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Stage 2 Detailed Site Investigation

Lot 103 in DP627012 and Lot 105 in DP629388

176 Mona Vale Road, St Ives NSW

Report Number 610.17035-R02

15 May 2017

Ku-ring-gai Council

818 Pacific Highway

Gordon NSW 2072

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Stage 2 Detailed Site Investigation

Lot 103 in DP627012 and Lot 105 in DP629388

176 Mona Vale Road, St Ives NSW

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Executive Summary

SLR Consulting Pty Ltd (SLR) was engaged by Ku-ring-gai Council to prepare a stage 2 detailed site investigation (DSI) for 176 Mona Vale Road, St Ives, NSW (the site).

The project was undertaken in accordance with SLR's offer of services dated 13 December 2017 (ref: 610.17035-P01-v1.0 20161213).

SLR understands the following:

- The site is proposed for reclassification from community land to operational land via an amendment to the Ku-ring-gai Council Local Environment Plan (LEP) Local Centres (2012);
- The reclassification of the site will facilitate the incorporation of the land into the future planning and redevelopment of the St Ives Shopping Village;
- Development could include a commercial land use scenario, or a mixed use (commercial / high density residential) land use scenario, both involving basement car parking; and
- Council requires a stage 1 preliminary site investigation (PSI) and optional stage 2 detailed site investigation (DSI) be undertaken for the site, for inclusion with the reclassification planning proposal.

The objectives of this project were to:

- Assess the potential for contamination to be present on the site, as a result of past and present land use activities;
- Provide advice on the suitability of the site (in the context of land contamination), for the proposed reclassification;
- Provide recommendations for additional investigation, management or remediation of the site (if warranted).

SLR undertook the following scope of work to address the project objectives:

- a desktop review;
- soil and groundwater sampling;
- laboratory analysis; and
- data assessment and reporting.

Based on a review of the available desktop search data, observations made during fieldwork, and the results of sample laboratory analysis (in the context of the proposed land use scenario for the site), SLR makes the following conclusions:

- The detected concentrations of the identified contaminants of potential concern in soils on the site are considered:
    - unlikely to present an unacceptable direct contact, soil vapour or vapour intrusion human health exposure risk;
    - unlikely to present an unacceptable risk of forming observable light non-aqueous phase liquid (LNAPL), fire / explosive hazards, or to buried infrastructure e.g. penetration of, or damage to, in-ground services by hydrocarbons;
    - unlikely to present an unacceptable aesthetics risk;
- The detected concentrations of the identified contaminants of potential concern in groundwater on the site are considered unlikely to present an unacceptable vapour intrusion risk;

Executive Summary

- The site is considered unlikely to be a material source of groundwater contamination risk to freshwater aquatic ecosystems; and
- It is considered that the site would be suitable (from a contamination perspective) for a commercial or mixed use (commercial and high density residential) land use scenario.

This report must be read in conjunction with the limitations set out in Section 13 of this report.

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1 INTRODUCTION

1.1 Background

SLR Consulting Pty Ltd (SLR) was engaged by Ku-ring-gai Council to prepare a stage 2 detailed site investigation (DSI) for 176 Mona Vale Road, St Ives, NSW (the site).

The project was undertaken in accordance with SLR's offer of services dated 13 December 2017 (ref: 610.17035-P01-v1.0 20161213).

SLR understands the following:

- The site is proposed for reclassification from community land to operational land via an amendment to the Ku-ring-gai Council Local Environment Plan (LEP) Local Centres (2012);
- The reclassification of the site will facilitate the incorporation of the land into the future planning and redevelopment of the St Ives Shopping Village;
- Development could include a commercial land use scenario, or a mixed use (commercial / high density residential) land use scenario, both involving basement car parking; and
- Council requires a stage 1 preliminary site investigation (PSI) and optional stage 2 detailed site investigation (DSI) be undertaken for the site, for inclusion with the reclassification planning proposal.

1.2 Objectives

The objectives of this project were to:

- Assess the potential for contamination to be present on the site, as a result of past and present land use activities;
- Provide advice on the suitability of the site (in the context of land contamination), for the proposed reclassification;
- Provide recommendations for additional investigation, management or remediation of the site (if warranted).

1.3 Scope of Work

SLR undertook the following scope of work to address the project objectives:

- a desktop review;
- soil and groundwater sampling;
- laboratory analysis; and
- data assessment and reporting.

2 SITE IDENTIFICATION

The locality of the site is presented in Figure 1.

The site is identified as Lot 103 in DP627012 and Lot 15 in DP629388.

The site is irregular in shape and occupies an area of 786m^2.

The layout of the site is presented in Figure 2.

3 SITE SETTING

3.1 Geology

The Geological Survey of NSW Sydney 1:100,000 Geological Series Sheet 9130 Edition 1 (1983) indicates that site is likely to be underlain by Middle Triassic Ashfield Shale, comprising black to dark grey shale and laminate.

3.2 Topography

The topography of the site is generally flat, with minor north and east facing slopes. The site sits at an approximate elevation of 165m Australian height datum (AHD).

3.3 Hydrogeology

The nearest surface water courses to the site appears to be:

- South Branch of Cowan Creek located approximately 1,000m to the west of the site;
- Middle Harbour Creek located approximately 2,300m to the east of the site;
- Ku-ring-gai Creek located approximately 1,200m north east of the site; and
- High Ridge Creek located approximately 1,400m south of the site.

Based on site topography and the distance to the nearest identified surface water courses, it is considered that groundwater flow in the immediate vicinity of the site may be towards the north east.

A search of the NSW Natural Resources Atlas (NSW-NRS, www.nratlas.nsw.gov.au) conducted on 22 December 2016 identified a number of registered groundwater works features within the search area (500m radius of the site). A significant number of these features appeared to be monitoring wells, likely to be associated with service station land use activities.

3.4 Acid Sulfate Soils

The Department of Land and Water Conservation Hornsby / Mona Vale Acid Sulfate Soil Edition Two map indicates that site is located in an area of no known occurrence of acid sulfate soil materials.

It is noted that acid sulfate soils typically occur at elevations <10m Australian Height Datum (AHD). The site is located at an elevation of approximately 165m AHD.

Further assessment of potential or actual acid sulfate soils on the site is considered not warranted.

4 PREVIOUS CONTAMINATION ASSESSMENTS

The following contamination assessment related report was available for review as part of this investigation:

- SLR 2015, 'Stage 1 Preliminary Site Investigation, 176 Mona Vale Road, St Ives, NSW', dated 13 February 2017, ref: 610.17035-R01-v1.0.

A summary of this report is presented in Section 4.1.

4.1 SLR (2017)

The objectives of this project were to:

- Assess the potential for contamination to be present on the site, as a result of past and present land use activities;
- Provide advice on the suitability of the site (in the context of land contamination), for the proposed redevelopment;
- Provide recommendations for additional investigation, management or remediation of the site (if warranted).

SLR undertook the following scope of work to address the project objectives:

- a desktop review;
- a site walkover; and
- data assessment and reporting.

A review of available site history data and observations made during site walkover indicated a number of areas of environmental concern (AEC) and contaminants of potential concern (COPC) that were considered as requiring further assessment.

Based on a review of the available desktop search data and observations made during the site walkover, SLR concluded that:

- Areas of environmental concern (AEC) and contaminants of potential concern (in the context of land contamination), have been identified for the site;
- The potential for contamination to be present on the site as a result of past and present land use activities is considered to be low to moderate;
- It is considered that the site could be made suitable for the proposed redevelopment, subject to the undertaking of a stage 2 detailed site investigation, and implementation of management or remedial strategies to address unacceptable contamination (if warranted).

Based on these conclusions, SLR made the following recommendations:

- A stage 2 detailed site investigation (DSI) should be undertaken for the site, to further assess the identified areas of environmental concern. The DSI should also include a search of the SafeWork NSW SCID database. A sampling, analytical and quality plan (SAQP) should also be prepared for the design of the stage 2 DSI; and
- The stage 2 DSI works should be undertaken by a suitably experienced environmental consultant.

5 CONCEPTUAL SITE MODEL

5.1 Areas of Environmental Concern and Contaminants of Potential Concern

A review of available site history data and observations made during the site walkover indicated a number of areas of environmental concern (AEC) and contaminants of potential concern (COPC) that are considered as requiring further assessment. These AEC and COPC are presented in Table 1 and Figure 3.

Table 1 Areas of Environmental Concern and Contaminants of Potential Concern

ID	AEC	Activity of Concern	Contaminants of Potential Concern
AEC01	Former residential dwelling	Demolition	Metals and asbestos
AEC02	Carpark	Uncontrolled filling	Hydrocarbons, PCB, pesticides, metals, asbestos
AEC03	Former service station	Petroleum storage and handling, mechanical workshop	Hydrocarbons, solvents, metals

5.2 Receptors and Pathways

5.2.1 Proposed Land Use Scenario

It is understood that the proposed redevelopment concept for the site could include a commercial land use scenario, or a mixed use (commercial / high density residential) land use scenario, both involving basement car parking.

Based on this redevelopment concept, it is considered reasonable to adopt a 'residential with minimal opportunities for soil access' land use scenario, for a contamination exposure assessment.

5.2.2 Human Health – Direct Contact

It is considered appropriate to assess whether a direct contact exposure risk may be present on the site.

5.2.3 Human Health – Inhalation / Vapour Intrusion

It is considered appropriate to assess whether an inhalation (vapour intrusion) exposure risk may be present on the site.

5.2.4 Aesthetics

No visual evidence of widespread or significant staining was observed on the hardstand surface of the site. While it is considered that basement excavation/construction and the ground floor development concept would prevent receptor visual exposure to potential sub surface visual aesthetic impacts, an assessment for the presence of malodorous sub surface soils on the site should be made.

5.2.5 Ecological – Terrestrial Ecosystems

NEPC (1999) requires a pragmatic risk-based approach should be taken in applying ecological investigation and screening levels in residential and commercial / industrial land use settings.

It is noted that SLR (2017) did not report evidence of significant or widespread phytotoxic impact (i.e. plant stress or dieback).

A review of current aerial photography did not indicate evidence of significant or widespread phytotoxic impact (i.e. plant stress or dieback) on land adjacent to the north, east, west and south of the site.

On this basis, further assessment of unacceptable risk to terrestrial ecosystems is considered not warranted.

5.2.6 Drinking Water

SLR (2017) reported that there are no registered drinking water bores on the site or within a 500m radius of the site.

Groundwater present in the shales of western Sydney is typically poor yielding and saline in nature, making it unsuitable for use as a reliable drinking water source.

A reticulated drinking water system is present in the area the site is located in.

Further assessment of this groundwater value at the site is therefore considered not warranted.

5.2.7 Recreational Water Use

The nearest hydraulically down gradient surface water for the site is considered to be Ku-ring-gai Creek.

Ku-ring-gai Creek is not considered to be suitable for primary or secondary recreational uses.

Ku-ring-gai Creek is also located a significant distance (1,200m) from the site and therefore unlikely to be a material receptor of identified potential contamination from this site.

Further assessment of this groundwater value is considered not warranted.

5.2.8 Agricultural (Irrigation and Stock Watering)

There are no registered groundwater bores onsite or down gradient of the site, registered for agricultural use. Regional urban development is considered likely to prevent agricultural activities being undertaken both on site and on surrounding land.

Further assessment of this groundwater value is considered not warranted.

5.2.9 Aquatic Ecosystems

The nearest likely aquatic ecosystem down gradient of the site is approximately 1,000m away (Ku-ring-gai Creek), considered to be a freshwater environment). Given the nature of the potential contamination at the site and the significant distance of Ku-ring-gai Creek from the site, it is considered that Ku-ring-gai Creek is unlikely to be a material receptor of potential groundwater contamination from this site.

However, it is considered that sufficient data is not available to assess whether the site is a material point source contributor to groundwater impact on aquatic ecosystems in the area.

Collection of further field data is considered warranted, to facilitate whether further assessment of this ground water value is warranted.

6 DATA QUALITY OBJECTIVES

Data quality objectives (DQO) have been developed using the seven step processes described in

- NSW DEC 2006, Contaminated Sites: Guidelines for the NSW Site Auditor Scheme (2nd edition).

The DQO were presented in SLR (2015), with the first three DQO replicated in Sections 6.1 to 6.3 below.

6.1 Step 1 – State the Problem

The objectives are to:

- Assess the nature and extent of potential contamination on the site, in the identified areas of environmental concern;
- Provide advice on the suitability of the site (in the context of land contamination), for the proposed reclassification;
- Provide recommendations for additional investigation, management or remediation of the site (if warranted).

The main problems are:

- How should relevant site media be assessed;
- What sampling layout should be used; and
- What contaminants should be analysed for and by what method to be useful for assessment.

6.2 Step 2 – Identify the Decision

The decisions that need to be made during this project include:

- Is the field and laboratory analytical data suitable for assessing the quality of the media being assessed;
- Does contamination in soils and groundwater on the site present an unacceptable exposure risk for the adopted land use scenario; and
- Is the site suitable (in the context of land contamination) for the proposed redevelopment concept.

6.3 Step 3 – Identify Inputs to the Decision

The primary inputs to assessing the above include:

- the site history made available;
- location, distribution and intervals of sampling at the site;
- data collected during the assessment, including field measurements, field observations and laboratory analysis results;
- outcomes of the assessment of the quality of collected data;
- adopted exposure risk assessment criteria.

Exposure risk assessment criteria will be adopted from:

- National Environment Protection Council (NEPC) 1999, 'Schedule B(1) Guideline on Investigation Levels for Soil and Groundwater, National Environment Protection (Assessment of Site Contamination) Measure (NEPM), as amended in 2013'.
- Friebel, E & Nadebaum, P 2011, 'Health screening levels for petroleum hydrocarbons in soil and groundwater, Part 2: Application document, CRC CARE Technical Report No. 10'

6.3.1 Human Health - Direct Contact

The relevant direct contact:

- Health-Based Investigation Levels (HILs) for residential with minimal opportunities for soil access in Table 1A (1) in NEPC (1999); and
- Health Screening Levels (HSL) for residential with accessible soils access listed in Table B4 of Friebel, E & Nadebaum, P (2011);

are adopted for this assessment.

6.3.2 Human Health – Inhalation / Vapour Intrusion

For the proposed land use exposure scenario, the relevant soil HSL for vapour intrusion listed in Table 1A (3) in NEPC (1999), are adopted for this assessment.

For the proposed land use exposure scenario, the relevant

- soil HSL A for vapour intrusion listed in Table 1A (3);
- groundwater HSL A for vapour intrusion in Table 1A(4);
- soil vapour HSL A for vapour intrusion in Table 1A(5); and
- interim soil vapour HIL A in Table 1A(2)

in NEPC (1999), are adopted for this project.

If required, relevant soil analytical data will be assessed against those HSLs relevant to the soil type encountered during intrusive works on the site.

If required, relevant groundwater analytical data will be assessed against HSLs relevant to groundwater depth gauged at the time of sampling.

Should evidence of petroleum hydrocarbon contamination be identified in site soils (e.g. significant odours, elevated PID readings), then assessment of soil vapour intrusion risk should be considered (against soil vapour HSLs for vapour intrusion in Table 1A(5) in NEPC (1999)).

6.3.3 Human Health – Asbestos

NEPC (1999) provides health screening levels for asbestos contamination in soil, which are based on specific land use exposure scenarios, for three forms of asbestos: bonded asbestos containing material (ACM), friable asbestos (FA) and asbestos fines (AF). These health screening levels are provided in Table 2.

Table 2 Health Screening Levels for asbestos contamination in soil

Form of asbestos	Health Screening Level (W/W)			
	Residential A	**Residential B**	**Recreational C**	**Commercial/Industrial**
ACM	0.01%	0.04%	0.02%	0.05%
FA and AF	0.001%			
All forms of asbestos	No visible asbestos in surface soil			

The laboratory method for analysis of asbestos in bulk materials is based on AS 4964-2004. Consequently, a practical quantification limit equal to or less than 0.001% by weight is not adopted and the limit is 0.1g/kg (equivalent to 0.01% w/w). For the purposes of this project, criteria of "no visible asbestos containing materials in surface soils (top 10cm)" and "no asbestos fibres detected in samples using trace analysis techniques" has been adopted as initial screening criteria.

6.3.4 Petroleum Hydrocarbon Compounds – Management Limits

NEPC (1999) advises that management limits for petroleum hydrocarbon compounds need to be considered to minimise the potential effects of:

- Formation of observable light non-aqueous phase liquids (LNAPL);
- Fire and explosive hazards; and
- Effects on buried infrastructure e.g. penetration of, or damage to, in ground services by hydrocarbons.

For the proposed land use exposure scenario, the management limits for residential, parkland and public open space in Table 1 B(7) of NEPC (1999), are adopted for this project. Specific management limits (relevant to soil texture) will be adopted based on field assessment of predominant soil types encountered during intrusive investigations i.e. coarse grain (sands) versus fine grain (silts and clays).

6.3.5 Aesthetics

NEPC (1999) requires that aesthetic quality of accessible soils be considered even if testing suggests that the concentrations of contaminants of concern are within acceptable limits.

No specific numerical guidelines have been assigned for aesthetics. However the NEPM 2013 indicates that professional judgement with regard to quantity, type and distribution of foreign material and/or odours in relation to the specific land use and its sensitivity should be employed.

The following circumstances are considered likely to trigger further aesthetic assessment:

- highly malodorous soils or extracted groundwater (e.g. strong residual petroleum hydrocarbon odours, hydrogen sulphide in soil or extracted groundwater, organo-sulfur compounds);
- hydrocarbon sheen on surface water;
- discoloured chemical deposits or soil staining with chemical waste other than of a very minor nature;
- large monolithic deposits of otherwise low risk material, e.g. gypsum as powder or plasterboard, cement kiln dust;
- presence of putrescible refuse including material that may generate hazardous levels of methane; and
- soils containing residue from animal burial.

There are no specific numeric aesthetic guidelines, however site assessment requires balanced

- consideration of the quantity, type and distribution of foreign material or odours in relation to the
- specific land use and its sensitivity. For example, higher expectations for soil quality would apply to
- residential properties with gardens compared with industrial settings.

General assessment considerations will include:

- that chemically discoloured soils or large quantities of various types of inert refuse particularly if unsightly, may cause ongoing concern to site users;

- the depth of the materials, including chemical residues, in relation to the final surface of the site; and
- the need for, and practicality of, any long-term management of foreign material.

In some cases, documentation of the nature and distribution of the foreign material may be sufficient to address concerns relating to potential land use restrictions.

In arriving at a balanced assessment, the presence of small quantities of non-hazardous inert material and low odour residue (for example, weak petroleum hydrocarbon odours) that will decrease over time will not be a cause of concern or limit the use of a site in most circumstances. Similarly, sites with large quantities of well-covered known inert materials that present no health hazard such as brick fragments and cement wastes (for example, broken cement blocks) will be of low concern for the proposed land use scenario.

However, caution will be applied when assessing large quantities of various fill types and demolition rubble are present.

6.3.6 Aquatic Ecosystems

The groundwater investigation levels for fresh waters in Table 1C of NEPC (1999) are adopted as initial screening criteria for this assessment.

Consideration will also be given to arithmetic mean contamination concentrations in stormwater in high urban environments, when assessing potential risks posed to aquatic ecosystem receptors. Stormwater contamination concentration data will be adopted from Fletcher T, Duncan H, Poelsman P & Lloyd S (2004).

6.4 Step 4 – Define the Study Boundaries

6.4.1 Spatial Boundaries

The horizontal boundary of the project is defined by the boundary of the site.

The vertical boundary of the project for soils is defined by the depth of potentially impacted material.

The vertical boundary of the project for groundwater is defined by a depth of approximately 2m below inferred standing water level on the site.

6.4.2 Temporal Boundaries

The temporal boundaries of investigation works will be limited by:

- natural daylight working hours; and
- levels of precipitation which, in the opinion of the environmental consultant, prevents adequate visual observations to be made.

6.5 Step 5 – Develop a Decision Rule

The decision rules for the project will be as follows:

- If the results of the laboratory analytical data and field data quality assessment are acceptable (i.e. comply with the procedures, requirements and limits set out in Section 6.6, then the data will be considered suitable for the purposes of the project. Data will be assessed for completeness, comparability, representativeness, precision and accuracy.

- If the results of the laboratory analytical data are within the adopted assessment criteria and fieldwork observations are acceptable, then the level of contamination in the media assessed will be considered an acceptable exposure risk.

Specifically, a series of if/then statements specific to each area requiring assessment, is presented in Table 3.

Table 3 Decision Rule If/Then Statements

ID	Decision Rule If/Then Statements
AEC01	If analytical results and field observations are less than adopted assessment criteria, then contamination related exposure risks are considered acceptable.
AEC02	If analytical results and field observations are less than adopted assessment criteria, then contamination related exposure risks are considered acceptable.
AEC03	If analytical results and field observations are less than adopted assessment criteria, then contamination related exposure risks are considered acceptable.

If the results of laboratory analytical data exceed the adopted assessment criteria or the fieldwork observations are unacceptable, then the level of contamination in the media assessed may require further assessment, management or remediation.

6.6 Step 6 – Specify Acceptable Limits on Decision Errors

There are two types of error:

- deciding that contamination on the site is an acceptable risk for the proposed land use when it is not; and
- deciding that contamination on the site is not an acceptable risk for the proposed land use when it is.

The assessment will aim to conclude with 95% confidence that media in the identified areas of environmental concern do not present an unacceptable risk. Consequently, the 95% upper confidence limit (UCL) statistic will be used to assess the mean concentrations of chemicals of potential concern in soil (where appropriate).

Confidence in the reliability of assessment methods (e.g. field observations, laboratory analysis and data review) will be based on appropriate levels of qualification and/or experience in the personnel undertaking the relevant task.

The data quality indicators set out in Table 4 will be used to assess data for completeness, comparability, representativeness, precision and accuracy.

Table 4 Data Quality Indicators

Completeness	
Field Considerations	*Laboratory Considerations*
All critical locations sampled All samples collected (from grid and at depth) SOPs appropriate and complied with Experienced sampler Documentation correct	All critical samples analysed in accordance with the data quality objectives All analytes analysed in accordance with the data quality objectives Appropriate methods and LORs Sample documentation complete Sample holding times complied with
Comparability	
Field Considerations	*Laboratory Considerations*
Same SOPs used on each occasion Experienced sampler Climatic conditions (temperature, rainfall, wind) Same types of samples collected (filtered, size fractions)	Sample analytical methods used (including clean-up) Sample LORs (justify/quantify if different) Same laboratories (justify/quantify if different) Same units (justify/quantify if different)
Representativeness	
Field Considerations	*Laboratory Considerations*
Appropriate media sampled in accordance with the data quality objectives All media identified in data quality objectives sampled	All samples analysed in accordance with the data quality objectives
Precision	
Field Considerations	*Laboratory Considerations*
SOPs appropriate and complied with	Analysis of: • laboratory and inter-laboratory duplicates • field duplicates • laboratory-prepared volatile trip spikes
Accuracy (bias)	
Field Considerations	*Laboratory Considerations*

SOPs appropriate and complied with	Analysis of: • field blanks • rinsate blanks • reagent blanks • method blanks • matrix spikes • matrix spike duplicates • surrogate spikes • reference materials • laboratory control samples • laboratory-prepared spikes

6.7 Step 7 – Optimise the Design for Obtaining Data

6.7.1 Sampling Frequency and Locations

The site covers an area of approximately 786m^2. NSW EPA 1995, 'Contaminated Sites: Sampling Design Guidelines' recommends a minimum of approximately 6 systematic sampling points to characterise a site of this size. SLR notes that the minimum sampling points set out in Table A in NSW EPA (1995)[1] is an approach for site characterisation based on detecting hot spots of certain diameters, using a systematic (i.e. grid based), sampling pattern, where the investigator has little knowledge about probable locations of contamination.

Section 3.1 of NSW EPA (1995) states that:

- A judgemental sampling pattern can be used where there is enough information on the probable locations of contamination

Section 6.2 of NEPC (1999b) provides guidance on undertaking judgemental sampling, sample random sampling and systematic / grid sampling. It is noted that NEPC (1999b) states that:

- judgemental sampling is based on knowledge of the site and professional judgement; and
- sampling is localised to known or potentially contaminated areas identified from knowledge of the site either from the site history or an earlier phase of site investigation; and
- judgemental sampling is commonly used to investigate sub surface contamination issues in site assessment.

Given the understanding of site history, it is considered appropriate to apply a judgemental and targeted based soil sampling pattern to address relevant areas of environmental concern, along with two groundwater monitoring wells, located at inferred up and down gradient locations.

Sampling points will be selected based on a combination of onsite accessibility, above and below ground constraints (e.g. services and buildings), and the location / extent of identified AEC.

[1] NSW EPA 1995, Contaminated Sites: Sampling Design Guidelines', dated September 1995, ref: EPA 95/59.

6.7.2 Sampling Methodology

6.7.2.1 Soil Boreholes

Soil boreholes drilled on site in accordance with the methodology presented in Table 5. Target depths are based on a number of factors including:

- Contaminant laydown mechanisms;
- Contaminant types; and
- Likely depth of contamination.

Table 5 Proposed Soil Borehole Drilling Summary

Sampling Point ID	Sampling Method	Target Depth
BH01 – BH06	Concrete coring and push tube sampler	Up to 1.5m below ground surface or 0.3m into natural material, or practical refusal, whichever occurs first
MW01 – MW02	Solid flight augers	Up to 6m below ground level, 2m below inferred standing water level, or practical refusal, whichever occurs first

6.7.2.2 Soil Sampling

Soil samples will be collected from each sampling point at the surface and then at regular depths thereafter, or where there is evidence of contamination or a change in soil lithology. Materials encountered during sampling will be logged in general accordance with the Unified Soil Classification System (UCS).

6.7.2.3 Groundwater Monitoring Wells Installation

Soil boreholes BH01 and BH02 will be further drilled (using solid flight augers) to a target depth of 6m below ground level, 2m below inferred standing water level or practical refusal (whichever occurs first).

Each bore will be finished with a groundwater monitoring well comprising 50mm PVC screen (from the base to approximately 0.5m below ground level), 50mm PVC casing, gravel pack (to the top of the screen), bentonite seal (to 0.3m above the top of the gravel pack), grout back to the surface and either a stand pipe or flush mount road box, depending on site conditions.

Wells will be screened across the inferred depth to groundwater, based on observations made during drilling.

Each monitoring well will be labelled with the respective borehole number and associated monitoring well number (e.g. BH01/MW01).

Each groundwater monitoring well will be developed using a peristaltic pump.

6.7.2.4 Groundwater Sampling

Each groundwater monitoring well will be:

- dipped using an interface probe (to assess for the presence of light non-aqueous phase liquids (LNAPL) and the standing water level gauged;
- purged until stabilisation of water quality parameters;
- sampled using low flow techniques.

Relevant samples will be field filtered to 0.45µm.

6.7.3 Soil Headspace Screening

Soil samples will be screened in the field for ionisable volatile organic compounds (VOC) using a calibrated photo-ionisation detector (PID). Screening results will be recorded on the relevant log.

6.7.4 Photographic Records

Photographs of fieldwork and other features of interest relevant to the project will be taken.

6.7.5 Location Records

The location of each sampling point will be recorded by hand on a site plan.

6.7.6 Sample Identification, Storage and Transport Procedures

Samples will be identified using unique sampling point identifiers and sample depth intervals (e.g. BH1/0.0-0.2).

Samples will be placed in laboratory prepared containers and zip lock bags, as appropriate. The sample containers will then be placed directly into an insulated chest containing ice, for transportation to the NATA accredited analytical laboratory with the chain of custody (COC) form recording the following information:

- project job number;
- date of sampling;
- sample identifier;
- sample matrix and container type;
- preservation methods used;
- analysis requirements for each sample;
- turnaround times required for analysis; and
- names and signatures of sender and receiving laboratory.

A copy of the chain of custody will be kept in the job file. Samples will be transported to the laboratory with sufficient time to perform analysis within the applicable holding period.

The proposed sample storage and transport requirements for the likely contaminants of potential concern are presented in Table 6.

Table 6 Sample Storage and Transport Requirements

Analyte	Soil Sample Container Type	Groundwater Sample Container Type	Storage and Transport
TRH C6-C10	1 x 250mL glass	2 x glass vials	Ice and insulated container
TRH >C10-C40	1 x 250mL glass	Nil	Ice and insulated container
BTEX	1 x 250mL glass	2 x glass vials	Ice and insulated container
VOC	1 x 250mL glass	2 x glass vials	Ice and insulated container
PAH	1 x 250mL glass	Nil	Ice and insulated container
Phenol	1 x 250mL glass	1 x amber glass bottle	Ice and insulated container
PCB	1 x 250mL glass	Nil	Ice and insulated container
OCP	1 x 250mL glass	Nil	Ice and insulated container
Metals	1 x 250mL glass	1 x plastic bottle	Ice and insulated container

Analyte	Soil Sample Container Type	Groundwater Sample Container Type	Storage and Transport
Asbestos	1 x 50-100g zip lock bag	Nil	Nil

6.7.7 Laboratory Analysis

Selected samples will be scheduled for analysis, based on identified contaminants of potential concern for the AEC that the sampling point is located in, field observations and headspace screening results, up to the quantities presented in Table 7.

Table 7 Laboratory Analytical Quantities

Sampling Point ID	TRH/BTEX	PAH	OCP/PCB	VOC	Metals	Asbestos
BH01 – BH06	6	9	3	2	9	6
MW01	2	2	-	2	2	-

In the event that field screening of samples identifies a potential for contamination to be present beyond that which can be assessed with the analytical quantities nominated in Table 7, analysis of additional samples (or additional analytes) will be considered.

6.7.8 Fieldwork Quality Assurance / Quality Control

6.7.8.1 Decontamination Procedures

Non-disposable sampling equipment will be decontaminated before and between sampling events to reduce the potential for cross contamination to occur between samples. Decontamination will include the following procedure:

- washing non-disposable sampling equipment in a solution of phosphate free detergent (e.g. Decon 90) and potable water; and
- rinsing with distilled water.

6.7.8.2 Intra-laboratory Duplicates

Intra-laboratory field duplicates will be collected on an average frequency of one sample per twenty samples collected (5%), with a minimum of one per batch (excluding samples collected for asbestos analysis). The analytical results of the two spilt samples will be compared to assess the precision of the sampling protocol, and provide an indication of variability in the sample source. The relative percentage difference (RPD) acceptance limits will be:

- No limit analytical results <10 times LOR
- 50% analytical results 10-20 times LOR
- 30% analytical results >20 times LOR

The RPD exceedances (if any) will be assessed to determine whether the project DQO's can still be addressed. If not, then further sampling and/or analysis may be required.

6.7.8.3 Inter-Laboratory Duplicates

Inter-laboratory field duplicates will be collected on an average frequency of one sample per twenty samples collected (5%) with a minimum of one per batch (excluding samples collected for asbestos analysis). The analytical results of the two spilt samples will be compared to assess the precision of the sampling protocol, and provide an indication of variability in the sample source. The relative percentage difference (RPD) acceptance limits will be:

- No limit analytical results <10 times LOR

- 50% analytical results 10-20 times LOR
- 30% analytical results >20 times LOR

The environmental consultant will assess RPD exceedances (if any) and whether the project DQO's can still be addressed. If not, then further sampling and/or analysis may be required.

6.7.8.4 Rinsate Samples

A rinsate sample will be collected and analysed for each day of field work carried out, where non-disposable sampling equipment has been used. The rinsate sample may be analysed for generally the same contaminants of potential concern that the samples are being analysed for (excluding asbestos).

The acceptance limit shall be the detected concentrations of the contaminants of concern analysed for in the sample, are less than the applicable LOR. The environmental consultant will assess the significance of the acceptance limit exceedance and whether the project DQO's can still be addressed. If not, then further sampling and/or analysis may be required.

6.7.8.5 Trip Blanks

Trip blanks will be used and analysed for a batch of samples provided to the laboratory, where the contaminants being analysed for, are volatile in nature (e.g. BTEX or TPH C_6-C_{10}). The trip blank will be analysed for BTEX.

The acceptance limit shall be the detected concentrations of BTEX in the trip blank, are less than the applicable LOR. The environmental consultant will assess the significance of acceptance limit exceedances and whether the project DQO's can still be addressed. If not, then further sampling and/or analysis may be required.

6.7.8.6 Trip Spikes

Trip spikes will be used and analysed for a batch of samples provided to the laboratory, where the contaminants being analysed for, are volatile in nature (e.g. BTEX or TPH C_6-C_{10}). The trip spike will be analysed for BTEX.

The acceptance limit shall be the BTEX recoveries in the trip spike are between 60% and 140%. The environmental consultant will assess the significance of acceptance limit exceedances and whether the project DQO's can still be addressed. If not, then further sampling and/or analysis may be required.

6.7.9 Laboratory Quality Assurance / Quality Control

6.7.9.1 Laboratory Selection

The primary and secondary laboratories used for this project will be NATA-accredited for the analyses being undertaken.

6.7.9.2 Laboratory Data Quality Indicators

The laboratory data quality will be assessed by checking the following:

- laboratory methods used are NATA accredited;
- laboratory limits of reporting are less than adopted assessment criteria;
- samples are extracted and analysed within holding times; and
- results of method blanks, surrogate, lab control sample, spike recoveries relative percentage differences (RPDs) between primary and duplicate laboratory samples.

Data Quality Indicators (DQI) that will be adopted for quality control samples are presented in Table 8.

Table 8 Laboratory Data Quality Indicators

Type of Quality Control Sample	Control Limit	
Method Blank	Analytical result < LOR	
Surrogate % Recovery	50% - %150%	
Labe Control Sample % Recovery	70% - 130%	
Spike % Recovery	70% - 130% for inorganics 60% - 140% for organics	
RPD	No limit 50% 30%	Analytical results <10 times LOR Analytical results 10-20 times LOR Analytical results >20 times LOR

Should the results of a laboratory quality control sample exceed the relevant adopted control limit, the laboratory will be requested assess the significance of the exceedance on the quality of the laboratory analytical data for the relevant batch. The environmental consultant will assess the significance of the control limit exceedance and whether the project DQO's can still be addressed. If not, then further sampling and/or analysis may be required.

6.7.9.3 Laboratory Limits of Reporting, Analytical Methods and Holding Times

Laboratory limits of reporting, analytical methods and holding times are presented in Table 9.

Table 9 Limits of Reporting, Methods and Holding Times

Analyte	Limit of Reporting (mg/kg)	Limit of Reporting (µg/L)	Method	Holding Time
BTEX and TRH C6-C10	0.2-0.5	1.0-2.0 and 50	USEPA 5030, 8260B and 8020	14 days
TRH >C10-C40	20-100	50-500	USEPA 8015B & C	14 days
PAH	0.1-0.2	-	USEPA 8270	14 days
VOC	0.1-0.5mg/kg	0.5-10	USEPA8260	14 days
OCP	0.2	-	USEPA 8081	14 days
PCB	0.2	-	USEPA 8270	14 days
Phenol	0.1	0.01	APHA 4500 P	14 days
Metals	1	0.1-5	USEPA 200	6 months
Asbestos	Presence / Absence	-	AS4964:2004	No limit

6.8 Reporting

A stage 2 detailed site investigation report will be prepared in accordance with the relevant sections of NSW OEH 2011, 'Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites', and will include the following:

- Executive summary;
- Scope of work;
- Site identification;
- Site history summary;
- Site condition and surrounding environment summary;

- Information on geology and hydrogeology;
- Field and laboratory analytical data;
- Field and laboratory data QA/QC assessment;
- Site characterisation; and
- Conclusions and recommendations.

7 FIELDWORK

7.1 Underground Services

An online dial before you dig search was submitted on 30 March 2017 and the plans received were reviewed.

An underground service survey of proposed drilling locations was undertaken on 18 April 2017, by Geotrace, under the supervision of SLR Consulting.

7.2 Soil Sampling

Soil sampling was undertaken on 18 April 2017. A total of six soil sampling points were set out for the site (BH01 to BH06).

Soil bores were drilled by BG Drilling using a track mounted Dando Terrier drilling rig, fitted with push tube augers and solid flight augers.

Soil samples were collected from push tube liners at the surface and at regular intervals thereafter, or where there was visual or olfactory evidence of contamination observed.

Collected samples were placed into laboratory prepared jars (with Teflon lined lids) and zip lock bags. Jars and bags were labelled with a project number, sampling point and depth interval, and the date. Samples were placed in insulated containers with ice during storage on site and transport to the laboratory.

The location of each sampling point was recorded on a site plan and these locations are presented in Figure 4.

Photo 7.2.1 Soil drilling on site

7.3 Site Specific Geology

Observations of soils encountered at each borehole location were recorded and are presented in logs in Appendix A.

7.3.1 Fill Material

Fill material was encountered in the boreholes to depths ranging from 0.5m to 0.6m below ground level.

Details of fill soils encountered are included in the borehole logs presented in Appendix A. Fill soils encountered in boreholes were primarily comprised of CLAY and gravelly CLAY.

7.3.2 Natural Material

Natural material was encountered in boreholes starting at depths ranging from 0.1m to 0.7m below ground surface.

Details of natural materials encountered are included in the logs presented in Appendix A. Natural materials encountered were primarily comprised of CLAY and weathered SHALE.

7.4 Odours

Olfactory evidence of odours in soil during the sampling works, were not encountered.

7.5 Staining

Visual evidence of staining in the soil samples collected was not observed.

7.6 Potential Asbestos Containing Materials

Visual evidence of potential asbestos containing materials (ACM) in the soil samples collected was not encountered.

7.7 Headspace Screening

Headspace screening was undertaken on the samples collected and the results are presented in the logs in Appendix A. Headspace screening was undertaken by placing a sub sample of soil from each relevant sampling point/depth into a zip lock bag, sealing the bag and shaking the bag gently. Each bag was then pierced using the tip of the PID probe and the PID screening result recorded.

The results of the headspace screening indicated a low to negligible potential for ionisable volatile organic compounds to be present in the soils encountered.

7.8 Preliminary Service Pit Vapour Monitoring

Two accessible telecommunications utility service pits (located adjacent to the southern and south eastern boundary of the site) were screened on 24 April 2017 at approximately 9:15am, for the presence of ionisable volatile organic compounds, using a calibrated photoionisation detector (PID). The location of the pits (SP01 to SP02) are presented in Figure 4. The screening was undertaken as an indicator of the potential for subsurface petroleum hydrocarbon vapours to be present in the associated service trench (considered to be a potential preferential pathway for vapour migration).

The probe of the PID was inserted through a hole in the lid covering the utility pit and monitoring undertaken for a period of one minute. A reading of 1.4ppm and 2.8ppm was recorded in SP01 and SP02 respectively, indicating a negligible potential for ionisable volatile organic compounds to be present.

7.9 Groundwater

7.9.1 Monitoring Well Installation Summary

Groundwater monitoring well installation was undertaken on 18 April 2017 at two locations across the site (MW01 to MW02), under the supervision of SLR. Well installation was undertaken by BG Drilling.

Table 10 Monitoring Well Installation Summary

Sampling Point	Method	Construction	Well Development	Developed Water Observations
MW01	Solid Flight Auger	50mm uPVC Class 18 screen and casing, gravel pack, hydrated bentonite seal, cast iron gatic	No – water not present on day of construction	Not applicable
MW02	Solid Flight Auger	50mm uPVC Class 18 screen and casing, gravel pack, hydrated bentonite seal, cast iron gatic	No – water not present on day of construction	Not applicable

Monitoring well construction details are presented in the logs in Appendix A.

7.9.2 Groundwater Sampling

Groundwater sampling was undertaken on 24 Apri3 April 2017 by SLR.

Each well was gauged using an interface probe to measure the depth to standing water level and to assess the presence of light non-aqueous phase liquids (LNAPL).

Depth to groundwater measured during well gauging is presented in Table 11.

Table 11 Well Gauging Results

Monitoring Well ID	Gauged Depth To Groundwater (m)
MW01	4.347
MW02	2.70

A site survey was not available to estimate the elevations of the monitoring well heads on site. However, based on site topography and the distance to the nearest identified surface water courses, it is considered that groundwater flow in the immediate vicinity of the site may be towards the north east.

Each well was then micro-purged and water quality parameters (pH, EC, Eh, DO and temperature) measured using a calibrated water quality meter and flow cell. Measured water quality parameters at the completion of purging are presented in Table 12.

Table 12 Water Quality Parameters

Monitoring Well ID	DO (ppm)	EC (mS/cm)	pH	Eh (mV)	Temp (°C)	Colour	Odour/Sheen
MW01	1.26	5.08	4.22	254	20.6	Clear	Nil
MW02	3.255	2.29	4.75	214	21.8	Grey	Nil

A copy of the groundwater monitoring event water quality parameter forms is presented in Appendix B.

Groundwater samples were collected using low flow sampling techniques. Collected samples were placed into laboratory prepared vials and bottles. The samples collected for metals analysis were subjected to filtering in the field, using 0.45µm filters. Sampling containers were labelled with a project number, sampling point identifier and sampling date.

Photo 7.9.2.1 Groundwater sampling at BH01/MW01.

8 LABORATORY ANALYSIS

A selection of soil and groundwater samples were scheduled for laboratory analysis, based on field observations and the contaminants of potential concern identified for the relevant areas of environmental concern (refer to Section 5.1).

Copies of the laboratory certificates of analysis are presented in Appendix C.

Tabulated laboratory analytical results are presented in Table LR1 and LR2.

9 QUALITY ASSURANCE / QUALITY CONTROL

9.1 Fieldwork

9.1.1 Sampling

The sampling was undertaken

- in accordance with SLR's standard operating procedures (SOP). These procedures are based on accepted industry practice for projects of this kind; and
- by a suitably experienced SLR environmental consultant (Craig Cowper);

The appropriate media (soil and groundwater) was sampled.

All critical soil sampling points were sampled.

9.1.2 Sample Identification, Storage and Transport

Samples were placed in laboratory prepared containers and zip lock plastic bags, and stored in eskies with ice, for transportation to the analytical laboratory, under chain of custody (COC) protocol. The following information was recorded on the COC:

- project job number;
- date of sampling;
- sample identifier;
- sample matrix and container type;
- preservation methods used;
- analysis requirements for each sample;
- turnaround times required for analysis; and
- names and signatures of sender and receiving laboratory.

Sample receipt advice from the receiving laboratories confirmed that the samples were received chilled (or an attempt to chill the samples was made).

A copy of the chain of custody documentation is presented in Appendix C for both the primary laboratory and the secondary laboratory.

9.1.3 Field Duplicates

A total of 12 primary soil samples were schedule for chemical analysis for the project.

Two intra-laboratory duplicates were collected and one analysed (a rate of 8.3% which addresses the minimum acceptance criterion of 5%).

Two inter-laboratory duplicates were collected and one analysed (a rate of 9.1% which addresses the minimum acceptance criterion of 5%). However, it is noted that a clerical error when completing the chain of custody, resulted in the inter-laboratory duplicate being analysed by the primary lab, rather than a secondary lab. However, the detected analyte concentrations in the primary sample, intra-laboratory duplicate and inter-laboratory duplicate were all less than the relevant adopted assessment criteria, and within ranges expected, based on site history and field observations. This minor non-conformance with the data quality objectives is not considered to have a material impact on the quality of the data, or the conclusions drawn based on the data, within the context of this investigation.

The parent / duplicate sample relationships and associated laboratory analytical data, is presented in Table LR3. The relative percentage difference (RPD) acceptance limits adopted were:

- No limit analytical results <10 times LOR
- 50% analytical results 10-20 times LOR
- 30% analytical results >20 times LOR

The relative percentage difference (RPD) between the parent sample and duplicates analysed, were within the RPD acceptance criteria, with the following exceptions:

- Field duplicate DUP01 and DUP01A (parent sample BH01/0.1-0.3) had an exceeding RPD for chromium. This exceedance of the adopted RPD assessment criteria is considered likely attributable to minor heterogeneity within the discrete soil sample (rather than sampling or laboratory analysis error), as the samples were not able to be homogenised prior to splitting, due to the potential for volatile contaminants to be present in this AEC. It is noted that the detected concentrations of chromium in the primary sample and both field duplicates, were well below the relevant adopted assessment criteria.

9.1.4 Trip Spike and Trip Blank

One trip spike was used during the fieldwork and one was scheduled for BTEXN analysis. The recovery results of the spike analysis were within the adopted acceptance criterion, indicating that sample preservation procedures during storage and transport were adequate for the mitigation of volatile sample losses from sample containers.

One trip blank was used during the fieldwork and one was scheduled for BTEXN analysis. The results of the blank analysis were within the adopted acceptance criterion, indicating that the potential for cross contamination of volatile contaminants between samples, during storage and transport, was negligible.

9.1.5 Rinsate Blanks

One rinsate blank sample (RB01) was collected and one was scheduled for laboratory analysis. The analyte concentrations in the rinsate sample were less than the laboratory limit of reporting, indicating that decontamination procedures of non-disposable sampling equipment were adequate.

9.1.6 Calibration

Sampling equipment used for the fieldwork included a photoionisation detector (PID), water quality meter, peristaltic pump and flow cell. A copy of the relevant calibration record for the equipment is presented in Appendix D.

9.2 Laboratory

Copies of the laboratory certificates of analysis, data quality objective reports, sample receipt advice and chain of custody records for the primary and secondary laboratories are presented in Appendix C.

The results of an assessment of laboratory analytical data quality indicate that:

- Laboratory analysis of the samples was undertaken by NATA accredited environmental testing laboratories (SGS Environmental, Alexandria NSW);
- The identified contaminants of potential concern were analysed for;
- The laboratory analytical methods and laboratory limits of reporting were appropriate for the objective of this project;
- The laboratory analytical methods and laboratory limits of reporting were consistent between the primary and secondary analytical laboratories;

- The same analytical laboratory was used for analysing all primary samples;
- The same analytical laboratory was used for analysing all secondary samples;
- Samples were extracted and analysed within applicable laboratory holding times;
- The laboratory sample surrogate recoveries were within laboratory acceptance criteria;
- The laboratory method blank analytical results were less than the laboratory limit of reporting;
- The relative percentage differences (RPD) between samples and laboratory prepared duplicates, were within the laboratories adopted acceptance criteria;
- The laboratory control sample recoveries were within the laboratory's adopted acceptance criteria;
- The laboratory matrix spike recoveries were within the laboratory's adopted acceptance criteria, with the following exceptions:
    - One metal analyte in SGS batch SE164358 and one metal analyte in SGS batch 164550. The laboratory reported that recovery failed acceptance criteria due to sample heterogeneity and the presence of a significantly high concentration of analyte (i.e. the concentration of analyte exceeded the spike level, respectively.

A copy of the laboratory data quality indicators is presented in Appendix C.

9.3 Data Quality Indicators

The assessment of field and laboratory data was compared to the data quality indicators adopted for the project. This assessment is presented in Table 13.

Table 13 Data Quality Indicator Assessment Results

Completeness		
Field Considerations	*Laboratory Considerations*	*Comment*
All critical locations sampled All samples collected (from grid and at depth) SOPs appropriate and complied with Experienced sampler Documentation correct	All critical samples analysed in accordance with the data quality objectives All analytes analysed in accordance with the data quality objectives Appropriate methods and LORs Sample documentation complete Sample holding times complied with	Acceptable
Comparability		
Field Considerations	*Laboratory Considerations*	*Comment*

Same SOPs used on each occasion Experienced sampler Climatic conditions (temperature, rainfall, wind) Same types of samples collected (filtered, size fractions)	Sample analytical methods used (including clean-up) Sample LORs (justify/quantify if different) Same laboratories (justify/quantify if different) Same units (justify/quantify if different)	Acceptable
Representativeness		
Field Considerations	*Laboratory Considerations*	*Comment*
Appropriate media sampled in accordance with the data quality objectives All media identified in DQO sampled	All samples analysed in accordance with the data quality objectives	Acceptable
Precision		
Field Considerations	*Laboratory Considerations*	*Comment*
SOPs appropriate and complied with	Analysis of: • laboratory and inter laboratory duplicates • field duplicates • laboratory-prepared volatile trip spikes	Acceptable
Accuracy (bias)		
Field Considerations	*Laboratory Considerations*	*Comment*

SOPs appropriate and complied with	Analysis of: • field blanks • rinsate blanks • reagent blanks • method blanks • matrix spikes • matrix spike duplicates • surrogate spikes • reference materials • laboratory control samples • laboratory-prepared spikes	Acceptable

The data is therefore considered to be adequately complete, comparable, representative, precise and accurate for the purpose of interpretation within the objective of this project.

10 DISCUSSION

A laboratory analytical data summary table for this investigation is presented in the attached Table LR1 and LR2. The data contained in that summary table has been used for the purposes of assessing the contamination status of the site, in the context of the proposed land use scenario.

10.1 Human Health - Direct Contact Exposure Risks (Soils)

10.1.1 BTEX

The concentrations of benzene, toluene, ethyl benzene and xylenes in the site investigation samples analysed were less than the adopted investigation criteria.

Further assessment, management or remediation of BTEX direct contact exposure risks in soil at the site is considered not warranted.

10.1.2 TRH

The concentrations of TRH C6-C10, TRH >C10-C16, TRH >C16-C34 and TRH >C34-C40 in the site investigation samples analysed were less than the adopted investigation criteria.

Further assessment, management or remediation of TRH direct contact exposure risks in soil at the site is considered not warranted.

10.1.3 VOC

The concentrations of VOC compounds in the site investigation samples analysed were less than the laboratory limit of reporting.

Further assessment, management or remediation of VOC compounds direct contact exposure risks in soil at the site is considered not warranted.

10.1.4 PAH

The concentrations of relevant PAH compounds in the site investigation samples analysed were less than the adopted investigation criteria.

Further assessment, management or remediation of PAH compounds direct contact exposure risks in soil at the site is considered not warranted.

10.1.5 Organochlorine Pesticides (OCP)

The concentrations of relevant OCP compounds in the site investigation samples analysed were less than the adopted investigation criteria.

Further assessment, management or remediation of OCP compounds direct contact exposure risks in soil at the site is considered not warranted.

10.1.6 Polychlorinated Biphenyl (PCB)

The concentrations of PCB in the site investigation samples analysed were less than the adopted investigation criteria.

Further assessment, management or remediation of PCB compounds direct contact exposure risks in soil at the site is considered not warranted.

10.1.7 Metals

The concentrations of metals in the site investigation samples analysed were less than the adopted investigation criteria.

Further assessment, management or remediation of metals direct contact risks in soil at the site is considered not warranted.

10.1.8 Asbestos

No asbestos was detected in the samples analysed.

No respirable fibres were detected in the samples analysed using trace analysis techniques.

Further assessment, management or remediation of asbestos in soils at the site is considered not warranted.

10.2 Human Health – Vapour Intrusion (Soils)

10.2.1 Soil Sample Ionisable Volatile Organic Compounds

The results of the headspace screening indicated a low potential for ionisable volatile organic compounds to be present in the soils encountered.

10.2.2 BTEX

The concentrations of benzene, toluene, ethyl benzene and xylenes in the site investigation samples analysed were less than the adopted investigation criteria.

Further assessment, management or remediation of BTEX vapour intrusion risks in soil at the site is considered not warranted.

10.2.3 TRH

The concentrations of TRH C6-C10 (F1) and TRH >C10-C16 (F2) in the site investigation samples analysed were less than the adopted investigation criteria.

Further assessment, management or remediation of TRH vapour intrusion risks in soil at the site is considered not warranted.

10.3 TRH Management Limits (Soils)

The concentrations of TRH C6-C10, TRH >C10-C16, TRH >C16-C34 and TRH >C34-C40 in the site investigation samples analysed were less than the adopted management limit investigation criteria.

10.4 Aesthetics (Soils)

Evidence of widespread or significant staining, buried wastes, odour or potential asbestos containing materials, was not observed in the soils encountered during intrusive works. Further assessment, management or remediation of these potential aesthetic impacts on site is considered not warranted.

10.5 Groundwater

10.5.1 Human Health – Vapour Intrusion (Groundwater)

The results of the laboratory analysis indicate that the concentrations of the contaminants of potential concern in the groundwater samples, were less than the adopted groundwater vapour intrusion assessment criteria, with concentrations of TRH C6-C10, TRH >C10-C16, BTEX and naphthalene less than the laboratory limit of reporting, with the exception of toluene, which was above the limit of reporting at 1.7 µg/L and 0.9 µg/L in MW01 and MW02 respectively, however the relevant vapour intrusion criterion is 'not limiting' (NL)[2], and so the detected toluene concentrations are less than the relevant adopted site investigation criteria.

No further assessment of these contaminants of concern in groundwater (with respect to vapour intrusion) is considered warranted.

10.5.2 Ecological Health - Freshwater Ecosystems

The results of the laboratory analysis indicate that the concentrations of the contaminants of potential concern in the groundwater samples, were less than the adopted marine ecosystem assessment criteria, with exception of

- Arsenic in MW01 (19µg/L), with a criterion of 13µg/L;
- Cadmium in MW01 (19µg/L) and MW02 (1µg/L), with a criterion of 0.2µg/L;
- Copper in MW01 (370µg/L) and MW02 (88µg/L), with a criterion of 1.4µg/L;
- Nickel in MW01 (240µg/L) and MW02 (19µg/L), with a criterion of 11µg/L; and
- Zinc in MW01 (2,100µg/L) and MW02 (110µg/L), with a criterion of 8µg/L.

It is noted that the concentrations of arsenic, cadmium, copper, nickel and zinc detected in the fill and natural soil samples collected from site and analysed by the laboratory, were all within background ranges set out in Berkman DA 1989, 'Field Geologists Manual, Third Edition' published by the Australasian Institute of Mining and Metallurgy. Consequently, the presence of an onsite source for groundwater contamination by these metals is considered unlikely. SLR considers it reasonable that the concentrations of these metals in groundwater may be associated with an offsite source and/or they may be associated with regional groundwater phenomenon.

Further assessment of potential arsenic, cadmium, copper, nickel and zinc site related contamination risk to groundwater (in the context of freshwater ecosystem receptors) is considered not warranted.

[2] Table 1A(4) in NEPC (1999) states that if the derived groundwater criterion exceeded the water solubility limit, a soil vapour source concentration for a petroleum mixture could not exceed a level that would result in the maximum allowable vapour risk for the given scenario, consequently resulting in a "not limiting" screening level being adopted.

11 CONCLUSIONS AND RECOMMENDATIONS

Based on a review of the available desktop search data, observations made during fieldwork, and the results of sample laboratory analysis (in the context of the proposed land use scenario for the site), SLR makes the following conclusions:

- The detected concentrations of the identified contaminants of potential concern in soils on the site are considered:
  - unlikely to present an unacceptable direct contact, soil vapour or vapour intrusion human health exposure risk;
  - unlikely to present an unacceptable risk of forming observable light non-aqueous phase liquid (LNAPL), fire / explosive hazards, or to buried infrastructure e.g. penetration of, or damage to, in-ground services by hydrocarbons;
  - unlikely to present an unacceptable aesthetics risk;
- The detected concentrations of the identified contaminants of potential concern in groundwater on the site are considered unlikely to present an unacceptable vapour intrusion risk;
- The site is considered unlikely to be a material source of groundwater contamination risk to freshwater aquatic ecosystems; and
- It is considered that the site would be suitable (from a contamination perspective) for a commercial or mixed use (commercial and high density residential) land use scenario.

This report must be read in conjunction with the limitations set out in Section 13 of this report.

12 REFERENCES

Friebel, E & Nadebaum, P 2011, 'Health screening levels for petroleum hydrocarbons in soil and groundwater. Part 2: Application document', CRC CARE Technical Report No. 10.

National Environment Protection Council (NEPC) 1999a, 'Schedule B(1) Guideline on Investigation Levels for Soil and Groundwater, National Environment Protection (Assessment of Site Contamination) Measure (NEPM) as amended in May 2013'.

National Environment Protection Council (NEPC) 1999b, 'Schedule B(2) Guideline on Site Characterisation, National Environment Protection (Assessment of Site Contamination) Measure (NEPM) as amended in May 2013'.

NSW DEC 2006, 'Contaminated Sites: Guidelines for the NSW Site Auditor Scheme (2nd edition)'.

NSW OEH 2011, 'Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites'.

SLR 2015, 'Stage 1 Preliminary Site Investigation, 176 Mona Vale Road, St Ives, NSW', dated 13 February 2017, ref: 610.17035-R01-v1.0.

13 LIMITATIONS

This report is for the exclusive use of Ku-ring-gai Council. No warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR Consulting.

This report has been prepared based on the scope of services (see below). SLR Consulting cannot be held responsible to the Client and/or others for any matters outside the agreed scope of services. Other parties should not rely upon this report and should make their own enquiries and obtain independent advice in relation to such matters.

This report has been prepared by SLR Consulting with reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with the Client. Information reported herein is based on the interpretation of data collected (data, surveys, analyses, designs, plans and other information), which has been accepted in good faith as being accurate and valid.

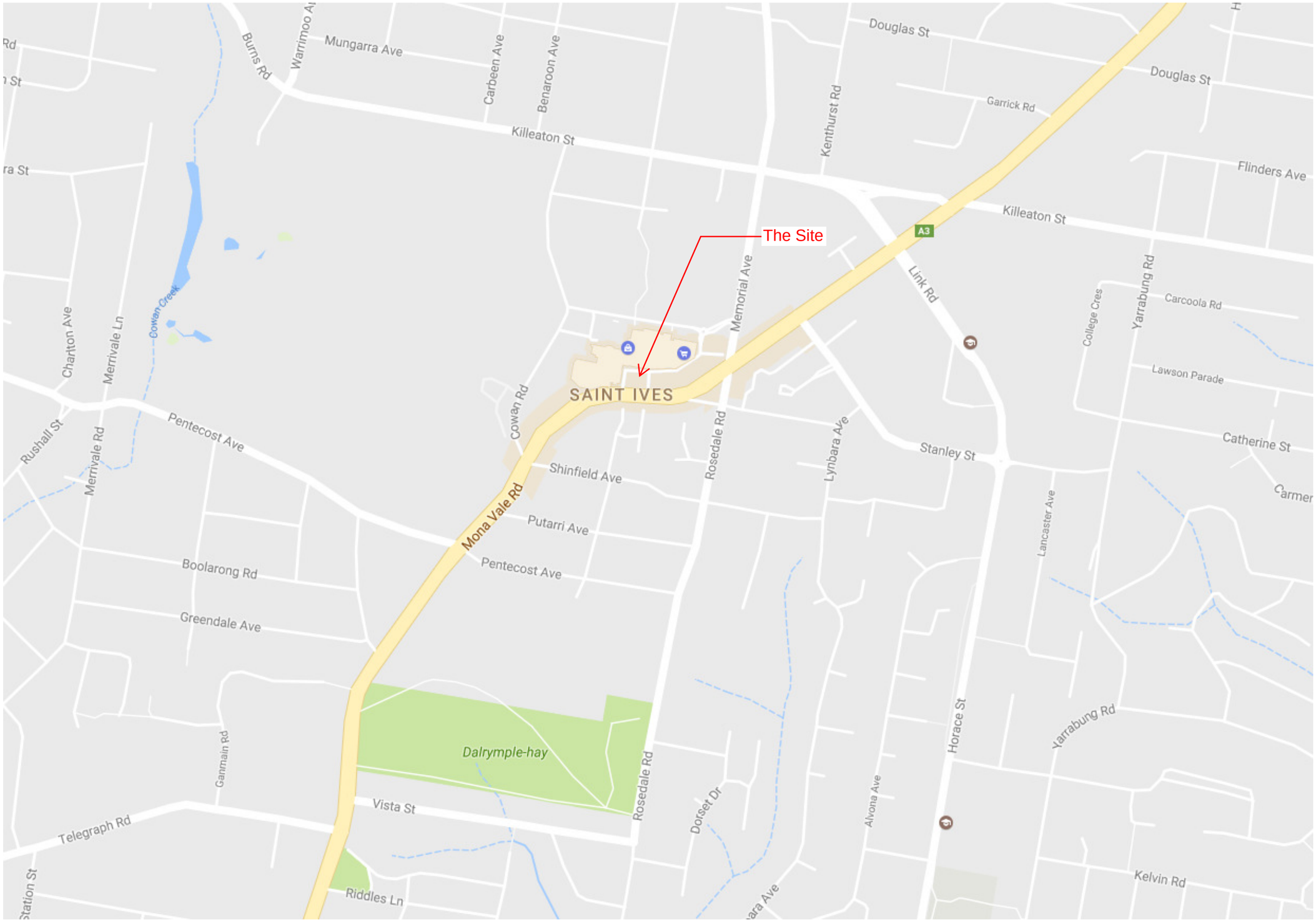
It should be noted that many investigations are based upon an assessment of potentially contaminating processes which may have occurred historically on the site. This assessment is based upon historical records associated with the site. Such records may be inaccurate, absent or contradictory. In addition documents may exist which are not readily available for public viewing.

Except where it has been stated in this report, SLR Consulting has not verified the accuracy or completeness of the data relied upon. Statements, opinions, facts, information, conclusions and/or recommendations made in this report ("conclusions") are based in whole or part on the data obtained, those conclusions are contingent upon the accuracy and completeness of the data. SLR Consulting cannot be held liable should any data, information or condition be incorrect or have been concealed, withheld, misrepresented or otherwise not fully disclosed to SLR Consulting leading to incorrect conclusions.

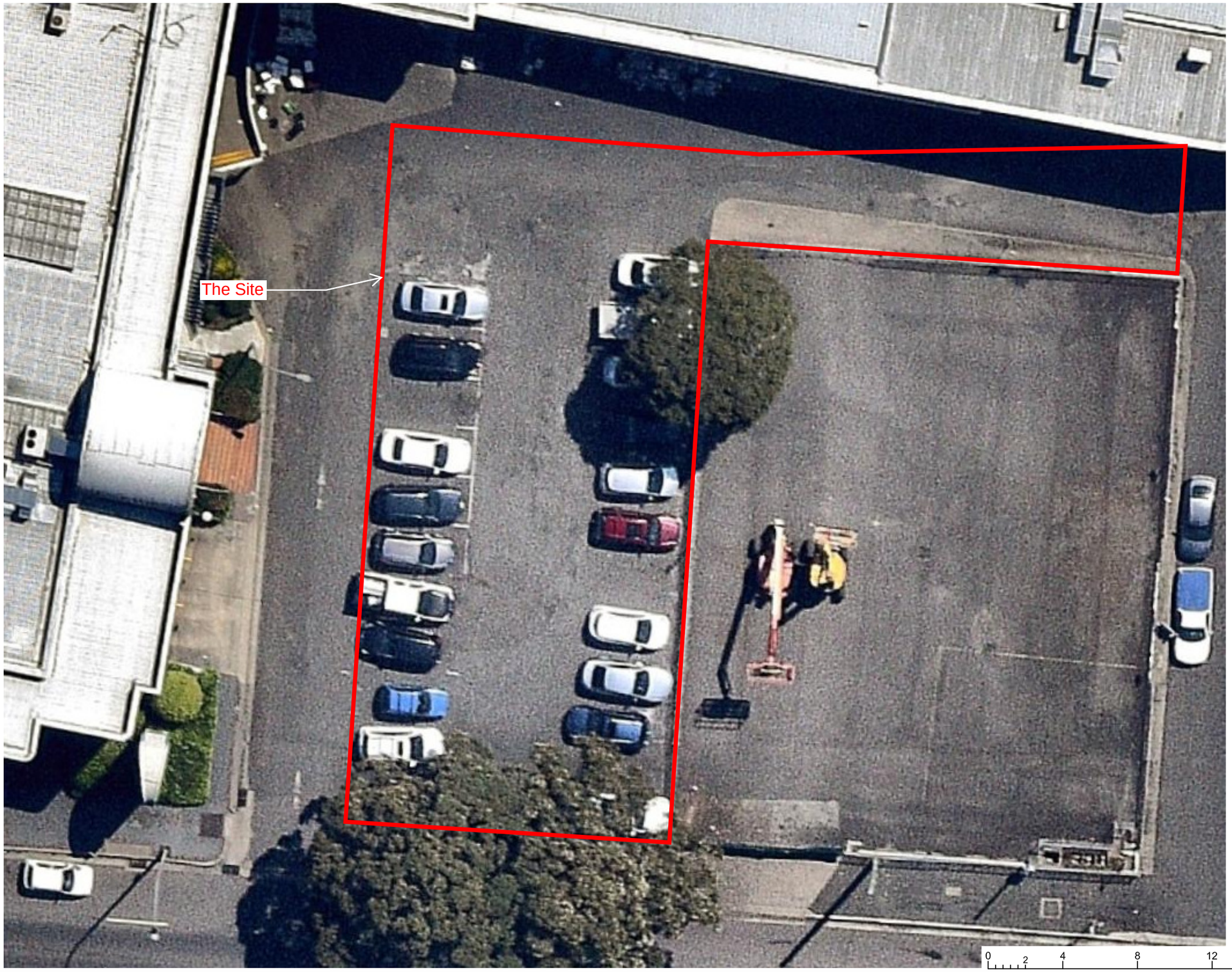
Should the report be reviewed for any reason, the report must be reviewed in its entirety and in conjunction with the associated Scope of Services. It should be understood that where a report has been developed for a specific purpose, for example a due diligence report for a property vendor, it may not be suitable for other purposes such as satisfying the needs of a purchaser or assessing contamination risks for classifying the site. The report should not be applied for any purpose other than that originally specified at the time the report was issued.

Report logs, figures, laboratory data, drawings, etc. are generated for this report by SLR consultants (unless otherwise stated) based on their individual interpretation of the site conditions at the time the site visit was undertaken. Although SLR consultants undergo training to achieve a standard of field reporting, individual interpretation still varies slightly. Information should not under any circumstances be redrawn for inclusion in other documents or separated from this report in any way.

FIGURES

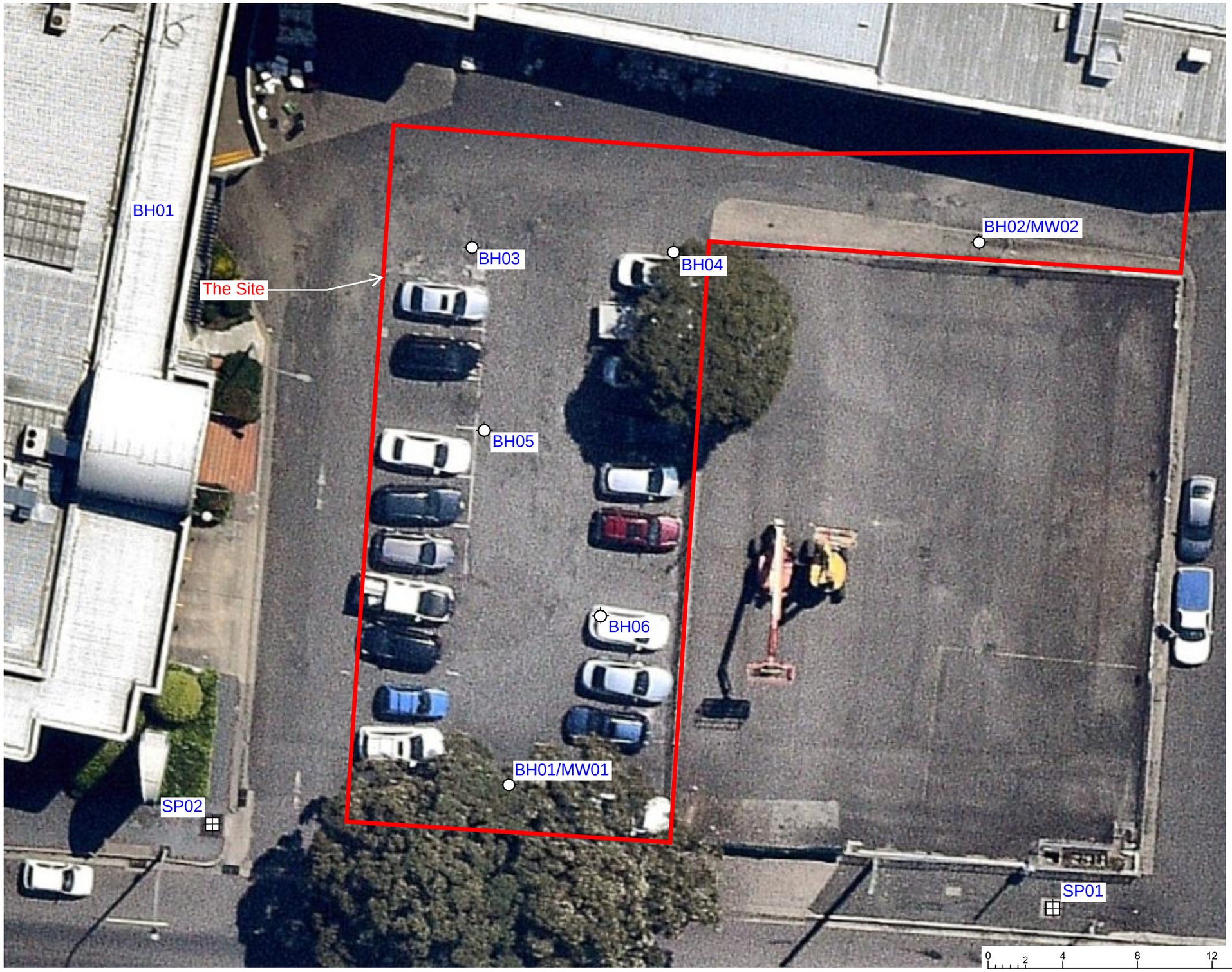


SLR	2 Lincoln Street, Lane Cove, NSW 2066 Australia	T: +61 2 9428 8100 sydney@slrconsulting.com www.slrconsulting.com	Stage 2 Detailed Site Investigation Ref: 610.17035.00001	Lot 103 in DP627012 and Lot 105 in DP629388 176 Mona Vale Road, St Ives, NSW	9 May 2017	N	Figure 1 Site Locality Plan



SLR	2 Lincoln Street, Lane Cove, NSW 2066 Australia	T: +61 2 9428 8100 sydney@slrconsulting.com www.slrconsulting.com	Stage 2 Detailed Site Investigation Ref: 610.17035.00001	Lot 103 in DP627012 and Lot 105 in DP629388 176 Mona Vale Road, St Ives, NSW	9 May 2017	N	Figure 2 Site Layout Plan

SLR	2 Lincoln Street, Lane Cove, NSW 2066 Australia	T: +61 2 9428 8100 sydney@slrconsulting.com www.slrconsulting.com	Stage 2 Detailed Site Investigation Ref: 610.17035.00001	Lot 103 in DP627012 and Lot 105 in DP629388 176 Mona Vale Road, St Ives, NSW	9 May 2017	N	Figure 3 Areas of Environmental Concern



SLR	2 Lincoln Street, Lane Cove, NSW 2066 Australia	T: +61 2 9428 8100 sydney@slrconsulting.com www.slrconsulting.com	Stage 2 Detailed Site Investigation Ref: 610.17035.00001	Lot 103 in DP627012 and Lot 105 in DP629388 176 Mona Vale Road, St Ives, NSW	9 May 2017	N	Figure 4 Sampling Point Layout Plan

TABLES

						Sample Name	SE164358.001	SE164358.002	SE164358.003	SE164358.004	SE164358.005	SE164358.006	SE164358.007	SE164358.008	SE164358.009	SE164358.010
						Description	BH01/0.1-0.3	BH02/0.15-0.35	BH02/0.5-0.7	BH03/0.3-0.5	BH03/0.6-0.8	BH04/0.4-0.6	BH04/0.6-0.8	BH05/0.2-0.4	BH06/0.3-0.5	BH06/0.7-0.9
						Sample Date	18-4-2017	18-4-2017	18-4-2017	18-4-2017	18-4-2017	18-4-2017	18-4-2017	18-4-2017	18-4-2017	18-4-2017
						Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Analyte Name	Units	Direct Contact HIL - Residential B (mg/kg)	Vapour intrusion 0m to <1m (mg/kg)	Vapour intrusion 1m to <2m (mg/kg)	Management Limits for TPH Fraction F1-F4 in soil (mg/kg)	Reporting Limit	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
BTEXN in Soil																
Benzene	mg/kg	140	0.5	0.5		0.1	<0.1	<0.1	N.A.	<0.1	N.A.	<0.1	<0.1	<0.1	<0.1	N.A.
Toluene	mg/kg	21000	160	220		0.1	<0.1	<0.1	N.A.	<0.1	N.A.	<0.1	<0.1	<0.1	<0.1	N.A.
Ethylbenzene	mg/kg	5900	55	NL		0.1	<0.1	<0.1	N.A.	<0.1	N.A.	<0.1	<0.1	<0.1	<0.1	N.A.
Total Xylenes	mg/kg	17000	40	60		0.3	<0.3	<0.3	N.A.	<0.3	N.A.	<0.3	<0.3	<0.3	<0.3	N.A.
Naphthalene	mg/kg	2200	3	NL		0.1	<0.1	<0.1	N.A.	<0.1	N.A.	<0.1	<0.1	<0.1	<0.1	N.A.
VOC in Soil																
Dichlorodifluoromethane (CFC-12)	mg/kg					1	N.A.	<1	N.A.	N.A.	N.A.	<1	N.A.	N.A.	N.A.	N.A.
Chloromethane	mg/kg					1	N.A.	<1	N.A.	N.A.	N.A.	<1	N.A.	N.A.	N.A.	N.A.
Vinyl chloride (Chloroethene)	mg/kg					0.1	N.A.	<0.1	N.A.	N.A.	N.A.	<0.1	N.A.	N.A.	N.A.	N.A.
Bromomethane	mg/kg					1	N.A.	<1	N.A.	N.A.	N.A.	<1	N.A.	N.A.	N.A.	N.A.
Chloroethane	mg/kg					1	N.A.	<1	N.A.	N.A.	N.A.	<1	N.A.	N.A.	N.A.	N.A.
Trichlorofluoromethane	mg/kg					1	N.A.	<1	N.A.	N.A.	N.A.	<1	N.A.	N.A.	N.A.	N.A.
Acetone (2-propanone)	mg/kg					10	N.A.	<10	N.A.	N.A.	N.A.	<10	N.A.	N.A.	N.A.	N.A.
Iodomethane	mg/kg					5	N.A.	<5	N.A.	N.A.	N.A.	<5	N.A.	N.A.	N.A.	N.A.
1,1-dichloroethene	mg/kg					0.1	N.A.	<0.1	N.A.	N.A.	N.A.	<0.1	N.A.	N.A.	N.A.	N.A.
Acrylonitrile	mg/kg					0.1	N.A.	<0.1	N.A.	N.A.	N.A.	<0.1	N.A.	N.A.	N.A.	N.A.
Dichloromethane (Methylene chloride)	mg/kg					0.5	N.A.	<0.5	N.A.	N.A.	N.A.	<0.5	N.A.	N.A.	N.A.	N.A.
Allyl chloride	mg/kg					0.1	N.A.	<0.1	N.A.	N.A.	N.A.	<0.1	N.A.	N.A.	N.A.	N.A.
Carbon disulfide	mg/kg					0.5	N.A.	<0.5	N.A.	N.A.	N.A.	<0.5	N.A.	N.A.	N.A.	N.A.
trans-1,2-dichloroethene	mg/kg					0.1	N.A.	<0.1	N.A.	N.A.	N.A.	<0.1	N.A.	N.A.	N.A.	N.A.
MtBE (Methyl-tert-butylether)	mg/kg					0.1	N.A.	<0.1	N.A.	N.A.	N.A.	<0.1	N.A.	N.A.	N.A.	N.A.
1,1-dichloroethane	mg/kg					0.1	N.A.	<0.1	N.A.	N.A.	N.A.	<0.1	N.A.	N.A.	N.A.	N.A.
Vinyl acetate	mg/kg					10	N.A.	<10	N.A.	N.A.	N.A.	<10	N.A.	N.A.	N.A.	N.A.
MEK (2-butanone)	mg/kg					10	N.A.	<10	N.A.	N.A.	N.A.	<10	N.A.	N.A.	N.A.	N.A.
cis-1,2-dichloroethene	mg/kg					0.1	N.A.	<0.1	N.A.	N.A.	N.A.	<0.1	N.A.	N.A.	N.A.	N.A.
Bromochloromethane	mg/kg					0.1	N.A.	<0.1	N.A.	N.A.	N.A.	<0.1	N.A.	N.A.	N.A.	N.A.
Chloroform	mg/kg					0.1	N.A.	<0.1	N.A.	N.A.	N.A.	<0.1	N.A.	N.A.	N.A.	N.A.
2,2-dichloropropane	mg/kg					0.1	N.A.	<0.1	N.A.	N.A.	N.A.	<0.1	N.A.	N.A.	N.A.	N.A.
1,2-dichloroethane	mg/kg					0.1	N.A.	<0.1	N.A.	N.A.	N.A.	<0.1	N.A.	N.A.	N.A.	N.A.
1,1,1-trichloroethane	mg/kg					0.1	N.A.	<0.1	N.A.	N.A.	N.A.	<0.1	N.A.	N.A.	N.A.	N.A.
1,1-dichloropropene	mg/kg					0.1	N.A.	<0.1	N.A.	N.A.	N.A.	<0.1	N.A.	N.A.	N.A.	N.A.
Carbon tetrachloride	mg/kg					0.1	N.A.	<0.1	N.A.	N.A.	N.A.	<0.1	N.A.	N.A.	N.A.	N.A.
Dibromomethane	mg/kg					0.1	N.A.	<0.1	N.A.	N.A.	N.A.	<0.1	N.A.	N.A.	N.A.	N.A.
1,2-dichloropropane	mg/kg					0.1	N.A.	<0.1	N.A.	N.A.	N.A.	<0.1	N.A.	N.A.	N.A.	N.A.
Trichloroethene (Trichloroethylene -TCE)	mg/kg					0.1	N.A.	<0.1	N.A.	N.A.	N.A.	<0.1	N.A.	N.A.	N.A.	N.A.
2-nitropropane	mg/kg					10	N.A.	<10	N.A.	N.A.	N.A.	<10	N.A.	N.A.	N.A.	N.A.
Bromodichloromethane	mg/kg					0.1	N.A.	<0.1	N.A.	N.A.	N.A.	<0.1	N.A.	N.A.	N.A.	N.A.
MIBK (4-methyl-2-pentanone)	mg/kg					1	N.A.	<1	N.A.	N.A.	N.A.	<1	N.A.	N.A.	N.A.	N.A.
cis-1,3-dichloropropene	mg/kg					0.1	N.A.	<0.1	N.A.	N.A.	N.A.	<0.1	N.A.	N.A.	N.A.	N.A.
trans-1,3-dichloropropene	mg/kg					0.1	N.A.	<0.1	N.A.	N.A.	N.A.	<0.1	N.A.	N.A.	N.A.	N.A.
1,1,2-trichloroethane	mg/kg					0.1	N.A.	<0.1	N.A.	N.A.	N.A.	<0.1	N.A.	N.A.	N.A.	N.A.
1,3-dichloropropane	mg/kg					0.1	N.A.	<0.1	N.A.	N.A.	N.A.	<0.1	N.A.	N.A.	N.A.	N.A.
Chlorodibromomethane	mg/kg					0.1	N.A.	<0.1	N.A.	N.A.	N.A.	<0.1	N.A.	N.A.	N.A.	N.A.
2-hexanone (MBK)	mg/kg					5	N.A.	<5	N.A.	N.A.	N.A.	<5	N.A.	N.A.	N.A.	N.A.
1,2-dibromoethane (EDB)	mg/kg					0.1	N.A.	<0.1	N.A.	N.A.	N.A.	<0.1	N.A.	N.A.	N.A.	N.A.
Tetrachloroethene (Perchloroethylene,PCE)	mg/kg					0.1	N.A.	<0.1	N.A.	N.A.	N.A.	<0.1	N.A.	N.A.	N.A.	N.A.
1,1,1,2-tetrachloroethane	mg/kg					0.1	N.A.	<0.1	N.A.	N.A.	N.A.	<0.1	N.A.	N.A.	N.A.	N.A.
Chlorobenzene	mg/kg					0.1	N.A.	<0.1	N.A.	N.A.	N.A.	<0.1	N.A.	N.A.	N.A.	N.A.
Bromoform	mg/kg					0.1	N.A.	<0.1	N.A.	N.A.	N.A.	<0.1	N.A.	N.A.	N.A.	N.A.
cis-1,4-dichloro-2-butene	mg/kg					1	N.A.	<1	N.A.	N.A.	N.A.	<1	N.A.	N.A.	N.A.	N.A.
Styrene (Vinyl benzene)	mg/kg					0.1	N.A.	<0.1	N.A.	N.A.	N.A.	<0.1	N.A.	N.A.	N.A.	N.A.
1,1,2,2-tetrachloroethane	mg/kg					0.1	N.A.	<0.1	N.A.	N.A.	N.A.	<0.1	N.A.	N.A.	N.A.	N.A.
1,2,3-trichloropropane	mg/kg					0.1	N.A.	<0.1	N.A.	N.A.	N.A.	<0.1	N.A.	N.A.	N.A.	N.A.
trans-1,4-dichloro-2-butene	mg/kg					1	N.A.	<1	N.A.	N.A.	N.A.	<1	N.A.	N.A.	N.A.	N.A.
Isopropylbenzene (Cumene)	mg/kg					0.1	N.A.	<0.1	N.A.	N.A.	N.A.	<0.1	N.A.	N.A.	N.A.	N.A.
Bromobenzene	mg/kg					0.1	N.A.	<0.1	N.A.	N.A.	N.A.	<0.1	N.A.	N.A.	N.A.	N.A.
n-propylbenzene	mg/kg					0.1	N.A.	<0.1	N.A.	N.A.	N.A.	<0.1	N.A.	N.A.	N.A.	N.A.
2-chlorotoluene	mg/kg					0.1	N.A.	<0.1	N.A.	N.A.	N.A.	<0.1	N.A.	N.A.	N.A.	N.A.
4-chlorotoluene	mg/kg					0.1	N.A.	<0.1	N.A.	N.A.	N.A.	<0.1	N.A.	N.A.	N.A.	N.A.
1,3,5-trimethylbenzene	mg/kg					0.1	N.A.	<0.1	N.A.	N.A.	N.A.	<0.1	N.A.	N.A.	N.A.	N.A.
tert-butylbenzene	mg/kg					0.1	N.A.	<0.1	N.A.	N.A.	N.A.	<0.1	N.A.	N.A.	N.A.	N.A.
1,2,4-trimethylbenzene	mg/kg					0.1	N.A.	<0.1	N.A.	N.A.	N.A.	<0.1	N.A.	N.A.	N.A.	N.A.
sec-butylbenzene	mg/kg					0.1	N.A.	<0.1	N.A.	N.A.	N.A.	<0.1	N.A.	N.A.	N.A.	N.A.
1,3-dichlorobenzene	mg/kg					0.1	N.A.	<0.1	N.A.	N.A.	N.A.	<0.1	N.A.	N.A.	N.A.	N.A.
1,4-dichlorobenzene	mg/kg					0.1	N.A.	<0.1	N.A.	N.A.	N.A.	<0.1	N.A.	N.A.	N.A.	N.A.
p-isopropyltoluene	mg/kg					0.1	N.A.	<0.1	N.A.	N.A.	N.A.	<0.1	N.A.	N.A.	N.A.	N.A.
1,2-dichlorobenzene	mg/kg					0.1	N.A.	<0.1	N.A.	N.A.	N.A.	<0.1	N.A.	N.A.	N.A.	N.A.
n-butylbenzene	mg/kg					0.1	N.A.	<0.1	N.A.	N.A.	N.A.	<0.1	N.A.	N.A.	N.A.	N.A.
1,2-dibromo-3-chloropropane	mg/kg					0.1	N.A.	<0.1	N.A.	N.A.	N.A.	<0.1	N.A.	N.A.	N.A.	N.A.
1,2,4-trichlorobenzene	mg/kg					0.1	N.A.	<0.1	N.A.	N.A.	N.A.	<0.1	N.A.	N.A.	N.A.	N.A.
Hexachlorobutadiene	mg/kg					0.1	N.A.	<0.1	N.A.	N.A.	N.A.	<0.1	N.A.	N.A.	N.A.	N.A.
1,2,3-trichlorobenzene	mg/kg					0.1	N.A.	<0.1	N.A.	N.A.	N.A.	<0.1	N.A.	N.A.	N.A.	N.A.
TRH in Soil																
Benzene (F0)	mg/kg	140				0.1	<0.1	<0.1	N.A.	<0.1	N.A.	<0.1	<0.1	<0.1	<0.1	N.A.
TRH C6-C10	mg/kg	5600			700	25	<25	<25	N.A.	<25	N.A.	<25	<25	<25	<25	N.A.
TRH C6-C10 minus BTEX (F1)	mg/kg		45	70		25	<25	<25	N.A.	<25	N.A.	<25	<25	<25	<25	N.A.
TRH >C10-C16 (F2)	mg/kg	4200			1000	25	<25	<25	N.A.	<25	N.A.	<25	<25	<25	<25	N.A.
TRH >C10-C16 (F2) - Naphthalene	mg/kg		110	240		25	<25	<25	N.A.	<25	N.A.	<25	<25	<25	<25	N.A.
TRH >C16-C34 (F3)	mg/kg	5800			3500	90	<90	<90	N.A.	<90	N.A.	<90	<90	<90	<90	N.A.
TRH >C34-C40 (F4)	mg/kg	8100			10000	120	<120	<120	N.A.	<120	N.A.	<120	<120	<120	<120	N.A.
PAH in Soil																
Naphthalene	mg/kg	2200				0.1	<0.1	<0.1	N.A.	<0.1	N.A.	<0.1	<0.1	<0.1	<0.1	<0.1
2-methylnaphthalene	mg/kg					0.1	<0.1	<0.1	N.A.	<0.1	N.A.	<0.1	<0.1	<0.1	<0.1	<0.1
1-methylnaphthalene	mg/kg					0.1	<0.1	<0.1	N.A.	<0.1	N.A.	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg					0.1	<0.1	<0.1	N.A.	<0.1	N.A.	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg					0.1	<0.1	<0.1	N.A.	<0.1	N.A.	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg					0.1	<0.1	<0.1	N.A.	<0.1	N.A.	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg					0.1	<0.1	<0.1	N.A.	<0.1	N.A.	<0.1	<0.1	<0.1	**0.1**	<0.1
Anthracene	mg/kg					0.1	<0.1	<0.1	N.A.	<0.1	N.A.	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg					0.1	<0.1	<0.1	N.A.	<0.1	N.A.	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg					0.1	<0.1	<0.1	N.A.	<0.1	N.A.	<0.1	<0.1	<0.1	**0.1**	<0.1
Benzo(a)anthracene	mg/kg					0.1	<0.1	<0.1	N.A.	<0.1	N.A.	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg					0.1	<0.1	<0.1	N.A.	<0.1	N.A.	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b&j)fluoranthene	mg/kg					0.1	<0.1	<0.1	N.A.	<0.1	N.A.	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	mg/kg					0.1	<0.1	<0.1	N.A.	<0.1	N.A.	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	mg/kg					0.1	<0.1	<0.1	N.A.	<0.1	N.A.	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-cd)pyrene	mg/kg					0.1	<0.1	<0.1	N.A.	<0.1	N.A.	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(ah)anthracene	mg/kg					0.1	<0.1	<0.1	N.A.	<0.1	N.A.	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	mg/kg					0.1	<0.1	<0.1	N.A.	<0.1	N.A.	<0.1	<0.1	<0.1	<0.1	<0.1
Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ					0.2	<0.2	<0.2	N.A.	<0.2	N.A.	<0.2	<0.2	<0.2	<0.2	<0.2
Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	4				0.3	<0.3	<0.3	N.A.	<0.3	N.A.	<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	N.A.	<0.2	N.A.	<0.2	<0.2	<0.2	<0.2	<0.2
Total PAH (18)	mg/kg					0.8	<0.8	<0.8	N.A.	<0.8	N.A.	<0.8	<0.8	<0.8	<0.8	<0.8
Total PAH (NEPM/WHO 16)	mg/kg	400				0.8	<0.8	<0.8	N.A.	<0.8	N.A.	<0.8	<0.8	<0.8	<0.8	<0.8
OCP in Soil																
Hexachlorobenzene (HCB)	mg/kg	15				0.1	N.A.	N.A.	N.A.	<0.1	N.A.	N.A.	N.A.	N.A.	<0.1	N.A.
Alpha BHC	mg/kg					0.1	N.A.	N.A.	N.A.	<0.1	N.A.	N.A.	N.A.	N.A.	<0.1	N.A.
Lindane	mg/kg					0.1	N.A.	N.A.	N.A.	<0.1	N.A.	N.A.	N.A.	N.A.	<0.1	N.A.
Heptachlor	mg/kg	10				0.1	N.A.	N.A.	N.A.	<0.1	N.A.	N.A.	N.A.	N.A.	<0.1	N.A.
Aldrin	mg/kg	10				0.1	N.A.	N.A.	N.A.	<0.1	N.A.	N.A.	N.A.	N.A.	<0.1	N.A.
Dieldrin	mg/kg					0.2	N.A.	N.A.	N.A.	<0.2	N.A.	N.A.	N.A.	N.A.	<0.2	N.A.
Beta BHC	mg/kg					0.1	N.A.	N.A.	N.A.	<0.1	N.A.	N.A.	N.A.	N.A.	<0.1	N.A.
Delta BHC	mg/kg					0.1	N.A.	N.A.	N.A.	<0.1	N.A.	N.A.	N.A.	N.A.	<0.1	N.A.
Heptachlor epoxide	mg/kg					0.1	N.A.	N.A.	N.A.	<0.1	N.A.	N.A.	N.A.	N.A.	<0.1	N.A.
o,p'-DDT	mg/kg					0.1	N.A.	N.A.	N.A.	<0.1	N.A.	N.A.	N.A.	N.A.	<0.1	N.A.
p,p'-DDT	mg/kg					0.1	N.A.	N.A.	N.A.	<0.1	N.A.	N.A.	N.A.	N.A.	<0.1	N.A.
o,p'-DDE	mg/kg	600				0.1	N.A.	N.A.	N.A.	<0.1	N.A.	N.A.	N.A.	N.A.	<0.1	N.A.
p,p'-DDE	mg/kg					0.1	N.A.	N.A.	N.A.	<0.1	N.A.	N.A.	N.A.	N.A.	<0.1	N.A.
o,p'-DDD	mg/kg					0.1	N.A.	N.A.	N.A.	<0.1	N.A.	N.A.	N.A.	N.A.	<0.1	N.A.
p,p'-DDD	mg/kg					0.1	N.A.	N.A.	N.A.	<0.1	N.A.	N.A.	N.A.	N.A.	<0.1	N.A.
Alpha Endosulfan	mg/kg	400				0.2	N.A.	N.A.	N.A.	<0.2	N.A.	N.A.	N.A.	N.A.	<0.2	N.A.
Beta Endosulfan	mg/kg					0.2	N.A.	N.A.	N.A.	<0.2	N.A.	N.A.	N.A.	N.A.	<0.2	N.A.
Gamma Chlordane	mg/kg	90				0.1	N.A.	N.A.	N.A.	<0.1	N.A.	N.A.	N.A.	N.A.	<0.1	N.A.
Alpha Chlordane	mg/kg					0.1	N.A.	N.A.	N.A.	<0.1	N.A.	N.A.	N.A.	N.A.	<0.1	N.A.
trans-Nonachlor	mg/kg					0.1	N.A.	N.A.	N.A.	<0.1	N.A.	N.A.	N.A.	N.A.	<0.1	N.A.
Endrin	mg/kg	20				0.2	N.A.	N.A.	N.A.	<0.2	N.A.	N.A.	N.A.	N.A.	<0.2	N.A.
Endosulfan sulphate	mg/kg					0.1	N.A.	N.A.	N.A.	<0.1	N.A.	N.A.	N.A.	N.A.	<0.1	N.A.
Endrin Aldehyde	mg/kg					0.1	N.A.	N.A.	N.A.	<0.1	N.A.	N.A.	N.A.	N.A.	<0.1	N.A.
Methoxychlor	mg/kg	500				0.1	N.A.	N.A.	N.A.	<0.1	N.A.	N.A.	N.A.	N.A.	<0.1	N.A.
Endrin Ketone	mg/kg					0.1	N.A.	N.A.	N.A.	<0.1	N.A.	N.A.	N.A.	N.A.	<0.1	N.A.
Isodrin	mg/kg					0.1	N.A.	N.A.	N.A.	<0.1	N.A.	N.A.	N.A.	N.A.	<0.1	N.A.
Mirex	mg/kg	20				0.1	N.A.	N.A.	N.A.	<0.1	N.A.	N.A.	N.A.	N.A.	<0.1	N.A.
PCB in Soil																
Arochlor 1016	mg/kg					0.2	N.A.	N.A.	N.A.	N.A.	N.A.	<0.2	N.A.	<0.2	N.A.	N.A.
Arochlor 1221	mg/kg					0.2	N.A.	N.A.	N.A.	N.A.	N.A.	<0.2	N.A.	<0.2	N.A.	N.A.
Arochlor 1232	mg/kg					0.2	N.A.	N.A.	N.A.	N.A.	N.A.	<0.2	N.A.	<0.2	N.A.	N.A.
Arochlor 1242	mg/kg					0.2	N.A.	N.A.	N.A.	N.A.	N.A.	<0.2	N.A.	<0.2	N.A.	N.A.
Arochlor 1248	mg/kg					0.2	N.A.	N.A.	N.A.	N.A.	N.A.	<0.2	N.A.	<0.2	N.A.	N.A.
Arochlor 1254	mg/kg					0.2	N.A.	N.A.	N.A.	N.A.	N.A.	<0.2	N.A.	<0.2	N.A.	N.A.
Arochlor 1260	mg/kg					0.2	N.A.	N.A.	N.A.	N.A.	N.A.	<0.2	N.A.	<0.2	N.A.	N.A.
Arochlor 1262	mg/kg					0.2	N.A.	N.A.	N.A.	N.A.	N.A.	<0.2	N.A.	<0.2	N.A.	N.A.
Arochlor 1268	mg/kg					0.2	N.A.	N.A.	N.A.	N.A.	N.A.	<0.2	N.A.	<0.2	N.A.	N.A.
Total PCBs (Arochlors)	mg/kg	1				1	N.A.	N.A.	N.A.	N.A.	N.A.	<1	N.A.	<1	N.A.	N.A.
Metals in Soil																
Arsenic, As	mg/kg	500				3	**6**	**4**	<3	**3**	<3	**3**	N.A.	**13**	**3**	**3**
Cadmium, Cd	mg/kg	150				0.3	**0.3**	<0.3	<0.3	<0.3	**0.5**	<0.3	N.A.	<0.3	<0.3	<0.3
Chromium, Cr	mg/kg	500				0.3	**30**	**7.1**	**2.2**	**26**	**15**	**19**	N.A.	**14**	**37**	**7.6**
Copper, Cu	mg/kg	30000				0.5	**0.7**	**3.5**	**1.9**	**7.7**	**3.6**	**35**	N.A.	**1.5**	**21**	**3.0**
Lead, Pb	mg/kg	1200				1	**20**	**13**	**6**	**15**	**20**	**11**	N.A.	**19**	**11**	**15**
Nickel, Ni	mg/kg	1200				0.5	<0.5	**2.7**	<0.5	**20**	<0.5	**38**	N.A.	<0.5	**34**	<0.5
Zinc, Zn	mg/kg	60000				0.5	**3.3**	**8.1**	<0.5	**12**	**4.5**	**86**	N.A.	**2.5**	**26**	**1.5**
Mercury	mg/kg	120				0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	N.A.	<0.05	<0.05	<0.05
Asbestos in Soil																
Asbestos Detected	No unit	Yes				0	N.A.	No	N.A.	No	N.A.	No	N.A.	No	No	N.A.

Table LR2
Laboratory Analytical Results - Groundwater

				Sample Name	SE164550.001	SE164550.002
				Description	MW01	MW02
				Sample Date	24-4-2017	24-4-2017
				Matrix	Water	Water
Analyte Name	**Units**	**NEPC GILs (Fresh Water) / ANZECC 2000 Freshwater Low Reliability Trigger Values (µg/L)**	**Groundwater HSL for Vapour Intrusion (µg/L)**	**Reporting Limit**	**Result**	**Result**
BTEXN in Groundwater						
Benzene	µg/L	950	800	0.5	<0.5	<0.5
Toluene	µg/L	180	NL	0.5	**1.4**	**0.9**
Ethylbenzene	µg/L		NL	0.5	<0.5	<0.5
m/p-xylene	µg/L	200		1	<1	<1
o-xylene	µg/L	350		0.5	<0.5	<0.5
Total Xylenes	µg/L		NL	1.5	<1.5	<1.5
Naphthalene	µg/L	16	NL	0.5	<0.5	<0.5
VOC in Groundwater						
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	370		0.5	<0.5	**0.7**
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
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	<10	<10
TRH in Groundwater						
Benzene (F0)	µg/L			0.5	<0.5	<0.5
TRH C6-C10	µg/L			50	<50	<50
TRH C6-C10 minus BTEX (F1)	µg/L		1	50	<50	<50
TRH >C10-C16 (F2)	µg/L		1	60	<60	<60
TRH >C16-C34 (F3)	µg/L			500	<500	<500
TRH >C34-C40 (F4)	µg/L			500	<500	<500
PAH in Groundwater						
Naphthalene	µg/L	16	NL	0.02	**0.05**	**0.02**
2-methylnaphthalene	µg/L			0.01	**0.01**	<0.01
1-methylnaphthalene	µg/L			0.01	<0.01	<0.01
Acenaphthylene	µg/L			0.01	<0.01	<0.01
Acenaphthene	µg/L			0.01	<0.01	<0.01
Fluorene	µg/L			0.01	<0.01	<0.01
Phenanthrene	µg/L	2		0.01	**0.01**	<0.01
Anthracene	µg/L			0.01	<0.01	<0.01
Fluoranthene	µg/L			0.01	<0.01	<0.01
Pyrene	µg/L			0.01	<0.01	<0.01
Benzo(a)anthracene	µg/L			0.01	<0.01	<0.01
Chrysene	µg/L			0.01	<0.01	<0.01
Benzo(b&j&k)fluoranthene	µg/L			0.02	<0.02	<0.02
Benzo(a)pyrene	µg/L			0.01	<0.01	<0.01
Indeno(1,2,3-cd)pyrene	µg/L			0.01	<0.01	<0.01
Dibenzo(ah)anthracene	µg/L			0.01	<0.01	<0.01
Benzo(ghi)perylene	µg/L			0.01	<0.01	<0.01
Carcinogenic PAHs (as BaP TEQ) - assume non detects = 0	TEQ			0.012	<0.012	<0.012
Total PAH VIC EPA Guidelines (16)	µg/L			0.1	<0.1	<0.1
Total PAH (18)	µg/L			0.1	<0.1	<0.1
Metals in Groundwater (Dissolved)						
Arsenic, As	µg/L	13		1	**19**	<1
Cadmium, Cd	µg/L	0.2		0.1	**17**	**1.0**
Chromium, Cr	µg/L	3.3		1	2	<1
Copper, Cu	µg/L	1.4		1	**370**	**88**
Lead, Pb	µg/L	3.4		1	1	<1
Nickel, Ni	µg/L	11		1	**240**	**19**
Zinc, Zn	µg/L	8		5	**2100**	**110**
Mercury	mg/L	0.00006		0.0001	<0.0001	<0.0001

Table LR3
Laboratory Analytical Results - % RPD

		Sample Name	SE164358.001	SE164358.011			SE164358.012	
		Description	BH01/0.1-0.3	DUP01			DUP01A	
		Sample Date	18-4-2017	18-4-2017	% RPD		18-4-2017	% RPD
		Matrix	Soil	Soil			Soil	
Analyte Name	**Units**	**Reporting Limit**	**Result**	**Result**			**Result**	
Metals in Soil								
Arsenic, As	mg/kg	3	6	<3	#VALUE!		<3	#VALUE!
Cadmium, Cd	mg/kg	0.3	0.3	<0.3	#VALUE!		<0.3	#VALUE!
Chromium, Cr	mg/kg	0.3	30	6.1	132		10	100
Copper, Cu	mg/kg	0.5	0.7	0.6	15		0.7	0
Lead, Pb	mg/kg	1	20	16	22		16	22
Nickel, Ni	mg/kg	0.5	<0.5	<0.5	#VALUE!		<0.5	#VALUE!
Zinc, Zn	mg/kg	0.5	3.3	0.6	138		1.1	100
Mercury	mg/kg	0.05	<0.05	<0.05	#VALUE!		<0.05	#VALUE!

LOGS

BOREHOLE NUMBER BH01

SLR Consulting Pty Ltd

CLIENT Ku-ring-gai Council **PROJECT NAME** 176 Mona Vale Road, NSW

PROJECT NUMBER 610.17035.00000 **PROJECT LOCATION**

DATE STARTED 18/4/17 **COMPLETED** 18/4/17 **R.L. SURFACE** **DATUM**

DRILLING CONTRACTOR BG Drilling

EQUIPMENT Dando Terrier **HOLE LOCATION**

HOLE SIZE 80mm **LOGGED BY** CAC **CHECKED BY** NDS

NOTES

Method	Water	Well Details	Depth (m)	Graphic Log	Classification Symbol	Material Description	Sample ID Remarks	PID (ppm)	Additional Observations
SFA			0			**ASPHALT/ROAD BASE.**			.
						CLAY: red with grey mottles, moist, stiff, becoming hard with depth.	BH01 0.1m - 0.3m, PID = 0.7ppm		Nil odour or staining. DUP01/DUP01A
						Becoming grey with red mottles.			Trace tree root.
SFA			1			Becoming weathered clay/shale, dry and hard.			
			2						Add water to borehole to facilitate SFA drilling.
						Becoming grey to dark grey.			
			3						
			4						Adding water.
			5						
			6						
			7						
			8						Adding water.
			9			Collapse.			
						BH01 terminated at 9m bgl.			Target depth.
			10						

BOREHOLE NUMBER BH02

SLR Consulting Pty Ltd

CLIENT Ku-ring-gai Council **PROJECT NAME** 176 Mona Vale Road, NSW

PROJECT NUMBER 610.17035.00000 **PROJECT LOCATION**

DATE STARTED 18/4/17 **COMPLETED** 18/4/17 **R.L. SURFACE** **DATUM**

DRILLING CONTRACTOR BG Drilling

EQUIPMENT Dando Terrier **HOLE LOCATION**

HOLE SIZE 80mm **LOGGED BY** CAC **CHECKED BY** NDS

NOTES

Method	Water	Well Details	Depth (m)	Graphic Log	Classification Symbol	Material Description	Sample ID Remarks	PID (ppm)	Additional Observations
PTDT			0			**CONCRETE.**			.
						FILL: Gravelly CLAY, brown, moist, soft, some fine to medium sand, yellow.	BH02 0.15m - 0.35m, PID = 0.3ppm		Nil odour or staining.
						CLAY: grey, hard, moist, ironstone gravels and banding.	BH02 0.5m - 0.7m, PID = 0.2ppm		Nil odour or staining.
SFA			1			Becoming red.			
			2						Add water for drilling.
			3			Becoming grey/dark grey.			
			4						
			5						
			6						
			7						
			8						
			9						
			10			BH02 terminated at 9m bgl.			Target depth.

BOREHOLE NUMBER BH03

SLR Consulting Pty Ltd

CLIENT Ku-ring-gai Council **PROJECT NAME** 176 Mona Vale Road, NSW

PROJECT NUMBER 610.17035.00000 **PROJECT LOCATION**

DATE STARTED 18/4/17 **COMPLETED** 18/4/17 **R.L. SURFACE** **DATUM**

DRILLING CONTRACTOR BG Drilling

EQUIPMENT Dando Terrier **HOLE LOCATION**

HOLE SIZE 80mm **LOGGED BY** CAC **CHECKED BY** NDS

NOTES

Method	Water	Depth (m)	Graphic Log	Classification Symbol	Material Description	Sample ID Remarks	PID (ppm)	Additional Observations
SFA					**ASPHALT/ROADBASE**			.
PT		0.5			**FILL:** Gravelly CLAY, brown, firm, moist.	BH03 0.3m - 0.5m, PID = 0.0ppm		Nil odour or staining.
		1.0			**CLAY:** grey, red mottles, some ironstone gravels, moist, stiff.	BH03 0.6m - 0.8m, PID = 0.0ppm		Nil odour or staining.
		1.5			BH03 terminated at 1m bgl.			

BOREHOLE NUMBER BH04

SLR Consulting Pty Ltd

CLIENT Ku-ring-gai Council **PROJECT NAME** 176 Mona Vale Road, NSW

PROJECT NUMBER 610.17035.00000 **PROJECT LOCATION**

DATE STARTED 18/4/17 **COMPLETED** 18/4/17 **R.L. SURFACE** **DATUM**

DRILLING CONTRACTOR BG Drilling

EQUIPMENT Dando Terrier **HOLE LOCATION**

HOLE SIZE 80mm **LOGGED BY** CAC **CHECKED BY** NDS

NOTES

Method	Water	Depth (m)	Graphic Log	Classification Symbol	Material Description	Sample ID Remarks	PID (ppm)	Additional Observations
SFA					**ASPHALT/ROADBASE**			.
PT		0.5			**FILL:** Gravelly CLAY, brown, firm, moist.	BH04 0.4m - 0.6m, PID = 0.1ppm		Nil odour or staining.
		1.0			**CLAY:** red with grey/brown mottles, firm, stiff/hard.	BH04 0.6m - 0.8m, PID = 0.1ppm		Nil odour or staining.
		1.5			BH04 terminated at 1m bgl.			Target depth.

BOREHOLE NUMBER BH05

SLR Consulting Pty Ltd

CLIENT Ku-ring-gai Council **PROJECT NAME** 176 Mona Vale Road, NSW

PROJECT NUMBER 610.17035.00000 **PROJECT LOCATION**

DATE STARTED 18/4/17 **COMPLETED** 18/4/17 **R.L. SURFACE** **DATUM**

DRILLING CONTRACTOR BG Drilling

EQUIPMENT Dando Terrier **HOLE LOCATION**

HOLE SIZE 80mm **LOGGED BY** CAC **CHECKED BY** NDS

NOTES

Method	Water	Depth (m)	Graphic Log	Classification Symbol	Material Description	Sample ID Remarks	PID (ppm)	Additional Observations
SFA					**ASPHALT/ROADBASE**			
PT		0.5			**CLAY:** grey with red mottles, moist, stiff.	BH05 0.2m - 0.4m, PID = 0.3ppm		Nil odour or staining.
		1.0			BH05 terminated at 1m bgl.			Target depth.
		1.5						

BOREHOLE NUMBER BH06

SLR Consulting Pty Ltd

CLIENT Ku-ring-gai Council **PROJECT NAME** 176 Mona Vale Road, NSW

PROJECT NUMBER 610.17035.00000 **PROJECT LOCATION**

DATE STARTED 18/4/17 **COMPLETED** 18/4/17 **R.L. SURFACE** **DATUM**

DRILLING CONTRACTOR BG Drilling

EQUIPMENT Dando Terrier **HOLE LOCATION**

HOLE SIZE 80mm **LOGGED BY** CAC **CHECKED BY** NDS

NOTES

Method	Water	Depth (m)	Graphic Log	Classification Symbol	Material Description	Sample ID Remarks	PID (ppm)	Additional Observations
SFA					**ASPHALT/ROADBASE**			.
PT		0.5			**FILL:** CLAY, brown, dry, hard, with some igneous gravels.	BH06 0.3m - 0.5m, PID = 0.3ppm		Nil odour or staining.
		1.0			**CLAY:** grey with orange/brown mottles and ironstone gravels.	BH06 0.7m - 0.9m, PID = 0.0ppm		Nil odour or staining.
		1.5			BH06 terminated at 1m bgl.			Target depth.

GROUNDWATER MONITORING EVENT – FIELD FORMS

Groundwater Monitoring Event - Water Quality Parameters

PROJECT NAME: Stage 2 Detailed Site Investigation
PROJECT NUMBER: 610.17035.00001
PROJECT SITE ADDRESS: 176 Mona Vale Road, St Ives
PROJECT MANAGER: CAC
PROJECT FIELD WORK DATE: 24/04/2017
PROJECT FIELD STAFF: CAC

WELL ID MW01 DIAMETER (tick one): 38mm ☐ 50mm ☑ 100mm ☐ WELL DEPTH (mBTOC) 8.8 STICK UP (mm) —

FIELD EQUIPMENT (serial number)
WQM ID: 90FLMVSDS1649
IP ID: SOL122-67
PID ID: —

SAMPLING EQUIPMENT (tick applicable)
BAILER (ECO) ☐ MICRO-PURGE ☐
BAILER (S/S) ☐ PERISTALTIC ☑
BAILER (TEFLON) ☐ WATERRA ☐

DEPTH TO WATER (mBTOC) Before Pump Install	DEPTH TO WATER (mBTOC) After Pump Install	PUMP INTAKE DEPTH (mBTOC)	WELL HEADSPACE PID (ppm)
4.347	4.345	6.0	—

TIME (hh:mm)	PUMP RATE (L/min)	VOLUME (L)	DEPTH TO WATER (m BTOC)	DISSOLVED OXYGEN ~~(mg/L)~~ ppm	ELECTRICAL CONDUCTIVITY (mS/cm) or µS/cm (circle one)	pH (pH units)	REDOX POTENTIAL (mV)	TEMPERATURE (°C)	TURBIDITY (tick one) Turbid	Very Cloudy	Cloudy	Slightly Cloudy	Clear	COMMENTS (colour, sediment, odour, sheen, NAPL thickness)
Well Purge & Stabilisation Acceptance Criteria				±10%	±3%	±0.1	±10%	±10%						
0716	0.5	2	4.701	1.85	5.06	4.18	188	20.1					X	Nil odour/sheen
0723	0.3	1.5	4.905	1.15	5.08	4.17	222	20.3					X	" "
0733	0.3	1.8	5.25	1.26	5.08	4.22	254	20.6					X	" "
			SAMPLE											

Duplicate Sample ID: DUP 03
Triplicate Sample ID: DUP 03 A
Metals Sample Field Filtered: Yes ☑ No ☐

Groundwater Monitoring Event - Water Quality Parameters

PROJECT NAME: Stage 2 Detailed Site Investigation
PROJECT NUMBER: 610.17035.00001
PROJECT SITE ADDRESS: 176 Mona Vale Road, St Ives
PROJECT MANAGER: CAC
PROJECT FIELD WORK DATE: 24/04/17
PROJECT FIELD STAFF: CAC

WELL ID MW02 DIAMETER (tick one): 38mm ☐ 50mm ☑ 100mm ☐ WELL DEPTH (mBTOC) 8.70 STICK UP (mm) —

FIELD EQUIPMENT (serial number)		SAMPLING EQUIPMENT (tick applicable)		DEPTH TO WATER (mBTOC)		PUMP INTAKE DEPTH (mBTOC)	WELL HEADSPACE PID (ppm)
				Before Pump Install	After Pump Install		
WQM ID:	90FLMVSDS1649	BAILER (ECO) ☐	MICRO-PURGE ☐				
IP ID:	SOL22-67	BAILER (S/S) ☐	PERISTALTIC ☑				
PID ID:	—	BAILER (TEFLON) ☐	WATERRA ☐	2.70	2.68	5.5	—

TIME (hh:mm)	PUMP RATE (L/min)	VOLUME (L)	DEPTH TO WATER (m BTOC)	DISSOLVED OXYGEN ~~(mg/L)~~ ppm	ELECTRICAL CONDUCTIVITY ~~mS/cm~~ or ~~uS/cm~~ (circle one)	pH (pH units)	REDOX POTENTIAL (mV)	TEMPERATURE (°C)	TURBIDITY (tick one)					COMMENTS (colour, sediment, odour, sheen, NAPL thickness)
									Turbid	Very Cloudy	Cloudy	Slightly Cloudy	Clear	
Well Purge & Stabilisation Acceptance Criteria				±10%	±3%	±0.1	±10%	±10%						
0825	0.3	1.5	2.835	0.92	2411 µS	4.68	195	21.3		X				Grey, nil odour/sheen
0832	0.3	1.8	3.055	0.58	2.36mS	4.68	209	21.8			X			" "
0840	0.3	1.8	3.255	0.51	2.29	4.75	214	21.8			X			" "
		SAMPLE												

Duplicate Sample ID: DUP — Triplicate Sample ID: DUP — A Metals Sample Field Filtered: Yes ☑ No ☐

LABORATORY

ANALYTICAL REPORT

Accreditation No. 2562

CLIENT DETAILS

Contact	Craig Cowper
Client	SLR CONSULTING AUSTRALIA PTY LTD
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Telephone	02 9427 8100
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Email	ccowper@slrconsulting.com
Project	**610.17038 St Ives**
Order Number	**22498**
Samples	15

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
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Email	au.environmental.sydney@sgs.com
SGS Reference	**SE164358 R0**
Date Received	19/4/2017
Date Reported	27/4/2017

COMMENTS

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

No respirable fibres detected in all soil samples using trace analysis technique.

Asbestos analysed by Approved Identifier Ravee Sivasubramaniam .

SIGNATORIES

Andy Sutton
Senior Organic Chemist

Bennet Lo
Senior Organic Chemist/Metals Chemist

Dong Liang
Metals/Inorganics Team Leader

Kamrul Ahsan
Senior Chemist

Ly Kim Ha
Organic Section Head

Ravee Sivasubramaniam
Hygiene Team Leader

VOC's in Soil [AN433] Tested: 21/4/2017

PARAMETER	UOM	LOR	BH01/0.1-0.3 SOIL - 18/4/2017 SE164358.001	BH02/0.15-0.35 SOIL - 18/4/2017 SE164358.002	BH03/0.3-0.5 SOIL - 18/4/2017 SE164358.004	BH04/0.4-0.6 SOIL - 18/4/2017 SE164358.006	BH04/0.6-0.8 SOIL - 18/4/2017 SE164358.007
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
Dichlorodifluoromethane (CFC-12)	mg/kg	1	-	<1	-	<1	-
Chloromethane	mg/kg	1	-	<1	-	<1	-
Vinyl chloride (Chloroethene)	mg/kg	0.1	-	<0.1	-	<0.1	-
Bromomethane	mg/kg	1	-	<1	-	<1	-
Chloroethane	mg/kg	1	-	<1	-	<1	-
Trichlorofluoromethane	mg/kg	1	-	<1	-	<1	-
Acetone (2-propanone)	mg/kg	10	-	<10	-	<10	-
Iodomethane	mg/kg	5	-	<5	-	<5	-
1,1-dichloroethene	mg/kg	0.1	-	<0.1	-	<0.1	-
Acrylonitrile	mg/kg	0.1	-	<0.1	-	<0.1	-
Dichloromethane (Methylene chloride)	mg/kg	0.5	-	<0.5	-	<0.5	-
Allyl chloride	mg/kg	0.1	-	<0.1	-	<0.1	-
Carbon disulfide	mg/kg	0.5	-	<0.5	-	<0.5	-
trans-1,2-dichloroethene	mg/kg	0.1	-	<0.1	-	<0.1	-
MtBE (Methyl-tert-butyl ether)	mg/kg	0.1	-	<0.1	-	<0.1	-
1,1-dichloroethane	mg/kg	0.1	-	<0.1	-	<0.1	-
Vinyl acetate	mg/kg	10	-	<10	-	<10	-
MEK (2-butanone)	mg/kg	10	-	<10	-	<10	-
cis-1,2-dichloroethene	mg/kg	0.1	-	<0.1	-	<0.1	-
Bromochloromethane	mg/kg	0.1	-	<0.1	-	<0.1	-
Chloroform	mg/kg	0.1	-	<0.1	-	<0.1	-
2,2-dichloropropane	mg/kg	0.1	-	<0.1	-	<0.1	-
1,2-dichloroethane	mg/kg	0.1	-	<0.1	-	<0.1	-
1,1,1-trichloroethane	mg/kg	0.1	-	<0.1	-	<0.1	-
1,1-dichloropropene	mg/kg	0.1	-	<0.1	-	<0.1	-
Carbon tetrachloride	mg/kg	0.1	-	<0.1	-	<0.1	-
Dibromomethane	mg/kg	0.1	-	<0.1	-	<0.1	-
1,2-dichloropropane	mg/kg	0.1	-	<0.1	-	<0.1	-
Trichloroethene (Trichloroethylene -TCE)	mg/kg	0.1	-	<0.1	-	<0.1	-
2-nitropropane	mg/kg	10	-	<10	-	<10	-
Bromodichloromethane	mg/kg	0.1	-	<0.1	-	<0.1	-
MIBK (4-methyl-2-pentanone)	mg/kg	1	-	<1	-	<1	-
cis-1,3-dichloropropene	mg/kg	0.1	-	<0.1	-	<0.1	-
trans-1,3-dichloropropene	mg/kg	0.1	-	<0.1	-	<0.1	-
1,1,2-trichloroethane	mg/kg	0.1	-	<0.1	-	<0.1	-
1,3-dichloropropane	mg/kg	0.1	-	<0.1	-	<0.1	-
Chlorodibromomethane	mg/kg	0.1	-	<0.1	-	<0.1	-
2-hexanone (MBK)	mg/kg	5	-	<5	-	<5	-
1,2-dibromoethane (EDB)	mg/kg	0.1	-	<0.1	-	<0.1	-
Tetrachloroethene (Perchloroethylene,PCE)	mg/kg	0.1	-	<0.1	-	<0.1	-
1,1,1,2-tetrachloroethane	mg/kg	0.1	-	<0.1	-	<0.1	-
Chlorobenzene	mg/kg	0.1	-	<0.1	-	<0.1	-
Bromoform	mg/kg	0.1	-	<0.1	-	<0.1	-
cis-1,4-dichloro-2-butene	mg/kg	1	-	<1	-	<1	-
Styrene (Vinyl benzene)	mg/kg	0.1	-	<0.1	-	<0.1	-
1,1,2,2-tetrachloroethane	mg/kg	0.1	-	<0.1	-	<0.1	-
1,2,3-trichloropropane	mg/kg	0.1	-	<0.1	-	<0.1	-
trans-1,4-dichloro-2-butene	mg/kg	1	-	<1	-	<1	-

VOC's in Soil [AN433] Tested: 21/4/2017 (continued)

PARAMETER	UOM	LOR	BH01/0.1-0.3 SOIL - 18/4/2017 SE164358.001	BH02/0.15-0.35 SOIL - 18/4/2017 SE164358.002	BH03/0.3-0.5 SOIL - 18/4/2017 SE164358.004	BH04/0.4-0.6 SOIL - 18/4/2017 SE164358.006	BH04/0.6-0.8 SOIL - 18/4/2017 SE164358.007
Isopropylbenzene (Cumene)	mg/kg	0.1	-	<0.1	-	<0.1	-
Bromobenzene	mg/kg	0.1	-	<0.1	-	<0.1	-
n-propylbenzene	mg/kg	0.1	-	<0.1	-	<0.1	-
2-chlorotoluene	mg/kg	0.1	-	<0.1	-	<0.1	-
4-chlorotoluene	mg/kg	0.1	-	<0.1	-	<0.1	-
1,3,5-trimethylbenzene	mg/kg	0.1	-	<0.1	-	<0.1	-
tert-butylbenzene	mg/kg	0.1	-	<0.1	-	<0.1	-
1,2,4-trimethylbenzene	mg/kg	0.1	-	<0.1	-	<0.1	-
sec-butylbenzene	mg/kg	0.1	-	<0.1	-	<0.1	-
1,3-dichlorobenzene	mg/kg	0.1	-	<0.1	-	<0.1	-
1,4-dichlorobenzene	mg/kg	0.1	-	<0.1	-	<0.1	-
p-isopropyltoluene	mg/kg	0.1	-	<0.1	-	<0.1	-
1,2-dichlorobenzene	mg/kg	0.1	-	<0.1	-	<0.1	-
n-butylbenzene	mg/kg	0.1	-	<0.1	-	<0.1	-
1,2-dibromo-3-chloropropane	mg/kg	0.1	-	<0.1	-	<0.1	-
1,2,4-trichlorobenzene	mg/kg	0.1	-	<0.1	-	<0.1	-
Hexachlorobutadiene	mg/kg	0.1	-	<0.1	-	<0.1	-
1,2,3-trichlorobenzene	mg/kg	0.1	-	<0.1	-	<0.1	-
Total VOC*	mg/kg	24	-	<24	-	<24	-
Total Volatile Chlorinated Hydrocarbons*	mg/kg	3	-	<3.0	-	<3.0	-
Total Chlorinated Hydrocarbons VIC EPA*	mg/kg	1.8	-	<1.8	-	<1.8	-
Total Other Chlorinated Hydrocarbons VIC EPA*	mg/kg	1.8	-	<1.8	-	<1.8	-

VOC's in Soil [AN433] Tested: 21/4/2017 (continued)

PARAMETER	UOM	LOR	BH05/0.2-0.4 SOIL - 18/4/2017 SE164358.008	BH06/0.3-0.5 SOIL - 18/4/2017 SE164358.009
Benzene	mg/kg	0.1	<0.1	<0.1
Toluene	mg/kg	0.1	<0.1	<0.1
Ethylbenzene	mg/kg	0.1	<0.1	<0.1
m/p-xylene	mg/kg	0.2	<0.2	**0.2**
o-xylene	mg/kg	0.1	<0.1	<0.1
Total Xylenes*	mg/kg	0.3	<0.3	<0.3
Total BTEX	mg/kg	0.6	<0.6	<0.6
Naphthalene	mg/kg	0.1	<0.1	<0.1
Dichlorodifluoromethane (CFC-12)	mg/kg	1	-	-
Chloromethane	mg/kg	1	-	-
Vinyl chloride (Chloroethene)	mg/kg	0.1	-	-
Bromomethane	mg/kg	1	-	-
Chloroethane	mg/kg	1	-	-
Trichlorofluoromethane	mg/kg	1	-	-
Acetone (2-propanone)	mg/kg	10	-	-
Iodomethane	mg/kg	5	-	-
1,1-dichloroethene	mg/kg	0.1	-	-
Acrylonitrile	mg/kg	0.1	-	-
Dichloromethane (Methylene chloride)	mg/kg	0.5	-	-
Allyl chloride	mg/kg	0.1	-	-
Carbon disulfide	mg/kg	0.5	-	-
trans-1,2-dichloroethene	mg/kg	0.1	-	-
MtBE (Methyl-tert-butyl ether)	mg/kg	0.1	-	-
1,1-dichloroethane	mg/kg	0.1	-	-
Vinyl acetate	mg/kg	10	-	-
MEK (2-butanone)	mg/kg	10	-	-
cis-1,2-dichloroethene	mg/kg	0.1	-	-
Bromochloromethane	mg/kg	0.1	-	-
Chloroform	mg/kg	0.1	-	-
2,2-dichloropropane	mg/kg	0.1	-	-
1,2-dichloroethane	mg/kg	0.1	-	-
1,1,1-trichloroethane	mg/kg	0.1	-	-
1,1-dichloropropene	mg/kg	0.1	-	-
Carbon tetrachloride	mg/kg	0.1	-	-
Dibromomethane	mg/kg	0.1	-	-
1,2-dichloropropane	mg/kg	0.1	-	-
Trichloroethene (Trichloroethylene -TCE)	mg/kg	0.1	-	-
2-nitropropane	mg/kg	10	-	-
Bromodichloromethane	mg/kg	0.1	-	-
MIBK (4-methyl-2-pentanone)	mg/kg	1	-	-
cis-1,3-dichloropropene	mg/kg	0.1	-	-
trans-1,3-dichloropropene	mg/kg	0.1	-	-
1,1,2-trichloroethane	mg/kg	0.1	-	-
1,3-dichloropropane	mg/kg	0.1	-	-
Chlorodibromomethane	mg/kg	0.1	-	-
2-hexanone (MBK)	mg/kg	5	-	-
1,2-dibromoethane (EDB)	mg/kg	0.1	-	-
Tetrachloroethene (Perchloroethylene,PCE)	mg/kg	0.1	-	-
1,1,1,2-tetrachloroethane	mg/kg	0.1	-	-
Chlorobenzene	mg/kg	0.1	-	-
Bromoform	mg/kg	0.1	-	-
cis-1,4-dichloro-2-butene	mg/kg	1	-	-
Styrene (Vinyl benzene)	mg/kg	0.1	-	-
1,1,2,2-tetrachloroethane	mg/kg	0.1	-	-
1,2,3-trichloropropane	mg/kg	0.1	-	-
trans-1,4-dichloro-2-butene	mg/kg	1	-	-

VOC's in Soil [AN433] Tested: 21/4/2017 (continued)

PARAMETER	UOM	LOR	BH05/0.2-0.4 SOIL - 18/4/2017 SE164358.008	BH06/0.3-0.5 SOIL - 18/4/2017 SE164358.009
Isopropylbenzene (Cumene)	mg/kg	0.1	-	-
Bromobenzene	mg/kg	0.1	-	-
n-propylbenzene	mg/kg	0.1	-	-
2-chlorotoluene	mg/kg	0.1	-	-
4-chlorotoluene	mg/kg	0.1	-	-
1,3,5-trimethylbenzene	mg/kg	0.1	-	-
tert-butylbenzene	mg/kg	0.1	-	-
1,2,4-trimethylbenzene	mg/kg	0.1	-	-
sec-butylbenzene	mg/kg	0.1	-	-
1,3-dichlorobenzene	mg/kg	0.1	-	-
1,4-dichlorobenzene	mg/kg	0.1	-	-
p-isopropyltoluene	mg/kg	0.1	-	-
1,2-dichlorobenzene	mg/kg	0.1	-	-
n-butylbenzene	mg/kg	0.1	-	-
1,2-dibromo-3-chloropropane	mg/kg	0.1	-	-
1,2,4-trichlorobenzene	mg/kg	0.1	-	-
Hexachlorobutadiene	mg/kg	0.1	-	-
1,2,3-trichlorobenzene	mg/kg	0.1	-	-
Total VOC*	mg/kg	24	-	-
Total Volatile Chlorinated Hydrocarbons*	mg/kg	3	-	-
Total Chlorinated Hydrocarbons VIC EPA*	mg/kg	1.8	-	-
Total Other Chlorinated Hydrocarbons VIC EPA*	mg/kg	1.8	-	-

Volatile Petroleum Hydrocarbons in Soil [AN433] Tested: 21/4/2017

PARAMETER	UOM	LOR	BH01/0.1-0.3 SOIL - 18/4/2017 SE164358.001	BH02/0.15-0.35 SOIL - 18/4/2017 SE164358.002	BH03/0.3-0.5 SOIL - 18/4/2017 SE164358.004	BH04/0.4-0.6 SOIL - 18/4/2017 SE164358.006	BH04/0.6-0.8 SOIL - 18/4/2017 SE164358.007
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	BH05/0.2-0.4 SOIL - 18/4/2017 SE164358.008	BH06/0.3-0.5 SOIL - 18/4/2017 SE164358.009
TRH C6-C9	mg/kg	20	<20	<20
Benzene (F0)	mg/kg	0.1	<0.1	<0.1
TRH C6-C10	mg/kg	25	<25	<25
TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25

TRH (Total Recoverable Hydrocarbons) in Soil [AN403] Tested: 20/4/2017

PARAMETER	UOM	LOR	BH01/0.1-0.3 SOIL - 18/4/2017 SE164358.001	BH02/0.15-0.35 SOIL - 18/4/2017 SE164358.002	BH03/0.3-0.5 SOIL - 18/4/2017 SE164358.004	BH04/0.4-0.6 SOIL - 18/4/2017 SE164358.006	BH04/0.6-0.8 SOIL - 18/4/2017 SE164358.007
TRH C10-C14	mg/kg	20	<20	<20	<20	<20	<20
TRH C15-C28	mg/kg	45	<45	<45	<45	<45	<45
TRH C29-C36	mg/kg	45	<45	<45	<45	<45	<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	BH05/0.2-0.4 SOIL - 18/4/2017 SE164358.008	BH06/0.3-0.5 SOIL - 18/4/2017 SE164358.009
TRH C10-C14	mg/kg	20	<20	<20
TRH C15-C28	mg/kg	45	<45	<45
TRH C29-C36	mg/kg	45	<45	<45
TRH C37-C40	mg/kg	100	<100	<100
TRH >C10-C16 (F2)	mg/kg	25	<25	<25
TRH >C10-C16 (F2) - Naphthalene	mg/kg	25	<25	<25
TRH >C16-C34 (F3)	mg/kg	90	<90	<90
TRH >C34-C40 (F4)	mg/kg	120	<120	<120
TRH C10-C36 Total	mg/kg	110	<110	<110
TRH C10-C40 Total	mg/kg	210	<210	<210

PAH (Polynuclear Aromatic Hydrocarbons) in Soil [AN420] Tested: 20/4/2017

PARAMETER	UOM	LOR	BH01/0.1-0.3 SOIL - 18/4/2017 SE164358.001	BH02/0.15-0.35 SOIL - 18/4/2017 SE164358.002	BH03/0.3-0.5 SOIL - 18/4/2017 SE164358.004	BH04/0.4-0.6 SOIL - 18/4/2017 SE164358.006	BH04/0.6-0.8 SOIL - 18/4/2017 SE164358.007
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	<0.1	<0.1	<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	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<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(ah)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	<0.2	<0.2
Total PAH (18)	mg/kg	0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Total PAH (NEPM/WHO 16)	mg/kg	0.8	<0.8	<0.8	<0.8	<0.8	<0.8

PARAMETER	UOM	LOR	BH05/0.2-0.4 SOIL - 18/4/2017 SE164358.008	BH06/0.3-0.5 SOIL - 18/4/2017 SE164358.009	BH06/0.7-0.9 SOIL - 18/4/2017 SE164358.010
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1
2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1
1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.1	<0.1	**0.1**	<0.1
Anthracene	mg/kg	0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	0.1	<0.1	**0.1**	<0.1
Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	0.1	<0.1	<0.1	<0.1
Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	mg/kg	0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	<0.1
Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	<0.1
Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ	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
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	<0.2	<0.2	<0.2
Total PAH (18)	mg/kg	0.8	<0.8	<0.8	<0.8
Total PAH (NEPM/WHO 16)	mg/kg	0.8	<0.8	<0.8	<0.8

OC Pesticides in Soil [AN420] Tested: 20/4/2017

PARAMETER	UOM	LOR	BH03/0.3-0.5 SOIL - 18/4/2017 SE164358.004	BH06/0.3-0.5 SOIL - 18/4/2017 SE164358.009
Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	<0.1
Alpha BHC	mg/kg	0.1	<0.1	<0.1
Lindane	mg/kg	0.1	<0.1	<0.1
Heptachlor	mg/kg	0.1	<0.1	<0.1
Aldrin	mg/kg	0.1	<0.1	<0.1
Beta BHC	mg/kg	0.1	<0.1	<0.1
Delta BHC	mg/kg	0.1	<0.1	<0.1
Heptachlor epoxide	mg/kg	0.1	<0.1	<0.1
o,p'-DDE	mg/kg	0.1	<0.1	<0.1
Alpha Endosulfan	mg/kg	0.2	<0.2	<0.2
Gamma Chlordane	mg/kg	0.1	<0.1	<0.1
Alpha Chlordane	mg/kg	0.1	<0.1	<0.1
trans-Nonachlor	mg/kg	0.1	<0.1	<0.1
p,p'-DDE	mg/kg	0.1	<0.1	<0.1
Dieldrin	mg/kg	0.2	<0.2	<0.2
Endrin	mg/kg	0.2	<0.2	<0.2
o,p'-DDD	mg/kg	0.1	<0.1	<0.1
o,p'-DDT	mg/kg	0.1	<0.1	<0.1
Beta Endosulfan	mg/kg	0.2	<0.2	<0.2
p,p'-DDD	mg/kg	0.1	<0.1	<0.1
p,p'-DDT	mg/kg	0.1	<0.1	<0.1
Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	0.1	<0.1	<0.1
Methoxychlor	mg/kg	0.1	<0.1	<0.1
Endrin Ketone	mg/kg	0.1	<0.1	<0.1
Isodrin	mg/kg	0.1	<0.1	<0.1
Mirex	mg/kg	0.1	<0.1	<0.1

PCBs in Soil [AN420] Tested: 20/4/2017

PARAMETER	UOM	LOR	BH04/0.4-0.6 SOIL - 18/4/2017 SE164358.006	BH05/0.2-0.4 SOIL - 18/4/2017 SE164358.008
Arochlor 1016	mg/kg	0.2	<0.2	<0.2
Arochlor 1221	mg/kg	0.2	<0.2	<0.2
Arochlor 1232	mg/kg	0.2	<0.2	<0.2
Arochlor 1242	mg/kg	0.2	<0.2	<0.2
Arochlor 1248	mg/kg	0.2	<0.2	<0.2
Arochlor 1254	mg/kg	0.2	<0.2	<0.2
Arochlor 1260	mg/kg	0.2	<0.2	<0.2
Arochlor 1262	mg/kg	0.2	<0.2	<0.2
Arochlor 1268	mg/kg	0.2	<0.2	<0.2
Total PCBs (Arochlors)	mg/kg	1	<1	<1

Total Recoverable Metals in Soil/Waste Solids/Materials by ICPOES [AN040/AN320] Tested: 24/4/2017

PARAMETER	UOM	LOR	BH01/0.1-0.3 SOIL - 18/4/2017 SE164358.001	BH02/0.15-0.35 SOIL - 18/4/2017 SE164358.002	BH02/0.5-0.7 SOIL - 18/4/2017 SE164358.003	BH03/0.3-0.5 SOIL - 18/4/2017 SE164358.004	BH03/0.6-0.8 SOIL - 18/4/2017 SE164358.005
Arsenic, As	mg/kg	3	6	4	<3	3	<3
Cadmium, Cd	mg/kg	0.3	0.3	<0.3	<0.3	<0.3	0.5
Chromium, Cr	mg/kg	0.3	30	7.1	2.2	26	15
Copper, Cu	mg/kg	0.5	0.7	3.5	1.9	7.7	3.6
Lead, Pb	mg/kg	1	20	13	6	15	20
Nickel, Ni	mg/kg	0.5	<0.5	2.7	<0.5	20	<0.5
Zinc, Zn	mg/kg	0.5	3.3	8.1	<0.5	12	4.5

PARAMETER	UOM	LOR	BH04/0.4-0.6 SOIL - 18/4/2017 SE164358.006	BH05/0.2-0.4 SOIL - 18/4/2017 SE164358.008	BH06/0.3-0.5 SOIL - 18/4/2017 SE164358.009	BH06/0.7-0.9 SOIL - 18/4/2017 SE164358.010	DUP01 SOIL - 18/4/2017 SE164358.011
Arsenic, As	mg/kg	3	3	13	3	3	<3
Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Chromium, Cr	mg/kg	0.3	19	14	37	7.6	6.1
Copper, Cu	mg/kg	0.5	35	1.5	21	3.0	0.6
Lead, Pb	mg/kg	1	11	19	11	15	16
Nickel, Ni	mg/kg	0.5	38	<0.5	34	<0.5	<0.5
Zinc, Zn	mg/kg	0.5	86	2.5	26	1.5	0.6

PARAMETER	UOM	LOR	DUP01A SOIL - 18/4/2017 SE164358.012
Arsenic, As	mg/kg	3	<3
Cadmium, Cd	mg/kg	0.3	<0.3
Chromium, Cr	mg/kg	0.3	10
Copper, Cu	mg/kg	0.5	0.7
Lead, Pb	mg/kg	1	16
Nickel, Ni	mg/kg	0.5	<0.5
Zinc, Zn	mg/kg	0.5	1.1

Mercury in Soil [AN312] Tested: 21/4/2017

PARAMETER	UOM	LOR	BH01/0.1-0.3 SOIL - 18/4/2017 SE164358.001	BH02/0.15-0.35 SOIL - 18/4/2017 SE164358.002	BH02/0.5-0.7 SOIL - 18/4/2017 SE164358.003	BH03/0.3-0.5 SOIL - 18/4/2017 SE164358.004	BH03/0.6-0.8 SOIL - 18/4/2017 SE164358.005
Mercury	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05	<0.05

PARAMETER	UOM	LOR	BH04/0.4-0.6 SOIL - 18/4/2017 SE164358.006	BH05/0.2-0.4 SOIL - 18/4/2017 SE164358.008	BH06/0.3-0.5 SOIL - 18/4/2017 SE164358.009	BH06/0.7-0.9 SOIL - 18/4/2017 SE164358.010	DUP01 SOIL - 18/4/2017 SE164358.011
Mercury	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05	<0.05

PARAMETER	UOM	LOR	DUP01A SOIL - 18/4/2017 SE164358.012
Mercury	mg/kg	0.05	<0.05

Moisture Content [AN002] Tested: 24/4/2017

PARAMETER	UOM	LOR	BH01/0.1-0.3 SOIL - 18/4/2017 SE164358.001	BH02/0.15-0.35 SOIL - 18/4/2017 SE164358.002	BH02/0.5-0.7 SOIL - 18/4/2017 SE164358.003	BH03/0.3-0.5 SOIL - 18/4/2017 SE164358.004	BH03/0.6-0.8 SOIL - 18/4/2017 SE164358.005
% Moisture	%w/w	0.5	18	13	12	15	14

PARAMETER	UOM	LOR	BH04/0.4-0.6 SOIL - 18/4/2017 SE164358.006	BH04/0.6-0.8 SOIL - 18/4/2017 SE164358.007	BH05/0.2-0.4 SOIL - 18/4/2017 SE164358.008	BH06/0.3-0.5 SOIL - 18/4/2017 SE164358.009	BH06/0.7-0.9 SOIL - 18/4/2017 SE164358.010
% Moisture	%w/w	0.5	11	14	16	12	13

PARAMETER	UOM	LOR	DUP01 SOIL - 18/4/2017 SE164358.011	DUP01A SOIL - 18/4/2017 SE164358.012
% Moisture	%w/w	0.5	17	17

Fibre Identification in soil [AN602] Tested: 24/4/2017

PARAMETER	UOM	LOR	BH02/0.15-0.35 SOIL - 18/4/2017 SE164358.002	BH03/0.3-0.5 SOIL - 18/4/2017 SE164358.004	BH04/0.4-0.6 SOIL - 18/4/2017 SE164358.006	BH05/0.2-0.4 SOIL - 18/4/2017 SE164358.008	BH06/0.3-0.5 SOIL - 18/4/2017 SE164358.009
Asbestos Detected	No unit	-	No	No	No	No	No

VOCs in Water [AN433] Tested: 20/4/2017

PARAMETER	UOM	LOR	Trip Spike WATER - 18/4/2017 SE164358.014	Trip Blank WATER - 18/4/2017 SE164358.015
Benzene	µg/L	0.5	[97%]	<0.5
Toluene	µg/L	0.5	[97%]	<0.5
Ethylbenzene	µg/L	0.5	[101%]	<0.5
m/p-xylene	µg/L	1	[106%]	<1
o-xylene	µg/L	0.5	[105%]	<0.5
Naphthalene	µg/L	0.5	-	<0.5
Total Xylenes	µg/L	1.5	-	<1.5
Total BTEX	µg/L	3	-	<3

Trace Metals (Dissolved) in Water by ICPMS [AN318] Tested: 20/4/2017

PARAMETER	UOM	LOR	RB01 WATER - 18/4/2017 SE164358.013
Arsenic, As	µg/L	1	<1
Cadmium, Cd	µg/L	0.1	<0.1
Copper, Cu	µg/L	1	<1
Chromium, Cr	µg/L	1	<1
Nickel, Ni	µg/L	1	<1
Lead, Pb	µg/L	1	<1
Zinc, Zn	µg/L	5	<5

Mercury (dissolved) in Water [AN311(Perth)/AN312] Tested: 26/4/2017

PARAMETER	UOM	LOR	RB01 WATER - 18/4/2017 SE164358.013
Mercury	mg/L	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.
AN311(Perth)/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.
AN403	Total Recoverable Hydrocarbons: Determination of Hydrocarbons by gas chromatography after a solvent extraction. Detection is by flame ionisation detector (FID) that produces an electronic signal in proportion to the combustible matter passing through it. Total Recoverable Hydrocarbons (TRH) are routinely reported as four alkane groupings based on the carbon chain length of the compounds: C6-C9, C10-C14, C15-C28 and C29-C36 and in recognition of the NEPM 1999 (2013), >C10-C16 (F2), >C16-C34 (F3) and >C34-C40 (F4). F2 is reported directly and also corrected by subtracting Naphthalene (from VOC method AN433) where available.
AN403	Additionally, the volatile C6-C9 fraction may be determined by a purge and trap technique and GC/MS because of the potential for volatiles loss. Total Petroleum Hydrocarbons (TPH) follows the same method of analysis after silica gel cleanup of the solvent extract. Aliphatic/Aromatic Speciation follows the same method of analysis after fractionation of the solvent extract over silica with differential polarity of the eluent solvents .
AN403	The GC/FID method is not well suited to the analysis of refined high boiling point materials (ie lubricating oils or greases) but is particularly suited for measuring diesel, kerosene and petrol if care to control volatility is taken. This method will detect naturally occurring hydrocarbons, lipids, animal fats, phenols and PAHs if they are present at sufficient levels, dependent on the use of specific cleanup /fractionation techniques. Reference USEPA 3510B, 8015B.
AN420	(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).
AN420	SVOC Compounds: Semi-Volatile Organic Compounds (SVOCs) including OC, OP, PCB, Herbicides, PAH, Phthalates and Speciated Phenols in soils, sediments and waters are determined by GCMS /ECD technique following appropriate solvent extraction process (Based on USEPA 3500C and 8270D).
AN433	VOCs and C6-C9 Hydrocarbons by GC-MS P&T: VOC`s are volatile organic compounds. The sample is presented to a gas chromatograph via a purge and trap (P&T) concentrator and autosampler and is detected with a Mass Spectrometer (MSD). Solid samples are initially extracted with methanol whilst liquid samples are processed directly. References: USEPA 5030B, 8020A, 8260.
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.
AN602	Fibres/material that cannot be unequivocably identified as one of the three asbestos forms, will be reported as unknown mineral fibres (umf).
AN602	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."

AN602	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.		

Samples analysed as received.
Solid samples expressed on a dry weight basis.

Where "Total" analyte groups are reported (for example, Total PAHs, Total OC Pesticides) the total will be calculated as the sum of the individual analytes, with those analytes that are reported as <LOR being assumed to be zero. The summed (Total) limit of reporting is calculated by summing the individual analyte LORs and dividing by two. For example, where 16 individual analytes are being summed and each has an LOR of 0.1 mg/kg, the "Totals" LOR will be 1.6 / 2 (0.8 mg/kg). Where only 2 analytes are being summed, the " Total" LOR will be the sum of those two LORs.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

If reported, measurement uncertainty follow the ± sign after the analytical result and is expressed as the expanded uncertainty calculated using a coverage factor of 2, providing a level of confidence of approximately 95%, unless stated otherwise in the comments section of this report.

Results reported for samples tested under test methods with codes starting with ARS-SOP, radionuclide or gross radioactivity concentrations are expressed in becquerel (Bq) per unit of mass or volume or per wipe as stated on the report. Becquerel is the SI unit for activity and equals one nuclear transformation per second.
Note that in terms of units of radioactivity:

a. 1 Bq is equivalent to 27 pCi
b. 37 MBq is equivalent to 1 mCi

For results reported for samples tested under test methods with codes starting with ARS-SOP, less than (<) values indicate the detection limit for each radionuclide or parameter for the measurement system used. The respective detection limits have been calculated in accordance with ISO 11929.

The QC criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here : http://www.sgs.com.au/~/media/Local/Australia/Documents/Technical%20Documents/MP-AU-ENV-QU-022%20QA%20QC%20Plan.pdf

ANALYTICAL REPORT

Accreditation No. 2562

CLIENT DETAILS

Contact	Craig Cowper
Client	SLR CONSULTING AUSTRALIA PTY LTD
Address	Lego Building, 2 Lincoln Street (PO Box 176 NSW LANECOVE 1595) LANECOVE NSW 2066
Telephone	02 9427 8100
Facsimile	02 9427 8200
Email	ccowper@slrconsulting.com
Project	**610.17038 St Ives**
Order Number	**22498**
Samples	5

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	**SE164358 R0**
Date Received	19 Apr 2017
Date Reported	27 Apr 2017

COMMENTS

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

No respirable fibres detected in all soil samples using trace analysis technique.

Asbestos analysed by Approved Identifier Ravee Sivasubramaniam .

SIGNATORIES

Andy Sutton
Senior Organic Chemist

Bennet Lo
Senior Organic Chemist/Metals Chemis

Dong Liang
Metals/Inorganics Team Leader

Kamrul Ahsan
Senior Chemist

Ly Kim Ha
Organic Section Head

Ravee Sivasubramaniam
Hygiene Team Leader

ANALYTICAL REPORT

RESULTS

Fibre Identification in soil — Method AN602

Laboratory Reference	Client Reference	Matrix	Sample Description	Date Sampled	Fibre Identification
SE164358.002	BH02/0.15-0.35	Soil	72g Clay	18 Apr 2017	No Asbestos Found
SE164358.004	BH03/0.3-0.5	Soil	69g Clay	18 Apr 2017	No Asbestos Found
SE164358.006	BH04/0.4-0.6	Soil	64g Clay	18 Apr 2017	No Asbestos Found
SE164358.008	BH05/0.2-0.4	Soil	63g Clay	18 Apr 2017	No Asbestos Found
SE164358.009	BH06/0.3-0.5	Soil		18 Apr 2017	No Asbestos Found

METHOD SUMMARY

SE164358 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.
AN602	Fibres/material that cannot be unequivocably identified as one of the three asbestos forms, will be reported as unknown mineral fibres (umf).
AN602	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."
AN602	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

STATEMENT OF QA/QC PERFORMANCE

SE164358 R0

CLIENT DETAILS

Contact	Craig Cowper
Client	SLR CONSULTING AUSTRALIA PTY LTD
Address	Lego Building, 2 Lincoln Street (PO Box 176 NSW LANECOVE 1595) LANECOVE NSW 2066
Telephone	02 9427 8100
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Email	ccowper@slrconsulting.com
Project	**610.17038 St Ives**
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Samples	15

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	**SE164358 R0**
Date Received	19 Apr 2017
Date Reported	27 Apr 2017

COMMENTS

All the laboratory data for each environmental matrix was compared to SGS' 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/Waste Solids/Materials by ICPOES	1 item

SAMPLE SUMMARY

Samples clearly labelled	Yes	Complete documentation received	Yes
Sample container provider	SGS	Sample cooling method	Ice
Samples received in correct containers	Yes	Sample counts by matrix	12 Soil, 3 Water
Date documentation received	19/4/2017	Type of documentation received	COC
Samples received in good order	Yes	Samples received without headspace	Yes
Sample temperature upon receipt	4.0°C	Sufficient sample for analysis	Yes
Turnaround time requested	Standard		

HOLDING TIME SUMMARY

SE164358 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
BH02/0.15-0.35	SE164358.002	LB122819	18 Apr 2017	19 Apr 2017	18 Apr 2018	24 Apr 2017	18 Apr 2018	27 Apr 2017
BH03/0.3-0.5	SE164358.004	LB122819	18 Apr 2017	19 Apr 2017	18 Apr 2018	24 Apr 2017	18 Apr 2018	27 Apr 2017
BH04/0.4-0.6	SE164358.006	LB122819	18 Apr 2017	19 Apr 2017	18 Apr 2018	24 Apr 2017	18 Apr 2018	27 Apr 2017
BH05/0.2-0.4	SE164358.008	LB122819	18 Apr 2017	19 Apr 2017	18 Apr 2018	24 Apr 2017	18 Apr 2018	27 Apr 2017
BH06/0.3-0.5	SE164358.009	LB122819	18 Apr 2017	19 Apr 2017	18 Apr 2018	24 Apr 2017	18 Apr 2018	27 Apr 2017

Mercury (dissolved) in Water

Method: ME-(AU)-[ENV]AN311(Perth)/AN312

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
RB01	SE164358.013	LB122864	18 Apr 2017	19 Apr 2017	16 May 2017	26 Apr 2017	16 May 2017	26 Apr 2017

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH01/0.1-0.3	SE164358.001	LB122741	18 Apr 2017	19 Apr 2017	16 May 2017	21 Apr 2017	16 May 2017	26 Apr 2017
BH02/0.15-0.35	SE164358.002	LB122741	18 Apr 2017	19 Apr 2017	16 May 2017	21 Apr 2017	16 May 2017	26 Apr 2017
BH02/0.5-0.7	SE164358.003	LB122741	18 Apr 2017	19 Apr 2017	16 May 2017	21 Apr 2017	16 May 2017	26 Apr 2017
BH03/0.3-0.5	SE164358.004	LB122741	18 Apr 2017	19 Apr 2017	16 May 2017	21 Apr 2017	16 May 2017	26 Apr 2017
BH03/0.6-0.8	SE164358.005	LB122741	18 Apr 2017	19 Apr 2017	16 May 2017	21 Apr 2017	16 May 2017	26 Apr 2017
BH04/0.4-0.6	SE164358.006	LB122741	18 Apr 2017	19 Apr 2017	16 May 2017	21 Apr 2017	16 May 2017	26 Apr 2017
BH05/0.2-0.4	SE164358.008	LB122741	18 Apr 2017	19 Apr 2017	16 May 2017	21 Apr 2017	16 May 2017	26 Apr 2017
BH06/0.3-0.5	SE164358.009	LB122741	18 Apr 2017	19 Apr 2017	16 May 2017	21 Apr 2017	16 May 2017	26 Apr 2017
BH06/0.7-0.9	SE164358.010	LB122741	18 Apr 2017	19 Apr 2017	16 May 2017	21 Apr 2017	16 May 2017	26 Apr 2017
DUP01	SE164358.011	LB122741	18 Apr 2017	19 Apr 2017	16 May 2017	21 Apr 2017	16 May 2017	26 Apr 2017
DUP01A	SE164358.012	LB122741	18 Apr 2017	19 Apr 2017	16 May 2017	21 Apr 2017	16 May 2017	26 Apr 2017

Moisture Content

Method: ME-(AU)-[ENV]AN002

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH01/0.1-0.3	SE164358.001	LB122790	18 Apr 2017	19 Apr 2017	02 May 2017	24 Apr 2017	29 Apr 2017	26 Apr 2017
BH02/0.15-0.35	SE164358.002	LB122790	18 Apr 2017	19 Apr 2017	02 May 2017	24 Apr 2017	29 Apr 2017	26 Apr 2017
BH02/0.5-0.7	SE164358.003	LB122790	18 Apr 2017	19 Apr 2017	02 May 2017	24 Apr 2017	29 Apr 2017	26 Apr 2017
BH03/0.3-0.5	SE164358.004	LB122790	18 Apr 2017	19 Apr 2017	02 May 2017	24 Apr 2017	29 Apr 2017	26 Apr 2017
BH03/0.6-0.8	SE164358.005	LB122790	18 Apr 2017	19 Apr 2017	02 May 2017	24 Apr 2017	29 Apr 2017	26 Apr 2017
BH04/0.4-0.6	SE164358.006	LB122790	18 Apr 2017	19 Apr 2017	02 May 2017	24 Apr 2017	29 Apr 2017	26 Apr 2017
BH04/0.6-0.8	SE164358.007	LB122790	18 Apr 2017	19 Apr 2017	02 May 2017	24 Apr 2017	29 Apr 2017	26 Apr 2017
BH05/0.2-0.4	SE164358.008	LB122790	18 Apr 2017	19 Apr 2017	02 May 2017	24 Apr 2017	29 Apr 2017	26 Apr 2017
BH06/0.3-0.5	SE164358.009	LB122790	18 Apr 2017	19 Apr 2017	02 May 2017	24 Apr 2017	29 Apr 2017	26 Apr 2017
BH06/0.7-0.9	SE164358.010	LB122790	18 Apr 2017	19 Apr 2017	02 May 2017	24 Apr 2017	29 Apr 2017	26 Apr 2017
DUP01	SE164358.011	LB122790	18 Apr 2017	19 Apr 2017	02 May 2017	24 Apr 2017	29 Apr 2017	26 Apr 2017
DUP01A	SE164358.012	LB122790	18 Apr 2017	19 Apr 2017	02 May 2017	24 Apr 2017	29 Apr 2017	26 Apr 2017

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH01/0.1-0.3	SE164358.001	LB122637	18 Apr 2017	19 Apr 2017	02 May 2017	20 Apr 2017	30 May 2017	26 Apr 2017
BH02/0.15-0.35	SE164358.002	LB122637	18 Apr 2017	19 Apr 2017	02 May 2017	20 Apr 2017	30 May 2017	26 Apr 2017
BH03/0.3-0.5	SE164358.004	LB122637	18 Apr 2017	19 Apr 2017	02 May 2017	20 Apr 2017	30 May 2017	26 Apr 2017
BH04/0.4-0.6	SE164358.006	LB122637	18 Apr 2017	19 Apr 2017	02 May 2017	20 Apr 2017	30 May 2017	26 Apr 2017
BH04/0.6-0.8	SE164358.007	LB122637	18 Apr 2017	19 Apr 2017	02 May 2017	20 Apr 2017	30 May 2017	26 Apr 2017
BH05/0.2-0.4	SE164358.008	LB122637	18 Apr 2017	19 Apr 2017	02 May 2017	20 Apr 2017	30 May 2017	26 Apr 2017
BH06/0.3-0.5	SE164358.009	LB122637	18 Apr 2017	19 Apr 2017	02 May 2017	20 Apr 2017	30 May 2017	26 Apr 2017
BH06/0.7-0.9	SE164358.010	LB122637	18 Apr 2017	19 Apr 2017	02 May 2017	20 Apr 2017	30 May 2017	26 Apr 2017

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
BH01/0.1-0.3	SE164358.001	LB122637	18 Apr 2017	19 Apr 2017	02 May 2017	20 Apr 2017	30 May 2017	26 Apr 2017
BH02/0.15-0.35	SE164358.002	LB122637	18 Apr 2017	19 Apr 2017	02 May 2017	20 Apr 2017	30 May 2017	26 Apr 2017
BH03/0.3-0.5	SE164358.004	LB122637	18 Apr 2017	19 Apr 2017	02 May 2017	20 Apr 2017	30 May 2017	26 Apr 2017
BH04/0.4-0.6	SE164358.006	LB122637	18 Apr 2017	19 Apr 2017	02 May 2017	20 Apr 2017	30 May 2017	26 Apr 2017
BH04/0.6-0.8	SE164358.007	LB122637	18 Apr 2017	19 Apr 2017	02 May 2017	20 Apr 2017	30 May 2017	26 Apr 2017
BH05/0.2-0.4	SE164358.008	LB122637	18 Apr 2017	19 Apr 2017	02 May 2017	20 Apr 2017	30 May 2017	26 Apr 2017
BH06/0.3-0.5	SE164358.009	LB122637	18 Apr 2017	19 Apr 2017	02 May 2017	20 Apr 2017	30 May 2017	26 Apr 2017
BH06/0.7-0.9	SE164358.010	LB122637	18 Apr 2017	19 Apr 2017	02 May 2017	20 Apr 2017	30 May 2017	26 Apr 2017

HOLDING TIME SUMMARY

SE164358 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.

PCBs in Soil

Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH01/0.1-0.3	SE164358.001	LB122637	18 Apr 2017	19 Apr 2017	02 May 2017	20 Apr 2017	30 May 2017	26 Apr 2017
BH02/0.15-0.35	SE164358.002	LB122637	18 Apr 2017	19 Apr 2017	02 May 2017	20 Apr 2017	30 May 2017	26 Apr 2017
BH03/0.3-0.5	SE164358.004	LB122637	18 Apr 2017	19 Apr 2017	02 May 2017	20 Apr 2017	30 May 2017	26 Apr 2017
BH04/0.4-0.6	SE164358.006	LB122637	18 Apr 2017	19 Apr 2017	02 May 2017	20 Apr 2017	30 May 2017	26 Apr 2017
BH04/0.6-0.8	SE164358.007	LB122637	18 Apr 2017	19 Apr 2017	02 May 2017	20 Apr 2017	30 May 2017	26 Apr 2017
BH05/0.2-0.4	SE164358.008	LB122637	18 Apr 2017	19 Apr 2017	02 May 2017	20 Apr 2017	30 May 2017	26 Apr 2017
BH06/0.3-0.5	SE164358.009	LB122637	18 Apr 2017	19 Apr 2017	02 May 2017	20 Apr 2017	30 May 2017	26 Apr 2017
BH06/0.7-0.9	SE164358.010	LB122637	18 Apr 2017	19 Apr 2017	02 May 2017	20 Apr 2017	30 May 2017	26 Apr 2017

Total Recoverable Metals in Soil/Waste Solids/Materials by ICPOES

Method: ME-(AU)-[ENV]AN040/AN320

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH01/0.1-0.3	SE164358.001	LB122772	18 Apr 2017	19 Apr 2017	15 Oct 2017	24 Apr 2017	15 Oct 2017	26 Apr 2017
BH02/0.15-0.35	SE164358.002	LB122772	18 Apr 2017	19 Apr 2017	15 Oct 2017	24 Apr 2017	15 Oct 2017	26 Apr 2017
BH02/0.5-0.7	SE164358.003	LB122772	18 Apr 2017	19 Apr 2017	15 Oct 2017	24 Apr 2017	15 Oct 2017	26 Apr 2017
BH03/0.3-0.5	SE164358.004	LB122772	18 Apr 2017	19 Apr 2017	15 Oct 2017	24 Apr 2017	15 Oct 2017	26 Apr 2017
BH03/0.6-0.8	SE164358.005	LB122772	18 Apr 2017	19 Apr 2017	15 Oct 2017	24 Apr 2017	15 Oct 2017	26 Apr 2017
BH04/0.4-0.6	SE164358.006	LB122772	18 Apr 2017	19 Apr 2017	15 Oct 2017	24 Apr 2017	15 Oct 2017	26 Apr 2017
BH05/0.2-0.4	SE164358.008	LB122772	18 Apr 2017	19 Apr 2017	15 Oct 2017	24 Apr 2017	15 Oct 2017	26 Apr 2017
BH06/0.3-0.5	SE164358.009	LB122772	18 Apr 2017	19 Apr 2017	15 Oct 2017	24 Apr 2017	15 Oct 2017	26 Apr 2017
BH06/0.7-0.9	SE164358.010	LB122772	18 Apr 2017	19 Apr 2017	15 Oct 2017	24 Apr 2017	15 Oct 2017	26 Apr 2017
DUP01	SE164358.011	LB122772	18 Apr 2017	19 Apr 2017	15 Oct 2017	24 Apr 2017	15 Oct 2017	26 Apr 2017
DUP01A	SE164358.012	LB122772	18 Apr 2017	19 Apr 2017	15 Oct 2017	24 Apr 2017	15 Oct 2017	26 Apr 2017

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
RB01	SE164358.013	LB122616	18 Apr 2017	19 Apr 2017	15 Oct 2017	20 Apr 2017	15 Oct 2017	21 Apr 2017

TRH (Total Recoverable Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN403

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH01/0.1-0.3	SE164358.001	LB122637	18 Apr 2017	19 Apr 2017	02 May 2017	20 Apr 2017	30 May 2017	26 Apr 2017
BH02/0.15-0.35	SE164358.002	LB122637	18 Apr 2017	19 Apr 2017	02 May 2017	20 Apr 2017	30 May 2017	26 Apr 2017
BH03/0.3-0.5	SE164358.004	LB122637	18 Apr 2017	19 Apr 2017	02 May 2017	20 Apr 2017	30 May 2017	26 Apr 2017
BH04/0.4-0.6	SE164358.006	LB122637	18 Apr 2017	19 Apr 2017	02 May 2017	20 Apr 2017	30 May 2017	26 Apr 2017
BH04/0.6-0.8	SE164358.007	LB122637	18 Apr 2017	19 Apr 2017	02 May 2017	20 Apr 2017	30 May 2017	26 Apr 2017
BH05/0.2-0.4	SE164358.008	LB122637	18 Apr 2017	19 Apr 2017	02 May 2017	20 Apr 2017	30 May 2017	26 Apr 2017
BH06/0.3-0.5	SE164358.009	LB122637	18 Apr 2017	19 Apr 2017	02 May 2017	20 Apr 2017	30 May 2017	26 Apr 2017
BH06/0.7-0.9	SE164358.010	LB122637	18 Apr 2017	19 Apr 2017	02 May 2017	20 Apr 2017	30 May 2017	26 Apr 2017

VOC's in Soil

Method: ME-(AU)-[ENV]AN433

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH01/0.1-0.3	SE164358.001	LB122743	18 Apr 2017	19 Apr 2017	02 May 2017	21 Apr 2017	31 May 2017	26 Apr 2017
BH02/0.15-0.35	SE164358.002	LB122743	18 Apr 2017	19 Apr 2017	02 May 2017	21 Apr 2017	31 May 2017	27 Apr 2017
BH03/0.3-0.5	SE164358.004	LB122743	18 Apr 2017	19 Apr 2017	02 May 2017	21 Apr 2017	31 May 2017	26 Apr 2017
BH04/0.4-0.6	SE164358.006	LB122743	18 Apr 2017	19 Apr 2017	02 May 2017	21 Apr 2017	31 May 2017	27 Apr 2017
BH04/0.6-0.8	SE164358.007	LB122743	18 Apr 2017	19 Apr 2017	02 May 2017	21 Apr 2017	31 May 2017	26 Apr 2017
BH05/0.2-0.4	SE164358.008	LB122743	18 Apr 2017	19 Apr 2017	02 May 2017	21 Apr 2017	31 May 2017	26 Apr 2017
BH06/0.3-0.5	SE164358.009	LB122743	18 Apr 2017	19 Apr 2017	02 May 2017	21 Apr 2017	31 May 2017	26 Apr 2017

VOCs in Water

Method: ME-(AU)-[ENV]AN433

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
Trip Spike	SE164358.014	LB122640	18 Apr 2017	19 Apr 2017	25 Apr 2017	20 Apr 2017	30 May 2017	26 Apr 2017
Trip Blank	SE164358.015	LB122640	18 Apr 2017	19 Apr 2017	25 Apr 2017	20 Apr 2017	30 May 2017	26 Apr 2017

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH01/0.1-0.3	SE164358.001	LB122743	18 Apr 2017	19 Apr 2017	02 May 2017	21 Apr 2017	31 May 2017	26 Apr 2017
BH02/0.15-0.35	SE164358.002	LB122743	18 Apr 2017	19 Apr 2017	02 May 2017	21 Apr 2017	31 May 2017	27 Apr 2017
BH03/0.3-0.5	SE164358.004	LB122743	18 Apr 2017	19 Apr 2017	02 May 2017	21 Apr 2017	31 May 2017	26 Apr 2017
BH04/0.4-0.6	SE164358.006	LB122743	18 Apr 2017	19 Apr 2017	02 May 2017	21 Apr 2017	31 May 2017	27 Apr 2017
BH04/0.6-0.8	SE164358.007	LB122743	18 Apr 2017	19 Apr 2017	02 May 2017	21 Apr 2017	31 May 2017	26 Apr 2017
BH05/0.2-0.4	SE164358.008	LB122743	18 Apr 2017	19 Apr 2017	02 May 2017	21 Apr 2017	31 May 2017	26 Apr 2017
BH06/0.3-0.5	SE164358.009	LB122743	18 Apr 2017	19 Apr 2017	02 May 2017	21 Apr 2017	31 May 2017	26 Apr 2017

HOLDING TIME SUMMARY

SE164358 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.

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.

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Tetrachloro-m-xylene (TCMX) (Surrogate)	BH03/0.3-0.5	SE164358.004	%	60 - 130%	113
	BH06/0.3-0.5	SE164358.009	%	60 - 130%	114

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
2-fluorobiphenyl (Surrogate)	BH01/0.1-0.3	SE164358.001	%	70 - 130%	82
	BH02/0.15-0.35	SE164358.002	%	70 - 130%	82
	BH03/0.3-0.5	SE164358.004	%	70 - 130%	82
	BH04/0.4-0.6	SE164358.006	%	70 - 130%	82
	BH04/0.6-0.8	SE164358.007	%	70 - 130%	80
	BH05/0.2-0.4	SE164358.008	%	70 - 130%	82
	BH06/0.3-0.5	SE164358.009	%	70 - 130%	74
	BH06/0.7-0.9	SE164358.010	%	70 - 130%	84
d14-p-terphenyl (Surrogate)	BH01/0.1-0.3	SE164358.001	%	70 - 130%	90
	BH02/0.15-0.35	SE164358.002	%	70 - 130%	84
	BH03/0.3-0.5	SE164358.004	%	70 - 130%	94
	BH04/0.4-0.6	SE164358.006	%	70 - 130%	92
	BH04/0.6-0.8	SE164358.007	%	70 - 130%	88
	BH05/0.2-0.4	SE164358.008	%	70 - 130%	94
	BH06/0.3-0.5	SE164358.009	%	70 - 130%	88
	BH06/0.7-0.9	SE164358.010	%	70 - 130%	92
d5-nitrobenzene (Surrogate)	BH01/0.1-0.3	SE164358.001	%	70 - 130%	92
	BH02/0.15-0.35	SE164358.002	%	70 - 130%	92
	BH03/0.3-0.5	SE164358.004	%	70 - 130%	90
	BH04/0.4-0.6	SE164358.006	%	70 - 130%	92
	BH04/0.6-0.8	SE164358.007	%	70 - 130%	92
	BH05/0.2-0.4	SE164358.008	%	70 - 130%	94
	BH06/0.3-0.5	SE164358.009	%	70 - 130%	80
	BH06/0.7-0.9	SE164358.010	%	70 - 130%	96

PCBs in Soil

Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Tetrachloro-m-xylene (TCMX) (Surrogate)	BH04/0.4-0.6	SE164358.006	%	60 - 130%	111
	BH05/0.2-0.4	SE164358.008	%	60 - 130%	117

VOC's in Soil

Method: ME-(AU)-[ENV]AN433

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	BH01/0.1-0.3	SE164358.001	%	60 - 130%	91
	BH02/0.15-0.35	SE164358.002	%	60 - 130%	82
	BH03/0.3-0.5	SE164358.004	%	60 - 130%	90
	BH04/0.4-0.6	SE164358.006	%	60 - 130%	89
	BH04/0.6-0.8	SE164358.007	%	60 - 130%	90
	BH05/0.2-0.4	SE164358.008	%	60 - 130%	90
	BH06/0.3-0.5	SE164358.009	%	60 - 130%	83
d4-1,2-dichloroethane (Surrogate)	BH01/0.1-0.3	SE164358.001	%	60 - 130%	86
	BH02/0.15-0.35	SE164358.002	%	60 - 130%	84
	BH03/0.3-0.5	SE164358.004	%	60 - 130%	74
	BH04/0.4-0.6	SE164358.006	%	60 - 130%	74
	BH04/0.6-0.8	SE164358.007	%	60 - 130%	86
	BH05/0.2-0.4	SE164358.008	%	60 - 130%	81
	BH06/0.3-0.5	SE164358.009	%	60 - 130%	83
d8-toluene (Surrogate)	BH01/0.1-0.3	SE164358.001	%	60 - 130%	79
	BH02/0.15-0.35	SE164358.002	%	60 - 130%	76
	BH03/0.3-0.5	SE164358.004	%	60 - 130%	80
	BH04/0.4-0.6	SE164358.006	%	60 - 130%	79
	BH04/0.6-0.8	SE164358.007	%	60 - 130%	79
	BH05/0.2-0.4	SE164358.008	%	60 - 130%	78
	BH06/0.3-0.5	SE164358.009	%	60 - 130%	90
Dibromofluoromethane (Surrogate)	BH01/0.1-0.3	SE164358.001	%	60 - 130%	78
	BH02/0.15-0.35	SE164358.002	%	60 - 130%	82
	BH03/0.3-0.5	SE164358.004	%	60 - 130%	73
	BH04/0.4-0.6	SE164358.006	%	60 - 130%	73

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

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Dibromofluoromethane (Surrogate)	BH04/0.6-0.8	SE164358.007	%	60 - 130%	78
	BH05/0.2-0.4	SE164358.008	%	60 - 130%	77
	BH06/0.3-0.5	SE164358.009	%	60 - 130%	77

VOCs in Water

Method: ME-(AU)-[ENV]AN433

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	Trip Spike	SE164358.014	%	40 - 130%	91
	Trip Blank	SE164358.015	%	40 - 130%	98
d4-1,2-dichloroethane (Surrogate)	Trip Spike	SE164358.014	%	40 - 130%	90
	Trip Blank	SE164358.015	%	40 - 130%	90
d8-toluene (Surrogate)	Trip Spike	SE164358.014	%	40 - 130%	96
	Trip Blank	SE164358.015	%	40 - 130%	87
Dibromofluoromethane (Surrogate)	Trip Spike	SE164358.014	%	40 - 130%	91
	Trip Blank	SE164358.015	%	40 - 130%	94

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	BH01/0.1-0.3	SE164358.001	%	60 - 130%	91
	BH02/0.15-0.35	SE164358.002	%	60 - 130%	84
	BH03/0.3-0.5	SE164358.004	%	60 - 130%	90
	BH04/0.4-0.6	SE164358.006	%	60 - 130%	88
	BH04/0.6-0.8	SE164358.007	%	60 - 130%	90
	BH05/0.2-0.4	SE164358.008	%	60 - 130%	90
	BH06/0.3-0.5	SE164358.009	%	60 - 130%	83
d4-1,2-dichloroethane (Surrogate)	BH01/0.1-0.3	SE164358.001	%	60 - 130%	86
	BH02/0.15-0.35	SE164358.002	%	60 - 130%	80
	BH03/0.3-0.5	SE164358.004	%	60 - 130%	74
	BH04/0.4-0.6	SE164358.006	%	60 - 130%	83
	BH04/0.6-0.8	SE164358.007	%	60 - 130%	86
	BH05/0.2-0.4	SE164358.008	%	60 - 130%	81
	BH06/0.3-0.5	SE164358.009	%	60 - 130%	83
d8-toluene (Surrogate)	BH01/0.1-0.3	SE164358.001	%	60 - 130%	79
	BH02/0.15-0.35	SE164358.002	%	60 - 130%	90
	BH03/0.3-0.5	SE164358.004	%	60 - 130%	80
	BH04/0.4-0.6	SE164358.006	%	60 - 130%	75
	BH04/0.6-0.8	SE164358.007	%	60 - 130%	79
	BH05/0.2-0.4	SE164358.008	%	60 - 130%	78
	BH06/0.3-0.5	SE164358.009	%	60 - 130%	90
Dibromofluoromethane (Surrogate)	BH01/0.1-0.3	SE164358.001	%	60 - 130%	78
	BH02/0.15-0.35	SE164358.002	%	60 - 130%	75
	BH03/0.3-0.5	SE164358.004	%	60 - 130%	73
	BH04/0.4-0.6	SE164358.006	%	60 - 130%	81
	BH04/0.6-0.8	SE164358.007	%	60 - 130%	78
	BH05/0.2-0.4	SE164358.008	%	60 - 130%	77
	BH06/0.3-0.5	SE164358.009	%	60 - 130%	77

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.

Mercury (dissolved) in Water

Method: ME-(AU)-[ENV]AN311(Perth)/AN312

Sample Number	Parameter	Units	LOR	Result
LB122864.001	Mercury	mg/L	0.0001	<0.0001

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

Sample Number	Parameter	Units	LOR	Result
LB122741.001	Mercury	mg/kg	0.05	<0.05

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result
LB122637.001		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
		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)	%	-	113

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result
LB122637.001		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(ah)anthracene	mg/kg	0.1	<0.1
		Benzo(ghi)perylene	mg/kg	0.1	<0.1
		Total PAH (18)	mg/kg	0.8	<0.8
	Surrogates	d5-nitrobenzene (Surrogate)	%	-	98
		2-fluorobiphenyl (Surrogate)	%	-	86
		d14-p-terphenyl (Surrogate)	%	-	82

PCBs in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number	Parameter	Units	LOR

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.

PCBs in Soil (continued)

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result
LB122637.001		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)	%	-	113

Total Recoverable Metals in Soil/Waste Solids/Materials by ICPOES

Method: ME-(AU)-[ENV]AN040/AN320

Sample Number	Parameter	Units	LOR	Result
LB122772.001	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
LB122616.001	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

TRH (Total Recoverable Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN403

Sample Number	Parameter	Units	LOR	Result
LB122637.001	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

VOC's in Soil

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result
LB122743.001	Fumigants	2,2-dichloropropane	mg/kg	0.1	<0.1
		1,2-dichloropropane	mg/kg	0.1	<0.1
		cis-1,3-dichloropropene	mg/kg	0.1	<0.1
		trans-1,3-dichloropropene	mg/kg	0.1	<0.1
		1,2-dibromoethane (EDB)	mg/kg	0.1	<0.1
	Halogenated Aliphatics	Dichlorodifluoromethane (CFC-12)	mg/kg	1	<1
		Chloromethane	mg/kg	1	<1
		Vinyl chloride (Chloroethene)	mg/kg	0.1	<0.1
		Bromomethane	mg/kg	1	<1
		Chloroethane	mg/kg	1	<1
		Trichlorofluoromethane	mg/kg	1	<1
		Iodomethane	mg/kg	5	<5
		1,1-dichloroethene	mg/kg	0.1	<0.1
		Dichloromethane (Methylene chloride)	mg/kg	0.5	<0.5
		Allyl chloride	mg/kg	0.1	<0.1
		trans-1,2-dichloroethene	mg/kg	0.1	<0.1
		1,1-dichloroethane	mg/kg	0.1	<0.1
		cis-1,2-dichloroethene	mg/kg	0.1	<0.1
		Bromochloromethane	mg/kg	0.1	<0.1
		1,2-dichloroethane	mg/kg	0.1	<0.1
		1,1,1-trichloroethane	mg/kg	0.1	<0.1

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.

VOC's in Soil (continued)

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result
LB122743.001	Halogenated Aliphatics	1,1-dichloropropene	mg/kg	0.1	<0.1
		Carbon tetrachloride	mg/kg	0.1	<0.1
		Dibromomethane	mg/kg	0.1	<0.1
		Trichloroethene (Trichloroethylene -TCE)	mg/kg	0.1	<0.1
		1,1,2-trichloroethane	mg/kg	0.1	<0.1
		1,3-dichloropropane	mg/kg	0.1	<0.1
		Tetrachloroethene (Perchloroethylene,PCE)	mg/kg	0.1	<0.1
		1,1,1,2-tetrachloroethane	mg/kg	0.1	<0.1
		cis-1,4-dichloro-2-butene	mg/kg	1	<1
		1,1,2,2-tetrachloroethane	mg/kg	0.1	<0.1
		1,2,3-trichloropropane	mg/kg	0.1	<0.1
		trans-1,4-dichloro-2-butene	mg/kg	1	<1
		1,2-dibromo-3-chloropropane	mg/kg	0.1	<0.1
		Hexachlorobutadiene	mg/kg	0.1	<0.1
	Halogenated Aromatics	Chlorobenzene	mg/kg	0.1	<0.1
		Bromobenzene	mg/kg	0.1	<0.1
		2-chlorotoluene	mg/kg	0.1	<0.1
		4-chlorotoluene	mg/kg	0.1	<0.1
		1,3-dichlorobenzene	mg/kg	0.1	<0.1
		1,4-dichlorobenzene	mg/kg	0.1	<0.1
		1,2-dichlorobenzene	mg/kg	0.1	<0.1
		1,2,4-trichlorobenzene	mg/kg	0.1	<0.1
		1,2,3-trichlorobenzene	mg/kg	0.1	<0.1
	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
		Styrene (Vinyl benzene)	mg/kg	0.1	<0.1
		Isopropylbenzene (Cumene)	mg/kg	0.1	<0.1
		n-propylbenzene	mg/kg	0.1	<0.1
		1,3,5-trimethylbenzene	mg/kg	0.1	<0.1
		tert-butylbenzene	mg/kg	0.1	<0.1
		1,2,4-trimethylbenzene	mg/kg	0.1	<0.1
		sec-butylbenzene	mg/kg	0.1	<0.1
		p-isopropyltoluene	mg/kg	0.1	<0.1
		n-butylbenzene	mg/kg	0.1	<0.1
	Nitrogenous Compounds	Acrylonitrile	mg/kg	0.1	<0.1
		2-nitropropane	mg/kg	10	<10
	Oxygenated Compounds	Acetone (2-propanone)	mg/kg	10	<10
		MtBE (Methyl-tert-butyl ether)	mg/kg	0.1	<0.1
		Vinyl acetate	mg/kg	10	<10
		MEK (2-butanone)	mg/kg	10	<10
		MIBK (4-methyl-2-pentanone)	mg/kg	1	<1
		2-hexanone (MBK)	mg/kg	5	<5
	Polycyclic VOCs	Naphthalene	mg/kg	0.1	<0.1
	Sulphonated	Carbon disulfide	mg/kg	0.5	<0.5
	Surrogates	Dibromofluoromethane (Surrogate)	%	-	83
		d4-1,2-dichloroethane (Surrogate)	%	-	76
		d8-toluene (Surrogate)	%	-	81
		Bromofluorobenzene (Surrogate)	%	-	86
	Totals	Total BTEX	mg/kg	0.6	<0.3
		Total Chlorinated Hydrocarbons VIC EPA*	mg/kg	1.8	<1.8
		Total Other Chlorinated Hydrocarbons VIC EPA*	mg/kg	1.8	<1.8
	Trihalomethanes	Chloroform	mg/kg	0.1	<0.1
		Bromodichloromethane	mg/kg	0.1	<0.1
		Chlorodibromomethane	mg/kg	0.1	<0.1
		Bromoform	mg/kg	0.1	<0.1

VOCs in Water

Method: ME-(AU)-[ENV]AN433

Sample Number	Parameter	Units	LOR

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

Sample Number		Parameter	Units	LOR	Result
LB122640.001	Monocyclic Aromatic Hydrocarbons	Benzene	µg/L	0.5	<0.5
		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
	Polycyclic VOCs	Naphthalene	µg/L	0.5	<0.5
	Surrogates	Dibromofluoromethane (Surrogate)	%	-	81
		d4-1,2-dichloroethane (Surrogate)	%	-	76
		d8-toluene (Surrogate)	%	-	77
		Bromofluorobenzene (Surrogate)	%	-	79

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result
LB122743.001		TRH C6-C9	mg/kg	20	<20
	Surrogates	Dibromofluoromethane (Surrogate)	%	-	74
		d4-1,2-dichloroethane (Surrogate)	%	-	72
		d8-toluene (Surrogate)	%	-	82

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 in Soil

Method: ME-(AU)-[ENV]AN312

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE164358.011	LB122741.014	Mercury	mg/kg	0.05	<0.05	<0.05	200	0
SE164448.024	LB122741.024	Mercury	mg/kg	0.05	0.06025647960.0474913056		123	19

Moisture Content

Method: ME-(AU)-[ENV]AN002

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE164356.003	LB122790.022	% Moisture	%w/w	0.5	13	14	37	2
SE164356.013	LB122790.033	% Moisture	%w/w	0.5	14	14	37	2
SE164358.004	LB122790.044	% Moisture	%w/w	0.5	15	15	37	2
SE164358.012	LB122790.053	% Moisture	%w/w	0.5	17	17	36	2
SE164501.007	LB122790.011	% Moisture	%w/w	0.5	13	11	38	12

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE164358.009	LB122637.026		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	-	0.17	0.177	30	3

Total Recoverable Metals in Soil/Waste Solids/Materials by ICPOES

Method: ME-(AU)-[ENV]AN040/AN320

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE164357.008	LB122772.024	Lead, Pb	mg/kg	1	19	20	35	1
SE164358.011	LB122772.014	Arsenic, As	mg/kg	3	<3	<3	148	10
		Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	200	0
		Chromium, Cr	mg/kg	0.3	6.1	7.3	37	17
		Copper, Cu	mg/kg	0.5	0.6	0.7	104	12
		Lead, Pb	mg/kg	1	16	16	36	1
		Nickel, Ni	mg/kg	0.5	<0.5	<0.5	200	0
		Zinc, Zn	mg/kg	0.5	0.6	0.8	200	0

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE164247.010	LB122616.014	Cadmium, Cd	µg/L	0.1	<0.1	<0.1	200	0
		Copper, Cu	µg/L	1	<1	<1	144	0
		Lead, Pb	µg/L	1	<1	<1	200	0
		Nickel, Ni	µg/L	1	5	5	35	3
		Zinc, Zn	µg/L	5	14	14	52	1

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.

TRH (Total Recoverable Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN403

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE164357.008	LB122637.027		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

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE164357.010	LB122743.014	Fumigants	2,2-dichloropropane	mg/kg	0.1	<0.1	<0.1	200	0
			1,2-dichloropropane	mg/kg	0.1	<0.1	<0.1	200	0
			cis-1,3-dichloropropene	mg/kg	0.1	<0.1	<0.1	200	0
			trans-1,3-dichloropropene	mg/kg	0.1	<0.1	<0.1	200	0
			1,2-dibromoethane (EDB)	mg/kg	0.1	<0.1	<0.1	200	0
		Halogenated	Dichlorodifluoromethane (CFC-12)	mg/kg	1	<1	<1	200	0
		Aliphatics	Chloromethane	mg/kg	1	<1	<1	200	0
			Vinyl chloride (Chloroethene)	mg/kg	0.1	<0.1	<0.1	200	0
			Bromomethane	mg/kg	1	<1	<1	200	0
			Chloroethane	mg/kg	1	<1	<1	200	0
			Trichlorofluoromethane	mg/kg	1	<1	<1	200	0
			Iodomethane	mg/kg	5	<5	<5	200	0
			1,1-dichloroethene	mg/kg	0.1	<0.1	<0.1	200	0
			Dichloromethane (Methylene chloride)	mg/kg	0.5	<0.5	<0.5	200	0
			Allyl chloride	mg/kg	0.1	<0.1	<0.1	200	0
			trans-1,2-dichloroethene	mg/kg	0.1	<0.1	<0.1	200	0
			1,1-dichloroethane	mg/kg	0.1	<0.1	<0.1	200	0
			cis-1,2-dichloroethene	mg/kg	0.1	<0.1	<0.1	200	0
			Bromochloromethane	mg/kg	0.1	<0.1	<0.1	200	0
			1,2-dichloroethane	mg/kg	0.1	<0.1	<0.1	200	0
			1,1,1-trichloroethane	mg/kg	0.1	<0.1	<0.1	200	0
			1,1-dichloropropene	mg/kg	0.1	<0.1	<0.1	200	0
			Carbon tetrachloride	mg/kg	0.1	<0.1	<0.1	200	0
			Dibromomethane	mg/kg	0.1	<0.1	<0.1	200	0
			Trichloroethene (Trichloroethylene -TCE)	mg/kg	0.1	<0.1	<0.1	200	0
			1,1,2-trichloroethane	mg/kg	0.1	<0.1	<0.1	200	0
			1,3-dichloropropane	mg/kg	0.1	<0.1	<0.1	200	0
			Tetrachloroethene (Perchloroethylene,PCE)	mg/kg	0.1	<0.1	<0.1	200	0
			1,1,1,2-tetrachloroethane	mg/kg	0.1	<0.1	<0.1	200	0
			cis-1,4-dichloro-2-butene	mg/kg	1	<1	<1	200	0
			1,1,2,2-tetrachloroethane	mg/kg	0.1	<0.1	<0.1	200	0
			1,2,3-trichloropropane	mg/kg	0.1	<0.1	<0.1	200	0
			trans-1,4-dichloro-2-butene	mg/kg	1	<1	<1	200	0
			1,2-dibromo-3-chloropropane	mg/kg	0.1	<0.1	<0.1	200	0
			Hexachlorobutadiene	mg/kg	0.1	<0.1	<0.1	200	0
		Halogenated	Chlorobenzene	mg/kg	0.1	<0.1	<0.1	200	0
		Aromatics	Bromobenzene	mg/kg	0.1	<0.1	<0.1	200	0
			2-chlorotoluene	mg/kg	0.1	<0.1	<0.1	200	0
			4-chlorotoluene	mg/kg	0.1	<0.1	<0.1	200	0
			1,3-dichlorobenzene	mg/kg	0.1	<0.1	<0.1	200	0
			1,4-dichlorobenzene	mg/kg	0.1	<0.1	<0.1	200	0
			1,2-dichlorobenzene	mg/kg	0.1	<0.1	<0.1	200	0
			1,2,4-trichlorobenzene	mg/kg	0.1	<0.1	<0.1	200	0
			1,2,3-trichlorobenzene	mg/kg	0.1	<0.1	<0.1	200	0
		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

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**

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE164357.010	LB122743.014	Monocyclic	o-xylene	mg/kg	0.1	<0.1	<0.1	200	0
		Aromatic	Styrene (Vinyl benzene)	mg/kg	0.1	<0.1	<0.1	200	0
			Isopropylbenzene (Cumene)	mg/kg	0.1	<0.1	<0.1	200	0
			n-propylbenzene	mg/kg	0.1	<0.1	<0.1	200	0
			1,3,5-trimethylbenzene	mg/kg	0.1	<0.1	<0.1	200	0
			tert-butylbenzene	mg/kg	0.1	<0.1	<0.1	200	0
			1,2,4-trimethylbenzene	mg/kg	0.1	<0.1	<0.1	200	0
			sec-butylbenzene	mg/kg	0.1	<0.1	<0.1	200	0
			p-isopropyltoluene	mg/kg	0.1	<0.1	<0.1	200	0
			n-butylbenzene	mg/kg	0.1	<0.1	<0.1	200	0
		Nitrogenous	Acrylonitrile	mg/kg	0.1	<0.1	<0.1	200	0
		Compounds	2-nitropropane	mg/kg	10	<10	<10	200	0
		Oxygenated	Acetone (2-propanone)	mg/kg	10	<10	<10	200	0
		Compounds	MtBE (Methyl-tert-butyl ether)	mg/kg	0.1	<0.1	<0.1	200	0
			Vinyl acetate	mg/kg	10	<10	<10	200	0
			MEK (2-butanone)	mg/kg	10	<10	<10	200	0
			MIBK (4-methyl-2-pentanone)	mg/kg	1	<1	<1	200	0
			2-hexanone (MBK)	mg/kg	5	<5	<5	200	0
		Polycyclic	Naphthalene	mg/kg	0.1	<0.1	<0.1	200	0
		Sulphonated	Carbon disulfide	mg/kg	0.5	<0.5	<0.5	200	0
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	3.6	3.7	50	3
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	3.6	3.8	50	6
			d8-toluene (Surrogate)	mg/kg	-	4.0	3.9	50	1
			Bromofluorobenzene (Surrogate)	mg/kg	-	4.2	4.2	50	0
		Totals	Total Xylenes*	mg/kg	0.3	<0.3	<0.3	200	0
			Total BTEX	mg/kg	0.6	<0.6	<0.3	200	0
			Total VOC*	mg/kg	24	<24	<24	200	0
			Total Volatile Chlorinated Hydrocarbons*	mg/kg	3	<3.0	<3.0	200	0
			Total Chlorinated Hydrocarbons VIC EPA*	mg/kg	1.8	<1.8	<1.8	200	0
			Total Other Chlorinated Hydrocarbons VIC EPA*	mg/kg	1.8	<1.8	<1.8	200	0
		Trihalomethan	Chloroform	mg/kg	0.1	<0.1	<0.1	200	0
		es	Bromodichloromethane	mg/kg	0.1	<0.1	<0.1	200	0
			Chlorodibromomethane	mg/kg	0.1	<0.1	<0.1	200	0
			Bromoform	mg/kg	0.1	<0.1	<0.1	200	0
SE164360.001	LB122743.025	Fumigants	2,2-dichloropropane	mg/kg	0.1	<0.2	<0.2	200	0
			1,2-dichloropropane	mg/kg	0.1	<0.2	<0.2	200	0
			cis-1,3-dichloropropene	mg/kg	0.1	<0.2	<0.2	200	0
			trans-1,3-dichloropropene	mg/kg	0.1	<0.2	<0.2	200	0
			1,2-dibromoethane (EDB)	mg/kg	0.1	<0.2	<0.2	200	0
		Halogenated	Dichlorodifluoromethane (CFC-12)	mg/kg	1	<2	<2	200	0
		Aliphatics	Chloromethane	mg/kg	1	<2	<2	200	0
			Vinyl chloride (Chloroethene)	mg/kg	0.1	<0.2	<0.2	200	0
			Bromomethane	mg/kg	1	<2	<2	200	0
			Chloroethane	mg/kg	1	<2	<2	200	0
			Trichlorofluoromethane	mg/kg	1	<2	<2	200	0
			Iodomethane	mg/kg	5	<10	<10	200	0
			1,1-dichloroethene	mg/kg	0.1	<0.2	<0.2	200	0
			Dichloromethane (Methylene chloride)	mg/kg	0.5	<1.0	<1.0	200	0
			Allyl chloride	mg/kg	0.1	<0.2	<0.2	200	0
			trans-1,2-dichloroethene	mg/kg	0.1	<0.2	<0.2	200	0
			1,1-dichloroethane	mg/kg	0.1	<0.2	<0.2	200	0
			cis-1,2-dichloroethene	mg/kg	0.1	<0.2	<0.2	200	0
			Bromochloromethane	mg/kg	0.1	<0.2	<0.2	200	0
			1,2-dichloroethane	mg/kg	0.1	<0.2	<0.2	200	0
			1,1,1-trichloroethane	mg/kg	0.1	<0.2	<0.2	200	0
			1,1-dichloropropene	mg/kg	0.1	<0.2	<0.2	200	0
			Carbon tetrachloride	mg/kg	0.1	<0.2	<0.2	200	0
			Dibromomethane	mg/kg	0.1	<0.2	<0.2	200	0
			Trichloroethene (Trichloroethylene -TCE)	mg/kg	0.1	<0.2	<0.2	200	0
			1,1,2-trichloroethane	mg/kg	0.1	<0.2	<0.2	200	0
			1,3-dichloropropane	mg/kg	0.1	<0.2	<0.2	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.

VOC's in Soil (continued)

Method: ME-(AU)-[ENV]AN433

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE164360.001	LB122743.025	Halogenated	Tetrachloroethene (Perchloroethylene,PCE)	mg/kg	0.1	<0.2	<0.2	200	0
		Aliphatics	1,1,1,2-tetrachloroethane	mg/kg	0.1	<0.2	<0.2	200	0
			cis-1,4-dichloro-2-butene	mg/kg	1	<2	<2	200	0
			1,1,2,2-tetrachloroethane	mg/kg	0.1	<0.2	<0.2	200	0
			1,2,3-trichloropropane	mg/kg	0.1	<0.2	<0.2	200	0
			trans-1,4-dichloro-2-butene	mg/kg	1	<2	<2	200	0
			1,2-dibromo-3-chloropropane	mg/kg	0.1	<0.2	<0.2	200	0
			Hexachlorobutadiene	mg/kg	0.1	<0.2	<0.2	200	0
		Halogenated	Chlorobenzene	mg/kg	0.1	<0.2	<0.2	200	0
		Aromatics	Bromobenzene	mg/kg	0.1	<0.2	<0.2	200	0
			2-chlorotoluene	mg/kg	0.1	<0.2	<0.2	200	0
			4-chlorotoluene	mg/kg	0.1	<0.2	<0.2	200	0
			1,3-dichlorobenzene	mg/kg	0.1	<0.2	<0.2	200	0
			1,4-dichlorobenzene	mg/kg	0.1	<0.2	<0.2	200	0
			1,2-dichlorobenzene	mg/kg	0.1	<0.2	<0.2	200	0
			1,2,4-trichlorobenzene	mg/kg	0.1	<0.2	<0.2	200	0
			1,2,3-trichlorobenzene	mg/kg	0.1	<0.2	<0.2	200	0
		Monocyclic	Benzene	mg/kg	0.1	<0.2	<0.2	200	0
		Aromatic	Toluene	mg/kg	0.1	<0.2	<0.2	135	0
			Ethylbenzene	mg/kg	0.1	0.8	0.7	43	9
			m/p-xylene	mg/kg	0.2	<0.4	<0.4	83	0
			o-xylene	mg/kg	0.1	<0.2	<0.2	200	0
			Styrene (Vinyl benzene)	mg/kg	0.1	<0.2	<0.2	200	0
			Isopropylbenzene (Cumene)	mg/kg	0.1	11	11	31	4
			n-propylbenzene	mg/kg	0.1	51	44	30	15
			1,3,5-trimethylbenzene	mg/kg	0.1	<1.1	<1.1	40	0
			tert-butylbenzene	mg/kg	0.1	<0.2	<0.2	200	0
			1,2,4-trimethylbenzene	mg/kg	0.1	<0.5	<0.5	61	0
			sec-butylbenzene	mg/kg	0.1	10	10	31	3
			p-isopropyltoluene	mg/kg	0.1	<0.2	<0.2	200	0
			n-butylbenzene	mg/kg	0.1	18	21	31	15
		Nitrogenous	Acrylonitrile	mg/kg	0.1	<0.2	<0.2	200	0
		Compounds	2-nitropropane	mg/kg	10	<20	<20	200	0
		Oxygenated	Acetone (2-propanone)	mg/kg	10	<20	<20	200	0
		Compounds	MtBE (Methyl-tert-butyl ether)	mg/kg	0.1	<0.2	<0.2	200	0
			Vinyl acetate	mg/kg	10	<20	<20	200	0
			MEK (2-butanone)	mg/kg	10	<20	<20	200	0
			MIBK (4-methyl-2-pentanone)	mg/kg	1	<2	<2	200	0
			2-hexanone (MBK)	mg/kg	5	<10	<10	200	0
		Polycyclic	Naphthalene	mg/kg	0.1	43	45	30	5
		Sulphonated	Carbon disulfide	mg/kg	0.5	<1.0	<1.0	200	0
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	3.8	3.8	50	1
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	3.6	3.9	50	6
			d8-toluene (Surrogate)	mg/kg	-	3.5	3.5	50	1
			Bromofluorobenzene (Surrogate)	mg/kg	-	6.2	6.4	50	4
		Totals	Total Xylenes*	mg/kg	0.3	<0.6	<0.6	100	0
			Total BTEX	mg/kg	0.6	1.3	1.3	53	5
			Total VOC*	mg/kg	24	140	130	48	2
			Total Volatile Chlorinated Hydrocarbons*	mg/kg	3	<6.0	<6.0	200	0
			Total Chlorinated Hydrocarbons VIC EPA*	mg/kg	1.8	<3.6	<3.6	200	0
			Total Other Chlorinated Hydrocarbons VIC EPA*	mg/kg	1.8	<3.6	<3.6	200	0
		Trihalomethan	Chloroform	mg/kg	0.1	<0.2	<0.2	200	0
		es	Bromodichloromethane	mg/kg	0.1	<0.2	<0.2	200	0
			Chlorodibromomethane	mg/kg	0.1	<0.2	<0.2	200	0
			Bromoform	mg/kg	0.1	<0.2	<0.2	200	0

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE164357.010	LB122743.014		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	-	3.6	3.7	30	1

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.

Volatile Petroleum Hydrocarbons in Soil (continued) — **Method: ME-(AU)-[ENV]AN433**

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE164357.010	LB122743.014	Surrogates	d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.1	4.2	30	2
			d8-toluene (Surrogate)	mg/kg	-	4.0	4.2	30	4
			Bromofluorobenzene (Surrogate)	mg/kg	-	4.1	4.2	30	2
		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
SE164360.001	LB122743.025		TRH C6-C10	mg/kg	25	370	400	36	7
			TRH C6-C9	mg/kg	20	130	140	44	7
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	3.7	3.7	30	1
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	3.8	4.1	30	7
			d8-toluene (Surrogate)	mg/kg	-	3.6	3.7	30	5
			Bromofluorobenzene (Surrogate)	mg/kg	-	3.6	3.7	30	2
		VPH F Bands	Benzene (F0)	mg/kg	0.1	<0.2	<0.2	200	0
			TRH C6-C10 minus BTEX (F1)	mg/kg	25	370	400	36	7

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.

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB122741.002	Mercury	mg/kg	0.05	0.19	0.2	70 - 130	97

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB122637.002		Heptachlor	mg/kg	0.1	0.2	0.2	60 - 140	124
		Aldrin	mg/kg	0.1	0.2	0.2	60 - 140	121
		Delta BHC	mg/kg	0.1	0.2	0.2	60 - 140	124
		Dieldrin	mg/kg	0.2	0.2	0.2	60 - 140	117
		Endrin	mg/kg	0.2	0.2	0.2	60 - 140	123
		p,p'-DDT	mg/kg	0.1	0.2	0.2	60 - 140	124
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0.16	0.15	40 - 130	107

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB122637.002		Naphthalene	mg/kg	0.1	4.4	4	60 - 140	109
		Acenaphthylene	mg/kg	0.1	4.4	4	60 - 140	109
		Acenaphthene	mg/kg	0.1	4.5	4	60 - 140	112
		Phenanthrene	mg/kg	0.1	4.6	4	60 - 140	114
		Anthracene	mg/kg	0.1	4.5	4	60 - 140	113
		Fluoranthene	mg/kg	0.1	4.6	4	60 - 140	115
		Pyrene	mg/kg	0.1	4.5	4	60 - 140	112
		Benzo(a)pyrene	mg/kg	0.1	5.0	4	60 - 140	124
	Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.5	0.5	40 - 130	104
		2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	0.5	40 - 130	96
		d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.5	40 - 130	90

PCBs in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB122637.002	Arochlor 1260	mg/kg	0.2	0.4	0.4	60 - 140	106

Total Recoverable Metals in Soil/Waste Solids/Materials by ICPOES

Method: ME-(AU)-[ENV]AN040/AN320

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB122772.002	Arsenic, As	mg/kg	3	48	50	80 - 120	95
	Cadmium, Cd	mg/kg	0.3	49	50	80 - 120	97
	Chromium, Cr	mg/kg	0.3	46	50	80 - 120	93
	Copper, Cu	mg/kg	0.5	48	50	80 - 120	96
	Lead, Pb	mg/kg	1	49	50	80 - 120	97
	Nickel, Ni	mg/kg	0.5	48	50	80 - 120	96
	Zinc, Zn	mg/kg	0.5	47	50	80 - 120	94

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB122616.002	Arsenic, As	µg/L	1	20	20	80 - 120	100
	Cadmium, Cd	µg/L	0.1	21	20	80 - 120	107
	Chromium, Cr	µg/L	1	23	20	80 - 120	113
	Copper, Cu	µg/L	1	23	20	80 - 120	113
	Lead, Pb	µg/L	1	22	20	80 - 120	110
	Nickel, Ni	µg/L	1	22	20	80 - 120	109
	Zinc, Zn	µg/L	5	21	20	80 - 120	107

TRH (Total Recoverable Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN403

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB122637.002		TRH C10-C14	mg/kg	20	38	40	60 - 140	95
		TRH C15-C28	mg/kg	45	<45	40	60 - 140	93
		TRH C29-C36	mg/kg	45	<45	40	60 - 140	88
	TRH F Bands	TRH >C10-C16 (F2)	mg/kg	25	39	40	60 - 140	98
		TRH >C16-C34 (F3)	mg/kg	90	<90	40	60 - 140	93
		TRH >C34-C40 (F4)	mg/kg	120	<120	20	60 - 140	95

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.

VOC's in Soil

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB122743.002	Halogenated	1,1-dichloroethene	mg/kg	0.1	2.2	2.56	60 - 140	84
	Aliphatics	1,2-dichloroethane	mg/kg	0.1	2.8	2.56	60 - 140	108
		Trichloroethene (Trichloroethylene -TCE)	mg/kg	0.1	1.8	2.56	60 - 140	71
	Halogenated	Chlorobenzene	mg/kg	0.1	2.7	2.56	60 - 140	105
	Monocyclic	Benzene	mg/kg	0.1	2.8	2.9	60 - 140	95
	Aromatic	Toluene	mg/kg	0.1	2.4	2.9	60 - 140	83
		Ethylbenzene	mg/kg	0.1	2.2	2.9	60 - 140	77
		m/p-xylene	mg/kg	0.2	4.8	5.8	60 - 140	83
		o-xylene	mg/kg	0.1	2.6	2.9	60 - 140	91
	Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	4.1	5	60 - 140	82
		d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.6	5	60 - 140	93
		d8-toluene (Surrogate)	mg/kg	-	4.7	5	60 - 140	94
		Bromofluorobenzene (Surrogate)	mg/kg	-	4.9	5	60 - 140	97
	Trihalomethan	Chloroform	mg/kg	0.1	2.3	2.56	60 - 140	90

VOCs in Water

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB122640.002	Monocyclic	Benzene	µg/L	0.5	51	45.45	60 - 140	112
	Aromatic	Toluene	µg/L	0.5	51	45.45	60 - 140	111
		Ethylbenzene	µg/L	0.5	51	45.45	60 - 140	112
		m/p-xylene	µg/L	1	100	90.9	60 - 140	111
		o-xylene	µg/L	0.5	51	45.45	60 - 140	111
	Surrogates	Dibromofluoromethane (Surrogate)	µg/L	-	5.0	5	60 - 140	100
		d4-1,2-dichloroethane (Surrogate)	µg/L	-	5.2	5	60 - 140	105
		d8-toluene (Surrogate)	µg/L	-	5.2	5	60 - 140	104
		Bromofluorobenzene (Surrogate)	µg/L	-	4.8	5	60 - 140	97

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB122743.002		TRH C6-C10	mg/kg	25	<25	24.65	60 - 140	83
		TRH C6-C9	mg/kg	20	20	23.2	60 - 140	87
	Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	4.3	5	60 - 140	87
		d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.4	5	60 - 140	88
		d8-toluene (Surrogate)	mg/kg	-	4.8	5	60 - 140	97
		Bromofluorobenzene (Surrogate)	mg/kg	-	4.4	5	60 - 140	87
	VPH F Bands	TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	7.25	60 - 140	79

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(Perth)/AN312

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE164357.013	LB122864.004	Mercury	mg/L	0.0001	0.0079	<0.0001	0.008	100

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE164358.001	LB122741.004	Mercury	mg/kg	0.05	0.17	<0.05	0.2	86

Total Recoverable Metals in Soil/Waste Solids/Materials by ICPOES

Method: ME-(AU)-[ENV]AN040/AN320

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE164358.001	LB122772.004	Arsenic, As	mg/kg	3	45	6	50	77
		Cadmium, Cd	mg/kg	0.3	45	0.3	50	90
		Chromium, Cr	mg/kg	0.3	61	30	50	63 ⑨
		Copper, Cu	mg/kg	0.5	46	0.7	50	90
		Lead, Pb	mg/kg	1	62	20	50	84
		Nickel, Ni	mg/kg	0.5	45	<0.5	50	88
		Zinc, Zn	mg/kg	0.5	46	3.3	50	86

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE164247.001	LB122616.004	Cadmium, Cd	µg/L	0.1	21	<0.1	20	106
		Copper, Cu	µg/L	1	19	<1	20	93
		Lead, Pb	µg/L	1	21	<1	20	105
		Nickel, Ni	µg/L	1	20	<1	20	95
		Zinc, Zn	µg/L	5	70	52	20	90

TRH (Total Recoverable Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN403

QC Sample	Sample Number		Parameter	Units	LOR	Original	Spike	Recovery%
SE164357.001	LB122637.026		TRH C10-C14	mg/kg	20	<20	40	95
			TRH C15-C28	mg/kg	45	<45	40	98
			TRH C29-C36	mg/kg	45	<45	40	83
			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	98
			TRH >C10-C16 (F2) - Naphthalene	mg/kg	25	<25	-	-
			TRH >C16-C34 (F3)	mg/kg	90	<90	40	95
			TRH >C34-C40 (F4)	mg/kg	120	<120	-	-

VOC's in Soil

Method: ME-(AU)-[ENV]AN433

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE164357.001	LB122743.004	Fumigants	2,2-dichloropropane	mg/kg	0.1	<0.1	<0.1	-	-
			1,2-dichloropropane	mg/kg	0.1	<0.1	<0.1	-	-
			cis-1,3-dichloropropene	mg/kg	0.1	<0.1	<0.1	-	-
			trans-1,3-dichloropropene	mg/kg	0.1	<0.1	<0.1	-	-
			1,2-dibromoethane (EDB)	mg/kg	0.1	<0.1	<0.1	-	-
		Halogenated	Dichlorodifluoromethane (CFC-12)	mg/kg	1	<1	<1	-	-
		Aliphatics	Chloromethane	mg/kg	1	<1	<1	-	-
			Vinyl chloride (Chloroethene)	mg/kg	0.1	<0.1	<0.1	-	-
			Bromomethane	mg/kg	1	<1	<1	-	-
			Chloroethane	mg/kg	1	<1	<1	-	-
			Trichlorofluoromethane	mg/kg	1	<1	<1	-	-
			Iodomethane	mg/kg	5	<5	<5	-	-
			1,1-dichloroethene	mg/kg	0.1	1.9	<0.1	2.56	73
			Dichloromethane (Methylene chloride)	mg/kg	0.5	<0.5	<0.5	-	-
			Allyl chloride	mg/kg	0.1	<0.1	<0.1	-	-
			trans-1,2-dichloroethene	mg/kg	0.1	<0.1	<0.1	-	-
			1,1-dichloroethane	mg/kg	0.1	<0.1	<0.1	-	-
			cis-1,2-dichloroethene	mg/kg	0.1	<0.1	<0.1	-	-
			Bromochloromethane	mg/kg	0.1	<0.1	<0.1	-	-

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

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE164357.001	LB122743.004	Halogenated Aliphatics	1,2-dichloroethane	mg/kg	0.1	2.2	<0.1	2.56	85
			1,1,1-trichloroethane	mg/kg	0.1	<0.1	<0.1	-	-
			1,1-dichloropropene	mg/kg	0.1	<0.1	<0.1	-	-
			Carbon tetrachloride	mg/kg	0.1	<0.1	<0.1	-	-
			Dibromomethane	mg/kg	0.1	<0.1	<0.1	-	-
			Trichloroethene (Trichloroethylene -TCE)	mg/kg	0.1	1.8	<0.1	2.56	71
			1,1,2-trichloroethane	mg/kg	0.1	<0.1	<0.1	-	-
			1,3-dichloropropane	mg/kg	0.1	<0.1	<0.1	-	-
			Tetrachloroethene (Perchloroethylene,PCE)	mg/kg	0.1	<0.1	<0.1	-	-
			1,1,1,2-tetrachloroethane	mg/kg	0.1	<0.1	<0.1	-	-
			cis-1,4-dichloro-2-butene	mg/kg	1	<1	<1	-	-
			1,1,2,2-tetrachloroethane	mg/kg	0.1	<0.1	<0.1	-	-
			1,2,3-trichloropropane	mg/kg	0.1	<0.1	<0.1	-	-
			trans-1,4-dichloro-2-butene	mg/kg	1	<1	<1	-	-
			1,2-dibromo-3-chloropropane	mg/kg	0.1	<0.1	<0.1	-	-
			Hexachlorobutadiene	mg/kg	0.1	<0.1	<0.1	-	-
		Halogenated Aromatics	Chlorobenzene	mg/kg	0.1	2.4	<0.1	2.56	92
			Bromobenzene	mg/kg	0.1	<0.1	<0.1	-	-
			2-chlorotoluene	mg/kg	0.1	<0.1	<0.1	-	-
			4-chlorotoluene	mg/kg	0.1	<0.1	<0.1	-	-
			1,3-dichlorobenzene	mg/kg	0.1	<0.1	<0.1	-	-
			1,4-dichlorobenzene	mg/kg	0.1	<0.1	<0.1	-	-
			1,2-dichlorobenzene	mg/kg	0.1	<0.1	<0.1	-	-
			1,2,4-trichlorobenzene	mg/kg	0.1	<0.1	<0.1	-	-
			1,2,3-trichlorobenzene	mg/kg	0.1	<0.1	<0.1	-	-
		Monocyclic Aromatic	Benzene	mg/kg	0.1	2.6	<0.1	2.9	88
			Toluene	mg/kg	0.1	2.2	<0.1	2.9	74
			Ethylbenzene	mg/kg	0.1	2.0	<0.1	2.9	69
			m/p-xylene	mg/kg	0.2	4.4	<0.2	5.8	73
			o-xylene	mg/kg	0.1	2.4	<0.1	2.9	81
			Styrene (Vinyl benzene)	mg/kg	0.1	<0.1	<0.1	-	-
			Isopropylbenzene (Cumene)	mg/kg	0.1	<0.1	<0.1	-	-
			n-propylbenzene	mg/kg	0.1	<0.1	<0.1	-	-
			1,3,5-trimethylbenzene	mg/kg	0.1	<0.1	<0.1	-	-
			tert-butylbenzene	mg/kg	0.1	<0.1	<0.1	-	-
			1,2,4-trimethylbenzene	mg/kg	0.1	<0.1	<0.1	-	-
			sec-butylbenzene	mg/kg	0.1	<0.1	<0.1	-	-
			p-isopropyltoluene	mg/kg	0.1	<0.1	<0.1	-	-
			n-butylbenzene	mg/kg	0.1	<0.1	<0.1	-	-
		Nitrogenous Compounds	Acrylonitrile	mg/kg	0.1	<0.1	<0.1	-	-
			2-nitropropane	mg/kg	10	<10	<10	-	-
		Oxygenated Compounds	Acetone (2-propanone)	mg/kg	10	<10	<10	-	-
			MtBE (Methyl-tert-butyl ether)	mg/kg	0.1	<0.1	<0.1	-	-
			Vinyl acetate	mg/kg	10	<10	<10	-	-
			MEK (2-butanone)	mg/kg	10	<10	<10	-	-
			MIBK (4-methyl-2-pentanone)	mg/kg	1	<1	<1	-	-
			2-hexanone (MBK)	mg/kg	5	<5	<5	-	-
		Polycyclic	Naphthalene	mg/kg	0.1	<0.1	<0.1	-	-
		Sulphonated	Carbon disulfide	mg/kg	0.5	<0.5	<0.5	-	-
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	3.7	4.0	-	74
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.1	3.9	-	81
			d8-toluene (Surrogate)	mg/kg	-	3.9	4.0	-	77
			Bromofluorobenzene (Surrogate)	mg/kg	-	4.5	4.2	-	90
		Totals	Total Xylenes*	mg/kg	0.3	6.7	<0.3	-	-
			Total BTEX	mg/kg	0.6	13	<0.6	-	-
			Total VOC*	mg/kg	24	24	<24	-	-
			Total Volatile Chlorinated Hydrocarbons*	mg/kg	3	<3.0	<3.0	-	-
			Total Chlorinated Hydrocarbons VIC EPA*	mg/kg	1.8	11	<1.8	-	-
			Total Other Chlorinated Hydrocarbons VIC EPA*	mg/kg	1.8	11	<1.8	-	-
		Trihalomethanes	Chloroform	mg/kg	0.1	2.5	<0.1	2.56	97
			Bromodichloromethane	mg/kg	0.1	<0.1	<0.1	-	-

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

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE164357.001	LB122743.004	Trihalometha	Chlorodibromomethane	mg/kg	0.1	<0.1	<0.1	-	-
		nes	Bromoform	mg/kg	0.1	<0.1	<0.1	-	-

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE164357.001	LB122743.004		TRH C6-C10	mg/kg	25	<25	<25	24.65	81
			TRH C6-C9	mg/kg	20	<20	<20	23.2	68
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	4.4	3.5	-	87
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.1	3.7	-	82
			d8-toluene (Surrogate)	mg/kg	-	4.1	4.0	-	82
			Bromofluorobenzene (Surrogate)	mg/kg	-	3.9	4.2	-	78
		VPH F	Benzene (F0)	mg/kg	0.1	2.6	<0.1	-	-
		Bands	TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	7.25	93

MATRIX SPIKE DUPLICATES

SE164358 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 Documents/MP-AU-ENV-QU-022 QA QC Plan.pdf

*	NATA accreditation does not cover the performance of this service.
-	Sample not analysed for this analyte.

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.

SAMPLE RECEIPT ADVICE

SE164358

CLIENT DETAILS

Contact	Craig Cowper
Client	SLR CONSULTING AUSTRALIA PTY LTD
Address	Lego Building, 2 Lincoln Street (PO Box 176 NSW LANECOVE 1595) LANECOVE NSW 2066
Telephone	02 9427 8100
Facsimile	02 9427 8200
Email	ccowper@slrconsulting.com
Project	**610.17038 St Ives**
Order Number	**22498**
Samples	15

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	Wed 19/4/2017
Report Due	Thu 27/4/2017
SGS Reference	**SE164358**

SUBMISSION DETAILS

This is to confirm that 15 samples were received on Wednesday 19/4/2017. Results are expected to be ready by Thursday 27/4/2017. Please quote SGS reference SE164358 when making enquiries. Refer below for details relating to sample integrity upon receipt.

Samples clearly labelled	Yes	Complete documentation received	Yes
Sample container provider	SGS	Sample cooling method	Ice
Samples received in correct containers	Yes	Sample counts by matrix	12 Soil, 3 Water
Date documentation received	19/4/2017	Type of documentation received	COC
Samples received in good order	Yes	Samples received without headspace	Yes
Sample temperature upon receipt	4.0°C	Sufficient sample for analysis	Yes
Turnaround time requested	Standard		

Unless otherwise instructed, water and bulk samples will be held for one month from date of report, and soil samples will be held for two months.

COMMENTS

SAMPLE RECEIPT ADVICE

SE164358

CLIENT DETAILS

Client SLR CONSULTING AUSTRALIA PTY LTD

Project 610.17038 St Ives

SUMMARY OF ANALYSIS

No.	Sample ID	OC Pesticides in Soil	PAH (Polynuclear Aromatic Hydrocarbons) in Soil	PCBs in Soil	Total Recoverable Metals in Soil/Waste	TRH (Total Recoverable Hydrocarbons) in Soil	VOC's in Soil	Volatile Petroleum Hydrocarbons in Soil
001	BH01/0.1-0.3	-	26	-	7	10	12	8
002	BH02/0.15-0.35	-	26	-	7	10	82	8
003	BH02/0.5-0.7	-	-	-	7	-	-	-
004	BH03/0.3-0.5	28	26	-	7	10	12	8
005	BH03/0.6-0.8	-	-	-	7	-	-	-
006	BH04/0.4-0.6	-	26	11	7	10	82	8
007	BH04/0.6-0.8	-	26	-	-	10	12	8
008	BH05/0.2-0.4	-	26	11	7	10	12	8
009	BH06/0.3-0.5	28	26	-	7	10	12	8
010	BH06/0.7-0.9	-	26	-	7	-	-	-
011	DUP01	-	-	-	7	-	-	-
012	DUP01A	-	-	-	7	-	-	-

CONTINUED OVERLEAF

The above table represents SGS' 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

SE164358

CLIENT DETAILS

Client SLR CONSULTING AUSTRALIA PTY LTD

Project 610.17038 St Ives

SUMMARY OF ANALYSIS

No.	Sample ID	Fibre Identification in soil	Mercury in Soil	Moisture Content	VOCs in Water
001	BH01/0.1-0.3	-	1	1	-
002	BH02/0.15-0.35	1	1	1	-
003	BH02/0.5-0.7	-	1	1	-
004	BH03/0.3-0.5	1	1	1	-
005	BH03/0.6-0.8	-	1	1	-
006	BH04/0.4-0.6	1	1	1	-
007	BH04/0.6-0.8	-	-	1	-
008	BH05/0.2-0.4	1	1	1	-
009	BH06/0.3-0.5	1	1	1	-
010	BH06/0.7-0.9	-	1	1	-
011	DUP01	-	1	1	-
012	DUP01A	-	1	1	-
014	Trip Spike	-	-	-	12
015	Trip Blank	-	-	-	12

CONTINUED OVERLEAF

The above table represents SGS' interpretation of the client-supplied Chain Of Custody document.
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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

SE164358

CLIENT DETAILS

Client SLR CONSULTING AUSTRALIA PTY LTD

Project 610.17038 St Ives

SUMMARY OF ANALYSIS

No.	Sample ID	Mercury (dissolved) in Water	Trace Metals (Dissolved) in Water by ICPMS
013	RB01	1	7

The above table represents SGS' 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 .

SGS

CHAIN OF CUSTODY & ANALYSIS REQUEST

SGS Environmental Services
Unit 16, 33 Maddox Street
Alexandria NSW 2015
Telephone No: (02) 85940400
Facsimile No: (02) 85940499
Email: au.samplereceipt.sydney@sgs.com

Company Name:	SLR Consulting	Project Name/No:	610.17038 St Ives
Address:	2 Lincoln Street	Purchase Order No:	SGS PO 22498 Eurofins PO 22499
	Lane Cove NSW 2066	Results Required By:	Standard 5 day turnaround
		Telephone:	0400 882 269
Contact Name:	Craig Cowper	Facsimile:	02 9427 8200
		Email Results:	ccowper@slrconsulting.com

Client Sample ID	Date Sampled	Lab Sample ID	WATER	SOIL	PRESERVATIVE	NO OF CONTAINERS	TRH / BTEX	PAH	OCP	PCB	VOC (8260)	Metals (8)	Asbestos (Absence / Presence)	pHF and pHFox								Notes
BH01/0.1-0.3	18/04/17	1		X	Ice	2	X	X				X										
BH02/0.15-0.35	18/04/17	2		X	Ice	2	X	X			X	X	X									
BH02/0.5-0.7	18/04/17	3		X	Ice	2						X										
BH03/0.3-0.5	18/04/17	4		X	Ice	2	X	X	X			X	X									
BH03/0.6-0.8	18/04/17	5		X	Ice	2						X										
BH04/0.4-0.6	18/04/17	6		X	Ice	2	X	X		X	X	X	X									
BH04/0.6-0.8	18/04/17	7		X	Ice	2	X	X														
BH05/0.2-0.4	18/04/17	8		X	Ice	2	X	X		X		X	X									
BH06/0.3-0.5	18/04/17	9		X	Ice	2	X	X	X			X	X									
BH06/0.7-0.9	18/04/17	10		X	Ice	2		X				X										

SGS EHS Alexandria Laboratory
SE164358 COC
Received: 19 – Apr – 2017

Relinquished By: Craig Cowper	Date/Time: 19/04/2017 @ 0930	Received By:	Date/Time
Relinquished By:	Date/Time:	Received By: TALCW	Date/Time 19/4/17 1:10
Samples Intact: Yes / No	Temperature: Ambient / Chilled 4°C	Sample Cooler Sealed: Yes / No	Laboratory Quotation No: SLR Pricing 2015
	Comments: Methods and detection limits to suit NEPM 2013 and ANZECC2000		Lab Quotation No: Eurofins Version 13.CS2

CHAIN OF CUSTODY & ANALYSIS REQUEST

SGS Environmental Services
Unit 16, 33 Maddox Street
Alexandria NSW 2015
Telephone No: (02) 85940400
Facsimile No: (02) 85940499
Email: au.samplereceipt.sydney@sgs.com

Company Name:	SLR Consulting	Project Name/No:	610.17038 St Ives
Address:	2 Lincoln Street	Purchase Order No:	SGS PO 22498 Eurofins PO 22499
	Lane Cove NSW 2066	Results Required By:	Standard 5 day turnaround
		Telephone:	0400 882 269
Contact Name:	Craig Cowper	Facsimile:	02 9427 8200
		Email Results:	ccowper@slrconsulting.com

Client Sample ID	Date Sampled	Lab Sample ID	WATER	SOIL	PRESERVATIVE	NO OF CONTAINERS	TRH / BTEX	PAH	OCP	PCB	VOC (8260)	Metals (8)	Asbestos (Absence / Presence)	pHF and pHFox	BTEX							Notes
DUP01	18/04/17	11		X	Ice	1						X										
DUP01A	18/04/17	12		X	Ice	1						X										
RB01	18/04/17	13	X		Ice	4						X										
Trip Spike	18/04/17	14	X		Ice	1									X							
Trip Blank	18/04/17	15	X		Ice	1									X							

Relinquished By: Craig Cowper	Date/Time: 19/04/2017 @ 0930	Received By:	Date/Time
Relinquished By:	Date/Time:	Received By: TAKyn	Date/Time 19/4/17 1=10
Samples Intact: Yes/ No	Temperature: Ambient / Chilled 4°C	Sample Cooler Sealed: Yes/ No	Laboratory Quotation No: SLR Pricing 2015
	Comments: Methods and detection limits to suit NEPM 2013 and ANZECC2000		Lab Quotation No: Eurofins Version 13.CS2

ANALYTICAL REPORT

Accreditation No. 2562

CLIENT DETAILS

Contact	Craig Cowper
Client	SLR CONSULTING AUSTRALIA PTY LTD
Address	Lego Building, 2 Lincoln Street (PO Box 176 NSW LANECOVE 1595) LANECOVE NSW 2066
Telephone	02 9427 8100
Facsimile	02 9427 8200
Email	ccowper@slrconsulting.com
Project	**610.17035 St Ives**
Order Number	**22525**
Samples	2

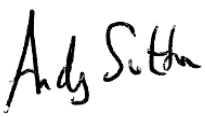
LABORATORY DETAILS

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	**SE164550 R0**
Date Received	24/4/2017
Date Reported	2/5/2017

COMMENTS

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

SIGNATORIES



Andy Sutton
Senior Organic Chemist

Dong Liang
Metals/Inorganics Team Leader

Kamrul Ahsan
Senior Chemist

Ly Kim Ha
Organic Section Head

VOCs in Water [AN433] Tested: 28/4/2017

PARAMETER	UOM	LOR	MW01 WATER - 24/4/2017 SE164550.001	MW02 WATER - 24/4/2017 SE164550.002
Benzene	µg/L	0.5	<0.5	<0.5
Toluene	µg/L	0.5	**1.4**	**0.9**
Ethylbenzene	µg/L	0.5	<0.5	<0.5
m/p-xylene	µg/L	1	<1	<1
o-xylene	µg/L	0.5	<0.5	<0.5
Total Xylenes	µg/L	1.5	<1.5	<1.5
Total BTEX	µg/L	3	<3	<3
Naphthalene	µg/L	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	**0.7**
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] Tested: 28/4/2017 (continued)

PARAMETER	UOM	LOR	MW01 WATER - 24/4/2017 SE164550.001	MW02 WATER - 24/4/2017 SE164550.002
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	<10	<10

Volatile Petroleum Hydrocarbons in Water [AN433] Tested: 28/4/2017

PARAMETER	UOM	LOR	MW01 WATER - 24/4/2017 SE164550.001	MW02 WATER - 24/4/2017 SE164550.002
TRH C6-C9	µg/L	40	<40	<40
Benzene (F0)	µg/L	0.5	<0.5	<0.5
TRH C6-C10	µg/L	50	<50	<50
TRH C6-C10 minus BTEX (F1)	µg/L	50	<50	<50

TRH (Total Recoverable Hydrocarbons) in Water [AN403] Tested: 28/4/2017

PARAMETER	UOM	LOR	MW01 WATER - 24/4/2017 SE164550.001	MW02 WATER - 24/4/2017 SE164550.002
TRH C10-C14	µg/L	50	<50	<50
TRH C15-C28	µg/L	200	<200	<200
TRH C29-C36	µg/L	200	<200	<200
TRH C37-C40	µg/L	200	<200	<200
TRH >C10-C16 (F2)	µg/L	60	<60	<60
TRH >C16-C34 (F3)	µg/L	500	<500	<500
TRH >C34-C40 (F4)	µg/L	500	<500	<500
TRH C10-C36	µg/L	450	<450	<450
TRH C10-C40	µg/L	650	<650	<650

Low Level PAH (Poly Aromatic Hydrocarbons) in Water [AN420] Tested: 28/4/2017

PARAMETER	UOM	LOR	MW01 WATER - 24/4/2017 SE164550.001	MW02 WATER - 24/4/2017 SE164550.002
Naphthalene	µg/L	0.02	**0.05**	**0.02**
2-methylnaphthalene	µg/L	0.01	**0.01**	<0.01
1-methylnaphthalene	µg/L	0.01	<0.01	<0.01
Acenaphthylene	µg/L	0.01	<0.01	<0.01
Acenaphthene	µg/L	0.01	<0.01	<0.01
Fluorene	µg/L	0.01	<0.01	<0.01
Phenanthrene	µg/L	0.01	**0.01**	<0.01
Anthracene	µg/L	0.01	<0.01	<0.01
Fluoranthene	µg/L	0.01	<0.01	<0.01
Pyrene	µg/L	0.01	<0.01	<0.01
Benzo(a)anthracene	µg/L	0.01	<0.01	<0.01
Chrysene	µg/L	0.01	<0.01	<0.01
Benzo(b&j&k)fluoranthene	µg/L	0.02	<0.02	<0.02
Benzo(a)pyrene	µg/L	0.01	<0.01	<0.01
Indeno(1,2,3-cd)pyrene	µg/L	0.01	<0.01	<0.01
Dibenzo(ah)anthracene	µg/L	0.01	<0.01	<0.01
Benzo(ghi)perylene	µg/L	0.01	<0.01	<0.01
Carcinogenic PAHs (as BaP TEQ) - assume non detects	TEQ	0.012	<0.012	<0.012
Total PAH VIC EPA Guidelines (16)*	µg/L	0.1	<0.1	<0.1
Total PAH (18)*	µg/L	0.1	<0.1	<0.1

Trace Metals (Dissolved) in Water by ICPMS [AN318] Tested: 27/4/2017

PARAMETER	UOM	LOR	MW01 WATER - 24/4/2017 SE164550.001	MW02 WATER - 24/4/2017 SE164550.002
Arsenic, As	µg/L	1	**19**	<1
Cadmium, Cd	µg/L	0.1	**17**	**1.0**
Chromium, Cr	µg/L	1	**2**	<1
Copper, Cu	µg/L	1	**370**	**88**
Lead, Pb	µg/L	1	**1**	<1
Nickel, Ni	µg/L	1	**240**	**19**
Zinc, Zn	µg/L	5	**2100**	**110**

Mercury (dissolved) in Water [AN311(Perth)/AN312] Tested: 1/5/2017

PARAMETER	UOM	LOR	MW01 WATER - 24/4/2017 SE164550.001	MW02 WATER - 24/4/2017 SE164550.002
Mercury	mg/L	0.0001	<0.0001	<0.0001

METHOD	METHODOLOGY SUMMARY
AN020	Unpreserved water sample is filtered through a 0.45µm membrane filter and acidified with nitric acid similar to APHA3030B.
AN311(Perth)/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.
AN318	Determination of elements at trace level in waters by ICP-MS technique, in accordance with USEPA 6020A.
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). Where F2 is corrected for Naphthalene, the VOC data for Naphthalene is used.
AN403	Additionally, the volatile C6-C9/C6-C10 fractions may be determined by a purge and trap technique and GC/MS because of the potential for volatiles loss. Total Recoveerable Hydrocarbons - Silica (TRH-Silica) follows the same method of analysis after silica gel cleanup of the solvent extract. Aliphatic/Aromatic Speciation follows the same method of analysis after fractionation of the solvent extract over silica with differential polarity of the eluent solvents.
AN403	The GC/FID method is not well suited to the analysis of refined high boiling point materials (ie lubricating oils or greases) but is particularly suited for measuring diesel, kerosene and petrol if care to control volatility is taken. This method will detect naturally occurring hydrocarbons, lipids, animal fats, phenols and PAHs if they are present at sufficient levels, dependent on the use of specific cleanup/fractionation techniques. Reference USEPA 3510B, 8015B.
AN420	PAH Compounds: The determination the concentration of polynuclear aromatic hydrocarbons (PAH) in solid waste matrices, soils and waters by Gas Chromatography with Mass Spectrometric Detection (Based on USEPA 3500C and 8270D).
AN420	Carcinogenic PAHs may be expressed as Benzo(a)pyrene equivalents by applying the BaP toxicity equivalence factor (NEPM 1999, June 2013, B7). These can be reported as the individual PAHs and as a sum of carcinogenic PAHs. The sum is reported three ways, the first assuming all <LOR results are zero, the second assuming all < LOR results are half the LOR and the third assuming all <LOR results are the LOR.
AN433	VOCs and C6-C9 Hydrocarbons by GC-MS P&T: VOC`s are volatile organic compounds. The sample is presented to a gas chromatograph via a purge and trap (P&T) concentrator and autosampler and is detected with a Mass Spectrometer (MSD). Solid samples are initially extracted with methanol whilst liquid samples are processed directly. References: USEPA 5030B, 8020A, 8260.

FOOTNOTES

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

Samples analysed as received.
Solid samples expressed on a dry weight basis.

Where "Total" analyte groups are reported (for example, Total PAHs, Total OC Pesticides) the total will be calculated as the sum of the individual analytes, with those analytes that are reported as <LOR being assumed to be zero. The summed (Total) limit of reporting is calculated by summing the individual analyte LORs and dividing by two. For example, where 16 individual analytes are being summed and each has an LOR of 0.1 mg/kg, the "Totals" LOR will be 1.6 / 2 (0.8 mg/kg). Where only 2 analytes are being summed, the " Total" LOR will be the sum of those two LORs.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

If reported, measurement uncertainty follow the ± sign after the analytical result and is expressed as the expanded uncertainty calculated using a coverage factor of 2, providing a level of confidence of approximately 95%, unless stated otherwise in the comments section of this report.

Results reported for samples tested under test methods with codes starting with ARS-SOP, radionuclide or gross radioactivity concentrations are expressed in becquerel (Bq) per unit of mass or volume or per wipe as stated on the report. Becquerel is the SI unit for activity and equals one nuclear transformation per second.
Note that in terms of units of radioactivity:

a. 1 Bq is equivalent to 27 pCi
b. 37 MBq is equivalent to 1 mCi

For results reported for samples tested under test methods with codes starting with ARS-SOP, less than (<) values indicate the detection limit for each radionuclide or parameter for the measurement system used. The respective detection limits have been calculated in accordance with ISO 11929.

The QC criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here : http://www.sgs.com.au/~/media/Local/Australia/Documents/Technical%20Documents/MP-AU-ENV-QU-022%20QA%20QC%20Plan.pdf

STATEMENT OF QA/QC PERFORMANCE

SE164550 R0

CLIENT DETAILS

Contact	Craig Cowper
Client	SLR CONSULTING AUSTRALIA PTY LTD
Address	Lego Building, 2 Lincoln Street (PO Box 176 NSW LANECOVE 1595) LANECOVE NSW 2066
Telephone	02 9427 8100
Facsimile	02 9427 8200
Email	ccowper@slrconsulting.com
Project	**610.17035 St Ives**
Order Number	**22525**
Samples	2

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	**SE164550 R0**
Date Received	24 Apr 2017
Date Reported	02 May 2017

COMMENTS

All the laboratory data for each environmental matrix was compared to SGS' 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	Trace Metals (Dissolved) in Water by ICPMS	1 item

SAMPLE SUMMARY

Samples clearly labelled	Yes	Complete documentation received	Yes
Sample container provider	SGS	Sample cooling method	Ice Bricks
Samples received in correct containers	Yes	Sample counts by matrix	2 Water
Date documentation received	24/4/2017	Type of documentation received	COC
Samples received in good order	Yes	Samples received without headspace	Yes
Sample temperature upon receipt	7.0°C	Sufficient sample for analysis	Yes
Turnaround time requested	Standard		

HOLDING TIME SUMMARY

SE164550 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.

Low Level PAH (Poly Aromatic Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
MW01	SE164550.001	LB123078	24 Apr 2017	24 Apr 2017	01 May 2017	28 Apr 2017	07 Jun 2017	02 May 2017
MW02	SE164550.002	LB123078	24 Apr 2017	24 Apr 2017	01 May 2017	28 Apr 2017	07 Jun 2017	02 May 2017

Mercury (dissolved) in Water

Method: ME-(AU)-[ENV]AN311(Perth)/AN312

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
MW01	SE164550.001	LB123155	24 Apr 2017	24 Apr 2017	22 May 2017	01 May 2017	22 May 2017	02 May 2017
MW02	SE164550.002	LB123155	24 Apr 2017	24 Apr 2017	22 May 2017	01 May 2017	22 May 2017	02 May 2017

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
MW01	SE164550.001	LB122972	24 Apr 2017	24 Apr 2017	21 Oct 2017	27 Apr 2017	21 Oct 2017	27 Apr 2017
MW02	SE164550.002	LB122972	24 Apr 2017	24 Apr 2017	21 Oct 2017	27 Apr 2017	21 Oct 2017	27 Apr 2017

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
MW01	SE164550.001	LB123078	24 Apr 2017	24 Apr 2017	01 May 2017	28 Apr 2017	07 Jun 2017	02 May 2017
MW02	SE164550.002	LB123078	24 Apr 2017	24 Apr 2017	01 May 2017	28 Apr 2017	07 Jun 2017	02 May 2017

VOCs in Water

Method: ME-(AU)-[ENV]AN433

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
MW01	SE164550.001	LB123077	24 Apr 2017	24 Apr 2017	01 May 2017	28 Apr 2017	07 Jun 2017	01 May 2017
MW02	SE164550.002	LB123077	24 Apr 2017	24 Apr 2017	01 May 2017	28 Apr 2017	07 Jun 2017	01 May 2017

Volatile Petroleum Hydrocarbons in Water

Method: ME-(AU)-[ENV]AN433

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
MW01	SE164550.001	LB123077	24 Apr 2017	24 Apr 2017	01 May 2017	28 Apr 2017	07 Jun 2017	01 May 2017
MW02	SE164550.002	LB123077	24 Apr 2017	24 Apr 2017	01 May 2017	28 Apr 2017	07 Jun 2017	01 May 2017

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.

Low Level PAH (Poly Aromatic Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
2-fluorobiphenyl (Surrogate)	MW01	SE164550.001	%	40 - 130%	NA
	MW02	SE164550.002	%	40 - 130%	NA
d14-p-terphenyl (Surrogate)	MW01	SE164550.001	%	40 - 130%	56
	MW02	SE164550.002	%	40 - 130%	48
d5-nitrobenzene (Surrogate)	MW01	SE164550.001	%	40 - 130%	NA
	MW02	SE164550.002	%	40 - 130%	NA

VOCs in Water

Method: ME-(AU)-[ENV]AN433

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	MW01	SE164550.001	%	40 - 130%	101
	MW02	SE164550.002	%	40 - 130%	106
d4-1,2-dichloroethane (Surrogate)	MW01	SE164550.001	%	40 - 130%	96
	MW02	SE164550.002	%	40 - 130%	115
d8-toluene (Surrogate)	MW01	SE164550.001	%	40 - 130%	96
	MW02	SE164550.002	%	40 - 130%	86
Dibromofluoromethane (Surrogate)	MW01	SE164550.001	%	40 - 130%	107
	MW02	SE164550.002	%	40 - 130%	126

Volatile Petroleum Hydrocarbons in Water

Method: ME-(AU)-[ENV]AN433

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	MW01	SE164550.001	%	40 - 130%	91
	MW02	SE164550.002	%	40 - 130%	104
d4-1,2-dichloroethane (Surrogate)	MW01	SE164550.001	%	60 - 130%	100
	MW02	SE164550.002	%	60 - 130%	119
d8-toluene (Surrogate)	MW01	SE164550.001	%	40 - 130%	97
	MW02	SE164550.002	%	40 - 130%	86
Dibromofluoromethane (Surrogate)	MW01	SE164550.001	%	40 - 130%	102
	MW02	SE164550.002	%	40 - 130%	123

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.

Low Level PAH (Poly Aromatic Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result
LB123078.001		Naphthalene	µg/L	0.02	<0.02
		2-methylnaphthalene	µg/L	0.01	<0.01
		1-methylnaphthalene	µg/L	0.01	<0.01
		Acenaphthylene	µg/L	0.01	<0.01
		Acenaphthene	µg/L	0.01	<0.01
		Fluorene	µg/L	0.01	<0.01
		Phenanthrene	µg/L	0.01	<0.01
		Anthracene	µg/L	0.01	<0.01
		Fluoranthene	µg/L	0.01	<0.01
		Pyrene	µg/L	0.01	<0.01
		Benzo(a)anthracene	µg/L	0.01	<0.01
		Chrysene	µg/L	0.01	<0.01
		Benzo(b&j&k)fluoranthene	µg/L	0.02	<0.02
		Benzo(a)pyrene	µg/L	0.01	<0.01
		Indeno(1,2,3-cd)pyrene	µg/L	0.01	<0.01
		Dibenzo(ah)anthracene	µg/L	0.01	<0.01
		Benzo(ghi)perylene	µg/L	0.01	<0.01
	Surrogates	d14-p-terphenyl (Surrogate)	%	-	104

Mercury (dissolved) in Water

Method: ME-(AU)-[ENV]AN311(Perth)/AN312

Sample Number	Parameter	Units	LOR	Result
LB123155.001	Mercury	mg/L	0.0001	<0.0001

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

Sample Number	Parameter	Units	LOR	Result
LB122972.001	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

TRH (Total Recoverable Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN403

Sample Number	Parameter	Units	LOR	Result
LB123078.001	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

VOCs in Water

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result
LB123077.001	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

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

Sample Number		Parameter	Units	LOR	Result
LB123077.001	Halogenated Aliphatics	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
		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 Hydrocarbons	Benzene	µg/L	0.5	<0.5
		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)	%	-	108
		d4-1,2-dichloroethane (Surrogate)	%	-	95
		d8-toluene (Surrogate)	%	-	95
		Bromofluorobenzene (Surrogate)	%	-	102
	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 Water

Method: ME-(AU)-[ENV]AN433

Sample Number	Parameter	Units	LOR

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.

Volatile Petroleum Hydrocarbons in Water (continued) — **Method: ME-(AU)-[ENV]AN433**

Sample Number		Parameter	Units	LOR	Result
LB123077.001		TRH C6-C9	µg/L	40	<40
	Surrogates	Dibromofluoromethane (Surrogate)	%	-	103
		d4-1,2-dichloroethane (Surrogate)	%	-	99
		d8-toluene (Surrogate)	%	-	102
		Bromofluorobenzene (Surrogate)	%	-	95

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.

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE164564.085	LB122972.014	Arsenic, As	µg/L	1	<1	<1	161	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	129	0
		Lead, Pb	µg/L	1	<1	<1	200	0
		Nickel, Ni	µg/L	1	2	1	80	5
		Zinc, Zn	µg/L	5	<5	<5	200	0

VOCs in Water

Method: ME-(AU)-[ENV]AN433

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE164466.003	LB123077.021	Fumigants	2,2-dichloropropane	µg/L	0.5	<0.5	0	200	0
			1,2-dichloropropane	µg/L	0.5	<0.5	0	200	0
			cis-1,3-dichloropropene	µg/L	0.5	<0.5	0	200	0
			trans-1,3-dichloropropene	µg/L	0.5	<0.5	0	200	0
			1,2-dibromoethane (EDB)	µg/L	0.5	<0.5	0	200	0
		Halogenated	Dichlorodifluoromethane (CFC-12)	µg/L	5	<5	0	200	0
		Aliphatics	Chloromethane	µg/L	5	<5	0	200	0
			Vinyl chloride (Chloroethene)	µg/L	0.3	<0.3	0	200	0
			Bromomethane	µg/L	10	<10	0	200	0
			Chloroethane	µg/L	5	<5	0	200	0
			Trichlorofluoromethane	µg/L	1	<1	0	200	0
			Iodomethane	µg/L	5	<5	0	200	0
			1,1-dichloroethene	µg/L	0.5	<0.5	0	200	0
			Dichloromethane (Methylene chloride)	µg/L	5	<5	0	200	0
			Allyl chloride	µg/L	2	<2	0	200	0
			trans-1,2-dichloroethene	µg/L	0.5	<0.5	0	200	0
			1,1-dichloroethane	µg/L	0.5	<0.5	0	200	0
			cis-1,2-dichloroethene	µg/L	0.5	<0.5	0	200	0
			Bromochloromethane	µg/L	0.5	<0.5	0	200	0
			1,2-dichloroethane	µg/L	0.5	<0.5	0	200	0
			1,1,1-trichloroethane	µg/L	0.5	<0.5	0	200	0
			1,1-dichloropropene	µg/L	0.5	<0.5	0	200	0
			Carbon tetrachloride	µg/L	0.5	<0.5	0	200	0
			Dibromomethane	µg/L	0.5	<0.5	0	200	0
			Trichloroethene (Trichloroethylene,TCE)	µg/L	0.5	<0.5	0	200	0
			1,1,2-trichloroethane	µg/L	0.5	<0.5	0	200	0
			1,3-dichloropropane	µg/L	0.5	<0.5	0	200	0
			Tetrachloroethene (Perchloroethylene,PCE)	µg/L	0.5	<0.5	0	200	0
			1,1,1,2-tetrachloroethane	µg/L	0.5	<0.5	0	200	0
			cis-1,4-dichloro-2-butene	µg/L	1	<1	0	200	0
			1,1,2,2-tetrachloroethane	µg/L	0.5	<0.5	0	200	0
			1,2,3-trichloropropane	µg/L	0.5	<0.5	0	200	0
			trans-1,4-dichloro-2-butene	µg/L	1	<1	0	200	0
			1,2-dibromo-3-chloropropane	µg/L	0.5	<0.5	0	200	0
			Hexachlorobutadiene	µg/L	0.5	<0.5	0	200	0
		Halogenated	Chlorobenzene	µg/L	0.5	<0.5	0	200	0
		Aromatics	Bromobenzene	µg/L	0.5	<0.5	0	200	0
			2-chlorotoluene	µg/L	0.5	<0.5	0	200	0
			4-chlorotoluene	µg/L	0.5	<0.5	0	200	0
			1,3-dichlorobenzene	µg/L	0.5	<0.5	0	200	0
			1,4-dichlorobenzene	µg/L	0.3	<0.3	0	200	0
			1,2-dichlorobenzene	µg/L	0.5	<0.5	0	200	0
			1,2,4-trichlorobenzene	µg/L	0.5	<0.5	0	200	0
			1,2,3-trichlorobenzene	µg/L	0.5	<0.5	0	200	0
		Monocyclic	Benzene	µg/L	0.5	<0.5	0.07	200	0
		Aromatic	Toluene	µg/L	0.5	<0.5	0.09	200	0
			Ethylbenzene	µg/L	0.5	<0.5	0.13	200	0
			m/p-xylene	µg/L	1	<1	0.44	200	0
			o-xylene	µg/L	0.5	<0.5	0.37	158	0
			Styrene (Vinyl benzene)	µg/L	0.5	<0.5	0	200	0
			Isopropylbenzene (Cumene)	µg/L	0.5	<0.5	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.

VOCs in Water (continued) — **Method: ME-(AU)-[ENV]AN433**

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE164466.003	LB123077.021	Monocyclic	n-propylbenzene	µg/L	0.5	<0.5	0	200	0
		Aromatic	1,3,5-trimethylbenzene	µg/L	0.5	<0.5	0	200	0
			tert-butylbenzene	µg/L	0.5	<0.5	0	200	0
			1,2,4-trimethylbenzene	µg/L	0.5	<0.5	0	200	0
			sec-butylbenzene	µg/L	0.5	<0.5	0	200	0
			p-isopropyltoluene	µg/L	0.5	<0.5	0	200	0
			n-butylbenzene	µg/L	0.5	<0.5	0	200	0
		Nitrogenous	Acrylonitrile	µg/L	0.5	<0.5	0	200	0
		Oxygenated	Acetone (2-propanone)	µg/L	10	<10	0	200	0
		Compounds	MtBE (Methyl-tert-butyl ether)	µg/L	2	<2	0	200	0
			Vinyl acetate	µg/L	10	<10	0	200	0
			MEK (2-butanone)	µg/L	10	<10	0	200	0
			MIBK (4-methyl-2-pentanone)	µg/L	5	<5	0	200	0
			2-hexanone (MBK)	µg/L	5	<5	0	200	0
		Polycyclic	Naphthalene	µg/L	0.5	<0.5	0	200	0
		Sulphonated	Carbon disulfide	µg/L	2	<2	0	200	0
		Surrogates	Dibromofluoromethane (Surrogate)	µg/L	-	5.3	4.81	30	10
			d4-1,2-dichloroethane (Surrogate)	µg/L	-	4.8	4.42	30	8
			d8-toluene (Surrogate)	µg/L	-	5.2	4.72	30	10
			Bromofluorobenzene (Surrogate)	µg/L	-	5.6	4.7	30	17
		Trihalomethan	Chloroform (THM)	µg/L	0.5	<0.5	0	200	0
		es	Bromodichloromethane (THM)	µg/L	0.5	<0.5	0	200	0
			Dibromochloromethane (THM)	µg/L	0.5	<0.5	0	200	0
			Bromoform (THM)	µg/L	0.5	<0.5	0	200	0
SE164550.001	LB123077.022	Fumigants	2,2-dichloropropane	µg/L	0.5	<0.5	0	200	0
			1,2-dichloropropane	µg/L	0.5	<0.5	0	200	0
			cis-1,3-dichloropropene	µg/L	0.5	<0.5	0	200	0
			trans-1,3-dichloropropene	µg/L	0.5	<0.5	0	200	0
			1,2-dibromoethane (EDB)	µg/L	0.5	<0.5	0	200	0
		Halogenated	Dichlorodifluoromethane (CFC-12)	µg/L	5	<5	0	200	0
		Aliphatics	Chloromethane	µg/L	5	<5	0	200	0
			Vinyl chloride (Chloroethene)	µg/L	0.3	<0.3	0	200	0
			Bromomethane	µg/L	10	<10	0	200	0
			Chloroethane	µg/L	5	<5	0	200	0
			Trichlorofluoromethane	µg/L	1	<1	0	200	0
			Iodomethane	µg/L	5	<5	0	200	0
			1,1-dichloroethene	µg/L	0.5	<0.5	0	200	0
			Dichloromethane (Methylene chloride)	µg/L	5	<5	0	200	0
			Allyl chloride	µg/L	2	<2	0	200	0
			trans-1,2-dichloroethene	µg/L	0.5	<0.5	0	200	0
			1,1-dichloroethane	µg/L	0.5	<0.5	0	200	0
			cis-1,2-dichloroethene	µg/L	0.5	<0.5	0	200	0
			Bromochloromethane	µg/L	0.5	<0.5	0	200	0
			1,2-dichloroethane	µg/L	0.5	<0.5	0	200	0
			1,1,1-trichloroethane	µg/L	0.5	<0.5	0	200	0
			1,1-dichloropropene	µg/L	0.5	<0.5	0	200	0
			Carbon tetrachloride	µg/L	0.5	<0.5	0	200	0
			Dibromomethane	µg/L	0.5	<0.5	0	200	0
			Trichloroethene (Trichloroethylene,TCE)	µg/L	0.5	<0.5	0	200	0
			1,1,2-trichloroethane	µg/L	0.5	<0.5	0	200	0
			1,3-dichloropropane	µg/L	0.5	<0.5	0	200	0
			Tetrachloroethene (Perchloroethylene,PCE)	µg/L	0.5	<0.5	0	200	0
			1,1,1,2-tetrachloroethane	µg/L	0.5	<0.5	0	200	0
			cis-1,4-dichloro-2-butene	µg/L	1	<1	0	200	0
			1,1,2,2-tetrachloroethane	µg/L	0.5	<0.5	0	200	0
			1,2,3-trichloropropane	µg/L	0.5	<0.5	0	200	0
			trans-1,4-dichloro-2-butene	µg/L	1	<1	0	200	0
			1,2-dibromo-3-chloropropane	µg/L	0.5	<0.5	0	200	0
			Hexachlorobutadiene	µg/L	0.5	<0.5	0	200	0
		Halogenated	Chlorobenzene	µg/L	0.5	<0.5	0	200	0
		Aromatics	Bromobenzene	µg/L	0.5	<0.5	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.

VOCs in Water (continued)

Method: ME-(AU)-[ENV]AN433

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE164550.001	LB123077.022	Halogenated	2-chlorotoluene	µg/L	0.5	<0.5	0	200	0
		Aromatics	4-chlorotoluene	µg/L	0.5	<0.5	0	200	0
			1,3-dichlorobenzene	µg/L	0.5	<0.5	0	200	0
			1,4-dichlorobenzene	µg/L	0.3	<0.3	0	200	0
			1,2-dichlorobenzene	µg/L	0.5	<0.5	0	200	0
			1,2,4-trichlorobenzene	µg/L	0.5	<0.5	0	200	0
			1,2,3-trichlorobenzene	µg/L	0.5	<0.5	0	200	0
		Monocyclic	Benzene	µg/L	0.5	<0.5	0	200	0
		Aromatic	Toluene	µg/L	0.5	1.4	1.43	66	6
			Ethylbenzene	µg/L	0.5	<0.5	0	200	0
			m/p-xylene	µg/L	1	<1	0.43	200	0
			o-xylene	µg/L	0.5	<0.5	0.23	200	0
			Styrene (Vinyl benzene)	µg/L	0.5	<0.5	0	200	0
			Isopropylbenzene (Cumene)	µg/L	0.5	<0.5	0	200	0
			n-propylbenzene	µg/L	0.5	<0.5	0	200	0
			1,3,5-trimethylbenzene	µg/L	0.5	<0.5	0	200	0
			tert-butylbenzene	µg/L	0.5	<0.5	0	200	0
			1,2,4-trimethylbenzene	µg/L	0.5	<0.5	0	200	0
			sec-butylbenzene	µg/L	0.5	<0.5	0	200	0
			p-isopropyltoluene	µg/L	0.5	<0.5	0	200	0
			n-butylbenzene	µg/L	0.5	<0.5	0	200	0
		Nitrogenous	Acrylonitrile	µg/L	0.5	<0.5	0	200	0
		Oxygenated	Acetone (2-propanone)	µg/L	10	<10	0	200	0
		Compounds	MtBE (Methyl-tert-butyl ether)	µg/L	2	<2	0	200	0
			Vinyl acetate	µg/L	10	<10	0	200	0
			MEK (2-butanone)	µg/L	10	<10	0	200	0
			MIBK (4-methyl-2-pentanone)	µg/L	5	<5	0	200	0
			2-hexanone (MBK)	µg/L	5	<5	0	200	0
		Polycyclic	Naphthalene	µg/L	0.5	<0.5	0.11	200	0
		Sulphonated	Carbon disulfide	µg/L	2	<2	0	200	0
		Surrogates	Dibromofluoromethane (Surrogate)	µg/L	-	5.4	5.19	30	3
			d4-1,2-dichloroethane (Surrogate)	µg/L	-	4.8	4.72	30	2
			d8-toluene (Surrogate)	µg/L	-	4.8	4.78	30	1
			Bromofluorobenzene (Surrogate)	µg/L	-	5.0	4.92	30	2
		Trihalomethan	Chloroform (THM)	µg/L	0.5	<0.5	0	200	0
		es	Bromodichloromethane (THM)	µg/L	0.5	<0.5	0	200	0
			Dibromochloromethane (THM)	µg/L	0.5	<0.5	0	200	0
			Bromoform (THM)	µg/L	0.5	<0.5	0	200	0

Volatile Petroleum Hydrocarbons in Water

Method: ME-(AU)-[ENV]AN433

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE164466.003	LB123077.021		TRH C6-C10	µg/L	50	<50	0	200	0
			TRH C6-C9	µg/L	40	<40	0	200	0
		Surrogates	Dibromofluoromethane (Surrogate)	µg/L	-	5.1	4.63	30	9
			d4-1,2-dichloroethane (Surrogate)	µg/L	-	5.0	4.58	30	9
			d8-toluene (Surrogate)	µg/L	-	4.9	4.33	30	13
			Bromofluorobenzene (Surrogate)	µg/L	-	4.9	4.52	30	7
		VPH F Bands	Benzene (F0)	µg/L	0.5	<0.5	0	200	0
			TRH C6-C10 minus BTEX (F1)	µg/L	50	<50	0	200	0
SE164550.001	LB123077.022		TRH C6-C10	µg/L	50	<50	0	200	0
			TRH C6-C9	µg/L	40	<40	0	200	0
		Surrogates	Dibromofluoromethane (Surrogate)	µg/L	-	5.1	4.97	30	3
			d4-1,2-dichloroethane (Surrogate)	µg/L	-	5.0	4.85	30	3
			d8-toluene (Surrogate)	µg/L	-	4.8	4.91	30	1
			Bromofluorobenzene (Surrogate)	µg/L	-	4.6	4.91	30	7
		VPH F Bands	Benzene (F0)	µg/L	0.5	<0.5	0	200	0
			TRH C6-C10 minus BTEX (F1)	µg/L	50	<50	-1.43	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.

Low Level PAH (Poly Aromatic Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN420

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB123078.002	Naphthalene	µg/L	0.02	25	40	60 - 140	62
	Acenaphthylene	µg/L	0.01	27	40	60 - 140	67
	Acenaphthene	µg/L	0.01	28	40	60 - 140	70
	Phenanthrene	µg/L	0.01	29	40	60 - 140	74
	Anthracene	µg/L	0.01	38	40	60 - 140	95
	Fluoranthene	µg/L	0.01	35	40	60 - 140	87
	Pyrene	µg/L	0.01	26	40	60 - 140	65
	Benzo(a)pyrene	µg/L	0.01	29	40	60 - 140	72

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB122972.002	Arsenic, As	µg/L	1	20	20	80 - 120	100
	Cadmium, Cd	µg/L	0.1	21	20	80 - 120	105
	Chromium, Cr	µg/L	1	22	20	80 - 120	108
	Copper, Cu	µg/L	1	22	20	80 - 120	108
	Lead, Pb	µg/L	1	23	20	80 - 120	113
	Nickel, Ni	µg/L	1	21	20	80 - 120	105
	Zinc, Zn	µg/L	5	20	20	80 - 120	102

TRH (Total Recoverable Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN403

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB123078.002		TRH C10-C14	µg/L	50	1200	1200	60 - 140	102
		TRH C15-C28	µg/L	200	1500	1200	60 - 140	122
		TRH C29-C36	µg/L	200	1500	1200	60 - 140	125
	TRH F Bands	TRH >C10-C16 (F2)	µg/L	60	1400	1200	60 - 140	115
		TRH >C16-C34 (F3)	µg/L	500	1500	1200	60 - 140	128
		TRH >C34-C40 (F4)	µg/L	500	720	600	60 - 140	120

VOCs in Water

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB123077.002	Halogenated	1,1-dichloroethene	µg/L	0.5	49	45.45	60 - 140	109
	Aliphatics	1,2-dichloroethane	µg/L	0.5	50	45.45	60 - 140	109
		Trichloroethene (Trichloroethylene,TCE)	µg/L	0.5	49	45.45	60 - 140	109
	Halogenated	Chlorobenzene	µg/L	0.5	50	45.45	60 - 140	109
	Monocyclic	Benzene	µg/L	0.5	49	45.45	60 - 140	108
	Aromatic	Toluene	µg/L	0.5	50	45.45	60 - 140	109
		Ethylbenzene	µg/L	0.5	50	45.45	60 - 140	109
		m/p-xylene	µg/L	1	99	90.9	60 - 140	109
		o-xylene	µg/L	0.5	49	45.45	60 - 140	109
	Surrogates	Dibromofluoromethane (Surrogate)	µg/L	-	4.3	5	60 - 140	87
		d4-1,2-dichloroethane (Surrogate)	µg/L	-	5.0	5	60 - 140	100
		d8-toluene (Surrogate)	µg/L	-	4.9	5	60 - 140	97
		Bromofluorobenzene (Surrogate)	µg/L	-	4.5	5	60 - 140	91
	Trihalomethan	Chloroform (THM)	µg/L	0.5	49	45.45	60 - 140	108

Volatile Petroleum Hydrocarbons in Water

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB123077.002		TRH C6-C10	µg/L	50	930	946.63	60 - 140	98
		TRH C6-C9	µg/L	40	760	818.71	60 - 140	92
	Surrogates	Dibromofluoromethane (Surrogate)	µg/L	-	5.0	5	60 - 140	99
		d4-1,2-dichloroethane (Surrogate)	µg/L	-	5.2	5	60 - 140	104
		d8-toluene (Surrogate)	µg/L	-	5.4	5	60 - 140	107
		Bromofluorobenzene (Surrogate)	µg/L	-	5.0	5	60 - 140	100
	VPH F Bands	TRH C6-C10 minus BTEX (F1)	µg/L	50	630	639.67	60 - 140	99

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(Perth)/AN312

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE164459.016	LB123155.004	Mercury	mg/L	0.0001	0.0075	<0.0001	0.008	96

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE164173A.02	LB122972.004	Zinc, Zn	µg/L	5	130	110	20	57 ⑤

VOCs in Water

Method: ME-(AU)-[ENV]AN433

QC Sample	Sample Number		Parameter	Units	LOR	Original	Spike	Recovery%
SE164466.004	LB123077.023	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	45.45	114
			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	45.45	123
			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	45.45	109
			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	-	-
			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	45.45	108
			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	45.45	109
			Toluene	µg/L	0.5	<0.5	45.45	108
			Ethylbenzene	µg/L	0.5	<0.5	45.45	109
			m/p-xylene	µg/L	1	<1	90.9	112
			o-xylene	µg/L	0.5	<0.5	45.45	111

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.

VOCs in Water (continued) — **Method: ME-(AU)-[ENV]AN433**

QC Sample	Sample Number		Parameter	Units	LOR	Original	Spike	Recovery%
SE164466.004	LB123077.023	Monocyclic Aromatic	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	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	Naphthalene	µg/L	0.5	<0.5	-	-
		Sulphonated	Carbon disulfide	µg/L	2	<2	-	-
		Surrogates	Dibromofluoromethane (Surrogate)	µg/L	-	5.5	-	89
			d4-1,2-dichloroethane (Surrogate)	µg/L	-	4.8	-	93
			d8-toluene (Surrogate)	µg/L	-	4.9	-	92
			Bromofluorobenzene (Surrogate)	µg/L	-	5.1	-	85
		Trihalomethanes	Chloroform (THM)	µg/L	0.5	<0.5	45.45	113
			Bromodichloromethane (THM)	µg/L	0.5	<0.5	-	-
			Dibromochloromethane (THM)	µg/L	0.5	<0.5	-	-
			Bromoform (THM)	µg/L	0.5	<0.5	-	-

MATRIX SPIKE DUPLICATES

SE164550 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 Documents/MP-AU-ENV-QU-022 QA QC Plan.pdf

*	NATA accreditation does not cover the performance of this service.
-	Sample not analysed for this analyte.

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.

SAMPLE RECEIPT ADVICE

SE164550

CLIENT DETAILS

Contact	Craig Cowper
Client	SLR CONSULTING AUSTRALIA PTY LTD
Address	Lego Building, 2 Lincoln Street (PO Box 176 NSW LANECOVE 1595) LANECOVE NSW 2066
Telephone	02 9427 8100
Facsimile	02 9427 8200
Email	ccowper@slrconsulting.com
Project	**610.17035 St Ives**
Order Number	**22525**
Samples	2

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	Mon 24/4/2017
Report Due	Tue 2/5/2017
SGS Reference	**SE164550**

SUBMISSION DETAILS

This is to confirm that 2 samples were received on Monday 24/4/2017. Results are expected to be ready by Tuesday 2/5/2017. Please quote SGS reference SE164550 when making enquiries. Refer below for details relating to sample integrity upon receipt.

Samples clearly labelled	Yes	Complete documentation received	Yes
Sample container provider	SGS	Sample cooling method	Ice Bricks
Samples received in correct containers	Yes	Sample counts by matrix	2 Water
Date documentation received	24/4/2017	Type of documentation received	COC
Samples received in good order	Yes	Samples received without headspace	Yes
Sample temperature upon receipt	7.0°C	Sufficient sample for analysis	Yes
Turnaround time requested	Standard		

Unless otherwise instructed, water and bulk samples will be held for one month from date of report, and soil samples will be held for two months.

COMMENTS

2 Water samples have been placed on hold.

SAMPLE RECEIPT ADVICE

SE164550

CLIENT DETAILS

Client SLR CONSULTING AUSTRALIA PTY LTD

Project 610.17035 St Ives

SUMMARY OF ANALYSIS

No.	Sample ID	Low Level PAH (Poly Aromatic Hydrocarbons) in	Mercury (dissolved) in Water	Trace Metals (Dissolved) in Water by ICPMS	TRH (Total Recoverable Hydrocarbons) in Water	VOCs in Water	Volatile Petroleum Hydrocarbons in Water
001	MW01	23	1	7	9	79	8
002	MW02	23	1	7	9	79	8

The above table represents SGS' 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 .

SGS

CHAIN OF CUSTODY & ANALYSIS REQUEST

SGS Environmental Services
Unit 16, 33 Maddox Street
Alexandria NSW 2015
Telephone No: (02) 85940400
Facsimile No: (02) 85940499
Email: au.samplereceipt.sydney@sgs.com

Company Name:	SLR Consulting	Project Name/No:	610.17035 St Ives
Address:	2 Lincoln Street	Purchase Order No:	SGS PO 22525 Eurofins
	Lane Cove NSW 2066	Results Required By:	Standard 5 day turnaround
		Telephone:	0400 882 269
Contact Name:	Craig Cowper	Facsimile:	02 9427 8200
		Email Results:	ccowper@slrconsulting.com

Client Sample ID	Date Sampled	Lab Sample ID	WATER	SOIL	PRESERVATIVE	NO OF CONTAINERS	TRH / BTEX	PAH (low level)	OCP	PCB	VOC (8260)	Metals (8)	Asbestos (Absence / Presence)	pHF and pHFox	Notes
MW01	24/4/17		X		Ice	4	X	X			X	X			
MW02			X		Ice	4	X	X			X	X			
DUP03			X		Ice	1									Hold
DUP03A			X		Ice	1									Hold

SGS EHS Alexandria Laboratory

SE164550 COC
Received: 24 – Apr – 2017

Relinquished By: Craig Cowper	Date/Time: ~~19/04/2017 @ 0930~~ 24/04/17 C1015	Received By:	Date/Time
Relinquished By:	Date/Time:	Received By: IDKun	Date/Time 24/4/17 1:05
Samples Intact: Yes/ No	Temperature: Ambient / Chilled C/P 7°C	Sample Cooler Sealed: Yes/ No	Laboratory Quotation No: SLR Pricing 2015
	Comments: Methods and detection limits to suit NEPM 2013 and ANZECC2000		Lab Quotation No: Eurofins Version 13.CS2

CALIBRATION

SLR

PID CALIBRATION LOG

PID MODEL: MiniRae Lite PGM73500 (10.6eV lamp)	PID SERIAL NUMBER: 595-000501

Date: 28/03/2017		SLR Project Number:	610.16577.00000
Isobutylene Gas Lot No:	1583028		
Isobutylene Standard (ppm):	100		
Fresh Air Cal (ppm):	0.0		
Isobutylene Cal (ppm):	100		
SLR Consultant Signature:			

Date:	12/04/2017	SLR Project Number:	610.17091.00000
Isobutylene Gas Lot No:	1583028		
Isobutylene Standard (ppm):	100		
Fresh Air Cal (ppm):	0.0		
Isobutylene Cal (ppm):	100		
SLR Consultant Signature:			

Date:	18/04/2017	SLR Project Number:	610.17035.00000
Isobutylene Gas Lot No:	1583028		
Isobutylene Standard (ppm):	100		
Fresh Air Cal (ppm):	0.0		
Isobutylene Cal (ppm):	100		
SLR Consultant Signature:			

Date:	21/04/2017	SLR Project Number:	610.17143.00001
Isobutylene Gas Lot No:	1583028		
Isobutylene Standard (ppm):	100		
Fresh Air Cal (ppm):	0.0		
Isobutylene Cal (ppm):	100		
SLR Consultant Signature:			

SLR Consulting Australia Pty Ltd 2 Lincoln Street Lane Cove NSW 2066 Australia
(PO Box 176 Lane Cove NSW 1595 Australia)
T: 61 2 9428 8100 F: 61 2 9427 8200 E: sydney@slrconsulting.com www.slrconsulting.com
ABN 29 001 584 612

SLR

PID CALIBRATION LOG

PID MODEL: MiniRae Lite PGM73500 (10.6eV lamp)	PID SERIAL NUMBER: 595-000501

Date:	24/04/17	SLR Project Number:	610.17035.00001
Isobutylene Gas Lot No:	1583028		
Isobutylene Standard (ppm):	100		
Fresh Air Cal (ppm):	0		
Isobutylene Cal (ppm):	100		
SLR Consultant Signature:			

Date:		SLR Project Number:	
Isobutylene Gas Lot No:			
Isobutylene Standard (ppm):			
Fresh Air Cal (ppm):			
Isobutylene Cal (ppm):			
SLR Consultant Signature:			

Date:		SLR Project Number:	
Isobutylene Gas Lot No:			
Isobutylene Standard (ppm):			
Fresh Air Cal (ppm):			
Isobutylene Cal (ppm):			
SLR Consultant Signature:			

Date:		SLR Project Number:	
Isobutylene Gas Lot No:			
Isobutylene Standard (ppm):			
Fresh Air Cal (ppm):			
Isobutylene Cal (ppm):			
SLR Consultant Signature:			

SLR Consulting Australia Pty Ltd 2 Lincoln Street Lane Cove NSW 2066 Australia
(PO Box 176 Lane Cove NSW 1595 Australia)
T: 61 2 9428 8100 **F:** 61 2 9427 8200 **E:** sydney@slrconsulting.com www.slrconsulting.com
ABN 29 001 584 612

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RENTALS

Equipment Certification Report – TPS 90FLMV Water Quality Meter

This Water Quality Meter has been performance checked and calibrated as follows:

Sensor	Concentration	Span 1	Span 2	Traceability Lot #	Pass?
pH	pH 7.00 / pH 4.00	7.00 pH	4.00 pH	292530/290533	☑
Conductivity	12.88mS/cm	0.00 mS/cm	12.88 mS/cm	QA1331	☑
TDS	36 ppk	– ppk	check only ppk	298901	☑
Dissolved Oxygen	Sodium Sulphite / Air	0.00 ppm in Sodium Sulphite	8.74 ppm Saturation in Air	1603215673 NJ1314	☑

Check only

Redox (ORP) *	Electrode operability test	240mV +/- 10%	244 mV	0647	☑

* This meter uses an Ag/AgCl ORP electrode. To convert readings to SHE (Standard Hydrogen Electrode), add 199mV to the mV reading.

☑ Battery Status 7.4 (min 7.2V)
☑ Electrical Safety Tag attached (AS/NZS 3760)

☑ Temperature 21.6 °C
☑ Electrodes Cleaned and checked

Tag No: 001497

Valid to: 9/6/2017

Date: 13/4/2017

Signed: _____

Please check that the following items are received and that all items are cleaned and decontaminated before return. A minimum $30 cleaning / service / repair charge may be applied to any unclean or damaged items. Items not returned will be billed for at the full replacement cost.

Sent	Returned	Item
☑	☐	90FLMV Unit. Ops check/Battery status: 8V
☑	☐	pH sensor with wetting cap, 5m
☑	☐	Conductivity/TDS/Temperature K=10 sensor, 5m
☑	☐	Dissolved oxygen YSI5739 sensor with wetting cap, 5m
☑	☐	Redox (ORP) sensor with wetting cap, 5m
☐	☐	Power supply 240V to 12V DC 200mA
☑	☐	Instruction Manual
☑	☐	Quick Guide
☑	☐	Syringe with storage solution for pH and ORP sensors
☑	☐	Carry Case
☑	☐	Check to confirm electrical safety (tag must be valid)

Date: 13/4/2017

Signed: _____

TFS Reference	CS006596	Return Date:	/ /
Customer Reference		Return Time:	
Equipment ID	90FLMV SD	Condition on return:	
Equipment Serial No.	S1649		

ThermoFisher SCIENTIFIC

RENTALS

Equipment Report – Geo Pump 2 PERISTALTIC PUMP

This pump has been cleaned and checked:

☑ Clean and check all components	Ops check

Date: 13/04/2017 Checked by: MILENKO

Signed: [signature]

☑ Electrical Safety Tag attached (AS/NZS 3760

Tag No: 001437

Valid to: 16/06/2017

Please check that the following items are received and that all items are cleaned and decontaminated before return. A minimum $20 cleaning / service / repair charge may be applied to any unclean or damaged items. Items not returned will be billed for at the full replacement cost.

Sent	Received	Returned	Item
✓			Peristaltic Model (GP2) Pump, Alligator Clips
✓			Instruction Sheet
✓			3/8" Medical Grade Silicone Tubing (pump head) 30cm
✓			2 metal Hose Clips
✓			Transport Case
✓			Charger
✓			Electrical Safety Tag attached (AS/NZS 3760
✓			2 X BATTERY
✓			2 X WELL WEIGHT
Processors Signature/ Initials			

EE Quote Reference	CS006596	Condition on return
Customer Ref		
Equipment ID	GP2SD	
Equipment serial no.		
Return Date	/ /	
Return Time		

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RENTALS

Equipment Report – Micropurge Flow Cell

This unit has been performance checked as follows:

Operations Check		
☑ Clean / decon		

Date: 13/04/2017 Checked by: MILENKO

Signed:

Please check that the following items are received and that all items are cleaned and decontaminated before return. A minimum $20 cleaning / service / repair charge may be applied to any unclean or damaged items. Items not returned will be billed for at the full replacement cost.

Sent	Received	Returned	Item
			Sample Pro Pump
☑	☐	☐	Flow Cell
☑	☐	☐	3-way valve
☑	☐	☐	Connecting tubes (3)
☒	☐	☐	Optional – cable
☐	☐	☐	
☐	☐	☐	

Processors Signature/ Initials MS

Quote Reference	CS006596	Condition on return
Customer Ref		
Equipment ID	EFC500-3	
Equipment serial no.		
Return Date	/ /	
Return Time		

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RENTALS

Equipment Report – Solinst Model 122 Interface Meter

This Meter has been performance checked / calibrated* as follows:

Cleaned/Tested **Pass?** ☑**Yes** ☐**No**

☑Probe

☑Tape/Reel

☑Performance Test & Battery Voltage Check (8.4 v) 8.0v minimum

Date: 5/4/2017 Checked by: Jerry

Signed: JL

Please check that the following items are received and that all items are cleaned and decontaminated before return. A minimum $20 cleaning / service / repair charge may be applied to any unclean or damaged items. Items not returned will be billed for at the full replacement cost.

Sent	Received	Returned	Item
☑	☐	☐	Operations check OK
☑	☐	☐	Plastic Box / Bag
☑	☐	☐	Spare 9V Battery Qty 1
☑	☐	☐	Probe Cleaning Brush
☐	☐	☐	Decon
☑	☐	☐	Instruction leaflet
☑	☐	☐	Tape Guide
☐	☐	☐	

Processors Signature/ Initials MS

Quote Reference	CS006596	Condition on return
Customer Ref		
Equipment ID	30L122-67	
Equipment serial no.	268062	
Return Date	/ /	
Return Time		