-1,4-dichloro-2-butene	µg/L	1	<1
		1,1,2,2-tetrachloroethane	µg/L	0.5	<0.5
		1,2,3-trichloropropane	µg/L	0.5	<0.5
		trans-1,4-dichloro-2-butene	µg/L	1	<1

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

VOCs in Water (continued)

Method: ME-(AU)-[ENV]AN433/AN434

Sample Number		Parameter	Units	LOR	Result
LB081906.001	Halogenated Aliphatics	1,2-dibromo-3-chloropropane	µg/L	0.5	<0.5
		Hexachlorobutadiene	µg/L	0.5	<0.5
	Halogenated Aromatics	Chlorobenzene	µg/L	0.5	<0.5
		Bromobenzene	µg/L	0.5	<0.5
		2-chlorotoluene	µg/L	0.5	<0.5
		4-chlorotoluene	µg/L	0.5	<0.5
		1,3-dichlorobenzene	µg/L	0.5	<0.5
		1,4-dichlorobenzene	µg/L	0.3	<0.3
		1,2-dichlorobenzene	µg/L	0.5	<0.5
		1,2,4-trichlorobenzene	µg/L	0.5	<0.5
		1,2,3-trichlorobenzene	µg/L	0.5	<0.5
	Monocyclic Aromatic	Benzene	µg/L	0.5	<0.5
	Hydrocarbons	Toluene	µg/L	0.5	<0.5
		Ethylbenzene	µg/L	0.5	<0.5
		m/p-xylene	µg/L	1	<1
		o-xylene	µg/L	0.5	<0.5
		Styrene (Vinyl benzene)	µg/L	0.5	<0.5
		Isopropylbenzene (Cumene)	µg/L	0.5	<0.5
		n-propylbenzene	µg/L	0.5	<0.5
		1,3,5-trimethylbenzene	µg/L	0.5	<0.5
		tert-butylbenzene	µg/L	0.5	<0.5
		1,2,4-trimethylbenzene	µg/L	0.5	<0.5
		sec-butylbenzene	µg/L	0.5	<0.5
		p-isopropyltoluene	µg/L	0.5	<0.5
		n-butylbenzene	µg/L	0.5	<0.5
	Nitrogenous Compounds	Acrylonitrile	µg/L	0.5	<0.5
	Oxygenated Compounds	Acetone (2-propanone)	µg/L	10	<10
		MtBE (Methyl-tert-butyl ether)	µg/L	2	<2
		Vinyl acetate	µg/L	10	<10
		MEK (2-butanone)	µg/L	10	<10
		MIBK (4-methyl-2-pentanone)	µg/L	5	<5
		2-hexanone (MBK)	µg/L	5	<5
	Polycyclic VOCs	Naphthalene	µg/L	0.5	<0.5
	Sulphonated	Carbon disulfide	µg/L	2	<2
	Surrogates	Dibromofluoromethane (Surrogate)	%	-	110
		d4-1,2-dichloroethane (Surrogate)	%	-	107
		d8-toluene (Surrogate)	%	-	103
		Bromofluorobenzene (Surrogate)	%	-	95
	Trihalomethanes	Chloroform (THM)	µg/L	0.5	<0.5
		Bromodichloromethane (THM)	µg/L	0.5	<0.5
		Dibromochloromethane (THM)	µg/L	0.5	<0.5
		Bromoform (THM)	µg/L	0.5	<0.5

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433/AN434/AN410

Sample Number		Parameter	Units	LOR	Result
LB081855.001		TRH C6-C9	mg/kg	20	<20
	Surrogates	Dibromofluoromethane (Surrogate)	%	-	126
		d4-1,2-dichloroethane (Surrogate)	%	-	119
		d8-toluene (Surrogate)	%	-	108

Volatile Petroleum Hydrocarbons in Water

Method: ME-(AU)-[ENV]AN433/AN434/AN410

Sample Number		Parameter	Units	LOR	Result
LB081906.001		TRH C6-C9	µg/L	40	<40
	Surrogates	Dibromofluoromethane (Surrogate)	%	-	106
		d4-1,2-dichloroethane (Surrogate)	%	-	105
		d8-toluene (Surrogate)	%	-	92
		Bromofluorobenzene (Surrogate)	%	-	76

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Mercury (dissolved) in Water

Method: ME-(AU)-[ENV]AN311/AN312

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE141822.018	LB081892.014	Mercury	µg/L	0.0001	<0.0001	<0.0001	200	0
SE141851.001	LB081892.018	Mercury	µg/L	0.0001	<0.0001	0.0000	200	23

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE141822.009	LB081893.014	Mercury	mg/kg	0.01	0.09	0.05	103	56
SE141822.014	LB081893.020	Mercury	mg/kg	0.01	0.11	0.08	83	29

Moisture Content

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

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE141822.010	LB081856.011	% Moisture	%w/w	0.5	9.2	8.8	41	4
SE141823.001	LB081856.018	% Moisture	%w/w	0.5	11.816838995	12.230215827	38	3

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN400/AN420

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE141822.006	LB081869.010		Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	0	200	0
			Alpha BHC	mg/kg	0.1	<0.1	0	200	0
			Lindane	mg/kg	0.1	<0.1	0	200	0
			Heptachlor	mg/kg	0.1	<0.1	0	200	0
			Aldrin	mg/kg	0.1	<0.1	0	200	0
			Beta BHC	mg/kg	0.1	<0.1	0	200	0
			Delta BHC	mg/kg	0.1	<0.1	0	200	0
			Heptachlor epoxide	mg/kg	0.1	<0.1	0	200	0
			o,p'-DDE	mg/kg	0.1	<0.1	0	200	0
			Alpha Endosulfan	mg/kg	0.2	<0.2	0	200	0
			Gamma Chlordane	mg/kg	0.1	<0.1	0	200	0
			Alpha Chlordane	mg/kg	0.1	<0.1	0	200	0
			trans-Nonachlor	mg/kg	0.1	<0.1	0	200	0
			p,p'-DDE	mg/kg	0.1	<0.1	0	200	0
			Dieldrin	mg/kg	0.2	<0.2	0	200	0
			Endrin	mg/kg	0.2	<0.2	0	200	0
			o,p'-DDD	mg/kg	0.1	<0.1	0	200	0
			o,p'-DDT	mg/kg	0.1	<0.1	0	200	0
			Beta Endosulfan	mg/kg	0.2	<0.2	0	200	0
			p,p'-DDD	mg/kg	0.1	<0.1	0	200	0
			p,p'-DDT	mg/kg	0.1	<0.1	0	200	0
			Endosulfan sulphate	mg/kg	0.1	<0.1	0	200	0
			Endrin Aldehyde	mg/kg	0.1	<0.1	0	200	0
			Methoxychlor	mg/kg	0.1	<0.1	0	200	0
			Endrin Ketone	mg/kg	0.1	<0.1	0	200	0
			Isodrin	mg/kg	0.1	<0.1	0	200	0
			Mirex	mg/kg	0.1	<0.1	0	200	0
		Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0.16	0.161	30	2

OP Pesticides in Soil

Method: ME-(AU)-[ENV]AN400/AN420

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE141822.006	LB081869.021		Dichlorvos	mg/kg	0.5	<0.5	0	200	0
			Dimethoate	mg/kg	0.5	<0.5	0	200	0
			Diazinon (Dimpylate)	mg/kg	0.5	<0.5	0	200	0
			Fenitrothion	mg/kg	0.2	<0.2	0.09	200	0
			Malathion	mg/kg	0.2	<0.2	0	200	0
			Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2	0	200	0
			Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2	0	200	0
			Bromophos Ethyl	mg/kg	0.2	<0.2	0	200	0
			Methidathion	mg/kg	0.5	<0.5	0	200	0
			Ethion	mg/kg	0.2	<0.2	0	200	0
			Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2	0	200	0
		Surrogates	2-fluorobiphenyl (Surrogate)	mg/kg	-	0.4	0.39	30	5
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.49	30	4

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE141822.006	LB081869.011		Naphthalene	mg/kg	0.1	<0.1	0	200	0
			2-methylnaphthalene	mg/kg	0.1	<0.1	0	200	0
			1-methylnaphthalene	mg/kg	0.1	<0.1	0	200	0
			Acenaphthylene	mg/kg	0.1	<0.1	0	200	0
			Acenaphthene	mg/kg	0.1	<0.1	0	200	0
			Fluorene	mg/kg	0.1	<0.1	0	200	0
			Phenanthrene	mg/kg	0.1	<0.1	0.01	200	0
			Anthracene	mg/kg	0.1	<0.1	0	200	0
			Fluoranthene	mg/kg	0.1	<0.1	0	200	0
			Pyrene	mg/kg	0.1	<0.1	0	200	0
			Benzo(a)anthracene	mg/kg	0.1	<0.1	0	200	0
			Chrysene	mg/kg	0.1	<0.1	0	200	0
			Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	0	200	0
			Benzo(k)fluoranthene	mg/kg	0.1	<0.1	0	200	0
			Benzo(a)pyrene	mg/kg	0.1	<0.1	0	200	0
			Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	0	200	0
			Dibenzo(a&h)anthracene	mg/kg	0.1	<0.1	0	200	0
			Benzo(ghi)perylene	mg/kg	0.1	<0.1	0	200	0
			Carcinogenic PAHs, BaP TEQ <LOR=0*	TEQ (mg/kg)	0.2	<0.2	0	200	0
			Carcinogenic PAHs, BaP TEQ <LOR=LOR*	TEQ (mg/kg)	0.3	<0.3	0.242	134	0
			Carcinogenic PAHs, BaP TEQ <LOR=LOR/2*	TEQ (mg/kg)	0.2	<0.2	0.121	175	0
			Total PAH	mg/kg	0.8	<0.8	0.01	200	0
		Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.4	0.44	30	5
			2-fluorobiphenyl (Surrogate)	mg/kg	-	0.4	0.39	30	5
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.49	30	4
SE141822.013	LB081869.020		Naphthalene	mg/kg	0.1	<0.1	0	200	0
			2-methylnaphthalene	mg/kg	0.1	<0.1	0.01	200	0
			1-methylnaphthalene	mg/kg	0.1	<0.1	0.01	200	0
			Acenaphthylene	mg/kg	0.1	<0.1	0	200	0
			Acenaphthene	mg/kg	0.1	<0.1	0	200	0
			Fluorene	mg/kg	0.1	<0.1	0	200	0
			Phenanthrene	mg/kg	0.1	<0.1	0.02	200	0
			Anthracene	mg/kg	0.1	<0.1	0.02	200	0
			Fluoranthene	mg/kg	0.1	<0.1	0	200	0
			Pyrene	mg/kg	0.1	<0.1	0.01	200	0
			Benzo(a)anthracene	mg/kg	0.1	<0.1	0.02	200	0
			Chrysene	mg/kg	0.1	<0.1	0.02	200	0
			Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	0	200	0
			Benzo(k)fluoranthene	mg/kg	0.1	<0.1	0	200	0
			Benzo(a)pyrene	mg/kg	0.1	<0.1	0	200	0
			Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	0	200	0
			Dibenzo(a&h)anthracene	mg/kg	0.1	<0.1	0	200	0
			Benzo(ghi)perylene	mg/kg	0.1	<0.1	0	200	0
			Carcinogenic PAHs, BaP TEQ <LOR=0*	TEQ (mg/kg)	0.2	<0.2	0	200	0
			Carcinogenic PAHs, BaP TEQ <LOR=LOR*	TEQ (mg/kg)	0.3	<0.3	0.242	134	0
			Carcinogenic PAHs, BaP TEQ <LOR=LOR/2*	TEQ (mg/kg)	0.2	<0.2	0.121	175	0
			Total PAH	mg/kg	0.8	<0.8	0.11	200	0
		Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.4	0.44	30	0
			2-fluorobiphenyl (Surrogate)	mg/kg	-	0.4	0.41	30	2
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.53	30	4

PCBs in Soil

Method: ME-(AU)-[ENV]AN400/AN420

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE141822.006	LB081869.010	Arochlor 1016	mg/kg	0.2	<0.2	0	200	0
		Arochlor 1221	mg/kg	0.2	<0.2	0	200	0
		Arochlor 1232	mg/kg	0.2	<0.2	0	200	0
		Arochlor 1242	mg/kg	0.2	<0.2	0	200	0
		Arochlor 1248	mg/kg	0.2	<0.2	0	200	0
		Arochlor 1254	mg/kg	0.2	<0.2	0	200	0
		Arochlor 1260	mg/kg	0.2	<0.2	0	200	0
		Arochlor 1262	mg/kg	0.2	<0.2	0	200	0

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

PCBs in Soil (continued)

Method: ME-(AU)-[ENV]AN400/AN420

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE141822.006	LB081869.010		Arochlor 1268	mg/kg	0.2	<0.2	0	200	0
			Total PCBs (Arochlors)	mg/kg	1	<1	0	200	0
		Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0	0.161	30	2

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest

Method: ME-(AU)-[ENV]AN040/AN320

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE141822.010	LB081888.014	Arsenic, As	mg/kg	3	<3	<3	73	6
		Cadmium, Cd	mg/kg	0.3	0.9	0.9	63	7
		Chromium, Cr	mg/kg	0.3	140	150	30	3
		Copper, Cu	mg/kg	0.5	32	33	32	1
		Lead, Pb	mg/kg	1	7	6	46	2
		Nickel, Ni	mg/kg	0.5	110	110	30	1
		Zinc, Zn	mg/kg	0.5	77	85	32	10
SE141822.014	LB081888.019	Arsenic, As	mg/kg	3	3	5	55	30
		Cadmium, Cd	mg/kg	0.3	0.8	1.1	62	26
		Chromium, Cr	mg/kg	0.3	22	27	32	22
		Copper, Cu	mg/kg	0.5	82	100	31	22
		Lead, Pb	mg/kg	1	37	49	32	27
		Nickel, Ni	mg/kg	0.5	85	110	31	25
		Zinc, Zn	mg/kg	0.5	110	150	32	27

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE141822.015	LB081860.014	Arsenic, As	µg/L	1	<1	<1	200	0
		Cadmium, Cd	µg/L	0.1	<0.1	<0.1	198	0
		Chromium, Cr	µg/L	1	<1	<1	200	0
		Copper, Cu	µg/L	1	<1	<1	135	0
		Lead, Pb	µg/L	1	<1	<1	200	0
		Nickel, Ni	µg/L	1	61	60	17	2
		Zinc, Zn	µg/L	5	18	18	43	1
SE141822.018	LB081860.018	Arsenic, As	µg/L	1	<1	<1	200	0
		Cadmium, Cd	µg/L	0.1	<0.1	<0.1	200	0
		Chromium, Cr	µg/L	1	<1	<1	200	0
		Copper, Cu	µg/L	1	<1	<1	118	0
		Lead, Pb	µg/L	1	<1	<1	200	0
		Nickel, Ni	µg/L	1	<1	<1	169	0
		Zinc, Zn	µg/L	5	<5	<5	200	0

TRH (Total Recoverable Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN403

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE141822.006	LB081869.011		TRH C10-C14	mg/kg	20	<20	0	200	0
			TRH C15-C28	mg/kg	45	<45	0	200	0
			TRH C29-C36	mg/kg	45	<45	0	200	0
			TRH C37-C40	mg/kg	100	<100	0	200	0
			TRH C10-C36 Total	mg/kg	110	<110	0	200	0
			TRH C10-C40 Total	mg/kg	210	<210	0	200	0
		TRH F Bands	TRH >C10-C16 (F2)	mg/kg	25	<25	0	200	0
			TRH >C10-C16 (F2) - Naphthalene	mg/kg	25	<25	0	200	0
			TRH >C16-C34 (F3)	mg/kg	90	<90	0	200	0
			TRH >C34-C40 (F4)	mg/kg	120	<120	0	200	0
SE141822.013	LB081869.020		TRH C10-C14	mg/kg	20	<20	0	200	0
			TRH C15-C28	mg/kg	45	<45	0	200	0
			TRH C29-C36	mg/kg	45	<45	0	200	0
			TRH C37-C40	mg/kg	100	<100	0	200	0
			TRH C10-C36 Total	mg/kg	110	<110	0	200	0
			TRH C10-C40 Total	mg/kg	210	<210	0	200	0
		TRH F Bands	TRH >C10-C16 (F2)	mg/kg	25	<25	0	200	0
			TRH >C10-C16 (F2) - Naphthalene	mg/kg	25	<25	0	200	0
			TRH >C16-C34 (F3)	mg/kg	90	<90	0	200	0
			TRH >C34-C40 (F4)	mg/kg	120	<120	0	200	0

VOC's in Soil

Method: ME-(AU)-[ENV]AN433/AN434

Original	Duplicate	Parameter	Units	LOR

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

VOC's in Soil (continued)

Method: ME-(AU)-[ENV]AN433/AN434

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE141822.010	LB081855.014	Monocyclic	Benzene	mg/kg	0.1	<0.1	<0.1	200	0
		Aromatic	Toluene	mg/kg	0.1	<0.1	<0.1	200	0
			Ethylbenzene	mg/kg	0.1	<0.1	<0.1	200	0
			m/p-xylene	mg/kg	0.2	<0.2	<0.2	200	0
			o-xylene	mg/kg	0.1	<0.1	<0.1	200	0
		Polycyclic	Naphthalene	mg/kg	0.1	<0.1	<0.1	184	0
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	5.1	5.1	50	1
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.9	5.1	50	3
			d8-toluene (Surrogate)	mg/kg	-	5.8	6.1	50	4
			Bromofluorobenzene (Surrogate)	mg/kg	-	4.8	4.8	50	1
		Totals	Total Xylenes*	mg/kg	0.3	<0.3	<0.3	200	0
			Total BTEX*	mg/kg	0.6	<0.6	<0.6	200	0
SE141822.014	LB081855.022	Monocyclic	Benzene	mg/kg	0.1	<0.1	0	200	0
		Aromatic	Toluene	mg/kg	0.1	<0.1	0.01	200	0
			Ethylbenzene	mg/kg	0.1	<0.1	0	200	0
			m/p-xylene	mg/kg	0.2	<0.2	0.01	200	0
			o-xylene	mg/kg	0.1	<0.1	0.01	200	0
		Polycyclic	Naphthalene	mg/kg	0.1	<0.1	0.04	200	0
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	5.2	5.2	50	0
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	5.2	5.09	50	3
			d8-toluene (Surrogate)	mg/kg	-	6.0	5.66	50	5
			Bromofluorobenzene (Surrogate)	mg/kg	-	4.8	5	50	3
		Totals	Total Xylenes*	mg/kg	0.3	<0.3	0.02	200	0
			Total BTEX*	mg/kg	0.6	<0.6	0.03	200	0

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433/AN434/AN410

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE141822.010	LB081855.014		TRH C6-C10	mg/kg	25	<25	<25	200	0
			TRH C6-C9	mg/kg	20	<20	<20	200	0
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	5.1	5.1	30	1
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.9	5.1	30	3
			d8-toluene (Surrogate)	mg/kg	-	5.8	6.1	30	4
			Bromofluorobenzene (Surrogate)	mg/kg	-	4.8	4.8	30	1
		VPH F Bands	Benzene (F0)	mg/kg	0.1	<0.1	<0.1	200	0
			TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	200	0
SE141822.014	LB081855.022		TRH C6-C10	mg/kg	25	<25	0.93	200	0
			TRH C6-C9	mg/kg	20	<20	0.83	200	0
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	5.2	5.2	30	0
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	5.2	5.09	30	3
			d8-toluene (Surrogate)	mg/kg	-	6.0	5.66	30	5
			Bromofluorobenzene (Surrogate)	mg/kg	-	4.8	5	30	3
		VPH F Bands	Benzene (F0)	mg/kg	0.1	<0.1	0	200	0
			TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	0.9	200	0

Laboratory Control Standard (LCS) results are evaluated against an expected result, typically the concentration of analyte spiked into the control during the sample preparation stage, producing a percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Full 8270 SVOC in Water

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB081872.002	01-PAHs	Acenaphthene	µg/L	0.1	46	40	60 - 140	115
		Acenaphthylene	µg/L	0.1	49	40	60 - 140	122
		Anthracene	µg/L	0.1	41	40	60 - 140	103
		Benzo(a)pyrene	µg/L	0.1	40	40	60 - 140	100
		Fluoranthene	µg/L	0.1	43	40	60 - 140	107
		Naphthalene	µg/L	0.1	47	40	60 - 140	118
		Phenanthrene	µg/L	0.1	42	40	60 - 140	104
		Pyrene	µg/L	0.1	49	40	60 - 140	122
	02-OCs	Aldrin	µg/L	0.1	4.7	4	60 - 140	117
		Delta-BHC	µg/L	0.1	3.7	4	60 - 140	92
		p,p-DDT	µg/L	0.1	3.2	4	60 - 140	79
		Dieldrin	µg/L	0.1	4.5	4	60 - 140	114
		Endrin	µg/L	0.1	4.3	4	60 - 140	108
		Heptachlor	µg/L	0.1	4.8	4	60 - 140	120
	03-OPs	Chlorpyrifos (Chlorpyrifos Ethyl)	µg/L	0.2	8.4	8	60 - 140	105
		Diazinon (Dimpylate)	µg/L	0.5	10	8	60 - 140	125
		Dichlorvos	µg/L	0.5	8.8	8	60 - 140	110
		Ethion	µg/L	0.2	8.1	8	60 - 140	101
	05-SVCH (Cl	Hexachlorobenzene (HCB)	µg/L	0.1	4.5	4	60 - 140	114
	Benzenes,	Hexachlorobutadiene	µg/L	0.5	4.3	4	60 - 140	107
		Hexachloroethane	µg/L	0.5	4.0	4	60 - 140	99
		Pentachlorobenzene	µg/L	0.5	4.8	4	60 - 140	121
		1,2,3,4-tetrachlorobenzene	µg/L	0.5	4.5	4	60 - 140	114
	06-Phthalates	Bis(2-ethylhexyl)phthalate	µg/L	50	<50	8	60 - 140	134
		Butyl benzyl phthalate	µg/L	1	10	8	60 - 140	129
		Di-n-butyl phthalate	µg/L	10	<10	8	60 - 140	123
		Diethyl phthalate	µg/L	5	9	8	60 - 140	115
		Dimethyl phthalate	µg/L	1	9	8	60 - 140	116
		Dioctyl phthalate	µg/L	1	10	8	60 - 140	119
	10-Nitroaromati	Pentachloronitrobenzene (quintozene)	µg/L	1	4	4	60 - 140	109
	14-Speciated	2,4-dichlorophenol	µg/L	0.5	43	40	60 - 140	109
	Routine	Phenol	µg/L	0.5	24	40	60 - 140	61
		2,4,6-trichlorophenol	µg/L	0.5	34	40	60 - 140	84
		Pentachlorophenol	µg/L	0.5	31	40	60 - 140	78
	Surrogates	d5-phenol (Surrogate)	µg/L	-	0.9	2	40 - 130	45
		d5-nitrobenzene (Surrogate)	µg/L	-	0.6	0.5	40 - 130	120
		2-fluorobiphenyl (Surrogate)	µg/L	-	0.5	0.5	40 - 130	100
		2,4,6-Tribromophenol (Surrogate)	µg/L	-	2.5	5	40 - 130	50
		d14-p-terphenyl (Surrogate)	µg/L	-	0.5	0.5	40 - 130	100

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB081893.002	Mercury	mg/kg	0.01	0.20	0.2	70 - 130	98

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN400/AN420

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB081869.002		Heptachlor	mg/kg	0.1	0.2	0.2	60 - 140	108
		Aldrin	mg/kg	0.1	0.2	0.2	60 - 140	107
		Delta BHC	mg/kg	0.1	0.2	0.2	60 - 140	102
		Dieldrin	mg/kg	0.2	0.2	0.2	60 - 140	101
		Endrin	mg/kg	0.2	0.2	0.2	60 - 140	113
		p,p'-DDT	mg/kg	0.1	0.2	0.2	60 - 140	99
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0.14	0.15	40 - 130	93

OC Pesticides in Water

Method: ME-(AU)-[ENV]AN400/AN420

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB081872.002	Delta BHC	µg/L	0.1	0.2	0.2	60 - 140	95
	Heptachlor	µg/L	0.1	0.2	0.2	60 - 140	94
	Aldrin	µg/L	0.1	0.2	0.2	60 - 140	92
	Dieldrin	µg/L	0.1	0.2	0.2	60 - 140	97

Laboratory Control Standard (LCS) results are evaluated against an expected result, typically the concentration of analyte spiked into the control during the sample preparation stage, producing a percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

OC Pesticides in Water (continued)

Method: ME-(AU)-[ENV]AN400/AN420

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB081872.002		Endrin	µg/L	0.1	0.2	0.2	60 - 140	103
		p,p'-DDT	µg/L	0.1	0.2	0.2	60 - 140	100
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	µg/L	-	0.11	0.15	40 - 130	70

OP Pesticides in Soil

Method: ME-(AU)-[ENV]AN400/AN420

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB081869.002		Dichlorvos	mg/kg	0.5	2.5	2	60 - 140	125
		Diazinon (Dimpylate)	mg/kg	0.5	2.1	2	60 - 140	104
		Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	2.0	2	60 - 140	101
		Ethion	mg/kg	0.2	1.9	2	60 - 140	95
	Surrogates	2-fluorobiphenyl (Surrogate)	mg/kg	-	0.4	0.5	40 - 130	76
		d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.5	40 - 130	92

OP Pesticides in Water

Method: ME-(AU)-[ENV]AN400/AN420

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB081872.002		Dichlorvos	µg/L	0.5	8.8	8	60 - 140	110
		Diazinon (Dimpylate)	µg/L	0.5	10	8	60 - 140	125
		Chlorpyrifos (Chlorpyrifos Ethyl)	µg/L	0.2	8.4	8	60 - 140	105
		Ethion	µg/L	0.2	8.1	8	60 - 140	101
	Surrogates	2-fluorobiphenyl (Surrogate)	µg/L	-	0.5	0.5	40 - 130	100
		d14-p-terphenyl (Surrogate)	µg/L	-	0.5	0.5	40 - 130	100

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB081869.002		Naphthalene	mg/kg	0.1	3.8	4	60 - 140	95
		Acenaphthylene	mg/kg	0.1	3.9	4	60 - 140	97
		Acenaphthene	mg/kg	0.1	3.9	4	60 - 140	99
		Phenanthrene	mg/kg	0.1	3.9	4	60 - 140	98
		Anthracene	mg/kg	0.1	3.9	4	60 - 140	99
		Fluoranthene	mg/kg	0.1	3.9	4	60 - 140	99
		Pyrene	mg/kg	0.1	3.9	4	60 - 140	96
		Benzo(a)pyrene	mg/kg	0.1	4.7	4	60 - 140	117
	Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.4	0.5	40 - 130	88
		2-fluorobiphenyl (Surrogate)	mg/kg	-	0.4	0.5	40 - 130	76
		d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.5	40 - 130	92

PAH (Polynuclear Aromatic Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB081872.002		Naphthalene	µg/L	0.1	28	40	60 - 140	70
		Acenaphthylene	µg/L	0.1	27	40	60 - 140	68
		Acenaphthene	µg/L	0.1	30	40	60 - 140	75
		Phenanthrene	µg/L	0.1	33	40	60 - 140	82
		Anthracene	µg/L	0.1	33	40	60 - 140	83
		Fluoranthene	µg/L	0.1	32	40	60 - 140	79
		Pyrene	µg/L	0.1	32	40	60 - 140	80
		Benzo(a)pyrene	µg/L	0.1	34	40	60 - 140	84
	Surrogates	d5-nitrobenzene (Surrogate)	µg/L	-	0.4	0.5	40 - 130	86
		2-fluorobiphenyl (Surrogate)	µg/L	-	0.4	0.5	40 - 130	80
		d14-p-terphenyl (Surrogate)	µg/L	-	0.6	0.5	40 - 130	112

PCBs in Soil

Method: ME-(AU)-[ENV]AN400/AN420

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB081869.002	Arochlor 1260	mg/kg	0.2	0.4	0.4	60 - 140	89

PCBs in Water

Method: ME-(AU)-[ENV]AN400/AN420

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB081872.002	Arochlor 1260	µg/L	1	<1	0.4	60 - 140	103

Speciated Phenols in Water

Method: ME-(AU)-[ENV]AN420

Sample Number	Parameter	Units	LOR

Laboratory Control Standard (LCS) results are evaluated against an expected result, typically the concentration of analyte spiked into the control during the sample preparation stage, producing a percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Speciated Phenols in Water (continued)

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB081872.002		Phenol	µg/L	0.5	25	40	60 - 140	63
		2,4-dichlorophenol	µg/L	0.5	29	40	60 - 140	73
		2,4,6-trichlorophenol	µg/L	0.5	40	40	60 - 140	100
		Pentachlorophenol	µg/L	0.5	31	40	60 - 140	78
	Surrogates	2,4,6-Tribromophenol (Surrogate)	µg/L	-	5.0	5	40 - 130	100
		d5-phenol (Surrogate)	µg/L	-	1.7	2	40 - 130	85

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest

Method: ME-(AU)-[ENV]AN040/AN320

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB081888.002	Arsenic, As	mg/kg	3	48	50	80 - 120	97
	Cadmium, Cd	mg/kg	0.3	50	50	80 - 120	100
	Chromium, Cr	mg/kg	0.3	51	50	80 - 120	103
	Copper, Cu	mg/kg	0.5	51	50	80 - 120	102
	Lead, Pb	mg/kg	1	50	50	80 - 120	100
	Nickel, Ni	mg/kg	0.5	51	50	80 - 120	101
	Zinc, Zn	mg/kg	0.5	52	50	80 - 120	103

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB081860.002	Arsenic, As	µg/L	1	18	20	80 - 120	91
	Cadmium, Cd	µg/L	0.1	19	20	80 - 120	96
	Chromium, Cr	µg/L	1	19	20	80 - 120	97
	Copper, Cu	µg/L	1	20	20	80 - 120	99
	Lead, Pb	µg/L	1	19	20	80 - 120	94
	Nickel, Ni	µg/L	1	19	20	80 - 120	93
	Zinc, Zn	µg/L	5	19	20	80 - 120	93

TRH (Total Recoverable Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN403

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB081869.002		TRH C10-C14	mg/kg	20	35	40	60 - 140	88
		TRH C15-C28	mg/kg	45	<45	40	60 - 140	88
		TRH C29-C36	mg/kg	45	<45	40	60 - 140	75
	TRH F Bands	TRH >C10-C16 (F2)	mg/kg	25	35	40	60 - 140	88
		TRH >C16-C34 (F3)	mg/kg	90	<90	40	60 - 140	80
		TRH >C34-C40 (F4)	mg/kg	120	<120	20	60 - 140	75

TRH (Total Recoverable Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN403

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB081872.002		TRH C10-C14	µg/L	50	1000	1200	60 - 140	83
		TRH C15-C28	µg/L	200	1100	1200	60 - 140	94
		TRH C29-C36	µg/L	200	1100	1200	60 - 140	92
	TRH F Bands	TRH >C10-C16 (F2)	µg/L	60	1000	1200	60 - 140	85
		TRH >C16-C34 (F3)	µg/L	500	1200	1200	60 - 140	97
		TRH >C34-C40 (F4)	µg/L	500	580	600	60 - 140	96

VOC's in Soil

Method: ME-(AU)-[ENV]AN433/AN434

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB081855.002	Monocyclic	Benzene	mg/kg	0.1	2.6	2.9	60 - 140	89
	Aromatic	Toluene	mg/kg	0.1	2.5	2.9	60 - 140	88
		Ethylbenzene	mg/kg	0.1	2.3	2.9	60 - 140	78
		m/p-xylene	mg/kg	0.2	4.9	5.8	60 - 140	84
		o-xylene	mg/kg	0.1	2.3	2.9	60 - 140	80
	Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	6.1	5	60 - 140	121
		d4-1,2-dichloroethane (Surrogate)	mg/kg	-	6.2	5	60 - 140	124
		d8-toluene (Surrogate)	mg/kg	-	6.0	5	60 - 140	121
		Bromofluorobenzene (Surrogate)	mg/kg	-	4.8	5	60 - 140	96

VOCs in Water

Method: ME-(AU)-[ENV]AN433/AN434

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB081906.002	Halogenated	1,1-dichloroethene	µg/L	0.5	52	45.45	60 - 140	114
	Aliphatics	1,2-dichloroethane	µg/L	0.5	48	45.45	60 - 140	106
		Trichloroethene (Trichloroethylene,TCE)	µg/L	0.5	48	45.45	60 - 140	106
	Halogenated	Chlorobenzene	µg/L	0.5	46	45.45	60 - 140	101
	Monocyclic	Benzene	µg/L	0.5	51	45.45	60 - 140	112

Laboratory Control Standard (LCS) results are evaluated against an expected result, typically the concentration of analyte spiked into the control during the sample preparation stage, producing a percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

VOCs in Water (continued)

Method: ME-(AU)-[ENV]AN433/AN434

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB081906.002	Monocyclic	Toluene	µg/L	0.5	51	45.45	60 - 140	112
	Aromatic	Ethylbenzene	µg/L	0.5	54	45.45	60 - 140	119
		m/p-xylene	µg/L	1	110	90.9	60 - 140	116
		o-xylene	µg/L	0.5	48	45.45	60 - 140	106
	Trihalomethan	Chloroform (THM)	µg/L	0.5	40	45.45	60 - 140	88

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433/AN434/AN410

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB081855.002		TRH C6-C10	mg/kg	25	<25	24.65	60 - 140	91
		TRH C6-C9	mg/kg	20	<20	23.2	60 - 140	79
	Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	6.1	5	60 - 140	121
		d4-1,2-dichloroethane (Surrogate)	mg/kg	-	6.2	5	60 - 140	124
		d8-toluene (Surrogate)	mg/kg	-	6.0	5	60 - 140	121
		Bromofluorobenzene (Surrogate)	mg/kg	-	4.8	5	60 - 140	96
	VPH F Bands	TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	7.25	60 - 140	110

Volatile Petroleum Hydrocarbons in Water

Method: ME-(AU)-[ENV]AN433/AN434/AN410

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB081906.002		TRH C6-C10	µg/L	50	1000	946.63	60 - 140	107
		TRH C6-C9	µg/L	40	760	818.71	60 - 140	93
	VPH F Bands	TRH C6-C10 minus BTEX (F1)	µg/L	50	700	639.67	60 - 140	109

Matrix Spike (MS) results are evaluated as the percentage recovery of an expected result, typically the concentration of analyte spiked into a field sub -sample during the sample preparation stage. The original sample's result is subtracted from the sub-sample result before determining the percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA/QC plan (ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Mercury (dissolved) in Water

Method: ME-(AU)-[ENV]AN311/AN312

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE141539A.03	LB081892.004	Mercury	mg/L	0.0001	0.0081	<0.0001	0.008	102

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE141539A.03	LB081893.004	Mercury	mg/kg	0.01	0.18	0.01	0.2	81

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

QC Sample	Sample Number		Parameter	Units	LOR	Original	Spike	Recovery%
SE141822.002	LB081869.006		Naphthalene	mg/kg	0.1	<0.1	4	96
			2-methylnaphthalene	mg/kg	0.1	<0.1	-	-
			1-methylnaphthalene	mg/kg	0.1	<0.1	-	-
			Acenaphthylene	mg/kg	0.1	<0.1	4	98
			Acenaphthene	mg/kg	0.1	<0.1	4	96
			Fluorene	mg/kg	0.1	<0.1	-	-
			Phenanthrene	mg/kg	0.1	<0.1	4	96
			Anthracene	mg/kg	0.1	<0.1	4	100
			Fluoranthene	mg/kg	0.1	<0.1	4	99
			Pyrene	mg/kg	0.1	<0.1	4	96
			Benzo(a)anthracene	mg/kg	0.1	<0.1	-	-
			Chrysene	mg/kg	0.1	<0.1	-	-
			Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	-	-
			Benzo(k)fluoranthene	mg/kg	0.1	<0.1	-	-
			Benzo(a)pyrene	mg/kg	0.1	<0.1	4	116
			Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	-	-
			Dibenzo(a&h)anthracene	mg/kg	0.1	<0.1	-	-
			Benzo(ghi)perylene	mg/kg	0.1	<0.1	-	-
			Carcinogenic PAHs, BaP TEQ <LOR=0*	TEQ	0.2	<0.2	-	-
			Carcinogenic PAHs, BaP TEQ <LOR=LOR*	TEQ (mg/kg)	0.3	<0.3	-	-
			Carcinogenic PAHs, BaP TEQ <LOR=LOR/2*	TEQ (mg/kg)	0.2	<0.2	-	-
			Total PAH	mg/kg	0.8	<0.8	-	-
		Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.5	-	86
			2-fluorobiphenyl (Surrogate)	mg/kg	-	0.4	-	78
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	-	92

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest

Method: ME-(AU)-[ENV]AN040/AN320

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE141822.001	LB081888.004	Arsenic, As	mg/kg	3	47	10	50	74
		Cadmium, Cd	mg/kg	0.3	38	0.7	50	76
		Chromium, Cr	mg/kg	0.3	54	13	50	81
		Copper, Cu	mg/kg	0.5	78	41	50	75
		Lead, Pb	mg/kg	1	83	45	50	75
		Nickel, Ni	mg/kg	0.5	54	16	50	78
		Zinc, Zn	mg/kg	0.5	170	150	50	43 ④

TRH (Total Recoverable Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN403

QC Sample	Sample Number		Parameter	Units	LOR	Original	Spike	Recovery%
SE141822.002	LB081869.006		TRH C10-C14	mg/kg	20	<20	40	88
			TRH C15-C28	mg/kg	45	<45	40	83
			TRH C29-C36	mg/kg	45	<45	40	78
			TRH C37-C40	mg/kg	100	<100	-	-
			TRH C10-C36 Total	mg/kg	110	<110	-	-
			TRH C10-C40 Total	mg/kg	210	<210	-	-
		TRH F Bands	TRH >C10-C16 (F2)	mg/kg	25	<25	40	85
			TRH >C10-C16 (F2) - Naphthalene	mg/kg	25	<25	-	-
			TRH >C16-C34 (F3)	mg/kg	90	<90	40	80
			TRH >C34-C40 (F4)	mg/kg	120	<120	-	-

VOC's in Soil

Method: ME-(AU)-[ENV]AN433/AN434

QC Sample	Sample Number	Parameter	Units	LOR

Matrix Spike (MS) results are evaluated as the percentage recovery of an expected result, typically the concentration of analyte spiked into a field sub -sample during the sample preparation stage. The original sample's result is subtracted from the sub-sample result before determining the percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA/QC plan (ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

VOC's in Soil (continued)

Method: ME-(AU)-[ENV]AN433/AN434

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE141822.001	LB081855.004	Monocyclic	Benzene	mg/kg	0.1	2.3	<0.1	2.9	78
		Aromatic	Toluene	mg/kg	0.1	2.2	<0.1	2.9	75
			Ethylbenzene	mg/kg	0.1	2.0	<0.1	2.9	67
			m/p-xylene	mg/kg	0.2	4.3	<0.2	5.8	74
			o-xylene	mg/kg	0.1	2.1	<0.1	2.9	71
		Polycyclic	Naphthalene	mg/kg	0.1	<0.1	<0.1	-	-
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	4.7	5.3	-	95
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.8	5.4	-	96
			d8-toluene (Surrogate)	mg/kg	-	5.3	5.7	-	107
			Bromofluorobenzene (Surrogate)	mg/kg	-	4.9	4.7	-	99
		Totals	Total Xylenes*	mg/kg	0.3	6.4	<0.3	-	-
			Total BTEX*	mg/kg	0.6	13	<0.6	-	-

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433/AN434/AN410

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE141822.001	LB081855.004		TRH C6-C10	mg/kg	25	<25	<25	24.65	80
			TRH C6-C9	mg/kg	20	<20	<20	23.2	77
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	4.7	5.3	-	95
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.8	5.4	-	96
			d8-toluene (Surrogate)	mg/kg	-	5.3	5.7	-	107
			Bromofluorobenzene (Surrogate)	mg/kg	-	4.9	4.7	-	99
		VPH F	Benzene (F0)	mg/kg	0.1	2.3	<0.1	-	-
		Bands	TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	7.25	98

MATRIX SPIKE DUPLICATES

SE141822 R0

Matrix spike duplicates are calculated as Relative Percent Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The original result is the analyte concentration of the matrix spike. The Duplicate result is the analyte concentration of the matrix spike duplicate.

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

No matrix spike duplicates were required for this job.

Samples analysed as received.

Solid samples expressed on a dry weight basis.

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

*	NATA accreditation does not cover tthe performance of this service.
-	Sample not analysed for this analyte.
^	Analysis performed by external laboratory.

IS	Insufficient sample for analysis.
LNR	Sample listed, but not received.
LOR	Limit of reporting.
QFH	QC result is above the upper tolerance.
QFL	QC result is below the lower tolerance.

①	At least 2 of 3 surrogates are within acceptance criteria.
②	RPD failed acceptance criteria due to sample heterogeneity.
③	Results less than 5 times LOR preclude acceptance criteria for RPD.
④	Recovery failed acceptance criteria due to matrix interference.
⑤	Recovery failed acceptance criteria due to the presence of significant concentration of analyte (i.e. the concentration of analyte exceeds the spike level).
⑥	LOR was raised due to sample matrix interference.
⑦	LOR was raised due to dilution of significantly high concentration of analyte in sample.
⑧	Reanalysis of sample in duplicate confirmed sample heterogeneity and inconsistency of results.
⑨	Recovery failed acceptance criteria due to sample heterogeneity.
⑩	LOR was raised due to high conductivity of the sample (required dilution).
†	Refer to Analytical Report comments for further information.

ANALYTICAL REPORT

WORLD RECOGNISED ACCREDITATION

CLIENT DETAILS

Contact	Barry Houston
Client	PETER J RAMSAY & ASSOCIATES
Address	Environmental Engineering Consultants 3/538, Gardeners Road Alexandria NSW 2015
Telephone	02 8338 1655
Facsimile	02 8338 1755
Email	barry.houston@pjra.com.au
Project	**884.1**
Order Number	**PCOC1**
Samples	8

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
SGS Reference	SE141822 R0
Report Number	0000116754
Date Reported	30 Jul 2015
Date Received	28 Jul 2015

COMMENTS

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

No respirable fibres detected in all samples using trace analysis technique.
Sample # 8:1-6 mm length fibre bundles found in 5x3 mm cement sheet fragments and found loose in sample.
Asbestos analysed by Approved Identifier Yusuf Kuthpudin.

SIGNATORIES

Andy Sutton
Senior Organic Chemist

Dong Liang
Metals/Inorganics Team Leader

Kamrul Ahsan
Senior Chemist

Ravee Sivasubramaniam
Asbestos Analyst / Hygiene Team Lead

ANALYTICAL REPORT

SE141822 R0

RESULTS

Fibre Identification in soil — Method AN602

Laboratory Reference	Client Reference	Matrix	Sample Description	Date Sampled	Fibre Identification
SE141822.001	BH1/D	Soil	145 g Clay,soil,rocks	27 Jul 2015	No Asbestos Found Organic Fibres Detected
SE141822.002	BH1/M	Soil	107 g Clay,rocks	27 Jul 2015	No Asbestos Found
SE141822.003	BH2/D	Soil	66 g Clay,soil,rocks	27 Jul 2015	No Asbestos Found
SE141822.004	BH2/G	Soil	51 g Clay,soil,rocks	27 Jul 2015	No Asbestos Found
SE141822.005	BH3/C	Soil	317 g Clay,sand,soil,rocks	27 Jul 2015	No Asbestos Found
SE141822.006	BH3/I	Soil	85 g Clay,rocks	27 Jul 2015	No Asbestos Found
SE141822.007	BH4/B	Soil	364 g Clay,soil,rocks	27 Jul 2015	No Asbestos Found Organic Fibres Detected
SE141822.008	BH4/E	Soil	164 g Clay,soil,rocks	27 Jul 2015	Chrysotile & Crocidolite Asbestos Found

METHOD SUMMARY

SE141822 R0

METHOD	METHODOLOGY SUMMARY
AN602	Qualitative identification of chrysotile, amosite and crocidolite in bulk samples by polarised light microscopy (PLM) in conjunction with dispersion staining (DS). AS4964 provides the basis for this document. Unequivocal identification of the asbestos minerals present is made by obtaining sufficient diagnostic `clues`, which provide a reasonable degree of certainty, dispersion staining is a mandatory `clue` for positive identification. If sufficient `clues` are absent, then positive identification of asbestos is not possible. This procedure requires removal of suspect fibres/bundles from the sample which cannot be returned. Fibres/material that cannot be unequivocably identified as one of the three asbestos forms, will be reported as unknown mineral fibres (umf). AS4964.2004 Method for the Qualitative Identification of Asbestos in Bulk Samples , Section 8.4, Trace Analysis Criteria, Note 4 states:"Depending upon sample condition and fibre type, the detection limit of this technique has been found to lie generally in the range of 1 in 1,000 to 1 in 10,000 parts by weight, equivalent to 1 to 0.1 g/kg." The sample can be reported “no asbestos found at the reporting limit of 0.1 g/kg” (<0.01%w/w) where AN602 section 4.5 of this method has been followed, and if- (a) no trace asbestos fibres have been detected (i.e. no ‘respirable’ fibres): (b) the estimated weight of non-respirable asbestos fibre bundles and/or the estimated weight of asbestos in asbestos-containing materials are found to be less than 0.1g/kg: and (c) these non-respirable asbestos fibre bundles and/or the asbestos containing materials are only visible under stereo-microscope viewing conditions.

FOOTNOTES

Amosite	-	Brown Asbestos	NA	-	Not Analysed
Chrysotile	-	White Asbestos	LNR	-	Listed, Not Required
Crocidolite	-	Blue Asbestos	*	-	NATA accreditation does not cover the performance of this service .
Amphiboles	-	Amosite and/or Crocidolite	**	-	Indicative data, theoretical holding time exceeded.

(In reference to soil samples only) This report does not comply with the analytical reporting recommendations in the Western Australian Department of Health Guidelines for the Assessment and Remediation and Management of Asbestos Contaminated sites in Western Australia - May 2009.

Sampled by the client.

Where reported: 'Asbestos Detected': Asbestos detected by polarised light microscopy, including dispersion staining.
Where reported: 'No Asbestos Found': No Asbestos Found by polarised light microscopy, including dispersion staining.
Where reported: 'UMF Detected': Mineral fibres of unknown type detected by polarised light microscopy, including dispersion staining. Confirmation by another independent analytical technique may be necessary.

Even after disintegration it can be very difficult, or impossible, to detect the presence of asbestos in some asbestos -containing bulk materials using polarised light microscopy. This is due to the low grade or small length or diameter of asbestos fibres present in the material, or to the fact that very fine fibres have been distributed intimately throughout the materials.

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

SAMPLE RECEIPT ADVICE

SE141822

CLIENT DETAILS

Contact	Barry Houston
Client	PETER J RAMSAY & ASSOCIATES
Address	Environmental Engineering Consultants 3/538, Gardeners Road Alexandria NSW 2015
Telephone	02 8338 1655
Facsimile	02 8338 1755
Email	barry.houston@pjra.com.au
Project	**884.1**
Order Number	**PCOC1**
Samples	20

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
Samples Received	Tue 28/7/2015
Report Due	Thu 30/7/2015
SGS Reference	**SE141822**

SUBMISSION DETAILS

This is to confirm that 20 samples were received on Tuesday 28/7/2015. Results are expected to be ready by Thursday 30/7/2015. Please quote SGS reference SE141822 when making enquiries. Refer below for details relating to sample integrity upon receipt.

Sample counts by matrix	16 Soils, 4 Waters	Type of documentation received	COC
Date documentation received	28/7/2015	Samples received in good order	Yes
Samples received without headspace	Yes	Sample temperature upon receipt	6.0°C
Sample container provider	Other Lab	Turnaround time requested	Two Days
Samples received in correct containers	Yes	Sufficient sample for analysis	Yes
Sample cooling method	Ice Bricks	Samples clearly labelled	Yes
Complete documentation received	Yes	Number of eskies/boxes received	

Samples will be held for one month for water samples and two months for soil samples from date of report, unless otherwise instructed.

COMMENTS

36 soil samples have been placed on hold.
Sample Trip spike will be tested for BTEX only.

SAMPLE RECEIPT ADVICE

SE141822

CLIENT DETAILS

Client PETER J RAMSAY & ASSOCIATES

Project 884.1

SUMMARY OF ANALYSIS

No.	Sample ID	OC Pesticides in Soil	OP Pesticides in Soil	PAH (Polynuclear Aromatic Hydrocarbons) in Soil	PCBs in Soil	Total Recoverable Metals in Soil by ICPOES from	TRH (Total Recoverable Hydrocarbons) in Soil	VOC's in Soil	Volatile Petroleum Hydrocarbons in Soil
001	BH1/D	28	13	25	11	7	10	12	8
002	BH1/M	28	13	25	11	7	10	12	8
003	BH2/D	28	13	25	11	7	10	12	8
004	BH2/G	28	13	25	11	7	10	12	8
005	BH3/C	28	13	25	11	7	10	12	8
006	BH3/I	28	13	25	11	7	10	12	8
007	BH4/B	28	13	25	11	7	10	12	8
008	BH4/E	28	13	25	11	7	10	12	8
009	BH5/A	-	-	25	-	7	10	12	8
010	BH5/C	-	-	25	-	7	10	12	8
011	BH6/A	-	-	25	-	7	10	12	8
012	BH6/C	-	-	25	-	7	10	12	8
013	BH7/B	-	-	25	-	7	10	12	8
014	DUP03	-	-	25	-	7	10	12	8
019	Trip Blank	-	-	-	-	-	-	12	8
020	Trip Spike	-	-	-	-	-	-	12	-

CONTINUED OVERLEAF

The above table represents SGS Environmental Services' interpretation of the client-supplied Chain Of Custody document.
The numbers shown in the table indicate the number of results requested in each package.
Please indicate as soon as possible should your request differ from these details .
Testing as per this table shall commence immediately unless the client intervenes with a correction .

SAMPLE RECEIPT ADVICE

SE141822

CLIENT DETAILS

Client PETER J RAMSAY & ASSOCIATES Project 884.1

SUMMARY OF ANALYSIS

No.	Sample ID	Fibre Identification in soil	Mercury in Soil	Moisture Content	PAH (Polynuclear Aromatic Hydrocarbons) in Water	TRH (Total Recoverable Hydrocarbons) in Water	VOCs in Water	Volatile Petroleum Hydrocarbons in Water
001	BH1/D	1	1	1	-	-	-	-
002	BH1/M	1	1	1	-	-	-	-
003	BH2/D	1	1	1	-	-	-	-
004	BH2/G	1	1	1	-	-	-	-
005	BH3/C	1	1	1	-	-	-	-
006	BH3/I	1	1	1	-	-	-	-
007	BH4/B	1	1	1	-	-	-	-
008	BH4/E	1	1	1	-	-	-	-
009	BH5/A	-	1	1	-	-	-	-
010	BH5/C	-	1	1	-	-	-	-
011	BH6/A	-	1	1	-	-	-	-
012	BH6/C	-	1	1	-	-	-	-
013	BH7/B	-	1	1	-	-	-	-
014	DUP03	-	1	1	-	-	-	-
015	BH03	-	-	-	22	9	79	8
016	BH08	-	-	-	22	9	79	8
017	QC01	-	-	-	22	9	12	8
018	RB1	-	-	-	22	9	12	8
019	Trip Blank	-	-	1	-	-	-	-

CONTINUED OVERLEAF

The above table represents SGS Environmental Services' interpretation of the client-supplied Chain Of Custody document.
The numbers shown in the table indicate the number of results requested in each package.
Please indicate as soon as possible should your request differ from these details .
Testing as per this table shall commence immediately unless the client intervenes with a correction .

SAMPLE RECEIPT ADVICE

SE141822

CLIENT DETAILS

Client PETER J RAMSAY & ASSOCIATES

Project 884.1

SUMMARY OF ANALYSIS

No.	Sample ID	Full 8270 SVOC in Water	Mercury (dissolved) in Water	OC Pesticides in Water	OP Pesticides in Water	PCBs in Water	Speciated Phenols in Water	Trace Metals (Dissolved) in Water by ICPMS
015	BH03	167	1	28	13	11	18	7
016	BH08	167	1	28	13	11	18	7
017	QC01	-	1	28	13	11	-	7
018	RB1	-	1	-	-	-	-	7

The above table represents SGS Environmental Services' interpretation of the client-supplied Chain Of Custody document.
The numbers shown in the table indicate the number of results requested in each package.
Please indicate as soon as possible should your request differ from these details .
Testing as per this table shall commence immediately unless the client intervenes with a correction .

Appendix H

Groundwater Purging and Sampling Sheets

WELL PURGING FIELD PARAMETERS

Job No: 884 Date: 27/7/11 RL Top of PVC: .....

Well No: BH08 RL Pavement: .....

Client: Charter Hall By: BH Stick Up: NONE 0 m

Project: 884 Depth to Water: 5.21 m from top PVC – CC

Time Start: 12:00 RL Top of Water: .....

Time End: 14:30 Depth of Well: 17:10 m from top PVC – CC

Standpipe Vol.: 14 litres Pump Method: Micro purge - low flow

LNAPL Present? Yes/No Meters Calibrated? (Yes)/No

Depth to Water after Sampling: .....m Depth to Pump Intake: .....m

Time (min)	Draw Down (m)	Flowrate (L/min)	Cum. Vol. (L)	Temp. (C)	EC (µs/cm)	pH (units)	Redox (mv)	DO (ppm)	Comments
5	0	0	0.2	16.7	16008	6.56	-31.5	1.51	Sediment - high %
6	0	0	0.25	16.7	15090	6.52	-36.5	1.18	"
9	0	0	0.4	17.6	17472	6.27	4.6	0.64	sediment
12	0	0	0.6	18.0	18.10[illegible]	6.07	29.8	0.47	
15	0	-	0.8	18.4	18156	6.95	43.6	0.39	Slightly cloudy - Stabilising
19	0	-	1.1	18.5	18.17	5.86	51.7	0.51	- Stabilising
22									Sample
Stabilisation Criteria					**±3%**	**±0.1**	**±10**	**±10%**	**Stabilisation Achieved? Yes/No**

Sampling Details

TPH ☐ SVOCs ☑ PAHs ☐ Sulfate ☐ Cations ☐ Anions ☐

BTEX ☑ VOCs ☑ Ammonia ☐ OCP/OPP ☑ Metals ☑ Filtered? ☑

Cyanide ☐ Turbidity L☐ M☐ H☐ Sheen? Yes/No Colour ..... Odour.....

Sample No. BH8 QC Duplicate No. N/A No. bottles .....

Cold ☑	Cool ☐	Mild ☐	Dry ☑	Humid ☐	Medium ☐	Rain ☐
Warm ☐	Hot ☐	Clear ☑	Cloudy ☐	Still ☐	Breeze ☑	Windy ☐

WELL PURGING FIELD PARAMETERS

Job No: 884 Date: 27/7/15 RL Top of PVC: .....

Well No: BH03 RL Pavement: .....

Client: CHARTER HALL By: BN Stick Up: None m

Project: SP4 Depth to Water: 9.09 m from top PVC — GL

Time Start: 12:30 RL Top of Water: .....

Time End: ..... Depth of Well: 16.56 m from top PVC — GL

Standpipe Vol.: 1.6 litres Pump Method: Low flow micro purge

LNAPL Present? Yes/No Meters Calibrated? Yes/No

Depth to Water after Sampling: 9.09 m Depth to Pump Intake: 13m m

Time (min)	Draw Down (m)	Flowrate (L/min)	Cum. Vol. (L)	Temp. (C)	EC (µs/cm)	pH (units)	Redox (mv)	DO (ppm)	Comments
3	0.1	-	0.2	15.2	12758	6.49	61.9	2.85	clear : No odour
5	0.1	-	0.3	15.5	11228	6.4	55.6	3.00	"
7	0.1	-	0.4	15.6	13600	6.30	47.9	2.44	becoming slightly
9	0.1	-	0.6	11.2	16797	6.19	36.3	1.26	
11	0.1	-	0.7	16.8	17498	6.15	28.0	0.83	cloudy
16	0.1	-	1.3	16.9	17676	6.17	21.2	0.73	stabilising
19	0.1	-	1.5	16.9	17632	6.16	25.4	0.65	" clear
Stabilisation Criteria					**±3%**	**±0.1**	**±10**	**±10%**	**Stabilisation Achieved? Yes/No**

Sampling Details

TPH ☑ SVOCs ☑ PAHs ☑ Sulfate ☐ Cations ☐ Anions ☐

BTEX ☑ VOCs ☑ Ammonia ☐ OCP/OPP ☑ Metals ☑ Filtered? ☑

Cyanide ☐ Turbidity L☐ M☐ H☐ Sheen? Yes/No Colour ..... Odour.....

Sample No. BH03 QC Duplicate No. ..... No. bottles .....

Cold	☑	Cool	☐	Mild	☐	Dry	☐	Humid	☐	Medium ☐	Rain ☐
Warm	☐	Hot	☐	Clear	☑	Cloudy	☐	Still	☐	Breeze ☑	Windy ☐


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