

Report on Site Investigation for Contamination

Proposed Mixed-Use Development 552-568 Oxford Street, Bondi Junction

Prepared for Denscen Pty Ltd

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The undersigned, on behalf of Douglas Partners Pty Ltd, confirm that this document and all attached drawings, logs and test results have been checked and reviewed for errors, omissions and inaccuracies.

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Report on Site Investigation for Contamination Proposed Mixed-Use Development

552-568 Oxford Street, Bondi Junction

1. Introduction

This report presents the results of a site investigation for contamination undertaken for the proposed mixed-use development (the site). The investigation was commissioned by Denscen Pty Ltd and was undertaken in accordance with Douglas Partners Pty Ltd (DP) proposal SYD171020.P.001.Rev2 dated 31 August 2017.

It is understood that this report will form part of the development application (DA) associated with the planned construction. DP carried out a contamination desktop study at the site in June 2017 and identified an existing dry cleaner at premises No. 566 Oxford Street, located at part of the site from 2009 to date. The dry cleaning industry previously (and most if not all currently) used tetrachloroethene (PCE) as part of the dry cleaning process and poor waste disposal practices commonly adopted in the past have led to significant soil and particularly groundwater contamination issues. As such, if this product is disposed of or leaked through degraded sewer pipes into the soil, and subsequently into the groundwater, it tends to migrate vertically downwards to a confining layer.

The objectives of this investigation were to:

- Supplement the contamination desktop study carried out by DP in June 2017;
-) Investigate concentrations of potential contaminants (particularly dry cleaning related chemicals) in soils, soil vapour and groundwater at accessible parts of the site, and particularly in the vicinity of the dry cleaner;
- Assess the laboratory results with respect to the proposed land use; and
- Make recommendations for further work, if considered necessary.

It is understood that the proposed redevelopment includes demolition of all existing site buildings and the construction of a nineteen (19) level shop-top-housing development comprising of:

-) Ninety (90) dwellings;
-) Three (3) retail premises;
- Four (4) basement levels with access from Grafton Lane, providing a total of eighty-eight (88) onsite parking spaces for vehicles;
- Ancillary items include storage space, garbage rooms, utility rooms and loading bays; and
-) Podium level communal landscaped gardens.



2. Scope of Works

The scope of the investigation was as follows:

-) Reviewed and outlined the key findings of a contamination desktop study conducted in June 2017, refer Section 5;
-) Conducted DBYD and services scanning at three borehole locations;
-) Drilled two soil boreholes (including a groundwater monitoring well) to a maximum of 17 m below ground level at rear of premises No. 558-560 and 566 Oxford Street, predominately for geotechnical purposes using a track-mounted drilling rig;
- Drilled a soil vapour borehole to a depth approximately 1.5 m below ground level at the rear of premises No. 566 Oxford Street (the dry cleaner site) using a track-mounted drilling rig;
-) Soil sampled from the three boreholes with soil collection at regular intervals and recording signs of contamination and changes in strata to up to 0.5 m into natural soils only;
-) Screened all soil samples for volatile organic compounds (VOC) using a photo-ionisation detection (PID) instrument;
-) The bore proposed for the groundwater monitoring well was extended to a depth of 17 m below ground level and a PVC standpipe was installed to permit groundwater level monitoring and sampling of groundwater beneath the site;
-) Following the drilling of the soil vapour borehole, a soil vapour probe was installed. A gravel pack was placed around the inlet then a bentonite layer followed by a gatic cover which was fixed in cement/concrete;
-) Analysed selected soil and groundwater samples at a NATA accredited analytical laboratory. The samples were analysed for various combinations of common contaminants as listed below:
 - Metals (As, Cd, Cr, Cu, Pb, Hg, Ni, Zn);
 - Total recoverable hydrocarbons (TRH) (a screening test for total petroleum hydrocarbons TPH);
 - Monocyclic aromatic hydrocarbons (benzene, toluene, ethylbenzene and xylene BTEX);
 - Polycyclic aromatic hydrocarbons (PAH);
 - Phenols;
 - Polychlorinated biphenyls (PCB);
 - Organochlorine pesticides (OCP);
 - Organophosphorous pesticides (OPP);
 - Volatile organic compounds (VOC);
 - Asbestos;
 - Toxicity characteristic leachability procedure (TCLP) (metals and PAH); and
 - Field replicates;
- Undertook leak detection on the soil vapour port using isopropanol alcohol (IPA) tracer;
- Purged and sampled the soil vapour well by removing one bore volume;

-) Conducted laboratory analysis on a soil vapour sample plus one replicate vapour sample for VOC TO15 USEPA Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air Second Edition. *Determination Of Volatile Organic Compounds (VOCs) In Air Collected In Specially-Prepared Canisters And Analyzed By Gas Chromatography/Mass Spectrometry (GC/MS);* in accordance with and general gases gas chromatography (including O₂, CO₂, CH₄, CO and He);
-) Collected of a back-up sample to carbon tubes. Analysis on the backup tubes will only be conducted if the results from the canister samples are outside the working range;
-) Conducted laboratory analysis on one shroud sample for IPA; and
-) Prepared this report detailing the findings of the investigation.

3. Site Information

3.1 Site Details

Site details are provided in Table 1, below. A site plan is provided as Drawing 1, Appendix A.

Item	Description	
Site Address	552-568 Oxford Street, Bondi Junction	
	552 Oxford Street: Lot 2 DP 543255;	
	554-556 Oxford Street: Lot 1 DP 450071;	
Let and DD Number	558-560 Oxford Street: Lot 2 DP 450571;	
Lot and DP Number	562-564 Oxford Street: Lot 1 DP 75269;	
	566 Oxford Street: Lot 1 DP 500217; and	
	568 Oxford Street: Lot 2 DP 500217.	
Local Government Authority	Waverley Council	
County/Parish	Parish of Alexandria and County of Cumberland	
Total Site Area	Approximately 1,120 m ²	
Current Zoning	B4 Mixed Use	
Site Owner	Denscen Pty Ltd	

Table 1: General Site Information



ltem	Description		
	552 Oxford Street: Lot 2 DP 543255: Beauty salon and mortgage broker office and psychology clinic;		
	554-556 Oxford Street: Lot 1 DP 450071: Hutchinson Builders' site office;		
	558-560 Oxford Street: Lot 2 DP 450571: Dibartoli (home barista centre);		
Current Site Use	562-564 Oxford Street: Lot 1 DP 75269: Vacant (former Richard Crooks' site office) and Medical Centre;		
	566 Oxford Street: Lot 1 DP 500217 Clothes Alterations, tailoring and dry cleaning;		
	568 Oxford Street: Lot 2 DP 500217; and Ugg boots Store.		
Proposed Development	Commercial/retail on ground level and residential on upper levels.		
	North: Grafton Lane and the 'Eclipse' high-rise building;		
	East: A new, high-rise building under construction;		
Adjacent Land Use	South: Oxford Street and the 'Hollywood' high-rise apartment;		
	West: Westfield Shopping Complex.		

3.2 Site Description

The majority of the site area comprises two to three-storey brick buildings with six adjoining shop façades, fronting Oxford Street. The buildings were observed during a recent walkover to be used for or have been used for numerous commercial / retail purposes including: beauty salon, mortgage broker office, psychology clinic, construction site offices, home barista centre, medical centre, clothes alterations, tailoring and dry cleaning and ugg boots store. It is understood that the upper levels were predominantly used as offices related to the retail and businesses operating on the ground level.

The current use of the rear of the site fronting Grafton Lane includes predominately loading bay areas, waste storage areas and parking. Due to access and parking constraints, the rear of the site was used to position the three boreholes as mentioned in Section 2.

The surface elevation at the south-eastern corner is about RL 84 m relative to the Australian Height Datum (AHD) and RL 80 m around the north-western corner on a north-north-west facing slope, which has been modified for the existing buildings.

No signs of potential contamination (such as oil stained concrete slabs) were observed. Anecdotal information with lease information indicated that premises 566 Oxford Street operated as a store for clothes alterations, tailoring and dry cleaning business since 2009.

Surrounding landuses were observed to be mainly commercial (shops and offices) and high-rise residential. The Westfield shopping complex was located to the west of the site.

4. Geology, Topography and Hydrogeology

Reference to the Sydney 1:100,000 series geological sheet indicates that the site is located on Hawkesbury Sandstone from the Triassic period. Hawkesbury Sandstone comprises medium to coarse grained quartz sandstone, very minor shale and laminate lenses.

A near vertical, north-south trending dyke, up to about 3 m in width may cross the western, north-western part of the site.

The site is in an area of no known occurrences of acid sulphate soils and/or saline soils according to data supplied by the NSW ASS/Salinity Risk Maps.

Topography surrounding the site has gentle slopes to the north and north-west. Groundwater is expected to flow towards Cooper Creek (at Cooper Park), located approximately 600 m to the north.

About a week after installation and purging, the water level measurement in the groundwater monitoring well indicated that the standing water level typically lay at approximately RL 74 m. Note that water pressure and levels are governed by the characteristics of the rock mass and that groundwater inflow into the excavation will principally be along discontinuities (bedding partings and some joints) in the rock, and to a lesser extend from the soil/rock interface.

5. Review of DP Report

DP prepared a preliminary site investigation for contamination report in June 2017 entitled: *Report to on Preliminary Site Investigation for Contamination at 552-568 Oxford Street, Bondi Junction NSW* (REF: 85822.01) (DP 2017).

The key findings of DP (2017) report are summarised below:

- Historical title deeds search revealed potential land uses such as: residential between 1920s and 1950s and commercial/retail after the 1950s;
-) Waverly Council records under the informal access to Council information indicated that the previous development applications have been predominately related to retail/commercial uses including: butcher's shop, pharmacy, sale of wallpaper, toys, electronic goods, florist, optometrist, paint shop, furniture and pantry shops;
- Based on the walkover conducted on 3 February 2017, the premises were used for numerous commercial / retail purposes including: beauty salon, mortgage broker office, psychology clinic,

construction site offices, home barista centre, medical centre, clothes alterations, tailoring and dry cleaning and ugg boots store. It was understood that the upper levels were predominantly used as offices related to the retails and businesses operating on the ground level;

-) The areas of environmental concern included: imported fill of unknown origin, hazardous building materials in existing buildings and dry cleaner;
- DP considered that the site can be made suitable for the proposed development subject to the following recommendations:
 - Z **Hazardous Building Material Assessment:** A hazardous building materials assessment on the existing buildings should be undertaken prior to demolition; and
 - Z **Detailed Site Investigation (DSI) incorporating waste classification:** A detailed contamination investigation to target the filling and groundwater should be undertaken following demolition of the current site buildings due to site access issues. The DSI will provide information on the contamination status of soils and groundwater, as well as a waste classification required for disposal of surplus soils during basement excavation.

6. Conceptual Site Model

A conceptual site model (CSM) is a representation of site-related information regarding contamination sources, receptors and exposure pathways between those sources and receptors. The CSM provides the framework for identifying how the site became contaminated and how potential receptors may be exposed to contamination either in the present or in the future i.e. it enables an assessment of the potential source – pathway – receptor linkages.

6.1 Potential Contamination Sources

The following Table 2 summarises potential sources of contamination identified based on the above reviewed site history and site walkover as discussed in DP (2017).

Potential Source	Description of Potential Contaminating Activity	Contaminants of Concern
Imported fill of unknown origin (S1)	Fieldwork carried out at the site identified the depth of filling ranging to up to 3.4 m below the surface. There is potential for contaminants to be present in the filling.	Common contaminants associated with fill include heavy metals, TPH, BTEX, PAH, PCB, OCP, OPP, phenols and asbestos

Table 2: Potential Contamination Sources and	d Contaminants of Concern
--	---------------------------

Potential Source	Description of Potential Contaminating Activity	Contaminants of Concern
Hazardous building materia in existing buildings (S2)	s Presence of hazardous building materials within the building fabric and also in site soils following the demolition of previous buildings.	Asbestos, lead and PCB
Dry Cleaner (S3)	Use as a dry cleaner at premises No. 566 Oxford Street since 2009 to date and other potentially contaminating, unknown historical commercial/retail uses.	VOC including aliphatic hydrocarbons, BTEX, PAH, phenols, metals and chlorinated solvents: tetrachloroethene (PCE) and its daughter products trichloroethene (TCE), dichloroethene (DCE)
Notes: TRH - total pe	troleum hydrocarbon	· · · · · · · · · · · · · · · · · · ·
BTEX - benzer	ie, toluene, ethylbenzene, xylene	

- PAH polycyclic aromatic hydrocarbons
- PCB polychlorinated biphenyls
- OCP organochlorine pesticides
- OPP organophosphorous pesticides
- VOC volatile organic compounds

The potential contamination sources (S) on the site are therefore as follows:

- S1 Fill of unknown origin;
- S2 Hazardous building materials; and
- S3 Existing dry cleaning business in operation since 2009.

6.2 Potential Receptors

6.2.1 Human Health Receptors

- R1 Current site users (site workers and visitors);
- R2 Construction and maintenance workers;
- R3 Final end users (site workers and visitors); and
- R4 Land users in adjacent areas (commercial/retail).

6.2.2 Environmental Receptors

- R5 Groundwater (Cooper Creek);
- R6 Surface water; and
- R7 Terrestrial ecology.



6.2.3 Potential Pathways

Potential pathways for the identified contamination to impact on the receptors include the following:

- P1 Ingestion and dermal contact;
- P2 Inhalation of dust and/or vapour;
- P3 Leaching of contaminants and vertical migration into groundwater;
- P4 Surface water run-off;
- P5 Lateral migration of groundwater; and
- P6 Contact with terrestrial ecology.

6.3 Summary of Preliminary CSM

A 'source – pathway – receptor' approach has been used to assess the potential risks of harm being caused to human, water or environmental receptors from contamination sources on or in the vicinity of the site, via exposure pathways. The possible pathways between the above sources (S1 to S3) and receptors (R1 to R7) are provided in Table 3 below.



Table 3: Conceptual Site Model

Source	Pathway	Receptor
S1: Fill of unknown origin	P1: Ingestion and dermal contact	R1: Current site users
S3: Dry Cleaner		R2: Construction and maintenance workers
		R3: Final end users
	P2: Inhalation of dust and/or vapour	R1: Current site users
		R2: Construction and maintenance workers
		R3: Final end users
		R4: Land users in adjacent areas
	P3: Leaching of contaminants and vertical migration into groundwater	R5: Groundwater
	P4: Surface water run-off	R6: Surface water
	P5: Lateral migration of groundwater	
	P6: Contact with terrestrial ecology	R7: Terrestrial ecology
S2: Hazardous building materials	P1: Ingestion and dermal contact	R1: Current site users
	P2: Inhalation of dust and/or vapour	R2: Construction and maintenance workers
		R3: Final end users



7. Methodology

The methodology of this investigation was based on EPA endorsed guidance and included determining the data quality objectives required to meet the assessment's objective. Details of the methodology are provided below.

7.1 Data Quality Objectives (DQO)

The scope of the DSI has been devised generally in accordance with the seven step data quality objective (DQO) process, as defined in National Environment Protection Council (NEPC) *National Environment Protection (Assessment of Site Contamination) Measure 1999* (amended 2013) (NEPC, 2013). The DQO process is outlined as follows:

7.1.1 State the Problem

The "problem" to be addressed is to whether the site is suitable (or will be suitable after remediation) for the proposed development, from a contamination perspective. The proposed development will involve the construction of retail/commercial uses on ground level and residential apartment on upper levels with four-level basement carpark.

7.1.2 Identify the Decision

The decisions to be made in completing this investigation are as follows:

-) What is the risk of elevated soil, soil vapour and groundwater contamination within the drilling accessible areas of the site?
- Does the site, or is the site likely to, present a risk to human health or the environment for the proposed development?
- Are there likely to be any significant contamination issues that would pose restrictions on the proposed development?
-) Does the site require further investigation, remediation and/or validation for the proposed development?
- J Is there any contamination requiring notification to NSW EPA?

7.1.3 Identify Inputs into the Decision

The inputs into the decision process are as follows:

-) DP (2017) report findings;
-) Site operations and observation details;
- Soil profile information obtained through the sampling phase;
-) Screening results;
-) Chemical test data on analysed soil, soil vapour and groundwater samples;
- Assessment of test data against applicable site assessment criteria; and



) Details of the proposed development.

7.1.4 Define the Boundary of the Assessment

The boundary of the assessment is the boundary of the site, as shown on Drawing 1, Appendix A and the depth of investigation. The maximum borehole depth was 17 m below ground level (bgl), predominately for geotechnical purposes. Environmental samples were collected at a maximum borehole depth of 4.0 m bgl. Sampling and testing was confined to a small part of the site that was accessible for drilling.

7.1.5 Develop a Decision Rule

The information obtained through this investigation was used to further assess the suitability of the site (from a contamination standpoint) for the proposed development. The decision rule in conducting this investigation was as follows:

- Laboratory test results were assessed individually, and/or statistically where appropriate;
-) The site assessment criteria (SAC) have been endorsed by the EPA or, for analytes where there are no EPA endorsed criteria, other relevant Australian or internationally recognised standards have been referred to as screening thresholds;
-) The soil, soil vapour and groundwater analytical results provide an indication of the likely potential for contamination at the site, in the areas accessible for the drilling rig;
-) Relevant site information, observations and exceedances of the SAC were used to evaluate the contamination status of the site; and
- *J* Further investigations and/or remediation works have been recommended, if required.

Laboratory test results were assessed and considered useable for the assessment based on the following conditions:

- All laboratories used are accredited by National Association of Testing Authorities (NATA) for the analyses undertaken;
-) Practical quantitation limits (PQL) set by the laboratories being below the assessment criteria adopted;
-) The reported concentrations of analytes in the replicate sample pairs are within accepted limits; and
-) The quality assurance/quality control (QA/QC) protocols and results reported by the laboratories comply with the requirements of the NEPC (2013).

7.1.6 Specify Acceptable Limits on Decision Errors

The limits on decision errors for the proposed assessment will be as follows:

-) The analyte selection is based on the conceptual site model provided in Section 6 of this report;
-) The SAC adopted from the guidelines stated in Section 8 have risk probabilities already incorporated;



-) The acceptable limits for replicate comparisons are outlined in Australian Standard AS 4482.1-2005, Guide to the investigation and sampling of sites with potentially contaminated soil, Part1: Non—volatile and semi-volatile compounds; and
-) The acceptance limits for laboratory QA/QC parameters are based on the laboratory reported acceptance limits and those stated in NEPC 2013 Schedule B3 "*Guideline on Laboratory Analysis of Potentially Contaminated Soils*".

7.1.7 Optimise the Design for Obtaining Data

The sample design was based on the CSM as detailed in Section 6 to specifically target the dry cleaner area, and to provide a limited amount on data on other potential sources of contamination identified in the CSM. The following items were specifically noted:

-) The recommended minimum sampling density in the EPA *Contaminated Sites: Sampling Design Guideline*, 1995 (EPA, 1995) for sites of 0.112 ha is six sampling points. The adopted sampling density of three sampling points over a 0.112 ha site is considered to be practical at this stage due to site access constraints;
-) Sample locations were selected to both target areas of identified specific concern and to provide some (limited) site coverage, noting limitations in access for drilling due to the operational nature of the site; and
-) The depth of sampling was based on materials most likely to be contaminated based on the site history and field observations.

Procedures for the collection of environmental samples, as described in Section 7.6, were employed during the site works. These are in line with EPA guidelines and current industry practice.

To optimise the selection of samples for chemical analysis, all soil samples were screened using a calibrated photo-ionisation detector (PID). The results of the PID readings are provided in the borehole logs. The interpretation of PID values enabled better assessment of the investigation samples to determine the analytical programme and the need, if any, for further investigation. Further, DP employed NATA accredited analytical laboratories to conduct sample analysis.

7.1.8 Data Quality Indicators

The performance of the assessment in achieving the DQO was assessed through the application of Data Quality Indicators (DQI), defined as follows:

-) Completeness a measure of the amount of usable data from a data collection activity;
-) Comparability the confidence (qualitative) that data may be considered to be equivalent for each sampling and analytical event;
-) Representativeness the confidence (qualitative) of data representativeness of media present onsite;
- Precision a measure of variability or reproducibility of data; and
- Accuracy a measure of closeness of the data to the 'true' value.

The adopted DQIs and the procedures designed to enable achievement of the DQIs.



7.2 Field Quality Assurance and Quality Control

DP's quality assurance (QA) and quality control (QC) procedures were adopted throughout the field sampling program to assess sampling precision and accuracy and prevent cross-contamination.

Appropriate sampling procedures were undertaken to limit cross contamination and followed procedures described in DP's *Standard Operating Procedures Manual*. This specifies that:-

- J Standard operating procedures were followed;
-) Site specific safe work method statement(s) were developed prior to commencement of works and were applied during fieldwork;
- Replicate field samples were collected and analysed, comprising 5% intra-laboratory samples.
 Replicate samples were analysed for heavy metals and PAH;
-) Trip spike and trip blank samples were taken out into the field. These samples were analysed for BTEX;
- Rinsate samples were not collected due to the use of disposable sampling equipment;
- Samples were stored under secure, temperature controlled conditions. An ice box (esky) cooled with ice was used for storage during fieldwork and transportation; and
-) Chain-of-custody documentation was employed for the handling, transport and delivery of samples to the selected laboratory.

The results of the DP assessment of laboratory QA/QC are shown in Appendix E, with the full laboratory certificates included in Appendix D.

7.3 Laboratory Quality Assurance/Quality Control

The contract laboratories were NATA accredited and conduct in-house QA/QC procedures involving the routine testing of:

- Reagent blanks;
- Spike recovery analysis;
- Laboratory duplicate analysis;
- Analysis of control standards;
-) Calibration standards and blanks; and
- Statistical analysis of QC data including control standards and recovery plots.

Samples were analysed using NATA endorsed methods. Samples were analysed within the required holding times.

The results of the DP assessment of laboratory QA/QC are included in Appendix E, with the full laboratory certificates included in Appendix D.



7.4 Fieldwork Timing

Fieldwork was conducted between 18 and 28 of September 2017 and comprised drilling of three boreholes. One of the boreholes (BH 2) was converted into a groundwater monitoring well and the other borehole (BH 3) was converted into a soil vapour well.

7.5 Sampling Locations and Rationale

7.5.1 Sampling Pattern

Sampling locations were determined to provide representative coverage across accessible areas of the site, including sampling from areas of different land uses, and to target potential point sources (e.g. dry cleaner) where identified and accessible.

A groundwater monitoring well was positioned in the north-eastern corner of the site to assess the groundwater quality at the hydraulic down gradient side of the site.

A soil vapour well was positioned at rear of the dry cleaner site as workers in the past would normally dispose waste liquid to the rear of dry cleaning sites.

The sampling locations are shown on Drawing 1, Appendix A.

7.5.2 Sampling Depths

Boreholes were all extended into natural soils with borehole depths of between 1.5 m and 4.0 m for environmental sampling.

Soil samples were collected at regular intervals and based on field observations, including changes in strata and signs of contamination.

7.6 Soil Sampling Procedures

All sampling data were recorded on DP borehole logs with samples also recorded on chain-of-custody sheets. The general sampling procedure adopted for the collection of environmental samples is summarised below:

- Collect soil samples using new disposable sampling equipment (push tubes and nitrile gloves);
-) Transfer samples into laboratory-prepared glass jars, completely filled to minimise the headspace within the sample jars, and capping immediately with a Teflon lined lid to minimise loss of volatiles;
-) At every sampling depth, additional samples were collected for acid sulphate soil testing. The acid sulphate soil samples were placed in zip-lock bags, cooled and sealed for transport to the laboratory;
-) Label sample containers with individual and unique identification, including project number, sample location and sample depth;



- Place the glass jars into a cooled, insulated and sealed container for transport to the laboratory;
-) Collection of additional replicate samples for QA/QC requirements; and
-) Screen all soil samples using a calibrated PID to assess the presence of volatile organic compounds.

Prior to PID screening, the PID was calibrated using a 100 ppm isobutylene standard. Replicate samples were collected at the time of sampling and placed in snap lock bags, sealed with some air to allow volatilisation into the headspace. Screening was conducted by pushing the PID intake valve through the snap lock seal.

Envirolab Services Pty Ltd, a NATA accredited laboratory, was employed to conduct the sample analysis. The laboratories are required to conduct in-house QC procedures.

7.7 Groundwater Well Installation

The groundwater monitoring well was installed to a depth of 17 m bgl in BH 2.

The groundwater monitoring well comprised 50 mm diameter, acid washed, class 18, PVC casing and machine slotted well screen. The well was completed with a gravel pack over the screened section, and sealed using a bentonite plug of 1 m thickness just above the screened section. A gatic cover was placed over the well, flush with the ground level. The well detail is recorded in the remarks on the corresponding bore log sheets which are included in Appendix B.

7.8 Groundwater Sampling

On 22 and 27 September 2017, the groundwater well was developed using a disposable bailer to remove approximately 100 litres of water, up to the point where the well was dry. Following development the well was allowed to recharge for over 24 hours and then sampled on 28 September 2017.

Prior to sampling, an interface probe was lowered to detect the presence of any phase separated hydrocarbons (PSH) and to measure the water levels relative to the top of casing. It should be noted that due to insufficient water for groundwater micropurging and sampling, a disposable bailer was used to sample the groundwater and, therefore, the field parameters were not assessed prior to sampling.

The sample was recovered from approximately the centre of the water column within the well. The sample was then placed with a minimum of aeration into appropriately preserved bottles.

Sample handling and transport procedures are set out below:

- J Groundwater sampling undertaken by an experienced environmental scientist;
-) Samples placed in laboratory prepared sample containers;
-) Sample containers labelled with individual and unique identification, including project number and sample location;



-) Sample containers placed into a cooled, insulated and sealed container for transport to the laboratory;
-) The samples delivered to the selected analytical laboratory on the day following fieldwork completion; and
-) Chain-of-Custody documentation maintained at all times and countersigned by the receiving laboratory on transfer of samples.

7.9 Soil Vapour Well Installation

The test bore was drilled to a depth of 1.5 and the soil vapour bore was installed nominally to a depth of 1.0 m bgl. The shallow depth was selected to determine the presence of any soil vapour contamination from the previous dry cleaner site. It should be noted that where basement excavations are proposed, the bores should be extended to the base or breathing level of the proposed basements level, provided the site sits above the groundwater table.

7.10 Soil Vapour Sampling

Samples were collected from the soil vapour well by an Environmental Engineer from DP on 22 Secptember2017. The sampling methodology was undertaken in general accordance with ASTM D7663-12 *Standard Practice for Active Soil Gas Sampling in the Vadose Zone for Vapour Intrusions* and current industry best practice. The sampling and analytical methodology adopted was as follows:

-) Performance of sampling train shut in tests prior to sampling to demonstrate that there were no leaks in the sampling train. The canister shut-in test involved assembling the sample apparatus to the extent practical (i.e. connecting the summa canister to the regulator), then opening the canister valve to apply the vacuum (of -30 mmHg) to the sampling train, while the regulator was still capped. The carbon back-up tube shut in test involved assembly the sample train (fittings to attach to vapour well, carbon tube, vacuum gauge, rotameter and pump plus the associated tubing connecting the sample train, then clamping the sampling tube between the vapour port and carbon tube, activating the pump until a vacuum of 15 in.Hg was achieved and then the sampling train was clamped at the pump. The shut in tests were run for a minimum of 30 seconds;
-) Purging of the soil vapour wells prior to sampling by removing at least one volume of air/vapour from each well;
-) Introduction of liquid isopropyl alcohol (IPA) into the sampling shroud to act as a tracer gas for leaks in the soil vapour ports and/or the sampling train. All samples were analysed for IPA as part of the TO15 analysis;
- The primary sample and a replicate sample were collected directly from the soil vapour port into 1L Summa Canisters with a flow regulator set by the analytical laboratory (approximately 100 ml per minute). The regulator was supplied by the analytical laboratory and were decontaminated by the laboratory prior to shipment;
- Back-up samples were collected directly into solid sorbent "Type 2 Air Toxics" thermal desorption sampling tubes using an SKC constant flow air-sampling pump, low flow adapter and rotameter to confirm the flowrate (0.1 L/min);



-) Collection of one shroud sample to a carbon tube to conduct analysis for IPA and determine the concentration of the tracer compound in the shroud; and
-) The VOC samples were collected from the sample point directly into the sorbent tube/canister so as not to pass through the pump, rotameter or tubing which has the potential to contaminate the samples (rotameter not required for canisters).

The quality assurance (QA) and quality control (QC) procedures adopted throughout the soil vapour monitoring included the following:

- Adoption of appropriate chain-of-custody procedures from site to the laboratory;
- Documenting sample receipt conditions to verify the validity of the sample;
- *J* Equipment calibration conducted regularly;
-) Checking of canister vacuum pressure at the commencement and completion of sampling in comparison to the pressures at dispatch and upon final receipt by the laboratory;
-) Performance of sample train shut-in leak tests;
- Analysis of samples within recommended holding times;
-) Collection and analysis of a field sample duplicates for intra-laboratory duplicate analysis;
- Analysis of a tracer gas (isopropyl alcohol (IPA)) introduced into the sampling shroud to assess for leaks in the sampling train and for interference from atmospheric gases; and
- Analysis of a method blank with every sample batch.

Trip blanks and spikes were not analysed due to the sampling method, direct to Summa canisters, which are certified by the laboratory prior to shipping as being "cleaned". Leakage from or to the canisters is assessed by comparing the vacuum pressures at the laboratory to site and from completion of sampling to the laboratory. If there is no change in vacuum pressure then no cross contamination and/or loss of product is considered to have occurred.

7.11 Analytical Rationale

The analytical scheme was designed to assess the potential presence and possible distribution of the contaminants of potential concern identified in the CSM (Section 6).

8. Assessment Criteria

8.1 Site Assessment Criteria - Soil

The Health Investigation Levels (HIL) and Health Screening Levels (HSL) are scientifically-based, generic assessment criteria designed to be used in the first stage (Tier 1) of an assessment of potential human health risk from chronic exposure to contaminants.

HILs are applicable to assessing health risk arising *via* all relevant pathways of exposure for a range of metals and organic substances. The HIL are generic to all soil types and apply generally to a depth of



4 m below the surface. Site-specific conditions may determine the depth to which HILs apply for other land uses.

HSLs are applicable to selected petroleum compounds and fractions to assess the risk to human health via inhalation and direct contact pathways. HSL have been developed for different land uses, soil types and depths to contamination.

The generic HIL and HSL are considered to be appropriate for the assessment of contamination at the site. Given the proposed land use the adopted HIL and HSL are:

- HIL-B residential with minimal soil access; and
- **HSL-D*** commercial industrial.
- * HSLs have been derived based on slab-on-ground construction and did not model basements, building design which incorporates shared communal car parks are required to meet Australian Standard for adequate ventilation either through air or mechanical ventilation. The air exchange rate required to meet the standard is higher than that used in the modelling of the commercial worker scenario. Therefore, the HSLs for commercial land use may be used for assessing communal basement car parks.

It is noted that CRC CARE (2011) also published health screening levels applicable to intrusive maintenance workers. However, the listed levels are less conservative than the abovementioned screening levels and therefore would not inform further investigation and/or remediation outcomes and are therefore not listed as SAC.

The HSLs adopted are predicated on the inputs summarised in Table 4.

Variable	Input	Rationale
Exposure	Vapour Intrusion Direct contact	Vapour inhalation and direct contact have been identified as exposure pathways in the CSM.
Soil Type	Sand	Sandy filling was present over much of the site, and is the most conservative soil type in the determination of HSLs.
Depth to contamination	0 m to <1 m	Depth of 0 to <1 m has been adopted for initial screening, being the most conservative in the determination of HSLs.

Table 4: Inputs to the Derivation of HSLs

The adopted soil HIL and HSL for the potential contaminants of concern are presented in Table 5.



Analyte		HIL-B	HSL-D, 0 to <1m Vapour Intrusion	HSL-D, 0 to <1m Direct Contact	
	Arsenic	500	-	-	
	Cadmium	150	-	-	
	Chromium	500	-	-	
	Chromium (VI)	500	-	-	
Motals	Copper	30,000	-	-	
metalo	Lead	1,200	-	-	
	Mercury (inorganic)	120	-	-	
	Nickel	1,200	-	-	
	Zinc	60,000	-	-	
	Benzo(a)pyrene TEQ ¹	4	-	-	
PAH	Naphthalene	3	NL	11,000	
	Total PAH	400	-		
	C6 – C10 (less BTEX) [F1]	-	260	26,000	
ТРН	>C10-C16 (less Naphthalene) [F2]	-	NL	20,000	
	>C16-C34 [F3]	-	-	27,000	
	>C34-C40 [F4]	-	-	38,000	
	Benzene	-	3	430	
DTEV	Toluene	-	NL	99,000	
DIEA	Ethylbenzene	-	NL	27,000	
	Xylenes	-	230	81,000	
	DDT+DDE+DD	600	-	-	
	Aldrin and dieldrin	10	-	-	
	Chlordane	90	-	-	
OCP	Endosulfan	400	-	-	
	Endrin	20	-	-	
	Heptachlor	10	-	-	
	НСВ	15	-	-	
	Methoxychlor	500	-	-	

Table 5: Health Investigation and Screening Levels (HIL and HSL) in mg/kg



Analyte	HIL-B	HSL-D, 0 to <1m Vapour Intrusion	HSL-D, 0 to <1m Direct Contact
Phenol 45,000		-	-
PCB ² 1		-	-
VOC PQL as initial screening concentration. Reference to national or international standards if above the PQL.		-	_

Notes:

- 1 sum of carcinogenic PAH
- 2 non dioxin-like PCBs only.
- 3 NL The solubility limit is defined as the soil concentration at which the water cannot dissolve any more of an individual chemical based on a petroleum mixture. The soil vapour which is in equilibrium with the soil will be at its maximum. If the derived soil HSL exceeds 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 a given scenario. For these scenarios no HSL is presented for these chemicals. These are denoted as not limiting 'NL'.

8.1.1 Ecological Investigation/Screening Levels

Given that the bulk of the site will be excavated for basement construction and podium level communal landscaped gardens has been proposed, EIL/ESL would not be applicable in this case.

8.1.2 Management Limits – Petroleum Hydrocarbons

In addition to appropriate consideration and application of the HSL, there are additional considerations which reflect the nature and properties of petroleum hydrocarbons, including:

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

Management Limits to avoid or minimise these potential effects have been adopted in NEPC (2013) as interim Tier 1 guidance. Management Limits have been derived in NEPC (2013) for the same four petroleum fractions as the HSL (F1 to F4). The adopted Management Limits, from Table 1B(7), Schedule B1 of NEPC (2013) are shown in the following table. The following site specific data and assumptions have been used to determine the Management Limits:

-) The Management Limits will apply to any depth within the soil profile;
-) The Management Limits for residential, parkland and public open space apply; and
- A "coarse" soil texture has been adopted given the predominantly sandy filling present across the site.



Analyte		Management Limit	
	$C_6 - C_{10} (F1)$ #	700	
TRH	>C ₁₀ -C ₁₆ (F2) [#]	1,000	
	>C ₁₆ -C ₃₄ (F3)	2,500	
	>C ₃₄ -C ₄₀ (F4)	10,000	

Table 6: Management Limits in mg/kg

Separate management limits for BTEX and naphthalene are not available hence these have not been subtracted from the relevant fractions to obtain F1 and F2

8.1.3 Asbestos in Soil

Bonded asbestos-containing material (ACM) is the most common form of asbestos contamination across Australia, generally arising from:

-) Inadequate removal and disposal practices during demolition of buildings containing asbestos products;
-) Widespread dumping of asbestos products and asbestos containing fill on vacant land and development sites; and
- Commonly occurring in historical fill containing unsorted demolition materials.

Mining, manufacturing or distribution of asbestos products may result in sites being contaminated by friable asbestos including free fibres. Severe weathering or damage to bonded ACM may also result in the formation of friable asbestos comprising fibrous asbestos (FA) and/or asbestos fines (AF).

Asbestos only poses a risk to human health when asbestos fibres are made airborne and inhaled. If asbestos is bound in a matrix such as cement or resin, it is not readily made airborne except through substantial physical damage. Bonded ACM in sound condition represents a low human health risk, whilst both FA and AF materials have the potential to generate, or be associated with, free asbestos fibres. Consequently, FA and AF must be carefully managed to prevent the release of asbestos fibres into the air.

As the investigation was limited to collection of soil samples from boreholes, a detailed characterisation of asbestos contamination in soil has not been undertaken at this stage and, therefore, the presence of any detectable asbestos will be considered significant for the purpose of this assessment.

8.2 Groundwater

The potential receptors of impacted groundwater from the site include:

) Cooper Creek – fresh water system.



8.2.1 Groundwater Investigation Levels

The Groundwater Investigation Levels (GIL) adopted in NEPC (2013) are based on:

- Australian Drinking Water Guidelines 2011 (ADWG); and
- National water quality management strategy. Australian and New Zealand guidelines for fresh and marine water guality 2000 (ANZECC & ARMCANZ).

However, as no potable groundwater use has been identified for the region, and the groundwater is likely to be heavily impacted by past industrial uses, the drinking water criteria are not referenced as SAC / GIL. The adopted GIL for the analytes included in the assessment (where applicable), and the corresponding source documents, are shown in Table 7.

Contaminant GILs (µg/L) Source of GILs **Volatile Organic Compounds** ^a ANZECC & ARMCANZ (2000) low to moderate reliability trigger values, Trichloroethene 330^a Australian Water Quality Guidelines Chloroform 370^a, 0.17^b for the protection of 95% of fresh water species. 1.1^b Bromodichloromethane ^b USA EPA, Region 9, Regional 87^b 1,3,5-trimethyl benzene Screening Level, Тар water 15^b 1,2,4-trimethyl benzene Supporting Table, November 2012. Metals Arsenic (III) 24 NEPC 2013. Table 1A(4) Arsenic (V) 13 Groundwater HSLs for Table 1C Cadmium 0.2 Groundwater Investigation Levels Chromium (VI) (GILS) for typical slightly-moderately disturbed fresh water systems in Copper 1.4 Schedule B(1) - Guideline on the Lead 3.4 Investigation Levels for Soil and Nickel 11 Groundwater Zinc 8 0.06^d Mercury (inorganic) NEPC 2013, Table 1A(4) TRH Groundwater HSLs for vapour NL $C_6 - C_{10}$ intrusion for recreational and open NL space in clay from 2 m to < 4m and 4 $C_{10} - C_{16}$ m to < 8 m.

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Table 7: Groundwater Investigation Levels (in µg/L unless otherwise stated)

 $C_{>16} - C_{40}$





Contaminant	GILs (µg/L)		Source of GILs
BTEX Benzene Toluene Ethylbenzene <i>o</i> -xylene <i>p</i> -xylene <i>m</i> -xylene	950° - - 350° 250° -	- NL ^d NL ^d NL ^d NL ^d	 ^c NEPC 2013, Table 1A(4) Groundwater HSLs for vapour intrusion for recreational and open space in clay from 2 m to < 4m and 4 m to < 8 m and ^d NEPC 2013, Table 1C – Groundwater Investigation Levels (GILS) for typical slightly-moderately disturbed fresh water systems in Schedule B(1) – Guideline on the Investigation Levels for Soil and Groundwater.

Note:

1 NL = NL -The solubility limit is defined as the groundwater concentration at which the water cannot dissolve any more of an individual chemical based on a petroleum mixture. The soil vapour which is in equilibrium with the groundwater will be at its maximum. If the derived groundwater HSL exceeds 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 a given scenario. For these scenarios no HSL is presented for these chemicals. These are denoted as not limiting 'NL'.

8.2.2 Health Screening Levels – Petroleum Hydrocarbons

The generic HSL are considered to be appropriate for the assessment of contamination at the site. Given the proposed land use the adopted HSL is:

) **HSL- D** – commercial/industrial

In addition, the HSL adopted is predicated on the following inputs prescribed in Table 8.

Variable	Input	Rationale
Potential exposure pathway	Groundwater vapour intrusion (inhalation)	-
Soil Type	Sand	Sandy filling was present over much of the site, and is the most conservative soil type.
Depth to contamination	2 m to <4 m	With basement excavation groundwater will be encountered below the groundwater level which is measured between depth of 6.66 m and 7.06 m bgl.

Table 8: Inputs to the Derivation of HSLs

The adopted groundwater HSL for vapour intrusion, from Table 1A(4), Schedule B1 of NEPC (2013) are shown in the following table.



Analyte		ANZECC & ARMCANZ (2000) Fresh Waters ^b	NEPC (2013) HSL D 2 m to <4 m Sand
TRH	C ₆ – C ₁₀ (less BTEX) [F1]	-	6000
	>C ₁₀ -C ₁₆ (less Naphthalene) [F2]	-	NL
	>C16-C34 [F3]	-	-
	>C34-C40 [F4]	-	-
BTEX	Benzene	950 ^ª	5000
	Toluene	-	NL
	Ethylbenzene	-	NL
	Xylene (m)	-	-
	Xylene (o)	350 ^b	-
	Xylene (p)	200 ^b	-
	Xylenes (Total)	-	NL
PAH	Naphthalene	16 ^ă	NL

Table 9: Screening Levels for Petroleum Hydrocarbons (µg/L)

Notes:

a Figure may not protect key species from chronic toxicity.

- b In absence of screening levels for ANZECC & ARMCANZ 2000 for marine waters, ANZECC & ARMCANZ for freshwaters or the low reliability trigger values have been adopted as initial screening levels.
- NL The solubility limit is defined as the groundwater concentration at which the water cannot dissolve any more of an individual chemical based on a petroleum mixture. The soil vapour which is in equilibrium with the groundwater will be at its maximum. If the derived groundwater HSL exceeds 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 a given scenario. For these scenarios no HSL is presented for these chemicals. These are denoted as not limiting 'NL'.
- In absence of screening levels for petroleum hydrocarbons, concentrations of contaminants below PQL have been adopted as initial screening levels.

8.3 Soil Classification for Off-Site Disposal

The following guidance applies to off-site disposal of soils:

-) NSW EPA Waste Classification Guidelines 2014 (EPA, 2014); or
-) A General or Specific Exemption under the Protection of the Environment Operations (Waste) Regulation 2005.

For contaminated filling, waste classification for disposal to a licenced waste facility is required. Three main categories of waste apply (from lower to higher contaminant levels): General Solid Waste, Restricted Solid Waste and Hazardous Waste. Other waste categories also exist and can apply in



conjunction with these three main categories, including Special Waste (including asbestos contaminated wastes), Putrescible General Solid Waste and Acid Sulphate Soil.

General Solid Waste comprises wastes with contaminant levels within the threshold levels CT1 and/ or SCC1 and TCLP1 (as applicable). Restricted Solid Waste comprises wastes with contaminant levels within the CT2 and/ or SCC2 and TCLP2 (as applicable) threshold levels. Hazardous Waste comprises wastes with contaminant levels above the SCC2 and TCLP2 (as applicable) threshold levels.

Liquids are classified as Liquid Waste, with no further assessment required to obtain a formal classification in accordance with EPA (2014). Depending on the source of the liquid, however, further testing can be required by the receiving facility to ensure they are legally able to receive it and have the capability to process it.

The EPA (2014) waste classification criteria are shown on Table C1 in Appendix C.

8.4 Vapour Assessment

The health-based investigation levels (HIL) for residential B provided in NEPC (2013) have been adopted as the initial investigation / screening levels for chlorinated hydrocarbons in soil vapour. The screening levels for Residential B are relevant to the proposed residential land use. The screening levels for chlorinated hydrocarbons are presented in Table 10, below.

Chemical	Residential B	
TCE	0.02	
1,1,1 – TCA	60	
PCE	2	
Cis, 1,2, -DCE	0.08	
Vinyl chloride (VC)	0.03	

Table 10: Interim Soil Vapour Health Investigation Levels for Chlorinated Compounds (mg/m³)

For petroleum hydrocarbons the soil vapour HSLs for vapour intrusion from NEPC (2013) have been adopted as the initial investigation / screening levels. Based on the soil conditions encountered at the site the threshold levels for sand were adopted. The HSL A&B were adopted for future residential areas that do not include basement Carpark levels. HSL D is provided as a screening level if communal carparks occupy the ground floor. The investigation levels for 0 to 1 m bgl were adopted. The investigation / screening levels for petroleum hydrocarbons adopted for the monitoring program are presented in Table 11, below.



Chamical	HSL A&B	HSL D		
Chemical	0 to 1m	0 to 1m		
Toluene	1300	4800		
Ethylbenzene	330	1300		
Xylenes	220	840		
Naphthalene	0.8	3		
Benzene	1	4		
C6 – C10 (less BTEX) [F1]	180	680		
>C10-C16 (less Naphthalene) [F2]	130	500		

Table 11: Soil Vapour HSLs for Vapour Intrusion (mg/m³)

For screening purposes, where there is no screening level in NEPC (2013) the sub-slab soil vapour results have been compared to the US EPA, 2017 *Vapor Intrusion Screening Levels (VISLs),* USEPA, *Vapor Intrusion Screening Levels (VISL) calculator version 3.5.2,* for Target sub-slab and exterior soil gas concentration, Target Hazard Quotient=1. The screening levels are in Table C2 in Appendix C (soil vapour results table).

9. Results of Investigation

9.1 Field Observations

9.1.1 Soil

Based on the available investigation data, subsurface conditions at the site are likely to comprise the following:

- Filling sand, clay, rubble and/or ripped sandstone filling to depths of between 0.5 m and 3.4 m;
-) Sand loose and/or medium dense, fine and medium grained sand, underlying the filling, to depths of 1.1 m to 5 m;
-) Sandy Clay and extremely low strength sandstone stiff to hard sandy clay and extremely low strength sandstone to depths of between 3.6 m to 5 m; and
-) Bedrock sandstone bedrock is expected to be encountered depths of 3.6 m to 5.0 m. The sandstone is expected to be of medium and high strength and generally slightly fractured or massive.

A near vertical, north-south trending dyke, up to about 3 m in width may cross the western, north-western part of the site.

Borehole logs for the current assessment are provided in Appendix B.



9.1.2 Soil Vapour

There were no significant chemical odours noted during vapour sampling. The PID screening results were all less than 1 ppm. Following the application of the tracer compound to the sampling shroud there was no significant increase in the PID readings in the sampling line suggesting that there were no leaks in the sampling train. The PID reading of the sampling shroud was 283 ppm and sample line 2.2 ppm. However, it should be noted that the shroud sample was not detected in the laboratory sample due to pump failure during the shroud sampling procedure.

The field sampling records from soil vapour sampling are presented in Appendix B.

9.1.3 Groundwater

A cloudy white colour was noticed during groundwater sampling on 28 September 2017.

The recorded water levels during development and sampling of groundwater are summarised in the table, below. It should be noted that an initial development of groundwater was undertaken on 22 September 2017 and a second round of groundwater development was conducted on 27 September 2017 due to low recharge rate of groundwater. Sampling was conducted on 28 September 2017.

Well	Surface level (m AHD)	Screened Depth (m bgl)	Depth to water prior to development (m bgl)	Water level prior to development (m AHD)	Depth to water prior to sampling (m bgl)	Water level prior to sampling (m AHD)	
Reco	Recorded Water Levels on 22 September 2017 (Initial Round of Groundwater Development)						
BH2	81.12	5	7.06	74.06	-	-	
Record	Recorded Water Levels on 27 September 2017 (Second Round of Groundwater Development)						
BH2	81.12	5	6.66	74.46	-	-	
	Recorded Water Levels on 28 September 2017 (Groundwater Sampling)						
BH2	81.12	5	-	-	9.82	71.3	

Table 12: Recorded Water Levels

It should be noted that due to insufficient water for groundwater micropurging and sampling, a disposable bailer was used to sample the groundwater at BH2 and, therefore, the field parameters (pH, temperature, electrical conductivity, redox potential and dissolved oxygen) were not assessed prior to sampling.

10. Laboratory Results

The results of the laboratory analysis are summarised in Tables C1 to C3, Appendix C, and NATA laboratory certificates including chain-of-custody and sample receipt information are presented in Appendix D.



10.1 Soil Results

10.1.1 Health Investigation/Screening Levels

The reported concentrations of heavy metals, TRH, BTEX, phenols, OCP, OPP, PCB and asbestos were either below the laboratory practical quantitation limit (PQL) or below the adopted health investigation/screening levels.

Three benzo(a)pyrene TEQ (carcinogenic PAHs) hotspots (2.5 times the adopted guideline) have been identified during the current soil investigation predominately in the top 0.5 m fill material in all three borehole locations. B(a)P TEQ exceedances are outlined as follows:

-) BH1/0.1-0.2: 12.67 mg/kg vs. 4 mg/kg (HSL);
-) BH2/0.5: 20.34 mg/kg vs. 4 mg/kg;
- BD1 (field replicate of BH2/0.5): 20.18 mg/kg vs. 4 mg/kg; and
-) BH3/0.2: 27.03 mg/kg vs. 4 mg/kg.

The source of the B(a)P TEQ is likely to be associated with the anthropogenic inclusions identified in fill material.

10.1.2 Provisional Soil Waste Class Results

As shown on Table C1 in Appendix C, all contaminant concentrations for the analysed fill samples were within the chemical contaminant thresholds (CT1s) for General Solid Waste (GSW) with the exception of:

-) Lead in samples: BH2/0.5 m and its field replicate (BD1), BH3/0.2 and its triplicate (BH3 [TRIPLICATE]);
-) PAH in sample BH3/0.2; and
- Benzo(a)pyrene in samples: BH1/0.1-0.2, BH2/0.5 and its field replicate (BD1).

TCLP test was conducted for the analytes exceeding the CT1 thresholds on samples: BH2/0.5 m, BD1 and BH3/0.2 for lead. The SCC and TCLP lead concentrations for samples BH2/0.5 m, BD1 and BH3/0.2 were within the contaminant thresholds SCC1 and TCLP1, for GSW, respectively.

TCLP test was conducted for the analytes exceeding the CT2 thresholds on samples BH3 – [TRIPLICATE] for lead; and BH1/0.1-0.2, BH2/0.5, BD1 and BH3/0.2 for benzo(a)pyrene. The SCC and TCLP concentrations for samples BH3 – [TRIPLICATE] for lead; and BH1/0.1-0.2, BH2/0.5, BD1 and BH3/0.2 for benzo(a)pyrene were within the contaminant thresholds SCC2 and TCLP2, for RSW, respectively.

Based on the observations at the time of sampling and the reported analytical results, the fill below depth of 0.5 m bgl in the three boreholes generally described as grey to dark brown sand filling (without building rubble) is preliminarily classified as **General Solid Waste (non-putrescible)**, as defined in EPA (2014).



Given the presence of building rubble in some of the fill, the fill above 0.5 m bgl in the three boreholes generally described as grey to black sand filling with some gravel and trace of rubble is provisionally classified as **Restricted Solid Waste**.

10.1.3 Overall Comments

It is noted that the bulk of existing fill on site will be removed as part of the proposed basement excavation and, as such, the identified fill/soil contamination will essentially be removed as part the basement excavation. Current data suggests that the filling (and some natural material) on site would largely classify as either **General Solid Waste** or **Restricted Solid Waste** which would require off-site disposal.

Given the preliminary nature of the assigned waste classification, which was based on limited sampling, it is recommended that the waste classification be confirmed by a qualified environmental consultant *ex situ* prior to and during bulk excavation, particularly where filling with building rubble and signs of contamination (i.e. odour and staining) have been identified.

10.2 Soil Vapour Results

The results of soil vapour testing were within the adopted NEPC (2013) screening values for both residential and commercial/industrial land uses. Detected concentrations of chlorinated hydrocarbons which are not stated in the NEPC (2013) screening levels fall within the USEPA (2017) screening values for sub-slab and exterior soil gas concentrations.

Detectable concentrations of chlorinated hydrocarbons were reported as below:

-) Bromodichloromethane (4 μ g/m³);
-) Chloroform (130 μ g/m³); and
-) Tetrachloroethene ($3 \mu g/m^3$).

It is noted that a number of other VOCs detected were all within USEPA (2017) screening levels and are in results table C2.

The above detectable levels of chlorinated hydrocarbons indicate that the risk of widespread or significant PCE contamination is low. However, given the limited number of soil vapour borehole, it is therefore considered possible that chlorinated hydrocarbon contamination may be present in other parts of the site, and hence no warranty can be given that chlorinated hydrocarbons are not present at the site. Additional soil vapour investigation will be required to characterise the risk associated with dry cleaning business following demolition of site buildings.

10.3 Groundwater Results

The reported concentrations of heavy metals, PAH, TRH, BTEX, phenols, OCP, OPP, PCB and VOC were either below the laboratory practical quantitation limit (PQL) or below the adopted site assessment criteria for groundwater.





Minor nickel and zinc exceedances were identified in the groundwater sample BH2. The concentrations of 0.012 mg/L and 0.07 mg/L detected were, however, considered to be within background ranges for urban environments and were therefore not considered to be an issue of concern.

11. Conclusion and Recommendations

Based on the preliminary contamination desktop study, field and analytical results reported herein, it is considered that the site is suitable for the proposed development, noting the proposal includes the excavation of four basement levels. In this regard, the following recommendations should be implemented prior to and during the excavation:

-) Validation of the surface soil within the footprint of the site building following demolition, initially through an inspection by an Environmental Consultant. Following demolition, additional soil, soil vapour and groundwater assessments are required to characterise the risks associated with the dry cleaning business;
-) Following demolition, the B(a)P TEQ hotspots will require delineation and *ex situ* waste classification prior to disposal;
- Preparation and implementation of an unexpected finds protocol which outlines actions to be taken in the unlikely event that a contamination source (e.g. dry cleaner) or indicator (e.g. stained/odorous soils and groundwater) is encountered during civil and construction works; and
- *Ex situ* (or further *in situ*) classification of soils as required for off-site disposal.

12. Limitations

Douglas Partners (DP) has prepared this report for this project at 552-568 Oxford Street, Bondi Junction in accordance with DP's proposal SYD171020.P.001.Rev2 dated 31 August 2017 and acceptance e-mail received from Mainway Management Pty Ltd on behalf of Denscen Pty Ltd dated 5 September 2017. The work was carried out under DP's Conditions of Engagement. This report is provided for the exclusive use of Denscen Pty Ltd for this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of DP, does so entirely at its own risk and without recourse to DP for any loss or damage. In preparing this report DP has necessarily relied upon information provided by the client and/or their agents.

The results provided in the report are indicative of the sub-surface conditions on the site only at the specific sampling and/or testing locations, and then only to the depths investigated and at the time the work was carried out. Sub-surface conditions can change abruptly due to variable geological processes and also as a result of human influences. Such changes may occur after DP's field testing has been completed.

DP's advice is based upon the conditions encountered during this investigation. The accuracy of the advice provided by DP in this report may be affected by undetected variations in ground conditions



across the site between and beyond the sampling and/or testing locations. The advice may also be limited by budget constraints imposed by others or by site accessibility.

This report must be read in conjunction with all of the attached and should be kept in its entirety without separation of individual pages or sections. DP cannot be held responsible for interpretations or conclusions made by others unless they are supported by an expressed statement, interpretation, outcome or conclusion stated in this report.

This report, or sections from this report, should not be used as part of a specification for a project, without review and agreement by DP. This is because this report has been written as advice and opinion rather than instructions for construction.

Asbestos has not been detected by observation or by laboratory analysis, either on the surface of the site, or in filling materials at the test locations sampled and analysed. Building demolition materials, such as concrete, brick, tile [list as appropriate to the field work findings], were, however, located in previous below-ground filling, and these are considered as indicative of the possible presence of hazardous building materials (HBM), including asbestos.

Although the sampling plan adopted for this investigation is considered appropriate to achieve the stated project objectives, there are necessarily parts of the site that have not been sampled and analysed. This is either due to undetected variations in ground conditions or to budget constraints (as discussed above), or to parts of the site being inaccessible and not available for inspection/sampling. It is therefore considered possible that HBM, including asbestos, may be present in unobserved or untested parts of the site, between and beyond sampling locations, and hence no warranty can be given that asbestos is not present.

The contents of this report do not constitute formal design components such as are required, by the Health and Safety Legislation and Regulations, to be included in a Safety Report specifying the hazards likely to be encountered during construction and the controls required to mitigate risk. This design process requires risk assessment to be undertaken, with such assessment being dependent upon factors relating to likelihood of occurrence and consequences of damage to property and to life. This, in turn, requires project data and analysis presently beyond the knowledge and project role respectively of DP. DP may be able, however, to assist the client in carrying out a risk assessment of potential hazards contained in the Comments section of this report, as an extension to the current scope of works, if so requested, and provided that suitable additional information is made available to DP. Any such risk assessment would, however, be necessarily restricted to the (geotechnical / environmental / groundwater) components set out in this report and to their application by the project designers to project design, construction, maintenance and demolition.

Douglas Partners Pty Ltd

Appendix A

Drawing 1

About This Report




Devertes Developera	CLIENT: Denscen Pty Ltd				TITLE:	Site and Locality Plan
Douglas Partners Geotechnics Environment Groundwater	OFFICE:	Sydney	DRAWN BY:	WFY		Site Investigation for Contamination
	SCALE:	NTS	DATE:	20 Oct 2017		552-568 Oxford Street, Bondi Junction



Introduction

These notes have been provided to amplify DP's report in regard to classification methods, field procedures and the comments section. Not all are necessarily relevant to all reports.

DP's reports are based on information gained from limited subsurface excavations and sampling, supplemented by knowledge of local geology and experience. For this reason, they must be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely.

Copyright

This report is the property of Douglas Partners Pty Ltd. The report may only be used for the purpose for which it was commissioned and in accordance with the Conditions of Engagement for the commission supplied at the time of proposal. Unauthorised use of this report in any form whatsoever is prohibited.

Borehole and Test Pit Logs

The borehole and test pit logs presented in this report are an engineering and/or geological interpretation of the subsurface conditions, and their reliability will depend to some extent on frequency of sampling and the method of drilling or excavation. Ideally, continuous undisturbed sampling or core drilling will provide the most reliable assessment, but this is not always practicable or possible to justify on economic grounds. In any case the boreholes and test pits represent only a very small sample of the total subsurface profile.

Interpretation of the information and its application to design and construction should therefore take into account the spacing of boreholes or pits, the frequency of sampling, and the possibility of other than 'straight line' variations between the test locations.

Groundwater

Where groundwater levels are measured in boreholes there are several potential problems, namely:

 In low permeability soils groundwater may enter the hole very slowly or perhaps not at all during the time the hole is left open;

- A localised, perched water table may lead to an erroneous indication of the true water table;
- Water table levels will vary from time to time with seasons or recent weather changes. They may not be the same at the time of construction as are indicated in the report; and
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water measurements are to be made.

More reliable measurements can be made by installing standpipes which are read at intervals over several days, or perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from a perched water table.

Reports

The report has been prepared by qualified personnel, is based on the information obtained from field and laboratory testing, and has been undertaken to current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal, the information and interpretation may not be relevant if the design proposal is changed. If this happens, DP will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface conditions, discussion of geotechnical and environmental aspects, and recommendations or suggestions for design and construction. However, DP cannot always anticipate or assume responsibility for:

- Unexpected variations in ground conditions. The potential for this will depend partly on borehole or pit spacing and sampling frequency;
- Changes in policy or interpretations of policy by statutory authorities; or
- The actions of contractors responding to commercial pressures.

If these occur, DP will be pleased to assist with investigations or advice to resolve the matter.

About this Report

Site Anomalies

In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, DP requests that it be immediately notified. Most problems are much more readily resolved when conditions are exposed rather than at some later stage, well after the event.

Information for Contractual Purposes

Where information obtained from this report is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. DP would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

Site Inspection

The company will always be pleased to provide engineering inspection services for geotechnical and environmental aspects of work to which this report is related. This could range from a site visit to confirm that conditions exposed are as expected, to full time engineering presence on site.

Appendix B

Borehole Logs Fieldwork Sheets

Sampling

Sampling is carried out during drilling or test pitting to allow engineering examination (and laboratory testing where required) of the soil or rock.

Disturbed samples taken during drilling provide information on colour, type, inclusions and, depending upon the degree of disturbance, some information on strength and structure.

Undisturbed samples are taken by pushing a thinwalled sample tube into the soil and withdrawing it to obtain a sample of the soil in a relatively undisturbed state. Such samples yield information on structure and strength, and are necessary for laboratory determination of shear strength and compressibility. Undisturbed sampling is generally effective only in cohesive soils.

Test Pits

Test pits are usually excavated with a backhoe or an excavator, allowing close examination of the insitu soil if it is safe to enter into the pit. The depth of excavation is limited to about 3 m for a backhoe and up to 6 m for a large excavator. A potential disadvantage of this investigation method is the larger area of disturbance to the site.

Large Diameter Augers

Boreholes can be drilled using a rotating plate or short spiral auger, generally 300 mm or larger in diameter commonly mounted on a standard piling rig. The cuttings are returned to the surface at intervals (generally not more than 0.5 m) and are disturbed but usually unchanged in moisture content. Identification of soil strata is generally much more reliable than with continuous spiral flight augers, and is usually supplemented by occasional undisturbed tube samples.

Continuous Spiral Flight Augers

The borehole is advanced using 90-115 mm diameter continuous spiral flight augers which are withdrawn at intervals to allow sampling or in-situ testing. This is a relatively economical means of drilling in clays and sands above the water table. Samples are returned to the surface, or may be collected after withdrawal of the auger flights, but they are disturbed and may be mixed with soils from the sides of the hole. Information from the drilling (as distinct from specific sampling by SPTs or undisturbed samples) is of relatively low reliability, due to the remoulding, possible mixing or softening of samples by groundwater.

Non-core Rotary Drilling

The borehole is advanced using a rotary bit, with water or drilling mud being pumped down the drill rods and returned up the annulus, carrying the drill cuttings. Only major changes in stratification can be determined from the cuttings, together with some information from the rate of penetration. Where drilling mud is used this can mask the cuttings and reliable identification is only possible from separate sampling such as SPTs.

Continuous Core Drilling

A continuous core sample can be obtained using a diamond tipped core barrel, usually with a 50 mm internal diameter. Provided full core recovery is achieved (which is not always possible in weak rocks and granular soils), this technique provides a very reliable method of investigation.

Standard Penetration Tests

Standard penetration tests (SPT) are used as a means of estimating the density or strength of soils and also of obtaining a relatively undisturbed sample. The test procedure is described in Australian Standard 1289, Methods of Testing Soils for Engineering Purposes - Test 6.3.1.

The test is carried out in a borehole by driving a 50 mm diameter split sample tube under the impact of a 63 kg hammer with a free fall of 760 mm. It is normal for the tube to be driven in three successive 150 mm increments and the 'N' value is taken as the number of blows for the last 300 mm. In dense sands, very hard clays or weak rock, the full 450 mm penetration may not be practicable and the test is discontinued.

The test results are reported in the following form.

 In the case where full penetration is obtained with successive blow counts for each 150 mm of, say, 4, 6 and 7 as:

 In the case where the test is discontinued before the full penetration depth, say after 15 blows for the first 150 mm and 30 blows for the next 40 mm as:

15, 30/40 mm

Sampling Methods

The results of the SPT tests can be related empirically to the engineering properties of the soils.

Dynamic Cone Penetrometer Tests / Perth Sand Penetrometer Tests

Dynamic penetrometer tests (DCP or PSP) are carried out by driving a steel rod into the ground using a standard weight of hammer falling a specified distance. As the rod penetrates the soil the number of blows required to penetrate each successive 150 mm depth are recorded. Normally there is a depth limitation of 1.2 m, but this may be extended in certain conditions by the use of extension rods. Two types of penetrometer are commonly used.

- Perth sand penetrometer a 16 mm diameter flat ended rod is driven using a 9 kg hammer dropping 600 mm (AS 1289, Test 6.3.3). This test was developed for testing the density of sands and is mainly used in granular soils and filling.
- Cone penetrometer a 16 mm diameter rod with a 20 mm diameter cone end is driven using a 9 kg hammer dropping 510 mm (AS 1289, Test 6.3.2). This test was developed initially for pavement subgrade investigations, and correlations of the test results with California Bearing Ratio have been published by various road authorities.

Soil Descriptions

Description and Classification Methods

The methods of description and classification of soils and rocks used in this report are based on Australian Standard AS 1726-1993, Geotechnical Site Investigations Code. In general, the descriptions include strength or density, colour, structure, soil or rock type and inclusions.

Soil Types

Soil types are described according to the predominant particle size, qualified by the grading of other particles present:

Туре	Particle size (mm)
Boulder	>200
Cobble	63 - 200
Gravel	2.36 - 63
Sand	0.075 - 2.36
Silt	0.002 - 0.075
Clay	<0.002

The sand and gravel sizes can be further subdivided as follows:

Туре	Particle size (mm)
Coarse gravel	20 - 63
Medium gravel	6 - 20
Fine gravel	2.36 - 6
Coarse sand	0.6 - 2.36
Medium sand	0.2 - 0.6
Fine sand	0.075 - 0.2

The proportions of secondary constituents of soils are described as:

Term	Proportion	Example
And	Specify	Clay (60%) and Sand (40%)
Adjective	20 - 35%	Sandy Clay
Slightly	12 - 20%	Slightly Sandy Clay
With some	5 - 12%	Clay with some sand
With a trace of	0 - 5%	Clay with a trace of sand

Definitions of grading terms used are:

- Well graded a good representation of all particle sizes
- Poorly graded an excess or deficiency of particular sizes within the specified range
- Uniformly graded an excess of a particular particle size
- Gap graded a deficiency of a particular particle size with the range

Cohesive Soils

s Pai

Cohesive soils, such as clays, are classified on the basis of undrained shear strength. The strength may be measured by laboratory testing, or estimated by field tests or engineering examination. The strength terms are defined as follows:

Description	Abbreviation	Undrained shear strength (kPa)
Very soft	VS	<12
Soft	S	12 - 25
Firm	f	25 - 50
Stiff	st	50 - 100
Very stiff	vst	100 - 200
Hard	h	>200

Cohesionless Soils

Cohesionless soils, such as clean sands, are classified on the basis of relative density, generally from the results of standard penetration tests (SPT), cone penetration tests (CPT) or dynamic penetrometers (PSP). The relative density terms are given below:

Relative Density	Abbreviation	SPT N value	CPT qc value (MPa)
Very loose	vl	<4	<2
Loose		4 - 10	2 -5
Medium dense	md	10 - 30	5 - 15
Dense	d	30 - 50	15 - 25
Very dense	vd	>50	>25

Soil Descriptions

Soil Origin

It is often difficult to accurately determine the origin of a soil. Soils can generally be classified as:

- Residual soil derived from in-situ weathering of the underlying rock;
- Transported soils formed somewhere else and transported by nature to the site; or
- Filling moved by man.

Transported soils may be further subdivided into:

- Alluvium river deposits
- Lacustrine lake deposits
- Aeolian wind deposits
- Littoral beach deposits
- Estuarine tidal river deposits
- Talus scree or coarse colluvium
- Slopewash or Colluvium transported downslope by gravity assisted by water. Often includes angular rock fragments and boulders.

Rock Descriptions

Rock Strength

Rock strength is defined by the Point Load Strength Index $(Is_{(50)})$ and refers to the strength of the rock substance and not the strength of the overall rock mass, which may be considerably weaker due to defects. The test procedure is described by Australian Standard 4133.4.1 - 2007. The terms used to describe rock strength are as follows:

Term	Abbreviation	Point Load Index Is ₍₅₀₎ MPa	Approximate Unconfined Compressive Strength MPa*
Extremely low	EL	<0.03	<0.6
Very low	VL	0.03 - 0.1	0.6 - 2
Low	L	0.1 - 0.3	2 - 6
Medium	М	0.3 - 1.0	6 - 20
High	Н	1 - 3	20 - 60
Very high	VH	3 - 10	60 - 200
Extremely high	EH	>10	>200

* Assumes a ratio of 20:1 for UCS to $Is_{(50)}$. It should be noted that the UCS to $Is_{(50)}$ ratio varies significantly for different rock types and specific ratios should be determined for each site.

Degree of Weathering

The degree of weathering of rock is classified as follows:

Term	Abbreviation	Description
Extremely weathered	EW	Rock substance has soil properties, i.e. it can be remoulded and classified as a soil but the texture of the original rock is still evident.
Highly weathered	HW	Limonite staining or bleaching affects whole of rock substance and other signs of decomposition are evident. Porosity and strength may be altered as a result of iron leaching or deposition. Colour and strength of original fresh rock is not recognisable
Moderately weathered	MW	Staining and discolouration of rock substance has taken place
Slightly weathered	SW	Rock substance is slightly discoloured but shows little or no change of strength from fresh rock
Fresh stained	Fs	Rock substance unaffected by weathering but staining visible along defects
Fresh	Fr	No signs of decomposition or staining

Degree of Fracturing

The following classification applies to the spacing of natural fractures in diamond drill cores. It includes bedding plane partings, joints and other defects, but excludes drilling breaks.

Term	Description
Fragmented	Fragments of <20 mm
Highly Fractured	Core lengths of 20-40 mm with some fragments
Fractured	Core lengths of 40-200 mm with some shorter and longer sections
Slightly Fractured	Core lengths of 200-1000 mm with some shorter and longer sections
Unbroken	Core lengths mostly > 1000 mm

Rock Descriptions

Rock Quality Designation

The quality of the cored rock can be measured using the Rock Quality Designation (RQD) index, defined as:

where 'sound' rock is assessed to be rock of low strength or better. The RQD applies only to natural fractures. If the core is broken by drilling or handling (i.e. drilling breaks) then the broken pieces are fitted back together and are not included in the calculation of RQD.

Stratification Spacing

For sedimentary rocks the following terms may be used to describe the spacing of bedding partings:

Term	Separation of Stratification Planes
Thinly laminated	< 6 mm
Laminated	6 mm to 20 mm
Very thinly bedded	20 mm to 60 mm
Thinly bedded	60 mm to 0.2 m
Medium bedded	0.2 m to 0.6 m
Thickly bedded	0.6 m to 2 m
Very thickly bedded	> 2 m

Symbols & Abbreviations

Introduction

These notes summarise abbreviations commonly used on borehole logs and test pit reports.

Drilling or Excavation Methods

С	Core drilling
R	Rotary drilling
SFA	Spiral flight augers
NMLC	Diamond core - 52 mm dia
NQ	Diamond core - 47 mm dia
HQ	Diamond core - 63 mm dia
PQ	Diamond core - 81 mm dia

Water

\triangleright	Water seep
\bigtriangledown	Water level

Sampling and Testing

- A Auger sample
- B Bulk sample
- D Disturbed sample
- E Environmental sample
- Undisturbed tube sample (50mm)
- W Water sample
- pp Pocket penetrometer (kPa)
- PID Photo ionisation detector
- PL Point load strength Is(50) MPa
- S Standard Penetration Test V Shear vane (kPa)

Description of Defects in Rock

The abbreviated descriptions of the defects should be in the following order: Depth, Type, Orientation, Coating, Shape, Roughness and Other. Drilling and handling breaks are not usually included on the logs.

Defect Type

В	Bedding plane
Cs	Clay seam
Cv	Cleavage
Cz	Crushed zone
Ds	Decomposed seam
F	Fault
J	Joint
Lam	Lamination
Pt	Parting
Sz	Sheared Zone
V	Vein

Orientation

The inclination of defects is always measured from the perpendicular to the core axis.

h horizontal

21

- v vertical
- sh sub-horizontal
- sv sub-vertical

Coating or Infilling Term

cln	clean
со	coating
he	healed
inf	infilled
stn	stained
ti	tight
vn	veneer

Coating Descriptor

са	calcite
cbs	carbonaceous
cly	clay
fe	iron oxide
mn	manganese
slt	silty

Shape

cu	curved
ir	irregular
pl	planar
st	stepped
un	undulating

Roughness

ро	polished
ro	rough
sl	slickensided
sm	smooth
vr	verv rouah

Other

fg	fragmented
bnd	band
qtz	quartz

Symbols & Abbreviations

Graphic Symbols for Soil and Rock

General

oo	
A. A. A. A A. D. A. A	

Asphalt Road base

Concrete

Filling

Soils



Topsoil

Peat Clay

Silty clay

Sandy clay

Gravelly clay

Shaly clay

Silt

Clayey silt

Sandy silt

Sand

Clayey sand

Silty sand

Gravel

Sandy gravel



Talus

Sedimentary Rocks



Limestone

Metamorphic Rocks

+

Quartzite

Igneous Rocks

Granite

Dolerite, basalt, andesite

Dacite, epidote

Tuff, breccia

Porphyry



Gneiss

CLIENT:

PROJECT:

Denscen Pty Ltd

LOCATION: 552-556 Oxford Street, Bondi Junction

Proposed Residential Apartments

SURFACE LEVEL: 81.0 AHD **EASTING:** 338375 **NORTHING:** 6248544 **DIP/AZIMUTH:** 90°/-- BORE No: 1 PROJECT No: 85822.03 DATE: 18/9/2017 SHEET 1 OF 2

[]		Description	Degree of	<u> </u>	Rock	L	Fracture	Discontinuities	Sa	amplir	ng & I	n Situ Testing
ᆋ	Depth (m)	of	Vicationing	aphi		/ate	Spacing (m)	B - Bedding J - Joint	e	e%	D	Test Results
	(11)	Strata	M T M M M M	ତ_ ଜ_	in High Aligh Nery H Mediu	< 10.0	0.105	S - Shear F - Fault	Ţ	Rec O	RQ %	& Comments
	0.15	CONCRETE							Δ			PID<1
EE		FILLING - brown mottled black sand		\bigotimes								
<u>}</u>		0.4m: becoming dark brown mottled		\bigotimes								PID<1
F F		light grey		\bigotimes								
F®F	1			\bowtie					A			PID<1
ŧŧ				\bigotimes		Ï						
 		1.3m: becoming pale grey		\bigotimes					A			PID<1
ĒĒ				\bigotimes		ĺ						
2	2	1.8m: becoming dark brown		\bigotimes					A			PID<1
È È				\bigotimes		i						
ĒĒ		2.3m: becoming pale grey		\bigotimes					A			PID<1
t t				\bigotimes		ļ	ii ii					
È.		2.8m: becoming brown mottled light		\bigotimes					Δ			PID<1
Ē	3	brown		\bigotimes		ļ			\square			
<u>}</u>	3.4			ĶĶ								
F F		SAND - brown sand										
EE									A			PID<1
	4							Note: Unless otherwise				
F F						Ï		stated, rock is fractured along rough planar				
EE						⊻		bedding dipping 0°- 10°				
 						i						
- <u>8</u> -	5 5.0	SANDSTONE - medium strength										
EE		slightly weathered, slightly fractured,				ļ	i G i	5.22m: B5°, cly vn, ti				
F F		sandstone with irregular indistinct										
EE		bedding at 0°- 10°						- E 76m; D0° 10° alum	с	93	89	
12	6					l		ir				PL(A) = 0.0
ĒĒ								້5.82m: B0°- 10°, cly vn, ຼir				
<u>}</u>	6.39	SANDSTONE - high strength,		\geq		Ť		6.29m: CORE LOSS:				
F F		slightly weathered and fresh, slightly fractured and unbroken, light						6.66m: B0°, cly vn				PL(A) = 1.34
[4]	7	grey-brown medium to coarse				ļ		6.9m: B10°, cly vn				
[graned sandstone								100	100	PI (A) = 1 57
ĒĒ						Ì				100	100	-(-)
EE												
È.												
Ē	8					Ï						
EE								8.25, 8.27m: B0°- 5°, cly				
 						i		vn				PL(A) = 2.86
ĒĒ									С	100	99	
12	9											
ļ ļ												
EE						ļ			<u> </u>			
		- with some carbonaceous laminae							С	100	100	PL(A) = 2.74
ΕĿ		0.00-0.0 mi				1						
RIG	: Dano	to Terrier DRILL	.ER: BG Dril	ling	LO	GG	ED: JS/SI/C	CL CASING: HQ	to 5.	0m		
TYF	PE OF E	BORING: Push tube to 5.0m; NM	LC-Coring to	17.4	7m							

WATER OBSERVATIONS: Free groundwater observed at 4.5m whilst augering **REMARKS:**

	SAN	/IPLIN	3 & IN SITU TESTING	LEG	END]	
	A Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)		
	B Bulk sample	Р	Piston sample	PL(A	A) Point load axial test Is(50) (MPa)		
	BLK Block sample	U,	Tube sample (x mm dia.)	PL(C	D) Point load diametral test Is(50) (MPa)		l Dollaise Partnere
	C Core drilling	Ŵ	Water sample	pp	Pocket penetrometer (kPa)		Dugias rai liicis
	D Disturbed sample	⊳	Water seep	S	Standard penetration test		
	E Environmental sample	Ŧ	Water level	V	Shear vane (kPa)		Geotechnics Environment Groundwater
-	· · · ·				· · ·		

SURFACE LEVEL: 81.0 AHD **EASTING:** 338375 **NORTHING:** 6248544 **DIP/AZIMUTH:** 90°/--

BORE No: 1 **PROJECT No: 85822.03** DATE: 18/9/2017 SHEET 2 OF 2

		Description		Rock Strength		Fracture	Discontinuities	Sa	amplir	ng & I	n Situ Testing
RL 7	Depth (m)	of Strata	EW MW SSW FR	Graph Log	Very Low Very Low Medium Kery High Ex High	Spacing (m)	B - Bedding J - Joint S - Shear F - Fault	Type	Core Rec. %	RQD %	Test Results & Comments
<u>k</u>		SANDSTONE - high strength, slightly weathered and fresh, slightly fractured and unbroken, light grey-brown medium to coarse grained sandstone (continued) 40.22m: 20mm slitstone clast						с	100	100	
. 02	- 11						11.26m: B5°, cly vn 11.91m: B15°, cly sm	С	100	100	PL(A) = 2.26 PL(A) = 1.76 PL(A) = 1.75
	- 13						12.26m: B10 , ciy sm 12.56m: J60°, cu, cln 12.65m: J60°, cln	С	100	94	
	- 14 - 14 						13.9m: B5°, cly vn 14m: B10°, cly vn 14.41m: B0°, cly, 3mm	с	100	94	PL(A) = 2.12 PL(A) = 1.31
. 99	- 15 						15.66m: B5°, cly vn 15.7m: B0°, cly vn	с	100	94	PL(A) = 2.21
64 65 65	- 16							С	100	100	PL(A) = 2.9 PL(A) = 2.16
62	17.47	Bore discontinued at 17.47m - limit of investigation									

RIG: Dando Terrier

CLIENT:

PROJECT:

Denscen Pty Ltd

LOCATION: 552-556 Oxford Street, Bondi Junction

Proposed Residential Apartments

DRILLER: BG Drilling

LOGGED: JS/SI/CL

CASING: HQ to 5.0m

TYPE OF BORING: Push tube to 5.0m; NMLC-Coring to 17.47m WATER OBSERVATIONS: Free groundwater observed at 4.5m whilst augering **REMARKS:**

	SAM	PLIN	G & IN SITU TESTING	، LEG	END	1				
	A Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)	1				
	B Bulk sample	Р	Piston sample	PL(A) Point load axial test Is(50) (MPa)				-	
	BLK Block sample	U,	Tube sample (x mm dia.)	PL(D) Point load diametral test Is(50) (MPa)		1.		6	Dartners
	C Core drilling	Ŵ	Water sample	pp	Pocket penetrometer (kPa)			D UGGIA	3	\mathbf{r} as used to \mathbf{s}
	D Disturbed sample	⊳	Water seep	S	Standard penetration test					
	E Environmental sample	¥	Water level	V	Shear vane (kPa)			🗖 Geotechnics En	iviro	nment Groundwater
1										

CLIENT:

PROJECT:

Denscen Pty Ltd

LOCATION: 552-556 Oxford Street, Bondi Junction

Proposed Residential Apartments

SURFACE LEVEL: 81.0 AHD **EASTING:** 338391 **NORTHING:** 6248554 **DIP/AZIMUTH:** 90°/-- BORE No: 2 PROJECT No: 85822.03 DATE: 19/9/2017 SHEET 1 OF 2

Γ		Description		Degree	of	U	Rock Strength	Fracture		Discontinuities	Sa	amplir	ng & I	n Situ Testing
뉟	Dept	ħ	of	vveatnei	ring	aphic og		ater	Spacing	B - Bedding I - Joint	ø	% و		Test Results
	(11)		Strata	<u> </u>	ഗല	5 U	X Low ery Low figh X High	\mathbb{A}^{0}) 	S - Shear F - Fault	Typ	ပ္က ပ္ပ	RQ %	& Comments
2	- 0	14	CONCRETE						11 11					
-	-	14	FILLING - brown and grey medium grained sand filling with some sandstone gravel and a trace of brick and glass fragments, damp			\bigotimes					E E*			PID=6.3 PID=7.3
- 88	- (-1).8	SAND - very loose, grey medium grained sand, damp								E,			PID=8.7
ŧ	- 1	1.3						i			S			2,2,3 N = 5
	- 2	-	SAND - very loose to loose, grey medium grained sand with some brown and dark brown layers, damp											
Ē	-							İ						5.4.5
[[Note: Unless otherwise stated, rock is fractured	s			N = 9
2		3.6								along rough planar bedding dipping 0°- 10°				
Ē		3.71	strength, extremely weathered, grey											PL(A) = 0.61
	[*		SANDSTONE - medium then high strength, moderately weathered,								с	100	100	
	[unbroken, brown medium grained sandstone											PL(A) = 1.1
76	-5													
	- 5.	65	SANDSTONE - high strength, slightly weathered and fresh, slightly fractured and unbroken, grey-brown medium grained sandstone with indistinct irregular cross-bedding at							5.19m: B0°, fe	с	100	100	PL(A) = 1.02
ł	-		0° - 10° - with some siltstone clasts at 6.33m					li						PL(A) = 1.88
74	- 7 - 7		- with trace carbonaceous laminae from 7.3m							6.84m: B5°, cly, 2mm 6.87m: B0°, cly, 5mm 6.89m: B10°, cly vn 6.97m: B10°, cly vn 7.01m: B5°, cly vn 7.04m: B10°, cly vn 7.05m: B10°, cly vn	с	100	86	
73	-8									⁻ 7.06m: B10°, cly, 5mm				PL(A) = 1.62
72										8.76m: B5°, cbs, 1mm	с	100	100	PL(A) = 1.69
-	-		- with some quartz and siltstone clasts from 9.6-10.8m 9.83m: some 30mm siltstone gravel								с	100	100	PL(A) = 1.93
RI	G: Da	and	lo Terrier DRILL	ER: BG	Dril	ling	Li Li Li	DGG	ied: JS/SI	Casing: HQ	to 3.	/ 7m		

TYPE OF BORING: Push tube to 1.0m; Solid flight auger (TC-bit) to 3.7m; NMLC-Coring to 17.0m

WATER OBSERVATIONS: No free groundwater observed whilst augering

REMARKS: *BD1 taken at 0.5m. Standpipe installed to 17.0m (backfill 0.0-0.5m; bentonite 0.5-1.5m; 1.5-17.0 gravel; slotted 5-17m; gatic cover at surface)

	SAN	PLIN	G & IN SITU TESTING	6 LEG	END		
	A Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)		
	B Bulk sample	Р	Piston sample	PL(A	A) Point load axial test Is(50) (MPa)		
	BLK Block sample	U,	Tube sample (x mm dia.)	PL(C	D) Point load diametral test Is(50) (MPa)	1.1	Nuolidiae Partnere
	C Core drilling	Ŵ	Water sample	pp	Pocket penetrometer (kPa)		
	D Disturbed sample	⊳	Water seep	S	Standard penetration test	17	
	E Environmental sample	Ŧ	Water level	V	Shear vane (kPa)		Geotechnics Environment Groundwater
•	h					_	

SURFACE LEVEL: 81.0 AHD **EASTING:** 338391 **NORTHING:** 6248554 **DIP/AZIMUTH:** 90°/-- BORE No: 2 PROJECT No: 85822.03 DATE: 19/9/2017 SHEET 2 OF 2

Γ		Description	Degree of Weathering	ici	Rock Strength	Fracture	Discontinuities	Sa	amplii	ng & I	n Situ Testing
R	(m)	of Strata	EW MW SS FR SS FR	Graph	Very Low Very Low Medium Medium Kery High Ex High	(m)	B - Bedding J - Joint S - Shear F - Fault	Type	Core Rec. %	RQD %	Test Results & Comments
<u> </u>	- - - - - - - - - - - - - - - - - - -	SANDSTONE - high strength, slightly weathered and fresh, slightly fractured and unbroken, grey-brown medium grained sandstone with indistinct irregular cross-bedding at 0°- 10° (continued)					⁹ 9.92m: B5°, cbs, 1mm 10.5m: B0°, cly, 2mm	с	100	100	PL(A) = 2.11
	- - - - - - - - - - - - - - - - - - -						11.9m: B5°, cly vn	С	100	100	PL(A) = 1.72 PL(A) = 2.1
	3-13 						12.55-12.95m: J70°, cln	С	100	100	PL(A) = 1.91
67	- 5 - 14	- with fine grained band 13.74-14.21m					13.74m: B0°, cly, 10mm				
	- - - - - - - - - - - - - - - - - - -						14.21m: B0°, cly vn 14.63m: B0°, cly vn 14.65m: B5°, cly vn 15.12m: B0°- 5° cly vn	С	100	99	PL(A) = 1.97
	3-16						, 16.5m: B0°, cly, 2mm 16.61m: B5°, cly vn	с	100	99	PL(A) = 1.41
- T	5-17 17.0·	Bore discontinued at 17.0m - limit of investigation				1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1					PL(A) = 1.64
	- - -										
	- - - - - - - - - - - - - - - - - - -										

RIG: Dando Terrier

CLIENT:

PROJECT:

Denscen Pty Ltd

LOCATION: 552-556 Oxford Street, Bondi Junction

Proposed Residential Apartments

DRILLER: BG Drilling

LOGGED: JS/SI

CASING: HQ to 3.7m

TYPE OF BORING: Push tube to 1.0m; Solid flight auger (TC-bit) to 3.7m; NMLC-Coring to 17.0m

WATER OBSERVATIONS: No free groundwater observed whilst augering

REMARKS: *BD1 taken at 0.5m. Standpipe installed to 17.0m (backfill 0.0-0.5m; bentonite 0.5-1.5m; 1.5-17.0 gravel; slotted 5-17m; gatic cover at surface)

	SAM	IPLIN	G & IN SITU TESTING	LEG	END		
	A Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)		
	B Bulk sample	P	Piston sample	PL(A	A) Point load axial test Is(50) (MPa)		
	BLK Block sample	U,	Tube sample (x mm dia.)	PL(I	D) Point load diametral test Is(50) (MPa)	1	Indialae Parthere
	C Core drilling	Ŵ	Water sample	pp	Pocket penetrometer (kPa)	/ /	Dugias rai lieis
	D Disturbed sample	⊳	Water seep	S	Standard penetration test	/	
	E Environmental sample	Ŧ	Water level	V	Shear vane (kPa)		Geotechnics Environment Groundwater
•	h					 _	

Denscen Pty Ltd

LOCATION: 552-558 Oxford Street, Bondi Junction

Proposed Residential Apartments

CLIENT: PROJECT: SURFACE LEVEL: 81.64 AHD **EASTING:** 338386 NORTHING: 6248553 **DIP/AZIMUTH:** 90°/--

BORE No: 3 PROJECT No: 85822.03 DATE: 19/9/2017 SHEET 1 OF 1

- RL	Depth (m)	of	Ч С С							
-	()		L a	e	th	ple	Results &	Vate	Construction	
		Strata	۵_	Тyр	Dep	Sam	Comments	>	Details	
		CONCRETE	4.4						Gatic cover	× A
-	0.14	FILLING - brown medium grained sand filling with some sand and cement rubble, damp		Е	0.2		PID=3.7		Concrete 0.0-0.3m	•.7.7.7 •.7.7
81	- - -	FILLING - brown and grey medium grained sand filling, damp		E	0.5		PID=5.3		Bentonite 0.3-0.6m	24
-	- - - 1			E	1.0		PID=5.6		- Gravel 0.6-1.0m	
-	- 1.1 - -	SAND - apparently very loose to loose, medium grained grey sand							Backfill 1.0-1.5m	-
	- 1.5	Bore discontinued at 1.5m		—E—	-1.5-		PID=5.4	_		
78	- 1.5 - - - - - - - - - - - - - - - - - - -	Bore discontinued at 1.5m			-1.5-				-2	
	- - - - - - - - -								4 4 	

RIG: Dando Terrier

DRILLER: BG Drilling TYPE OF BORING: Solid flight auger (TC-bit) to 1.5m

LOGGED: JS

CASING: Uncased

WATER OBSERVATIONS: No free groundwater observed whilst augering

REMARKS: Soil vapour well installed (stainless steel permanent implant with 1/4" tubing from 0.0m to 0.1m; concrete 0.0m to 0.3m; gravel 0.5m to 1.0m; backfill 1.0m to 1.5m)



Douglas Partners Geotechnics | Environment | Groundwater

1997

Groundwater Field She	et			В	ore Volume = caung vo	ume + filter pack
Project and Bore Installation	Details				$= \pi h_1 d_2^2 / 4$	+ n(xh,d, ² /4-xh,d, ² /4)
Bore / Standpipe ID:	D.H.2			u u	here: π=3.14	
Project Name:					n = percenty (0.3	for most filter pack
Project Number:	85822.03	2			material)	-
Site Location:	$- \overline{\mathcal{O}} $				$\mathbf{h}_i = \text{height of } \mathbf{w}_i$	iter column
Bore GPS Co-ord:			· ·		d _i = diameter of h.= length of fil	ter pack
Installation Date:	, <u>, , , , , , , , , , , , , , , , </u>				$d_2 = d_1 unstart of$	caung
GW Level (during drilling):	-	m bgl		8	ore Vol Normall	y: 7.2*h
Well Depth:		m bgl				
Screened Interval:		m bgl				
Contaminants/Comments:	-					
Bore Development Details			······································			
Date/Time:	2719117	9:00A	m			
Purged By:	LT					
GW Level (pre-purge):	6,66	m bgl				
GW Level (post-purge):		m bgl				
PSH observed:	Yes / No)	interface /	visual). Thickn	ess if observ	ed:	
Observed Well Depth:	16.62	m bgl				
Estimated Bore Volume:	71,71	L				
Total Volume Purged:	(target: no drill	mud, min 3 w	ell vol. or dry)			
Equipment:						
Micropurge and Sampling De	etails					
Date/Time:	28/9/17	9:45	2719-1+-	71	2:46	
Sampled By:	1.7			£		
Weather Conditions:	Overia	c A				
GW Level (pre-purge):	14-9-1-	m bgl	14.0-1	9.82		
GW Level (post sample):		m bgi				
PSH observed:	Yes / No ())interface /	visual). Thickn	ess if observ	ed:	
Observed Well Depth:	16.60	m bgi	16.6	5		
Estimated Bore Volume:		L				
Total Volume Purged:		L				
Fauinment						
		Water Quality	/ Parameters		· · · · · · · · · · · · · · · · · · ·	
Time / Volume	Temp (°C)		EC (US or mS/cm)		Turbidity	Redox (mV)
Stabilisation Criteria (3 readings)		+/-03ma/l	+/- 3%	+/- 0.1	+/- 10%	+/- 10 mV
Stabilisation Criteria (Steadings)	0.7 C			17-0.1	17-1078	
					_	
1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1997 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1997 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 -	2. ⁻					
Additional Readings Following	DO % Sat	990	TOS			
stabilization:	00 /a 3a(Gr G	100			
Stabilisation.		l Sample	Details			
Sampling Depth (rationale):		m hol	Details			
Sample Appearance (é.g.	Clauder 1	ni byi,				
colour silfiness odour):	croody i	white.				
Sample ID:						
QA/QC Samples:						
Sampling Containers and						
filtration:						
Comments / Observations:						



Soil Vapour Sample Field Record

Job Details

Site Name:	552-558 041	ford St, Be	iuration.	Date:		22	109/20	517					
Project Number:	8582	2,03		Sampli	ng Media:	1L Summa Canister and Carbon Backup							
Sample Location:	BH3			Weathe	er:	Sunn	ny, w	indy	•				
Sample Depth:				Flow C	ontroller:	Regula	tor (canist	er) and (0.1 L/min rotameter and low flow adapter				
Installation Date:				Pump ID									
Sampled by:	LT												
Purge Details													
Total Volume Purged: (L) (one volu	ıme)	100 ml		Equipment U	Used:			SKC Pump #				
PID Reading (ppm)			0, 0		carbon fu	6e :	685330	5008					
Pre-Start QA Tests													
Shut In Test													
Vacuum Applied (mmH	g): I	mmHg Ca	nister/- mr	nHg sarr	ple train	Durati	on (min)	30 Sec	conds				
Vacuum at Completion		mmHg Ca	nister/- mr	nHg sam	ple train	Pass	Èail						
Leak Test		***************************************											
Tracer Compound	Isop	oropyl alcol	hol				Field Tracer Level*		In shroud: <u>2</u> <i>C</i> 3 ppm In Sample Line: <u>2</u> ,2ppm				
Pass/Fail													

*Not applicable for isopropyl alcohol tracer (lab tested)



Sample Record (Carbon and Thermal Desorption Tubes)

Sample ID	Tube ID	Sample Time (min)	Flow (L/min)	Volume (L)	Vacuum (in.Hg)	Analysis Required	Comments
purge	6853305008	Snin	1		-0.23		
shroud	5817109813	30 seconds	1				
BH 3	5817301133	Smin	Ý		\downarrow		
B01/20172209	5171704977	Smin	↓ ↓		∕		
	-						
							-

.



Sample Record – Summa Canister

Sample ID	Canister ID	Regulator ID	Regulator Flow Rate (ml/min)	Start Pressure (mmHg)	Final Pressure (mmHg)	Sampling Duration (min)	Analysis Required	Comments
BH 3.A	1692	493	1000	-30	-6	9 min loser		
BD1/201722091	3496	1560	1000	- 30	-6	Emin ISsee		
		1						

Appendix C

Summary of Laboratory Results

							PA	Hs in So	oil		Inorganics Metals					ТРН												BTEX										
					cheduled chemicals (NSW Waste 2009)	enzo(a)pyrene TEQ calc (zero)	enzo(a)pyrene TEQ calc(half)	enzo(a)pyrene TEQ calc(PQL)	enzo(b,j+k)fluoranthene	otal +ve PAHs	loisture	rsenic	admium	hromium (III+VI)	opper		ad (with TCLP)	fercury	ickel	inc	10-C16	16-C34	34-C40	2-NAPHTHALENE	6 - C9	10 - C14	15 - C28	29-C36	C10 - C36 (Sum of total)	10 - C40 (Sum of total)	6-C10 less BTEX (F1)	6-C10	enzene	thylbenzene	oluene	ylene (m & p)	ylene (o)	ylene Total
					ma/ka	ma/ka	ma/ka	ma/ka	ma/ka	⊨ ma/ka	2	∢ ma/ka	o ma/ka	ma/ka	ma/ka	 ma/ka	mg/l	2 ma/ka	Z ma/ka	ng/kg	ma/ka	mg/kg	o ma/ka	ma/ka	mg/kg	o ma/ka	U ma/ka	o ma/ka	+ ma/ka n	og/kg	ma/ka	o mg/kg	ma/ka	ma/ka	ma/ka	mg/kg	ma/ka	× ma/ka
FOL					116/16	0.5	0.5	0.5	0.2	0.05	0.1	4	0.4	1	1	1	0.03	0.1	1	1	50	100	100	50	25	50	100	100	1116/ 16 1	50	25	25	0.2	1	0.5	2	1	1
Health Investigation	n/Screening Levels					0.0		0.0					I	- 1				1 0.1-																				_
CRC Care Direct Con	tact HSL-D																				20000	27000	38000									26000	430	27000	99000			81000
NEPM 2013 Table 1/	A(1) HILs Res B Soil											500	150		30000	1200		120	1200	60000																		
NEPM 2013 Table 1/	A(3) Comm/Ind D Soil	HSL for Vapour Intrusio	n. Sand																																			
0-1m																								NL							260		3	NL	NL			230
1-2m																								NL							370		3	NL	NL			NL
NEPM 2013 Table 1	B(7) Management Lim	its in Res / Parkland. Co	arse Soil																		1000	2500	10000									700						
Waste Classification	n Criteria				-													-		-					-											-	-	!!
EPA 2014 - GSW CT1	L (No TCLP)											100	20	100 ^a		100		4	40						650				10000				10	600	288			1000
EPA 2014 - GSW SCO	C1 (using TCLP)				<50							500	100	1900 ^a		1500	5	50	1050						650				10000				18	1080	518			1800
EPA 2014 - RSW CT2	(No TCLP)											400	80	400 ^a		400		16	160						2600				40000				40	2400	1152			4000
EPA 2014 - RSW SCC	2 (using TCLP)				<50							2000	400	7600 ^a		6000	20	200	4200						2600				40000				72	4320	2073			7200
Published Backgrou	ind Concentrations fo	r Australian Soils		1										,000																								
ANZECC 2000												1-53	0.016-0.	78		2-81			1-517	1-263																		
Field_ID	LocCode	Sample_Depth_Range	Sampled_Date-Time	Matrix_Description																																		
BH1	BH1	0.1-0.2	18/09/2017	Filling	<1.3	14	14	14	14	110	6	<4	<0.4	4	18	43		< 0.1	1	41	<50	410	<100	<50	<25	<50	280	170	475	410	<25	<25	<0.2	<1	< 0.5	<2	<1	<1
BH1	BH1	1.9-2	18/09/2017	Filling	-	<0.5	<0.5	< 0.5	<0.2	< 0.05	16	<4	<0.4	5	2	6		< 0.1	<1	5	<50	<100	<100	<50	<25	<50	<100	<100	<250	<50	<25	<25	<0.2	<1	<0.5	<2	<1	<1
BH2	BH2	0.5	19/09/2017	Filling	<2.3	23	23	23	23	180	4.3	<4	< 0.4	2	29	140	0.63	< 0.1	2	130	66	1000	240	66	<25	<50	690	450	1165	1300	<25	<25	<0.2	<1	< 0.5	<2	<1	<1
BD1	BH2	0.5	19/09/2017	Filling	-	22	22	22	23	170	3.9	<4	0.5	2	20	180	1.1	< 0.1	4	210	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH2	BH2	1	19/09/2017	Natural	-	< 0.5	<0.5	< 0.5	<0.2	< 0.05	3.5	<4	< 0.4	<1	4	9		< 0.1	<1	29	<50	<100	<100	<50	<25	<50	<100	<100	<250	<50	<25	<25	<0.2	<1	< 0.5	<2	<1	<1
BH3	BH3	0.2	19/09/2017	Filling	1.2	30	30	30	28	230	9.5	<4	<0.4	3	25	260	1.5	< 0.1	4	210	<50	1000	240	<50	<25	<50	670	470	1165	1300	<25	<25	<0.2	<1	<0.5	<2	<1	<1
BH3	BH3	1	19/09/2017	Filling	-	0.7	0.7	0.7	0.8	6.3	6.2	<4	< 0.4	2	6	53		< 0.1	<1	30	<50	<100	<100	<50	<25	<50	<100	<100	<250	<50	<25	<25	<0.2	<1	< 0.5	<2	<1	<1
BH3 - [TRIPLICATE]	BH3 - [TRIPLICATE]	0.2	19/09/2017	Filling	-	-	-	-	-	-	-	<4	0.4	7	35	580	1.3	0.1	5	280	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

	Exceeds HIL
	Exceeds GSW CT1
	Exceeds RSW CT2
	Exceeds GSW SCC1 (using TCLP)
	Exceeds RSW CT2 (No TCLP)
NAD	No asbestos dected at the limit of reporting
а	Chromium VI



	ns Halogenated Hydrocarbor	Chlorinated Hydrocarbons	Chlorinated H		MAH
PAC <th< th=""><th>Carbon tetrachloride Chlorodibromomethane Chloroethane Chloromethane Chloromethane dis-1,2-dichloroethene dis-1,3-dichloroethene Dibromomethane Trichloroethene Trichloroethene trans-1,2-dichloroethene trans-1,2-dichloroethene trans-1,2-dichloroethene trans-1,2-dichloroethene Dibromomethane Bromomethane Dichlorodifluoromethane Dichlorodifluoromethane</th><th>Bromochloromethane Bromodichloromethane Bromoform Carbon tetrachloride Chlorodibromomethane</th><th>1,1-dichloropropene 1,2,3-trichloropropane 1,2-dibromo-3-chloropropane 1,2-dichloropropane 1,3-dichloropropane 2,2-dichloropropane Bromodichloromethane Bromodichloromethane</th><th>tert-butylbenzene 1,1,1,2-tetrachloroethane 1,1,2-tetrachloroethane 1,1,2-trichloroethane 1,1,2-trichloroethane 1,1-dichloroethane</th><th>1,2,4-trimethylbenzene 1,3,5-trimethylbenzene 1,3,5-trimethylbenzene n-butylbenzene n-propylbenzene p-isopropyltoluene sec-butylbenzene Styrene</th></th<>	Carbon tetrachloride Chlorodibromomethane Chloroethane Chloromethane Chloromethane dis-1,2-dichloroethene dis-1,3-dichloroethene Dibromomethane Trichloroethene Trichloroethene trans-1,2-dichloroethene trans-1,2-dichloroethene trans-1,2-dichloroethene trans-1,2-dichloroethene Dibromomethane Bromomethane Dichlorodifluoromethane Dichlorodifluoromethane	Bromochloromethane Bromodichloromethane Bromoform Carbon tetrachloride Chlorodibromomethane	1,1-dichloropropene 1,2,3-trichloropropane 1,2-dibromo-3-chloropropane 1,2-dichloropropane 1,3-dichloropropane 2,2-dichloropropane Bromodichloromethane Bromodichloromethane	tert-butylbenzene 1,1,1,2-tetrachloroethane 1,1,2-tetrachloroethane 1,1,2-trichloroethane 1,1,2-trichloroethane 1,1-dichloroethane	1,2,4-trimethylbenzene 1,3,5-trimethylbenzene 1,3,5-trimethylbenzene n-butylbenzene n-propylbenzene p-isopropyltoluene sec-butylbenzene Styrene
EQ1 <t< td=""><td>s/kg mg/kg /td><td>g/kg mg/kg mg/kg mg/kg mg/kg mg</td><td>g mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg</td><td>g mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg</td><td>mg/kg mg/kg /td></t<>	s/kg mg/kg	g/kg mg/kg mg/kg mg/kg mg/kg mg	g mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg	g mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg	mg/kg
Hatter Heat Heat Heat NEM 2013Table JA(1) Husens Sol	$egin{array}{c c c c c c c c c c c c c c c c c c c $	1 1 1 1 1 1	1 1 1 1 1 1 1 1 1	1 1 1 1 1 1 1	
CRC Grower or contractiones or contrac					
NEM NEM S I <th< td=""><td></td><td></td><td></td><td></td><td></td></th<>					
Network Netw					
Define Property and property					
1-200 1-100 1-					
NEM 2013Table 18/19 Margement Unit sees / Parkland, Coarse Seil <td></td> <td></td> <td></td> <td></td> <td></td>					
Wate Classification criteria Wate Classification criteria EPA 2014 GSW IT (No TLP) a a a a a a b a b <td< td=""><td></td><td></td><td></td><td></td><td></td></td<>					
PA 2014 - SW CT (No TCLP) No					
EPA 2014 - SSW ST2 (w) TCLP) Image: Mode Mode Mode Mode Mode Mode Mode Mode	10 120 10 14 4	10	10	200 600 26 24 14	60
EPA 2014 - RSW C2 (vis) CU: Gui G	18 216 18 25.2 7.2	18	18	360 1080 46.8 43.2 25	108
EPA 2014 - RSW SC2 (using TCL) M	40 480 40 56 16	40	40	800 2400 104 96 56	240
Published Background Concentration Solv Submit And Solv Sub	72 864 72 100.8 28.8	72	72	1440 4320 187.2 172.8 100	432 1
ANZECC 2000 ANZECC 2000 Best B					
Field Sample					
Field_D Sample_Date_maps Sample_Date_maps Sample_Date_maps Matrix_Description ···					
BH1 0.1-0.2 18/09/2017 Filing - <th></th> <th></th> <th></th> <th></th> <th>tion</th>					tion
BH1 1.92 18/09/2017 Filing -					
BH2 0.5 19/09/2017 Filing d					
		1 1 1 1 1 1		4 4 4 4 4 4	
BD1 BH2 I0.5 19/09/2017 Filling					
BH2 1 19/09/2017 Natural			· · · · · · · · ·	· · · · · · · ·	· · · · · · · · · ·
BH3 0.2 19/09/2017 Filling d d d d d d d d d d d d d d d d d d d		4 4 4 4 4		4 4 4 4 4 4	
BH3 1 19/09/2017 Filing			· · · · · · · · · ·	· · · · · · ·	· · · · · · · · · · ·
BH3-[TRIPLICATE] BH3-[TRIPLICATE] 0.2 19/09/2017 Filling				· · · · · · ·	· · · · · · · · · · ·

	Exceeds HIL
	Exceeds GSW CT1
	Exceeds RSW CT2
	Exceeds GSW SCC1 (using TCLP)
	Exceeds RSW CT2 (No TCLP)
NAD	No asbestos dected at the limit of reporting
а	Chromium VI



						Halo	genated	d Benze	nes				Solvents									PAH/P	henols											Polyc	hlorinat	ed Biph	enyls				
					1, 2, 3-trichlorobenzene	1,2,4-trichlorobenzene	1,2-dichlorobenzene	1,3-dichlorobenzene	1,4-dichlorobenzene	2-chlorotoluene	4-chlorotoluene	Bromobenzene	Chlorobenzene	Hexachlorobenzene	Cyclohexane	PAH (total, NSW Waste 2009)	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a) pyrene	Benzo(a) pyrene (with TCLP)	Benzo(g,h,i)perylene	Carcinogenic PAHs (as BaP TEQ)	Chrysene	Dibenz(a,h) anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Phenolics Total	Pyrene	Arochlor 1016	Arochlor 1221	Arochlor 1232	Arochlor 1242	Arochlor 1248	Arochlor 1254	Arochlor 1260	PCBs (Sum of total)
					mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg n	ng/kg r	ng/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/L	mg/kg r	ng/kg	mg/kg	mg/kg	mg/kg	mg/kg n	ng/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg r	ng/kg
EQL					1	1	1	1	1	1	1	1	1	0.1	1		0.1	0.1	0.1	0.1	0.05	0.001	0.1		0.1	0.1	0.1	0.1	0.1	0.1	0.1	5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Health Investigation	n/Screening Levels																																								
CRC Care Direct Con	tact HSL-D																													11000											
NEPM 2013 Table 1A	A(1) HILs Res B Soil													15										4																	1
NEPM 2013 Table 1A	A(3) Comm/Ind D Soil	HSL for Vapour Intrusion	i, Sand																																						
0-1m																														NL											
1-2m																														NL											
NEPM 2013 Table 18	B(7) Management Lim	its in Res / Parkland, Coa	irse Soil																																						
Waste Classification	n Criteria																																								
EPA 2014 - GSW CT1	L (No TCLP)						86		150				2000								0.8											288									
EPA 2014 - GSW SCC	C1 (using TCLP)						155		270				3600			200					10	0.04										518									50
EPA 2014 - RSW CT2	(No TCLP)						344		600				8000								3.2											1152									
EPA 2014 - RSW SCC	2 (using TCLP)						620		1080			:	4400			800					23	0.16										2073									50
Published Backgrou	nd Concentrations fo	r Australian Soils		1																																					
ANZECC 2000																																									
Field_ID	LocCode	Sample_Depth_Range	Sampled_Date-Time	Matrix_Description																																					
BH1	BH1	0.1-0.2	18/09/2017	Filling	-	-	-	-	-	-	-	-	-	<0.1	-	94.55	< 0.1	1.5	2.4	11	9.8	< 0.001	5.2	12.67	9.1	1.2	19	0.4	4.3	<1 - 0.6	10	<5	20	<0.5	<0.5	< 0.5	<0.5	<0.5	<0.5	<0.5	< 0.5
BH1	BH1	1.9-2	18/09/2017	Filling	-	-	-	-	-	-	-	-	-	-	-	<1.35	<0.1	<0.1	<0.1	<0.1	< 0.05		<0.1 <	0.172	<0.1	<0.1	<0.1	< 0.1	<0.1	<0.1	<0.1	-	<0.1	-	-	-	-	-	-	-	-
BH2	BH2	0.5	19/09/2017	Filling	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.1	<1	157.8	0.6	2.1	4.8	15	16	< 0.001	9	20.34	14	1.9	34	0.8	7.1 .	<1 - 0.5	17	<5	35	<1	<1	<1	<1	<1	<1	<1	<1
BD1	BH2	0.5	19/09/2017	Filling	-	-	-	-	-	-	-	-	-	-	-	147	0.7	2.1	4.7	15	16	< 0.001	8.4	20.18	13	1.8	30	1	6.7	0.6	17	-	30	-	-	-	-	-	-	-	-
BH2	BH2	1	19/09/2017	Natural	-	-	-	-	-	-	-	-	-	-	-	<1.35	< 0.1	<0.1	<0.1	<0.1	< 0.05		<0.1 <	0.172	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	-	-	-	-	-	-	- +	-
BH3	BH3	0.2	19/09/2017	Filling	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.1	<1	207.7	0.2	3	6.3	22	21	< 0.001	12	27.03	18	2.6	42	1.4	9.3	<1 - 0.9	25	<5	44	<1	<1	<1	<1	<1	<1	<1	<1
BH3	BH3	1	19/09/2017	Filling	-	-	-	-	-	-	-	-	-	-	-	5.69	< 0.1	< 0.1	0.2	0.7	0.54		0.3	0.688	0.5	<0.1	1.2	<0.1	0.2	<0.1	0.6	-	1.2	-	-	-	-	-	-	-	-
BH3 - [TRIPLICATF]	BH3 - [TRIPLICATF]	0.2	19/09/2017	Filling	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-
		-	.,,																																						
	1				1											1	1	1	1	1	1																				

	Exceeds HIL
	Exceeds GSW CT1
	Exceeds RSW CT2
	Exceeds GSW SCC1 (using TCLP)
	Exceeds RSW CT2 (No TCLP)
NAD	No asbestos dected at the limit of reporting
а	Chromium VI



													C	rganocl	hlorine	Pesticid	es												Orga	nophos	phorous	s Pestici	des				Pestici	des
														ľ																								
					4,4-DDE	a-BHC	Aldrin	Aldrin + Dieldrin	6-BHC	Chlordane (cis)	Chlordane (trans)	d-BHC	QQQ	DDT	DDT+DDE+DDD	Dieldrin	Endosulfan I	Endosulfan II	Endosulfan sulphate	Endrin	Endrin aldehyde	g-BHC (Lindane)	Hepta chlor	Heptachlor epoxide	Methoxychlor	Azinophos methyl	Bromophos-ethyl	Chlorpyrifos	Chlorpyrifos-methyl	Diazinon	Dichlorvos	Dimethoate	Ethion	Fenitrothion	Malathion	Ronnel	Moderately Harmful Pesticides	Parathion
					mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	g mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg r	mg/kg m	ng/kg n	ng/kg
EQL					0.1	0.1	0.1		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1		0.1
Health Investigatio	n/Screening Levels																																					
CRC Care Direct Cor	ntact HSL-D																																					
NEPM 2013 Table 1	A(1) HILs Res B Soil							10							600					20			10		500			340										
NEPM 2013 Table 1	A(3) Comm/Ind D Soi	il HSL for Vapour Intrusion	, Sand																																			
0-1m																																						
1-2m																																						
NEPM 2013 Table 1	B(7) Management Lir	mits in Res / Parkland. Coa	rse Soil																																			
Waste Classificatio	n Criteria															-		-																				
FPA 2014 - GSW CT	1 (No TCLP)																											4										
EPA 2014 - GSW SC	C1 (using TCLP)																											75									250	
EPA 2014 - RSW CT	2 (No TCLP)																											16										
EPA 2014 - RSW SC	C2 (using TCLP)																											30								1	1000	
Published Backgrou	und Concentrations f	for Australian Soils																																				
ANZECC 2000																																						
Field ID	LocCode	Sample Depth Range	Sampled Date-Time	Matrix Description																																		
BH1	BH1	0.1-0.2	18/09/2017	Filling	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1 ·	<0.6	<0.1
BH1	BH1	1 9-2	18/09/2017	Filling	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH2	BH2	0.5	19/09/2017	Filling	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<01 /	<0.6	<0.1
BD1	BH2	0.5	19/09/2017	Filling	~0.1			-0.2	~0.1	~0.1				~0.1			~0.1		~0.1		~0.1					~0.1	~0.1	~0.1						~0.1			.0.0	
BH2	BH2	1	19/09/2017	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
BH3	BH3	0.2	19/09/2017	Filling	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.1	<0.1	<0.1	<0.1	<01	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<01	<0.6	<0.1
BH3	BH3	1	19/09/2017	Filling		~0.1		~0.2	~0.1			~0.1	-0.1	0.1	0.1	~0.1			~0.1		~0.1	~0.1	~0.1	.0.1	.0.1	~0.1	.0.1	-0.1	-0.1	-0.1	-0.1	.0.1	-0.1	.0.1	-0.1			-0.1
BH3 - [TRIDI ICATE]	BH3 - [TRIPLICATE]	0.2	19/09/2017	Filling							-		-																-		-			-			_	
	DITS [INFLICATE]	0.2	15/05/2017	1 11115	-					-			-	-	-	-																						

	Exceeds HIL Exceeds GSW CT1 Exceeds RSW CT2 Exceeds GSW SCC1 (using TCLP) Exceeds RSW CT2 (No TCLP)
NAD	No asbestos dected at the limit of reporting
a	Chromium VI

Asbe	stos
. Asbestos in soil	Trace Analyuso
g/kg	-
NAD	NAD
NAD	NAD
NAD	NAD
-	-
NAD	NAD
NAD	NAD
NAD	NAD
-	-



					Field_I)	BH3.A (can)	BD1/20172209 (can)	shroud	7										
					LocCode	e	BH3.A (can)	BH3.A (can)	shroud	1										
					WellCode	2				1										
					Sampled Date-Time	2	22/09/2017	22/09/2017	22/09/2017	1										
			NEPM 2013 Table	NEPM 2013 Table 1A(2	NEPM 2013 Table 1A(5)	USA EPA (2017)	22/03/2017	22/03/2027	22/03/2017	- Statistical Sum	mary									
			1A/5) Comm/Ind D Soil	Rec R Soil Van VOCC	Pos Soil Vanour HSL A/R	OSWER Vapour				Statistical Sam	initian y									
			Vanour HSL for Vanour		for Vanour Intrusion	Intrusion Screening														
			Intrusion Sand	11125	Sand	Levels														
Cham Grown	ChamNama	Unite FOI	0.1m		0.1m					Number of	Number	Minimum	Minimum	Maximum	Maximum	Average	Modian	Standard	Number of	Number of
chem_droup	Cheminame		0-1111		0-1111					Number of	Number	Numuru .	Detect	Nid XIIII UIII	Detest	Average	Ivieulati	Stanuaru		
										Results	OT	Concentratio	Detect	Concentratio	Detect	Concentratio	Concentratio	Deviation	Guideline	Guideline
											Detects	n		n		n	n		Exceedances	Exceedances
										1										(Detects Only)
	Freon 113	µg/m3 3.8					<3.8	<3.8	-	1	0	<3.8	ND	<3.8	ND		1.9		0	0
	2-Propanol	ug/m3 1					760	140	0	2	2	0	140	140	140		70		0	0
	Pronene	ug/m3 0.9					<0.9	<0.9		1	0	<0.9	ND	<0.9	ND		0.45		0	0
TO15 in Canisters +	1.2-Dichlorotetrafluoroethane	ug/m3 2.5					- 25	<25		1	0	<2.5	ND	(2.5	ND		1 25		0	0
PTEY	Renzene	ug/m2 1.6	4000		1000		<1.5	<1.5	-	1	0	<1.6	ND	<1.6	ND	-	0.9		0	0
DIEA	Delizerie Ethulhaanaan	μg/113 1.0	4000		220000		(1.0	(1.0	-	1	0	<1.0	ND	<1.0	ND		0.0		0	0
	Ethylbenzene	μg/m3 2	1300000		330000		<2	<2	-	1	0	<2	ND	<2	ND		1		0	0
	Toluene	μg/m3 1.9	4800000		1300000		580	560	-	1	1	560	560	560	560		560		0	0
	Xylene (m & p)	μg/m3 4				7000	<4	<4	-	1	0	<4	ND	<4	ND		2		0	0
	Xylene (o)	µg/m3 2				3500	<2	<2	-	1	0	<2	ND	<2	ND		1		0	U
MAH	1,2,4-trimethylbenzene	μg/m3 2.5				2100	<2.5	<2.5	-	1	0	<2.5	ND	<2.5	ND		1.25		0	0
	1,3,5-trimethylbenzene	μg/m3 2.5				-	<2.5	<2.5	-	1	0	<2.5	ND	<2.5	ND		1.25		0	0
	1-methyl-4 ethyl benzene	µg/m3 2.5					<2.5	<2.5	-	1	0	<2.5	ND	<2.5	ND		1.25		0	0
	Styrene	μg/m3 2				35,000	<2	<2	-	1	0	<2	ND	<2	ND		1		0	0
Chlorinated	1,1,1-trichloroethane	µg/m3 2.7		60000			<2.7	<2.7	-	1	0	<2.7	ND	<2.7	ND		1.35		0	0
Hydrocarbons	1.1.2.2-tetrachloroethane	ug/m3 3				1.6	<3	<3	-	1	0	<3	ND	<3	ND		1.5	1	0	0
,	1 1 2-trichloroethane	ug/m2 2.7				5.8	<27	-27	-	1	0	<2.7	ND	<2.7	ND		1 35	1	0	0
	1 1-dichloroethane	με/m3 2.7				5.0	~2.1	~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~	-	1	0	0	ND	12.1	ND	-	1		0	
		μg/1115 2				3.0	< <u>2</u>	~2	-	1	0	~2	ND	~2	ND		1		0	0
	1,1-dichloroethene	μg/m3 2				7000	<2	<2	-	1	0	<2	ND	<2	ND		1		0	0
	1,2-dichloroethane	μg/m3 2				3.6	<2	<2	-	1	0	<2	ND	<2	ND		1		0	0
	1,2-dichloropropane	μg/m3 2				2.5	<2	<2	-	1	0	<2	ND	<2	ND		1		0	0
	Benzyl chloride	ug/m3 2.6				1.9	<2.6	<2.6	-	1	0	<2.6	ND	<2.6	ND		1.3		0	0
	Bromodichloromethane	μg/m3 3				14,000	4	3	-	1	1	3	3	3	3		3		0	0
	Bromoform	μg/m3 5				8.5	<5	<5	-	1	0	<5	ND	<5	ND		2.5		0	0
	Carbon tetrachloride	µg/m3 3				1.6	<3	<3	-	1	0	<3	ND	<3	ND		1.5		0	0
	Chlorodibromomethane	ug/m3 1.6				-	<1.6	<1.6	-	1	0	<1.6	ND	<1.6	ND		0.8		0	0
	Chloroethane	ug/m3 1				4.1	<1	<1	-	1	0	<1	ND	<1	ND		0.5		0	0
	Chloroform	ug/m3 2				11 000	130	130	-	1	1	130	130	130	130		130		0	0
	Chloromethane	ug/m2 1				2100				1	0	<1	ND	<1	ND		0.5		0	0
	cition of the langest base	μg/115 1		00		5100		1	-	1	0	1	ND		ND		0.5		0	0
	cis-1,2-dichloroethene	μg/m3 2		80			<2	<2	-	1	0	<2	ND	<2	ND		1		0	0
	cis-1,3-dichloropropene	μg/m3 2				-	<2	<2	-	1	0	<2	ND	<2	ND		1		0	0
	Dichloromethane	μg/m3 17				-	<17	<17	-	1	0	<17	ND	<17	ND		8.5		0	0
	Hexachlorobutadiene	μg/m3 5				4.3	<5	<5	-	1	0	<5	ND	<5	ND		2.5		0	0
	Trichloroethene	µg/m3 2.7		20			<2.7	<2.7	-	1	0	<2.7	ND	<2.7	ND		1.35		0	0
	Tetrachloroethene	µg/m3 3		2000			3	4	-	1	1	4	4	4	4		4		0	0
	trans-1,2-dichloroethene	μg/m3 2				-	<2	<2	-	1	0	<2	ND	<2	ND		1		0	0
	trans-1,3-dichloropropene	µg/m3 2				-	<2	<2	-	1	0	<2	ND	<2	ND		1		0	0
	Vinvl chloride	ug/m3 1		30			<1	<1	-	1	0	<1	ND	<1	ND		0.5		0	0
Halogenated	1.2-dibromoethane	ug/m3 3.8				1.6	<3.8	<3.8	-	1	0	<3.8	ND	<3.8	ND		1.9		0	0
Hydrocarbons	Bromomethane	ug/m3 1.9				14	<1.9	<1.9	-	1	0	<1.9	ND	<1.9	ND		0.95		0	0
Ingulocarbonis	Dichloradifluoromathana	µg/m3 1.5				2500	<1.5	<1.5		1	0	<1.5	ND	~=	ND		2.55	-	0	0
	Trichlorofluctomethane	με/113 2.5				5500	()		-	1	0	<2.9	ND	~ ~ ~	ND		2.3	-	0	0
	Irichiorofiuoromethane	µg/m3 2.8				-	<2.8	<2.8	-	1	0	<2.8	ND	<2.8	ND		1.4		0	0
Haiogenated	1,2,4-tricniorobenzene	μg/m3 3.7				/	<3.7	<3.7	-	1	U	<3./	ND	<3./	ND		1.85	-	U	U
Benzenes	1,2-dichlorobenzene	μg/m3 3				7000	<3	<3	-	1	0	<3	ND	<3	ND		1.5		0	U
	1,3-dichlorobenzene	μg/m3 3				-	5	5	-	1	1	5	5	5	5		5		0	0
	1,4-dichlorobenzene	µg/m3 3				8.5	<3	<3	-	1	0	<3	ND	<3	ND		1.5		0	0
	Chlorobenzene	μg/m3 2				1700	<2	<2	-	1	0	<2	ND	<2	ND		1		0	0
VOCs	1,3-Butadiene	μg/m3 1				3.1	<1	<1	-	1	0	<1	ND	<1	ND		0.5		0	0
	Acrolein	μg/m3 1				7	<1	<1	-	1	0	<1	ND	<1	ND		0.5		0	0
	Methyl Methacrylate	µg/m3 2				700.000	4	4	-	1	1	4	4	4	4		4	1	0	0
Solvents	1.4-Dioxane	ug/m3 1.8				1.9	<1.8	<1.8	-	1	0	<1.8	ND	<1.8	ND		0.9	1	0	0
	Methyl Ethyl Ketope	ug/m2 1 5				170.000	21.5	-1.5	-	1	0	<1.5	ND	<15	ND		0.75		0	0
	2-bevanone (MPP)	με/113 1.3				1000	~1.5	~1.5		1	0	~1.5	ND	~1.5	ND	-	1		0	-0
	z-nexanone (IVIBK)	μg/m3 2				1000	<2	<2	-	1	0	~~		~2			1		0	U
	4-iviethyl-2-pentanone	μg/m3 2				1,100,000	2	2	-	1	1	2	2	2	2		2	-	U	U
	Acetone	ug/m3 12				350,000	10	20	-	1	1	20	20	20	20		20		0	U
	Carbon disulfide	μg/m3 1.6				24,000	<1.6	<1.6	-	1	0	<1.6	ND	<1.6	ND		0.8		0	0
	Cyclohexane	ug/m3 1.7				210,000	<1.7	<1.7	-	1	0	<1.7	ND	<1.7	ND		0.85		0	0
	Ethanol	μg/m3 0.9				-	18	32	-	1	1	32	32	32	32		32		0	0
	Ethyl acetate	µg/m3 1.8				2400	<1.8	<1.8	-	1	0	<1.8	ND	<1.8	ND		0.9		0	0
	Heptane	μg/m3 2				14,000	<2	<2	-	1	0	<2	ND	<2	ND		1	1	0	0
	Hexane	ug/m3 1.8				24.000	<1.8	<1.8	-	1	0	<1.8	ND	<1.8	ND		0.9	1	0	0
	MTBE	ug/m3 1.8				360	<1.8	<1.8	-	1	0	<1.8	ND	<1.8	ND		0.9		0	0
	Tetrabydrofurae	ug/m2 1 5				70.000	<15	-1.5	-	1	0	<1.5	ND	<1.5	ND		0.75	1	0	0
	Vipul acotato	με/m3 1.5				7000	~1.0	-1.0		1	0	-1.0	ND	-1.0	ND	-	0.0		0	
DALL (DL	vinyl acetate	μg/m3 1.8	2000			7000	<1.8	<1.8	-	1	0	5.1.7	ND	×1.8		-	0.9	1	0	0
PAH/Phenols	Naphthalene	µg/m3 2.6	3000		800		3	4	-	1	1	4	4	4	4		4	1	U	U



														Chlorin	ated Hyd	rocarbo	ns														Haloge	nated H	ydrocar	bons					Halogena	ted Benz	enes			
	1,1,1,2-tetrachloroethane	1,1,1-trichloroethane	1,1,2,2-tetrachloroethane	1,1,2-trichloroethane	1,1-dichloroethane	1,1-dichloroethene	1,1-dichloropropene	1,2,3-trichloropropane	1,2-dibromo-3-chloropropane	1, 2-dichloroethane	1,2-dichloropropane	1,3-dichloropropane	2, 2-dichloropropane	Bromochloromethane	Bromodichloromethane	Bromoform	Carbon tetrachloride	Chlorodibromomethane	Chloroethane	Chloroform	Chloromethane	cis-1, 2-dichloroethene	cis-1,3-dichloropropene	Dibromomethane	Hexachlorobutadiene	Trichloroethene	Tetrachloroethene	trans-1, 2-dichloroe then e	trans-1, 3-dichloropropene	Vinyl chloride	1, 2-dibromoethane	Bromomethane	Dichlorodifluoromethane	Trichlorofluoromethane	1,2,3-trichlorobenzene	1,2,4-trichlorobenzene	1,2-dichlorobenzene	1,3-dichlorobenzene	1,4-dichlorobenzene	2-chlorotoluene	4-chlorotoluene	Bromobenzene	Chlorobenzene	Hexachlorobenzene
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	_ mg/L	. mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
EQL	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.01	0.001	l 0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.01	0.001	0.01	0.01	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.000001
NEPM 2013 Table 1A(4) Comm/Ind HSL D GW for Vapour Intru																																												
2-<4m																																												
NEPM 2013 Table 1C GILs, Fresh Waters				6.5																															0.003	0.085	0.16	0.26	0.06					
Field_ID LocCode WellCode Sampled_Date-Time																																												
BD1/20172809 BH2 28/09/2017	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	<0.001	<0.001 •	<0.001	<0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.01	1 0.005	5 <0.01	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.01	< 0.001	< 0.01	< 0.01	< 0.01	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	-
BH2 BH2 28/09/2017	<0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	<0.001 ·	<0.001 <	<0.001	<0.001	< 0.001	< 0.001	< 0.001	<0.001	< 0.001	< 0.001	< 0.01	1 0.005	5 <0.01	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.01	< 0.001	< 0.01	< 0.01	< 0.01	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.000001
Trip blank Trip blank 28/09/2017	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

			Solvents							PA	H/Phenol	ls									Polychie	orinated Bi	ohenvis		
			Cyclohexane	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a) pyrene	Benzo(g,h,i)perylene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Phenolics Total	Pyrene	Arochlor 1016	Arochlor 1221	Arochlor 1232	Arochlor 1242	Arochlor 1248	Arochlor 1254	Arochlor 1260
			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
EQL			0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.05	0.001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001
NEPM 2013 Tab	le 1A(4) Con	nm/Ind HSL D GW for Vapour Intru	4																						
2-<4m															NL										
NEPM 2013 Tab	le 1C GILs, F	resh Waters													0.016							0.0003		0.00001	
Field_ID	LocCode	WellCode Sampled_Date-Time																							
BD1/20172809	BH2	28/09/2017	< 0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH2	BH2	28/09/2017	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.05	< 0.001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Trip blank	Trip blank	28/09/2017	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Report on Site Investigation for Contamination 552-568 Oxford Street, Bondi Junction

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Appendix D

NATA Laboratory Certificates



Envirolab Services Pty Ltd ABN 37 112 535 645 12 Ashley St Chatswood NSW 2067 ph 02 9910 6200 fax 02 9910 6201 customerservice@envirolab.com.au www.envirolab.com.au

CERTIFICATE OF ANALYSIS 176145

Client Details	
Client	Douglas Partners Pty Ltd
Attention	Wen-Fei Yuan
Address	96 Hermitage Rd, West Ryde, NSW, 2114

Sample Details	
Your Reference	85822.03
Number of Samples	9 soils
Date samples received	21/09/2017
Date completed instructions received	21/09/2017

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Please refer to the last page of this report for any comments relating to the results.

Report Details Date results requested by 28/09/2017 Date of Issue 27/09/2017 NATA Accreditation Number 2901. This document shall not be reproduced except in full. Accredited for compliance with ISO/IEC 17025 - Testing. Tests not covered by NATA are denoted with *

Asbestos Approved By

Analysed by Asbestos Approved Identifier: Lucy Zhu Authorised by Asbestos Approved Signatory: Lulu Scott **Results Approved By** Dragana Tomas, Senior Chemist

Long Pham, Team Leader, Metals Lulu Scott, Asbestos Supervisor Nick Sarlamis, Inorganics Supervisor Steven Luong, Chemist

Authorised By

David Springer, General Manager



VOCs in soil			
Our Reference		176145-3	176145-5
Your Reference	UNITS	BH2	BH3
Depth		0.5	0.2
Date Sampled		19/09/2017	19/09/2017
Type of sample		Soil	Soil
Date extracted	-	22/09/2017	22/09/2017
Date analysed	-	25/09/2017	25/09/2017
Dichlorodifluoromethane	mg/kg	<1	<1
Chloromethane	mg/kg	<1	<1
Vinyl Chloride	mg/kg	<1	<1
Bromomethane	mg/kg	<1	<1
Chloroethane	mg/kg	<1	<1
Trichlorofluoromethane	mg/kg	<1	<1
1,1-Dichloroethene	mg/kg	<1	<1
trans-1,2-dichloroethene	mg/kg	<1	<1
1,1-dichloroethane	mg/kg	<1	<1
cis-1,2-dichloroethene	mg/kg	<1	<1
bromochloromethane	mg/kg	<1	<1
chloroform	mg/kg	<1	<1
2,2-dichloropropane	mg/kg	<1	<1
1,2-dichloroethane	mg/kg	<1	<1
1,1,1-trichloroethane	mg/kg	<1	<1
1,1-dichloropropene	mg/kg	<1	<1
Cyclohexane	mg/kg	<1	<1
carbon tetrachloride	mg/kg	<1	<1
Benzene	mg/kg	<0.2	<0.2
dibromomethane	mg/kg	<1	<1
1,2-dichloropropane	mg/kg	<1	<1
trichloroethene	mg/kg	<1	<1
bromodichloromethane	mg/kg	<1	<1
trans-1,3-dichloropropene	mg/kg	<1	<1
cis-1,3-dichloropropene	mg/kg	<1	<1
1,1,2-trichloroethane	mg/kg	<1	<1
Toluene	mg/kg	<0.5	<0.5
1,3-dichloropropane	mg/kg	<1	<1
dibromochloromethane	mg/kg	<1	<1
1,2-dibromoethane	mg/kg	<1	<1
tetrachloroethene	mg/kg	<1	<1
1,1,1,2-tetrachloroethane	mg/kg	<1	<1
chlorobenzene	mg/kg	<1	<1
Ethylbenzene	mg/kg	<1	<1

VOCs in soil			
Our Reference		176145-3	176145-5
Your Reference	UNITS	BH2	BH3
Depth		0.5	0.2
Date Sampled		19/09/2017	19/09/2017
Type of sample		Soil	Soil
bromoform	mg/kg	<1	<1
m+p-xylene	mg/kg	<2	<2
styrene	mg/kg	<1	<1
1,1,2,2-tetrachloroethane	mg/kg	<1	<1
o-Xylene	mg/kg	<1	<1
1,2,3-trichloropropane	mg/kg	<1	<1
isopropylbenzene	mg/kg	<1	<1
bromobenzene	mg/kg	<1	<1
n-propyl benzene	mg/kg	<1	<1
2-chlorotoluene	mg/kg	<1	<1
4-chlorotoluene	mg/kg	<1	<1
1,3,5-trimethyl benzene	mg/kg	<1	<1
tert-butyl benzene	mg/kg	<1	<1
1,2,4-trimethyl benzene	mg/kg	<1	<1
1,3-dichlorobenzene	mg/kg	<1	<1
sec-butyl benzene	mg/kg	<1	<1
1,4-dichlorobenzene	mg/kg	<1	<1
4-isopropyl toluene	mg/kg	<1	<1
1,2-dichlorobenzene	mg/kg	<1	<1
n-butyl benzene	mg/kg	<1	<1
1,2-dibromo-3-chloropropane	mg/kg	<1	<1
1,2,4-trichlorobenzene	mg/kg	<1	<1
hexachlorobutadiene	mg/kg	<1	<1
1,2,3-trichlorobenzene	mg/kg	<1	<1
Surrogate Dibromofluorometha	%	88	100
Surrogate aaa-Trifluorotoluene	%	124	112
<i>Surrogate</i> Toluene-d ₈	%	103	92
Surrogate 4-Bromofluorobenzene	%	67	86

Client Reference: 85822.03

vTRH(C6-C10)/BTEXN in Soil									
Our Reference		176145-1	176145-2	176145-3	176145-4	176145-5			
Your Reference	UNITS	BH1	BH1	BH2	BH2	BH3			
Depth		0.1-0.2	1.9-2.0	0.5	1	0.2			
Date Sampled		18/09/2017	18/09/2017	19/09/2017	19/09/2017	19/09/2017			
Type of sample		Soil	Soil	Soil	Soil	Soil			
Date extracted	-	22/09/2017	22/09/2017	22/09/2017	22/09/2017	22/09/2017			
Date analysed	-	25/09/2017	25/09/2017	25/09/2017	25/09/2017	25/09/2017			
TRH C ₆ - C ₉	mg/kg	<25	<25	<25	<25	<25			
TRH C ₆ - C ₁₀	mg/kg	<25	<25	<25	<25	<25			
vTPH C ₆ - C ₁₀ less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25			
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2			
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5			
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1			
m+p-xylene	mg/kg	<2	<2	<2	<2	<2			
o-Xylene	mg/kg	<1	<1	<1	<1	<1			
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1			
naphthalene	mg/kg	<1	<1	<1	<1	<1			
Surrogate aaa-Trifluorotoluene	%	96	111	124	103	112			

vTRH(C6-C10)/BTEXN in Soil							
Our Reference		176145-6	176145-7	176145-8			
Your Reference	UNITS	BH3	Soil TS	Soil TB			
Depth		1	-	-			
Date Sampled		19/09/2017	-	-			
Type of sample		Soil	Soil	Soil			
Date extracted	-	22/09/2017	22/09/2017	22/09/2017			
Date analysed	-	25/09/2017	25/09/2017	25/09/2017			
TRH C ₆ - C ₉	mg/kg	<25	[NA]	<25			
TRH C ₆ - C ₁₀	mg/kg	<25	[NA]	<25			
vTPH C ₆ - C ₁₀ less BTEX (F1)	mg/kg	<25	[NA]	[NA]			
Benzene	mg/kg	<0.2	105%	<0.2			
Toluene	mg/kg	<0.5	102%	<0.5			
Ethylbenzene	mg/kg	<1	111%	<1			
m+p-xylene	mg/kg	<2	109%	<2			
o-Xylene	mg/kg	<1	111%	<1			
Total +ve Xylenes	mg/kg	<1	[NT]	<1			
naphthalene	mg/kg	<1	[NA]	[NA]			
Surrogate aaa-Trifluorotoluene	%	110	107	105			
svTRH (C10-C40) in Soil							
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Our Reference		176145-1	176145-2	176145-3	176145-4	176145-5	
Your Reference	UNITS	BH1	BH1	BH2	BH2	BH3	
Depth		0.1-0.2	1.9-2.0	0.5	1	0.2	
Date Sampled		18/09/2017	18/09/2017	19/09/2017	19/09/2017	19/09/2017	
Type of sample		Soil	Soil	Soil	Soil	Soil	
Date extracted	-	22/09/2017	22/09/2017	22/09/2017	22/09/2017	22/09/2017	
Date analysed	-	23/09/2017	23/09/2017	23/09/2017	23/09/2017	23/09/2017	
TRH C ₁₀ - C ₁₄	mg/kg	<50	<50	<50	<50	<50	
TRH C ₁₅ - C ₂₈	mg/kg	280	<100	690	<100	670	
TRH C ₂₉ - C ₃₆	mg/kg	170	<100	450	<100	470	
TRH >C10-C16	mg/kg	<50	<50	66	<50	<50	
TRH >C10 - C16 less Naphthalene (F2)	mg/kg	<50	<50	66	<50	<50	
TRH >C ₁₆ -C ₃₄	mg/kg	410	<100	1,000	<100	1,000	
TRH >C ₃₄ -C ₄₀	mg/kg	<100	<100	240	<100	240	
Total +ve TRH (>C10-C40)	mg/kg	410	<50	1,300	<50	1,300	
Surrogate o-Terphenyl	%	83	75	104	78	93	

svTRH (C10-C40) in Soil		
Our Reference		176145-6
Your Reference	UNITS	BH3
Depth		1
Date Sampled		19/09/2017
Type of sample		Soil
Date extracted	-	22/09/2017
Date analysed	-	23/09/2017
TRH C ₁₀ - C ₁₄	mg/kg	<50
TRH C ₁₅ - C ₂₈	mg/kg	<100
TRH C ₂₉ - C ₃₆	mg/kg	<100
TRH >C ₁₀ -C ₁₆	mg/kg	<50
TRH >C10 - C16 less Naphthalene (F2)	mg/kg	<50
TRH >C ₁₆ -C ₃₄	mg/kg	<100
TRH >C ₃₄ -C ₄₀	mg/kg	<100
Total +ve TRH (>C10-C40)	mg/kg	<50
Surrogate o-Terphenyl	%	75

PAHs in Soil						
Our Reference		176145-1	176145-2	176145-3	176145-4	176145-5
Your Reference	UNITS	BH1	BH1	BH2	BH2	BH3
Depth		0.1-0.2	1.9-2.0	0.5	1	0.2
Date Sampled		18/09/2017	18/09/2017	19/09/2017	19/09/2017	19/09/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	22/09/2017	22/09/2017	22/09/2017	22/09/2017	22/09/2017
Date analysed	-	25/09/2017	25/09/2017	25/09/2017	25/09/2017	25/09/2017
Naphthalene	mg/kg	0.6	<0.1	0.5	<0.1	0.9
Acenaphthylene	mg/kg	1.5	<0.1	2.1	<0.1	3.0
Acenaphthene	mg/kg	<0.1	<0.1	0.6	<0.1	0.2
Fluorene	mg/kg	0.4	<0.1	0.8	<0.1	1.4
Phenanthrene	mg/kg	10	<0.1	17	<0.1	25
Anthracene	mg/kg	2.4	<0.1	4.8	<0.1	6.3
Fluoranthene	mg/kg	19	<0.1	34	<0.1	42
Pyrene	mg/kg	20	<0.1	35	<0.1	44
Benzo(a)anthracene	mg/kg	11	<0.1	15	<0.1	22
Chrysene	mg/kg	9.1	<0.1	14	<0.1	18
Benzo(b,j+k)fluoranthene	mg/kg	14	<0.2	23	<0.2	28
Benzo(a)pyrene	mg/kg	9.8	<0.05	16	<0.05	21
Indeno(1,2,3-c,d)pyrene	mg/kg	4.3	<0.1	7.1	<0.1	9.3
Dibenzo(a,h)anthracene	mg/kg	1.2	<0.1	1.9	<0.1	2.6
Benzo(g,h,i)perylene	mg/kg	5.2	<0.1	9.0	<0.1	12
Benzo(a)pyrene TEQ calc (zero)	mg/kg	14	<0.5	23	<0.5	30
Benzo(a)pyrene TEQ calc(half)	mg/kg	14	<0.5	23	<0.5	30
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	14	<0.5	23	<0.5	30
Total +ve PAH's	mg/kg	110	<0.05	180	<0.05	230
Surrogate p-Terphenyl-d14	%	84	98	79	91	80

PAHs in Soil			
Our Reference		176145-6	176145-9
Your Reference	UNITS	BH3	BD1
Depth		1	-
Date Sampled		19/09/2017	-
Type of sample		Soil	Soil
Date extracted	-	22/09/2017	22/09/2017
Date analysed	-	25/09/2017	25/09/2017
Naphthalene	mg/kg	<0.1	0.6
Acenaphthylene	mg/kg	<0.1	2.1
Acenaphthene	mg/kg	<0.1	0.7
Fluorene	mg/kg	<0.1	1
Phenanthrene	mg/kg	0.6	17
Anthracene	mg/kg	0.2	4.7
Fluoranthene	mg/kg	1.2	30
Pyrene	mg/kg	1.2	30
Benzo(a)anthracene	mg/kg	0.7	15
Chrysene	mg/kg	0.5	13
Benzo(b,j+k)fluoranthene	mg/kg	0.8	23
Benzo(a)pyrene	mg/kg	0.54	16
Indeno(1,2,3-c,d)pyrene	mg/kg	0.2	6.7
Dibenzo(a,h)anthracene	mg/kg	<0.1	1.8
Benzo(g,h,i)perylene	mg/kg	0.3	8.4
Benzo(a)pyrene TEQ calc (zero)	mg/kg	0.7	22
Benzo(a)pyrene TEQ calc(half)	mg/kg	0.7	22
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	0.7	22
Total +ve PAH's	mg/kg	6.3	170
Surrogate p-Terphenyl-d14	%	92	78

Organochlorine Pesticides in soil				
Our Reference		176145-1	176145-3	176145-5
Your Reference	UNITS	BH1	BH2	BH3
Depth		0.1-0.2	0.5	0.2
Date Sampled		18/09/2017	19/09/2017	19/09/2017
Type of sample		Soil	Soil	Soil
Date extracted	-	22/09/2017	22/09/2017	22/09/2017
Date analysed	-	25/09/2017	25/09/2017	25/09/2017
НСВ	mg/kg	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	0.1
Surrogate TCMX	%	80	78	79

Organophosphorus Pesticides				
Our Reference		176145-1	176145-3	176145-5
Your Reference	UNITS	BH1	BH2	BH3
Depth		0.1-0.2	0.5	0.2
Date Sampled		18/09/2017	19/09/2017	19/09/2017
Type of sample		Soil	Soil	Soil
Date extracted	-	22/09/2017	22/09/2017	22/09/2017
Date analysed	-	25/09/2017	25/09/2017	25/09/2017
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1
Dichlorvos	mg/kg	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1
Surrogate TCMX	%	80	78	79

PCBs in Soil				
Our Reference		176145-1	176145-3	176145-5
Your Reference	UNITS	BH1	BH2	BH3
Depth		0.1-0.2	0.5	0.2
Date Sampled		18/09/2017	19/09/2017	19/09/2017
Type of sample		Soil	Soil	Soil
Date extracted	-	22/09/2017	22/09/2017	22/09/2017
Date analysed	-	25/09/2017	25/09/2017	25/09/2017
Aroclor 1016	mg/kg	<0.5	<1	<1
Aroclor 1221	mg/kg	<0.5	<1	<1
Aroclor 1232	mg/kg	<0.5	<1	<1
Aroclor 1242	mg/kg	<0.5	<1	<1
Aroclor 1248	mg/kg	<0.5	<1	<1
Aroclor 1254	mg/kg	<0.5	<1	<1
Aroclor 1260	mg/kg	<0.5	<1	<1
Total +ve PCBs (1016-1260)	mg/kg	<0.5	<1	<1
Surrogate TCLMX	%	80	78	79

Acid Extractable metals in soil						
Our Reference		176145-1	176145-2	176145-3	176145-4	176145-5
Your Reference	UNITS	BH1	BH1	BH2	BH2	BH3
Depth		0.1-0.2	1.9-2.0	0.5	1	0.2
Date Sampled		18/09/2017	18/09/2017	19/09/2017	19/09/2017	19/09/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	22/09/2017	22/09/2017	22/09/2017	22/09/2017	22/09/2017
Date analysed	-	22/09/2017	22/09/2017	22/09/2017	22/09/2017	22/09/2017
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	4	5	2	<1	3
Copper	mg/kg	18	2	29	4	25
Lead	mg/kg	43	6	140	9	260
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	1	<1	2	<1	4
Zinc	mg/kg	41	5	130	29	210

Acid Extractable metals in soil				
Our Reference		176145-6	176145-9	176145-10
Your Reference	UNITS	BH3	BD1	BH3 - [TRIPLICATE]
Depth		1	-	0.2
Date Sampled		19/09/2017	-	19/09/2017
Type of sample		Soil	Soil	Soil
Date prepared	-	22/09/2017	22/09/2017	22/09/2017
Date analysed	-	22/09/2017	22/09/2017	22/09/2017
Arsenic	mg/kg	<4	<4	<4
Cadmium	mg/kg	<0.4	0.5	0.4
Chromium	mg/kg	2	2	7
Copper	mg/kg	6	20	35
Lead	mg/kg	53	180	580
Mercury	mg/kg	<0.1	<0.1	0.1
Nickel	mg/kg	<1	4	5
Zinc	mg/kg	30	210	280

Misc Soil - Inorg				
Our Reference		176145-1	176145-3	176145-5
Your Reference	UNITS	BH1	BH2	BH3
Depth		0.1-0.2	0.5	0.2
Date Sampled		18/09/2017	19/09/2017	19/09/2017
Type of sample		Soil	Soil	Soil
Date prepared	-	22/09/2017	22/09/2017	22/09/2017
Date analysed	-	22/09/2017	22/09/2017	22/09/2017
Total Phenolics (as Phenol)	mg/kg	<5	<5	<5

Moisture						
Our Reference		176145-1	176145-2	176145-3	176145-4	176145-5
Your Reference	UNITS	BH1	BH1	BH2	BH2	BH3
Depth		0.1-0.2	1.9-2.0	0.5	1	0.2
Date Sampled		18/09/2017	18/09/2017	19/09/2017	19/09/2017	19/09/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	22/09/2017	22/09/2017	22/09/2017	22/09/2017	22/09/2017
Date analysed	-	25/09/2017	25/09/2017	25/09/2017	25/09/2017	25/09/2017
Moisture	%	6.0	16	4.3	3.5	9.5

MOISTUIR			
Our Reference		176145-6	176145-9
Your Reference	UNITS	BH3	BD1
Depth		1	-
Date Sampled		19/09/2017	-
Type of sample		Soil	Soil
Date prepared	-	22/09/2017	22/09/2017
Date analysed	-	25/09/2017	25/09/2017
Moisture	%	6.2	3.9

Asbestos ID - soils						
Our Reference		176145-1	176145-2	176145-3	176145-4	176145-5
Your Reference	UNITS	BH1	BH1	BH2	BH2	BH3
Depth		0.1-0.2	1.9-2.0	0.5	1	0.2
Date Sampled		18/09/2017	18/09/2017	19/09/2017	19/09/2017	19/09/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	26/09/2017	26/09/2017	26/09/2017	26/09/2017	26/09/2017
Sample mass tested	g	Approx. 30g	Approx. 50g	Approx. 45g	Approx. 35g	Approx. 40g
Sample Description	-	Brown sandy soil	Brown sandy soil	Brown sandy soil & bituminous soil	Beige sandy soil	Beige sandy soil
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg				
		Organic fibres detected				
Trace Analysis	-	No asbestos detected				

Asbestos ID - soils

Our Reference		176145-6
Your Reference	UNITS	BH3
Depth		1
Date Sampled		19/09/2017
Type of sample		Soil
Date analysed	-	26/09/2017
Sample mass tested	g	Approx. 50g
Sample Description	-	Brown sandy soil
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg
		Organic fibres detected
Trace Analysis	-	No asbestos detected

Method ID	Methodology Summary
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Inorg-031	Total Phenolics by segmented flow analyser (in line distillation with colourimetric finish). Solids are extracted in a caustic media prior to analysis.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID.
	F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
	Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual
	Note, the Total +ve reported DDD+DDE+DDT PQL is reflective of the lowest individual PQL and is therefore simply a sum of the positive individually report DDD+DDE+DDT.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD. Note, the Total +ve PCBs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PCBs" is simply a sum of the positive individual PCBs.
Org-008	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.

Method ID	Methodology Summary
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'EQ PQL'values are assuming all contributing PAHs reported as <pql actually="" are="" at="" conservative<br="" is="" most="" pql.="" the="" this="">approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'EQ zero'values are assuming all contributing PAHs reported as <pql and<br="" approach="" are="" conservative="" is="" least="" the="" this="" zero.="">is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'EQ half PQL'values are assuming all contributing PAHs reported as <pql a="" are="" half="" hence="" mid-point<br="" pql.="" stipulated="" the="">between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs</pql></pql></pql>
Org-014	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.

QUALIT	Y CONTRO	L: VOCs	in soil			Du	plicate		Spike Rec	overy %
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			22/09/2017	[NT]		[NT]	[NT]	22/09/2017	
Date analysed	-			25/09/2017	[NT]		[NT]	[NT]	25/09/2017	
Dichlorodifluoromethane	mg/kg	1	Org-014	<1	[NT]		[NT]	[NT]	[NT]	
Chloromethane	mg/kg	1	Org-014	<1	[NT]		[NT]	[NT]	[NT]	
Vinyl Chloride	mg/kg	1	Org-014	<1	[NT]		[NT]	[NT]	[NT]	
Bromomethane	mg/kg	1	Org-014	<1	[NT]		[NT]	[NT]	[NT]	
Chloroethane	mg/kg	1	Org-014	<1	[NT]		[NT]	[NT]	[NT]	
Trichlorofluoromethane	mg/kg	1	Org-014	<1	[NT]		[NT]	[NT]	[NT]	
1,1-Dichloroethene	mg/kg	1	Org-014	<1	[NT]		[NT]	[NT]	[NT]	
trans-1,2-dichloroethene	mg/kg	1	Org-014	<1	[NT]		[NT]	[NT]	[NT]	
1,1-dichloroethane	mg/kg	1	Org-014	<1	[NT]		[NT]	[NT]	112	
cis-1,2-dichloroethene	mg/kg	1	Org-014	<1	[NT]		[NT]	[NT]	[NT]	
bromochloromethane	mg/kg	1	Org-014	<1	[NT]		[NT]	[NT]	[NT]	
chloroform	mg/kg	1	Org-014	<1	[NT]		[NT]	[NT]	105	
2,2-dichloropropane	mg/kg	1	Org-014	<1	[NT]		[NT]	[NT]	[NT]	
1,2-dichloroethane	mg/kg	1	Org-014	<1	[NT]		[NT]	[NT]	118	
1,1,1-trichloroethane	mg/kg	1	Org-014	<1	[NT]		[NT]	[NT]	99	
1,1-dichloropropene	mg/kg	1	Org-014	<1	[NT]		[NT]	[NT]	[NT]	
Cyclohexane	mg/kg	1	Org-014	<1	[NT]		[NT]	[NT]	[NT]	
carbon tetrachloride	mg/kg	1	Org-014	<1	[NT]		[NT]	[NT]	[NT]	
Benzene	mg/kg	0.2	Org-014	<0.2	[NT]		[NT]	[NT]	[NT]	
dibromomethane	mg/kg	1	Org-014	<1	[NT]		[NT]	[NT]	[NT]	
1,2-dichloropropane	mg/kg	1	Org-014	<1	[NT]		[NT]	[NT]	[NT]	
trichloroethene	mg/kg	1	Org-014	<1	[NT]		[NT]	[NT]	76	
bromodichloromethane	mg/kg	1	Org-014	<1	[NT]		[NT]	[NT]	86	
trans-1,3-dichloropropene	mg/kg	1	Org-014	<1	[NT]		[NT]	[NT]	[NT]	
cis-1,3-dichloropropene	mg/kg	1	Org-014	<1	[NT]		[NT]	[NT]	[NT]	
1,1,2-trichloroethane	mg/kg	1	Org-014	<1	[NT]		[NT]	[NT]	[NT]	
Toluene	mg/kg	0.5	Org-014	<0.5	[NT]		[NT]	[NT]	[NT]	
1,3-dichloropropane	mg/kg	1	Org-014	<1	[NT]		[NT]	[NT]	[NT]	
dibromochloromethane	mg/kg	1	Org-014	<1	[NT]		[NT]	[NT]	91	
1,2-dibromoethane	mg/kg	1	Org-014	<1	[NT]		[NT]	[NT]	[NT]	
tetrachloroethene	mg/kg	1	Org-014	<1	[NT]		[NT]	[NT]	78	
1,1,1,2-tetrachloroethane	mg/kg	1	Org-014	<1	[NT]		[NT]	[NT]	[NT]	
chlorobenzene	mg/kg	1	Org-014	<1	[NT]		[NT]	[NT]	[NT]	
Ethylbenzene	mg/kg	1	Org-014	<1	[NT]		[NT]	[NT]	[NT]	
bromoform	mg/kg	1	Org-014	<1	[NT]		[NT]	[NT]	[NT]	
m+p-xylene	mg/kg	2	Org-014	<2	[NT]		[NT]	[NT]	[NT]	
styrene	mg/kg	1	Org-014	<1	[NT]		[NT]	[NT]	[NT]	
1,1,2,2-tetrachloroethane	mg/kg	1	Org-014	<1	[NT]		[NT]	[NT]	[NT]	
o-Xylene	mg/kg	1	Org-014	<1	[NT]		[NT]	[NT]	[NT]	

QUALIT	TY CONTRO	L: VOCs	in soil			Du	plicate		Spike Re	covery %
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
1,2,3-trichloropropane	mg/kg	1	Org-014	<1	[NT]		[NT]	[NT]		[NT]
isopropylbenzene	mg/kg	1	Org-014	<1	[NT]		[NT]	[NT]		[NT]
bromobenzene	mg/kg	1	Org-014	<1	[NT]		[NT]	[NT]		[NT]
n-propyl benzene	mg/kg	1	Org-014	<1	[NT]		[NT]	[NT]		[NT]
2-chlorotoluene	mg/kg	1	Org-014	<1	[NT]		[NT]	[NT]		[NT]
4-chlorotoluene	mg/kg	1	Org-014	<1	[NT]		[NT]	[NT]		[NT]
1,3,5-trimethyl benzene	mg/kg	1	Org-014	<1	[NT]		[NT]	[NT]		[NT]
tert-butyl benzene	mg/kg	1	Org-014	<1	[NT]		[NT]	[NT]		[NT]
1,2,4-trimethyl benzene	mg/kg	1	Org-014	<1	[NT]		[NT]	[NT]		[NT]
1,3-dichlorobenzene	mg/kg	1	Org-014	<1	[NT]		[NT]	[NT]		[NT]
sec-butyl benzene	mg/kg	1	Org-014	<1	[NT]		[NT]	[NT]		[NT]
1,4-dichlorobenzene	mg/kg	1	Org-014	<1	[NT]		[NT]	[NT]		[NT]
4-isopropyl toluene	mg/kg	1	Org-014	<1	[NT]		[NT]	[NT]		[NT]
1,2-dichlorobenzene	mg/kg	1	Org-014	<1	[NT]		[NT]	[NT]		[NT]
n-butyl benzene	mg/kg	1	Org-014	<1	[NT]		[NT]	[NT]		[NT]
1,2-dibromo-3-chloropropane	mg/kg	1	Org-014	<1	[NT]		[NT]	[NT]		[NT]
1,2,4-trichlorobenzene	mg/kg	1	Org-014	<1	[NT]		[NT]	[NT]		[NT]
hexachlorobutadiene	mg/kg	1	Org-014	<1	[NT]		[NT]	[NT]		[NT]
1,2,3-trichlorobenzene	mg/kg	1	Org-014	<1	[NT]		[NT]	[NT]		[NT]
Surrogate Dibromofluorometha	%		Org-014	88	[NT]		[NT]	[NT]	93	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-014	85	[NT]		[NT]	[NT]	91	[NT]
Surrogate Toluene-d ₈	%		Org-014	93	[NT]		[NT]	[NT]	88	[NT]
Surrogate 4-Bromofluorobenzene	%		Org-014	73	[NT]		[NT]	[NT]	86	[NT]

QUALITY CONT	ROL: vTRH	(C6-C10)	/BTEXN in Soil			Du	plicate		Spike Re	covery %
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			22/09/2017	[NT]		[NT]	[NT]	22/09/2017	
Date analysed	-			25/09/2017	[NT]		[NT]	[NT]	25/09/2017	
TRH C ₆ - C ₉	mg/kg	25	Org-016	<25	[NT]		[NT]	[NT]	89	
TRH C ₆ - C ₁₀	mg/kg	25	Org-016	<25	[NT]		[NT]	[NT]	89	
Benzene	mg/kg	0.2	Org-016	<0.2	[NT]		[NT]	[NT]	98	
Toluene	mg/kg	0.5	Org-016	<0.5	[NT]		[NT]	[NT]	86	
Ethylbenzene	mg/kg	1	Org-016	<1	[NT]		[NT]	[NT]	85	
m+p-xylene	mg/kg	2	Org-016	<2	[NT]		[NT]	[NT]	89	
o-Xylene	mg/kg	1	Org-016	<1	[NT]		[NT]	[NT]	79	
naphthalene	mg/kg	1	Org-014	<1	[NT]		[NT]	[NT]	[NT]	
Surrogate aaa-Trifluorotoluene	%		Org-016	85	[NT]		[NT]	[NT]	91	

QUALITY CO	NTROL: svT	RH (C10	-C40) in Soil			Duj	plicate		Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	[NT]	
Date extracted	-			22/09/2017	[NT]			[NT]	22/09/2017		
Date analysed	-			23/09/2017	[NT]			[NT]	23/09/2017		
TRH C ₁₀ - C ₁₄	mg/kg	50	Org-003	<50	[NT]			[NT]	102		
TRH C ₁₅ - C ₂₈	mg/kg	100	Org-003	<100	[NT]			[NT]	102		
TRH C ₂₉ - C ₃₆	mg/kg	100	Org-003	<100	[NT]			[NT]	106		
TRH >C ₁₀ -C ₁₆	mg/kg	50	Org-003	<50	[NT]			[NT]	102		
TRH >C ₁₆ -C ₃₄	mg/kg	100	Org-003	<100	[NT]			[NT]	102		
TRH >C ₃₄ -C ₄₀	mg/kg	100	Org-003	<100	[NT]			[NT]	106		
Surrogate o-Terphenyl	%		Org-003	78	[NT]	[NT]	[NT]	[NT]	89	[NT]	

QUALIT	Y CONTRO	L: PAHs	in Soil			Du	plicate		Spike Re	covery %
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	[NT]
Date extracted	-			22/09/2017	[NT]		[NT]	[NT]	22/09/2017	
Date analysed	-			25/09/2017	[NT]		[NT]	[NT]	25/09/2017	
Naphthalene	mg/kg	0.1	Org-012	<0.1	[NT]		[NT]	[NT]	97	
Acenaphthylene	mg/kg	0.1	Org-012	<0.1	[NT]		[NT]	[NT]	[NT]	
Acenaphthene	mg/kg	0.1	Org-012	<0.1	[NT]		[NT]	[NT]	[NT]	
Fluorene	mg/kg	0.1	Org-012	<0.1	[NT]		[NT]	[NT]	118	
Phenanthrene	mg/kg	0.1	Org-012	<0.1	[NT]		[NT]	[NT]	104	
Anthracene	mg/kg	0.1	Org-012	<0.1	[NT]		[NT]	[NT]	[NT]	
Fluoranthene	mg/kg	0.1	Org-012	<0.1	[NT]		[NT]	[NT]	105	
Pyrene	mg/kg	0.1	Org-012	<0.1	[NT]		[NT]	[NT]	107	
Benzo(a)anthracene	mg/kg	0.1	Org-012	<0.1	[NT]		[NT]	[NT]	[NT]	
Chrysene	mg/kg	0.1	Org-012	<0.1	[NT]		[NT]	[NT]	112	
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-012	<0.2	[NT]		[NT]	[NT]	[NT]	
Benzo(a)pyrene	mg/kg	0.05	Org-012	<0.05	[NT]		[NT]	[NT]	98	
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012	<0.1	[NT]		[NT]	[NT]	[NT]	
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012	<0.1	[NT]		[NT]	[NT]	[NT]	
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012	<0.1	[NT]		[NT]	[NT]	[NT]	
Surrogate p-Terphenyl-d14	%		Org-012	96	[NT]	[NT]	[NT]	[NT]	88	[NT]

QUALITY CONTR	OL: Organo	chlorine I	Pesticides in soil			Du	plicate		Spike Re	covery %
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	[NT]
Date extracted	-			22/09/2017	[NT]		[NT]	[NT]	22/09/2017	
Date analysed	-			25/09/2017	[NT]		[NT]	[NT]	25/09/2017	
НСВ	mg/kg	0.1	Org-005	<0.1	[NT]		[NT]	[NT]	[NT]	
alpha-BHC	mg/kg	0.1	Org-005	<0.1	[NT]		[NT]	[NT]	83	
gamma-BHC	mg/kg	0.1	Org-005	<0.1	[NT]		[NT]	[NT]	[NT]	
beta-BHC	mg/kg	0.1	Org-005	<0.1	[NT]		[NT]	[NT]	91	
Heptachlor	mg/kg	0.1	Org-005	<0.1	[NT]		[NT]	[NT]	87	
delta-BHC	mg/kg	0.1	Org-005	<0.1	[NT]		[NT]	[NT]	[NT]	
Aldrin	mg/kg	0.1	Org-005	<0.1	[NT]		[NT]	[NT]	84	
Heptachlor Epoxide	mg/kg	0.1	Org-005	<0.1	[NT]		[NT]	[NT]	84	
gamma-Chlordane	mg/kg	0.1	Org-005	<0.1	[NT]		[NT]	[NT]	[NT]	
alpha-chlordane	mg/kg	0.1	Org-005	<0.1	[NT]		[NT]	[NT]	[NT]	
Endosulfan I	mg/kg	0.1	Org-005	<0.1	[NT]		[NT]	[NT]	[NT]	
pp-DDE	mg/kg	0.1	Org-005	<0.1	[NT]		[NT]	[NT]	92	
Dieldrin	mg/kg	0.1	Org-005	<0.1	[NT]		[NT]	[NT]	96	
Endrin	mg/kg	0.1	Org-005	<0.1	[NT]		[NT]	[NT]	83	
pp-DDD	mg/kg	0.1	Org-005	<0.1	[NT]		[NT]	[NT]	92	
Endosulfan II	mg/kg	0.1	Org-005	<0.1	[NT]		[NT]	[NT]	[NT]	
pp-DDT	mg/kg	0.1	Org-005	<0.1	[NT]		[NT]	[NT]	[NT]	
Endrin Aldehyde	mg/kg	0.1	Org-005	<0.1	[NT]		[NT]	[NT]	[NT]	
Endosulfan Sulphate	mg/kg	0.1	Org-005	<0.1	[NT]		[NT]	[NT]	87	
Methoxychlor	mg/kg	0.1	Org-005	<0.1	[NT]		[NT]	[NT]	[NT]	
Surrogate TCMX	%		Org-005	79	[NT]		[NT]	[NT]	110	

QUALITY CONT	ROL: Organ	ophosph	orus Pesticides			Du	plicate		Spike Re	covery %
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	[NT]
Date extracted	-			22/09/2017	[NT]		[NT]	[NT]	22/09/2017	
Date analysed	-			25/09/2017	[NT]		[NT]	[NT]	25/09/2017	
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-008	<0.1	[NT]		[NT]	[NT]	[NT]	
Bromophos-ethyl	mg/kg	0.1	Org-008	<0.1	[NT]		[NT]	[NT]	[NT]	
Chlorpyriphos	mg/kg	0.1	Org-008	<0.1	[NT]		[NT]	[NT]	85	
Chlorpyriphos-methyl	mg/kg	0.1	Org-008	<0.1	[NT]		[NT]	[NT]	[NT]	
Diazinon	mg/kg	0.1	Org-008	<0.1	[NT]		[NT]	[NT]	[NT]	
Dichlorvos	mg/kg	0.1	Org-008	<0.1	[NT]		[NT]	[NT]	78	
Dimethoate	mg/kg	0.1	Org-008	<0.1	[NT]		[NT]	[NT]	[NT]	
Ethion	mg/kg	0.1	Org-008	<0.1	[NT]		[NT]	[NT]	74	
Fenitrothion	mg/kg	0.1	Org-008	<0.1	[NT]		[NT]	[NT]	93	
Malathion	mg/kg	0.1	Org-008	<0.1	[NT]		[NT]	[NT]	77	
Parathion	mg/kg	0.1	Org-008	<0.1	[NT]		[NT]	[NT]	86	
Ronnel	mg/kg	0.1	Org-008	<0.1	[NT]		[NT]	[NT]	93	
Surrogate TCMX	%		Org-008	79	[NT]		[NT]	[NT]	79	

QUALIT	Y CONTRO	L: PCBs i	n Soil			Du	plicate		Spike Re	covery %
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	[NT]
Date extracted	-			22/09/2017	[NT]		[NT]	[NT]	22/09/2017	[NT]
Date analysed	-			25/09/2017	[NT]		[NT]	[NT]	25/09/2017	[NT]
Aroclor 1016	mg/kg	0.1	Org-006	<0.1	[NT]		[NT]	[NT]	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-006	<0.1	[NT]		[NT]	[NT]	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-006	<0.1	[NT]		[NT]	[NT]	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-006	<0.1	[NT]		[NT]	[NT]	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-006	<0.1	[NT]		[NT]	[NT]	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-006	<0.1	[NT]		[NT]	[NT]	100	[NT]
Aroclor 1260	mg/kg	0.1	Org-006	<0.1	[NT]		[NT]	[NT]	[NT]	[NT]
Surrogate TCLMX	%		Org-006	79	[NT]		[NT]	[NT]	79	[NT]

QUALITY CONT		Du	Spike Recovery %							
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	[NT]
Date prepared	-			22/09/2017	9	22/09/2017	22/09/2017		22/09/2017	
Date analysed	-			22/09/2017	9	22/09/2017	22/09/2017		22/09/2017	
Arsenic	mg/kg	4	Metals-020	<4	9	<4	<4	0	95	
Cadmium	mg/kg	0.4	Metals-020	<0.4	9	0.5	<0.4	22	91	
Chromium	mg/kg	1	Metals-020	<1	9	2	2	0	92	
Copper	mg/kg	1	Metals-020	<1	9	20	25	22	94	
Lead	mg/kg	1	Metals-020	<1	9	180	230	24	90	
Mercury	mg/kg	0.1	Metals-021	<0.1	9	<0.1	<0.1	0	94	
Nickel	mg/kg	1	Metals-020	<1	9	4	3	29	92	
Zinc	mg/kg	1	Metals-020	<1	9	210	140	40	95	[NT]

QUALITY CONT		Du	Spike Recovery %							
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	5	22/09/2017	22/09/2017		[NT]	
Date analysed	-			[NT]	5	22/09/2017	22/09/2017		[NT]	
Arsenic	mg/kg	4	Metals-020	[NT]	5	<4	<4	0	[NT]	
Cadmium	mg/kg	0.4	Metals-020	[NT]	5	<0.4	<0.4	0	[NT]	
Chromium	mg/kg	1	Metals-020	[NT]	5	3	2	40	[NT]	
Copper	mg/kg	1	Metals-020	[NT]	5	25	20	22	[NT]	
Lead	mg/kg	1	Metals-020	[NT]	5	260	160	48	[NT]	
Mercury	mg/kg	0.1	Metals-021	[NT]	5	<0.1	<0.1	0	[NT]	
Nickel	mg/kg	1	Metals-020	[NT]	5	4	3	29	[NT]	
Zinc	mg/kg	1	Metals-020	[NT]	5	210	120	55	[NT]	[NT]

QUALITY		Du	Spike Recovery %							
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	[NT]
Date prepared	-			22/09/2017	1	22/09/2017	22/09/2017		22/09/2017	[NT]
Date analysed	-			22/09/2017	1	22/09/2017	22/09/2017		22/09/2017	[NT]
Total Phenolics (as Phenol)	mg/kg	5	Inorg-031	<5	1	<5	<5	0	98	[NT]

Result Definiti	ons
NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control	ol Definitions
Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.
Australian Drinking	Nator Quidalinga recommand that Thermatalerant Caliform, Ecosal Entergagesi, & E. Cali Javala are less than

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Report Comments

Acid Extractable Metals in Soil: The laboratory RPD acceptance criteria has been exceeded for 176145-5 for Zn. Therefore a triplicate result has been issued as laboratory sample number 176145-10.

PCBs in Soil (sample 1,3 and 5) - PQL has been raised due to interference from analytes(other than those being tested) in the sample/s.

Asbestos: Excessive sample volume was provided for asbestos analysis. A portion of the supplied sample was sub-sampled according to Envirolab procedures. We cannot guarantee that this sub-sample is indicative of the entire sample. Envirolab recommends supplying 40-50g (50mL) of sample in its own container as per AS4964-2004.

Note: Samples 176145-1 to 6 were sub-sampled from bags provided by the client.



CHAIN OF CUSTODY DESPATCH SHEET

Project No:	8582	2.03	5.5		Subur	b:	Bondi	Junction		To: Envirolab Services				
Project Name:					Order	Number	134462	2		12 Ashley Street, Chatswood NSW 2068				
Project Manager	: Wen-	Fei Yuan			Sampl	er:	CL/JS	1		Attn: Tania Notaras				
Emails:	wenf	ei.yuan@do	ouglaspart	ners.com.a	iu			. S. S. C. M.	and the	Phone:	02 9910 6	200		
Date Required:	Same	e day 🗆	24 hours	□ 48 hc	ours 🗆	72 hou	rs 🗆	Standard		Email:				
Prior Storage:	Esky	□ Fridge	□ Shelv	red	Do sam	ples contai	in 'potentia	I' HBM?	Yes 🗆	No 🗆 (If	YES, then handle	e, transport and	d store in accordance with FPM HAZID)	
		ate	Sample Type	Container Type					Analytes		<u> </u>			
Sample ID	Lab ID	Sampling D	S - soil W - water	G - glass P - plastic	Combo 8a	Combo 3a	VOC	НМ/РАН	TRH/BTEX				Notes/preservation	
BH1/0.1-0.2	1	18/09/17	S	G/P	x									
BH1/ 0.4-0.5 .9	-2.0	18/09/17	S	G/P		x							Envirolab Sorvices ETUROLOB 12 Ashley St	
BH2/0.5	3	19/09/17	S	G/P	x		x	h. in					Chatswood NSW 2067 Ph: (02) 9910 6200	
BH2/1	4	19/09/17	S	G/P		x				Sec. Syle			JOD NO: 176145	
BH3/0.2	5	19/09/17	S	G/P	x	Sec.	x	10.00				1	Date Received: 2119	
BH3/1	6	19/09/17	S	G/P		x		1000					Received by: D.J. 30	
Soil TS	7					•			BTEX		in the second		Temp: Cool/Ambient Cooling: Ice/Icepack	
Soil TB	8								x				Security: Intaci Broken/None	
BD1	9							x						
							19.4					A PACE	Despatch to Eurofins M	
												_		
					na Na siji									
PQL (S) mg/kg											ANZ	ECC PQLs	l req'd for all water analytes □	
PQL = practical q	uantitati	on limit. If	none giver	n, default to	Laborato	ry Method	Detectio	n Limit		Lah Ren	ort/Reference	e No:		
Metals to Analyse	e: 8HM u	nless specif	fied here:	Della	aulaha			Transer		hand		- 110.		
Send Results to:		ouglas Partr	ners Pty I to		ress 964	lermitage	Road	Transpo	orted to la	boratory by	/: Pho	ne: 9800 0	1666 Fax: 9809 4095	
Signed:	100	- Agree - arti		Received b	y:			The Series		D	ate & Time:	21.917	L 13-30	



Envirolab Services Pty Ltd ABN 37 112 535 645 12 Ashley St Chatswood NSW 2067 ph 02 9910 6200 fax 02 9910 6201 customerservice@envirolab.com.au www.envirolab.com.au

CERTIFICATE OF ANALYSIS 176145-A

Client Details	
Client	Douglas Partners Pty Ltd
Attention	Wen-Fei Yuan
Address	96 Hermitage Rd, West Ryde, NSW, 2114

Sample Details	
Your Reference	<u>85822.03</u>
Number of Samples	Additional anaysis 5 samples
Date samples received	21/09/2017
Date completed instructions received	13/10/2017

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Report Details					
Date results requested by	18/10/2017				
Date of Issue	18/10/2017				
NATA Accreditation Number 2901. This document shall not be reproduced except in full.					
Accredited for compliance with ISO/IEC 17	7025 - Testing. Tests not covered by NATA are denoted with *				

Asbestos Approved By

Analysed by Asbestos Approved Identifier: Lucy Zhu Authorised by Asbestos Approved Signatory: Lulu Scott **Results Approved By** Long Pham, Team Leader, Metals Steven Luong, Chemist

Authorised By

کھ

David Springer, General Manager



Metals in TCLP USEPA1311						
Our Reference		176145-A-1	176145-A-3	176145-A-5	176145-A-9	176145-A-10
Your Reference	UNITS	BH1	BH2	BH3	BD1	BH3 - [TRIPLICATE]
Depth		0.1-0.2	0.5	0.2	-	0.2
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	16/10/2017	17/10/2017	17/10/2017	17/10/2017	17/10/2017
Date analysed	-	17/10/2017	17/10/2017	17/10/2017	17/10/2017	17/10/2017
pH of soil for fluid# determ.	pH units	9.2	8.5	9.1	8.7	9.2
pH of soil TCLP (after HCI)	pH units	1.7	1.8	1.8	1.8	1.8
Extraction fluid used	-	1	1	1	1	1
pH of final Leachate	pH units	4.9	4.9	5.0	4.9	5.0
Lead in TCLP	mg/L	[NA]	0.63	1.5	1.1	1.3

PAHs in TCLP (USEPA 1311)					
Our Reference		176145-A-1	176145-A-3	176145-A-5	176145-A-9
Your Reference	UNITS	BH1	BH2	BH3	BD1
Depth		0.1-0.2	0.5	0.2	-
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	17/10/2017	17/10/2017	17/10/2017	17/10/2017
Date analysed	-	17/10/2017	17/10/2017	17/10/2017	17/10/2017
Naphthalene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001
Acenaphthylene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001
Acenaphthene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001
Fluorene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001
Phenanthrene in TCLP	mg/L	0.001	<0.001	<0.001	<0.001
Anthracene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001
Fluoranthene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001
Pyrene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001
Benzo(a)anthracene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001
Chrysene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001
Benzo(bjk)fluoranthene in TCLP	mg/L	<0.002	<0.002	<0.002	<0.002
Benzo(a)pyrene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001
Indeno(1,2,3-c,d)pyrene - TCLP	mg/L	<0.001	<0.001	<0.001	<0.001
Dibenzo(a,h)anthracene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001
Benzo(g,h,i)perylene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001
Total +ve PAH's	mg/L	0.001	NIL (+)VE	NIL (+)VE	NIL (+)VE
Surrogate p-Terphenyl-d14	%	93	102	97	76

Method ID	Methodology Summary
EXTRACT.7	Toxicity Characteristic Leaching Procedure (TCLP) using Zero Headspace Extraction (zHE) using AS4439 and USEPA 1311.
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA latest edition, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Inorg-004	Toxicity Characteristic Leaching Procedure (TCLP) using in house method INORG-004.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS.
Org-012	Leachates are extracted with Dichloromethane and analysed by GC-MS.
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013.

QUALITY CONTROL: Metals in TCLP USEPA1311					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date extracted	-			17/10/2017	3	17/10/2017	17/10/2017		17/10/2017	[NT]
Date analysed	-			17/10/2017	3	17/10/2017	17/10/2017		17/10/2017	[NT]
Lead in TCLP	mg/L	0.03	Metals-020 ICP- AES	<0.03	3	0.63	0.63	0	98	[NT]

QUALITY CONTROL: PAHs in TCLP (USEPA 1311)						Du	plicate	Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			17/10/2017	[NT]		[NT]	[NT]	17/10/2017	
Date analysed	-			17/10/2017	[NT]		[NT]	[NT]	17/10/2017	
Naphthalene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]		[NT]	[NT]	71	
Acenaphthylene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]		[NT]	[NT]	[NT]	
Acenaphthene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]		[NT]	[NT]	[NT]	
Fluorene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]		[NT]	[NT]	81	
Phenanthrene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]		[NT]	[NT]	80	
Anthracene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]		[NT]	[NT]	[NT]	
Fluoranthene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]		[NT]	[NT]	78	
Pyrene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]		[NT]	[NT]	83	
Benzo(a)anthracene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]		[NT]	[NT]	[NT]	
Chrysene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]		[NT]	[NT]	88	
Benzo(bjk)fluoranthene in TCLP	mg/L	0.002	Org-012	<0.002	[NT]		[NT]	[NT]	[NT]	
Benzo(a)pyrene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]		[NT]	[NT]	79	
Indeno(1,2,3-c,d)pyrene - TCLP	mg/L	0.001	Org-012	<0.001	[NT]		[NT]	[NT]	[NT]	
Dibenzo(a,h)anthracene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]		[NT]	[NT]	[NT]	
Benzo(g,h,i)perylene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]		[NT]	[NT]	[NT]	
Surrogate p-Terphenyl-d14	%		Org-012	100	[NT]	[NT]	[NT]	[NT]	96	[NT]

Result Definitions					
NT	Not tested				
NA	Test not required				
INS	Insufficient sample for this test				
PQL	Practical Quantitation Limit				
<	Less than				
>	Greater than				
RPD	Relative Percent Difference				
LCS	Laboratory Control Sample				
NS	Not specified				
NEPM	National Environmental Protection Measure				
NR	Not Reported				

Quality Control Definitions					
Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.				
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.				
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.				
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.				
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.				
Australian Drinking	Notar Cuidalinan recommand that Thermotolerant Caliform, Easaal Enterganesi, & E. Cali lavala are loss than				

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

<u>Please note that all samples submitted to the Envirolab Group laboratories will be analysed under the</u> Envirolab Group Terms and Conditions. The Terms and Conditions are accessible by clicking this link

From: Wen-Fei Yuan [mailto:WenFei.Yuan@douglaspartners.com.au]
Sent: Friday, 13 October 2017 4:09 PM
To: Ken Nguyen <<u>KNguyen@envirolab.com.au</u>>
Subject: ELS Reference: 176145_R00

ELS Ref: 176145_R00 DP Ref: 85822.03

Hi Ken,

Please conduct TCLP on the following samples:

Lead:

- # 3 BH2/0.5;
- #5 BH3/0.2;
- # 9 BD1; and
- # 10 BH3/0.2/Triplicate

PAH:

- ♣) BH1/0.1-0.2
- # 3 BH2/0.5
- # 5 BH3/0.2; and
- # 9 · BD1

ELS Ref: 176145-A 3 day TAT 181017

Regards

Wen-Fei Yuan | Environmental Scientist Douglas Partners Pty Ltd | ABN 75 053 980 117 | www.douglaspartners.com.au 96 Hermitage Road West Ryde NSW 2114 | PO Box 472 West Ryde NSW 1685 P: 02 8878 0642 | F: 02 9809 4095 | M: 0448 280 782 | E: <u>WenFei.Yuan@douglaspartners.com.au</u>



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Ken Nguyen

From: Sent: To: Subject:

Follow Up Flag: Flag Status: Wen-Fei Yuan <WenFei.Yuan@douglaspartners.com.au> Friday, 13 October 2017 4:57 PM Ken Nguyen FW: ELS Reference: 176145_R00

Follow up Flagged

Hi Ken,

Please allow 3 day TAT for the TCLP tests.

Cheers.

Wen-Fei Yuan | Environmental Scientist Douglas Partners Pty Ltd | ABN 75 053 980 117 | www.douglaspartners.com.au 96 Hermitage Road West Ryde NSW 2114 | PO Box 472 West Ryde NSW 1685 P: 02 8878 0642 | F: 02 9809 4095 | M: 0448 280 782 | E: WenFei.Yuan@douglaspartners.com.au



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FINANCIAL REVIEW

CLIENT CHO

WINNER

From: Ken Nguyen [mailto:KNguyen@envirolab.com.au]
Sent: Friday, 13 October 2017 4:11 PM
To: Wen-Fei Yuan
Cc: Simon Song
Subject: RE: ELS Reference: 176145_R00

Hi Wen-Fei,

No problem, we'll get it logged in.

Kind Regards, Ken

Regards,

Ken Nguyen | Chemist | Envirolab Services Pty Ltd (Monday to Friday 1pm to 9pm)

Great Science, Great Service.

12 Ashley Street Chatswood NSW 2067 T 612 9910 6200 F 612 9910 6201 E knguyen@envirolab.com.au | W www.envirolab.com.au

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Envirolab Services Pty Ltd ABN 37 112 535 645 12 Ashley St Chatswood NSW 2067 ph 02 9910 6200 fax 02 9910 6201 customerservice@envirolab.com.au www.envirolab.com.au

CERTIFICATE OF ANALYSIS 176277

Client Details	
Client	Douglas Partners Pty Ltd
Attention	Paul Gorman/Kurt Plambeck
Address	96 Hermitage Rd, West Ryde, NSW, 2114

Sample Details	
Your Reference	Vapour sampling
Number of Samples	2xCan, 4xCT
Date samples received	22/09/2017
Date completed instructions received	22/09/2017

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Report Details	
Date results requested by	06/10/2017
Date of Issue	06/10/2017
NATA Accreditation Number 2901. This do	ocument shall not be reproduced except in full.
Accredited for compliance with ISO/IEC 1	7025 - Testing. Tests not covered by NATA are denoted with *

Report Comments

TO15 in Canisters + ug/m3 calc - PQL has been raised for Dichlorodifluoromethane due to interference from analytes (other than those being tested) in the sample/s.

Results Approved By Giovanni Agosti, Group Technical Manager Jeremy Faircloth, Organics Supervisor

Authorised By

David Springer, General Manager

Envirolab Reference: 176277 Revision No: R00



Permanent Gas analysis		
Our Reference		176277-1
Your Reference	UNITS	BH3.A (can)
Date Sampled		22/09/2017
Type of sample		Canister
Date prepared	-	26/09/2017
Date analysed	-	26/09/2017
Methane (CH ₄)	%	<0.01
Carbon Dioxide (CO2)	%	0.44
Oxygen (O ₂)	%	20
Carbon Monoxide (CO)	%	<0.01
Helium (He)	%	<0.01

TO15 in Canisters + ug/m3 calc			
Our Reference		176277-1	176277-3
Your Reference	UNITS	BH3.A (can)	BD1/20172209 (can)
Date Sampled		22/09/2017	22/09/2017
Type of sample		Canister	Canister
Vacuum before Shipment	Hg"	-30	-30
Vacuum before Analysis	Hg"	-6	-5
Date prepared	-	04/10/2017	04/10/2017
Date analysed	-	04/10/2017	04/10/2017
Propylene	ppbv	<0.5	<0.5
Dichlorodifluoromethane	ppbv	<1	<1
Chloromethane	ppbv	<0.5	<0.5
1,2-Dichlorotetrafluoroethane	ppbv	<0.5	<0.5
Vinyl chloride	ppbv	<0.5	<0.5
1,3-Butadiene	ppbv	<0.5	<0.5
Bromomethane	ppbv	<0.5	<0.5
Chloroethane	ppbv	<0.5	<0.5
Ethanol	ppbv	9.7	17
Acrolein	ppbv	<0.5	<0.5
Trichlorofluoromethane (Freon 11)	ppbv	<0.5	<0.5
Acetone	ppbv	5	6
Isopropyl Alcohol	ppbv	310	57
1,1-Dichloroethene	ppbv	<0.5	<0.5
1,1,2-Trichlorotrifluoroethane	ppbv	<0.5	<0.5
Methylene chloride (Dichloromethane)	ppbv	<5	<5
Carbon Disulfide	ppbv	<0.5	<0.5
trans-1,2-dichloroethene	ppbv	<0.5	<0.5
МТВЕ	ppbv	<0.5	<0.5
1,1- Dichloroethane	ppbv	<0.5	<0.5
Vinyl Acetate	ppbv	<0.5	<0.5
MEK	ppbv	<0.5	<0.5
Hexane	ppbv	<0.5	<0.5
cis-1,2-Dichloroethene	ppbv	<0.5	<0.5
Ethyl Acetate	ppbv	<0.5	<0.5
Chloroform	ppbv	28	26
Tetrahydrofuran	ppbv	<0.5	<0.5
1,1,1-Trichloroethane	ppbv	<0.5	<0.5
1,2-Dichloroethane	ppbv	<0.5	<0.5
Benzene	ppbv	<0.5	<0.5
Carbon tetrachloride	ppbv	<0.5	<0.5
Cyclohexane	ppbv	<0.5	<0.5

TO15 in Canisters + ug/m3 calc			
Our Reference		176277-1	176277-3
Your Reference	UNITS	BH3.A (can)	BD1/20172209 (can)
Date Sampled		22/09/2017	22/09/2017
Type of sample		Canister	Canister
Heptane	ppbv	<0.5	<0.5
Trichloroethene	ppbv	<0.5	<0.5
1,2-Dichloropropane	ppbv	<0.5	<0.5
1,4-Dioxane	ppbv	<0.5	<0.5
Bromodichloromethane	ppbv	0.5	0.5
Methyl Methacrylate	ppbv	1	1
МІВК	ppbv	0.5	0.6
cis-1,3-Dichloropropene	ppbv	<0.5	<0.5
trans-1,3-Dichloropropene	ppbv	<0.5	<0.5
Toluene	ppbv	150	150
1,1,2-Trichloroethane	ppbv	<0.5	<0.5
Methyl Butyl Ketone	ppbv	<0.5	<0.5
Dibromochloromethane	ppbv	<0.5	<0.5
Tetrachloroethene	ppbv	0.5	0.6
1,2-Dibromoethane	ppbv	<0.5	<0.5
Chlorobenzene	ppbv	<0.5	<0.5
Ethylbenzene	ppbv	<0.5	<0.5
m-& p-Xylene	ppbv	<1	<1
Styrene	ppbv	<0.5	<0.5
o-Xylene	ppbv	<0.5	<0.5
Bromoform	ppbv	<0.5	<0.5
1,1,2,2-Tetrachloroethane	ppbv	<0.5	<0.5
4-ethyl toluene	ppbv	<0.5	<0.5
1,3,5-Trimethylbenzene	ppbv	<0.5	<0.5
1,2,4-Trimethylbenzene	ppbv	<0.5	<0.5
1,3-Dichlorobenzene	ppbv	0.8	0.9
Benzyl chloride	ppbv	<0.5	<0.5
1,4-Dichlorobenzene	ppbv	<0.5	<0.5
1,2-Dichlorobenzene	ppbv	<0.5	<0.5
1,2,4-Trichlorobenzene	ppbv	<0.5	<0.5
Naphthalene	ppbv	0.5	0.8
Hexachloro- 1,3-butadiene	ppbv	<0.5	<0.5
Surrogate-Bromochloromethane	% rec	99	93
Surrogate -1,4-Difluorobenzene	% rec	99	97
Surrogate-Chlorobenzene-D5	% rec	96	95
Propylene	µg/m³	<0.9	<0.9
Dichlorodifluoromethane	µg/m³	<5	<5

TO15 in Canisters + ug/m3 calc			
Our Reference		176277-1	176277-3
Your Reference	UNITS	BH3.A (can)	BD1/20172209 (can)
Date Sampled		22/09/2017	22/09/2017
Type of sample		Canister	Canister
Chloromethane	µg/m³	<1	<1
1,2-Dichlorotetrafluoroethane	µg/m³	<2.5	<2.5
Vinyl chloride	µg/m³	<1	<1
1,3-Butadiene	µg/m³	<1	<1
Bromomethane	µg/m³	<1.9	<1.9
Chloroethane	µg/m³	<1	<1
Ethanol	µg/m³	18	32
Acrolein	µg/m³	<1	<1
Trichlorofluoromethane	µg/m³	<2.8	<2.8
Acetone	µg/m³	10	20
Isopropyl Alcohol	µg/m³	760	140
1,1-Dichloroethene	µg/m³	<2.0	<2.0
1,1,2-Trichlorotrifluoroethane	µg/m³	<3.8	<3.8
Methylene chloride	µg/m³	<17	<17
Carbon Disulfide	µg/m³	<1.6	<1.6
trans-1,2-dichloroethene	µg/m³	<2.0	<2.0
МТВЕ	µg/m³	<1.8	<1.8
1,1-Dichloroethane	µg/m³	<2.0	<2.0
Vinyl Acetate	µg/m³	<1.8	<1.8
МЕК	µg/m³	<1.5	<1.5
Hexane	µg/m³	<1.8	<1.8
cis-1,2-Dichloroethene	µg/m³	<2.0	<2.0
Ethyl Acetate	µg/m³	<1.8	<1.8
Chloroform	µg/m³	130	130
Tetrahydrofuran	µg/m³	<1.5	<1.5
1,1,1-Trichloroethane	µg/m³	<2.7	<2.7
1,2-Dichloroethane	µg/m³	<2	<2
Benzene	µg/m³	<1.6	<1.6
Carbon tetrachloride	µg/m³	<3	<3
Cyclohexane	µg/m³	<1.7	<1.7
Heptane	µg/m³	<2.0	<2.0
Trichloroethene	µg/m³	<2.7	<2.7
1,2-Dichloropropane	µg/m³	<2	<2
1,4-Dioxane	µg/m³	<1.8	<1.8
Bromodichloromethane	µg/m³	4	3
Methyl Methacrylate	µg/m³	4	4
МІВК	µg/m³	2	2

TO15 in Canisters + ug/m3 calc			
Our Reference		176277-1	176277-3
Your Reference	UNITS	BH3.A (can)	BD1/20172209 (can)
Date Sampled		22/09/2017	22/09/2017
Type of sample		Canister	Canister
cis-1,3-Dichloropropene	µg/m³	<2	<2
trans-1,3-Dichloropropene	µg/m³	<2	<2
Toluene	µg/m³	580	560
1,1,2-Trichloroethane	µg/m³	<2.7	<2.7
Methyl Butyl Ketone	µg/m³	<2.0	<2.0
Dibromochloromethane	µg/m³	<1.6	<1.6
Tetrachloroethene	µg/m³	3	4
1,2-Dibromoethane	µg/m³	<3.8	<3.8
Chlorobenzene	µg/m³	<2	<2
Ethylbenzene	µg/m³	<2	<2
m-& p-Xylene	µg/m³	<4	<4
Styrene	µg/m³	<2	<2
o-Xylene	µg/m³	<2	<2
Bromoform	µg/m³	<5	<5
1,1,2,2-Tetrachloroethane	µg/m³	<3	<3
4-ethyl toluene	µg/m³	<2.5	<2.5
1,3,5-Trimethylbenzene	µg/m³	<2.5	<2.5
1,2,4-Trimethylbenzene	µg/m³	<2.5	<2.5
1,3-Dichlorobenzene	µg/m³	5	5
Benzyl chloride	µg/m³	<2.6	<2.6
1,4-Dichlorobenzene	µg/m³	<3.0	<3.0
1,2-Dichlorobenzene	µg/m³	<3.0	<3.0
1,2,4-Trichlorobenzene	µg/m³	<3.7	<3.7
Naphthalene	µg/m³	3	4
Hexachloro-1,3-butadiene	µg/m³	<5	<5

VOC in Carbon tubes		
Our Reference		176277-5
Your Reference	UNITS	shroud
Date Sampled		22/09/2017
Type of sample		Carbon Tube
Date extracted	-	26/09/2017
Date analysed	-	27/09/2017
Isopropyl Alcohol	µg/tube	<5
VOC Surrogate 1	%	82

VOC in Carbon tubos		
Our Reference		176277-5
Your Reference	UNITS	shroud
Data Osmulad		00/00/0047
Date Sampled		22/09/2017
Type of sample		Carbon Tube
rype of sample		
Date prepared	-	22/09/2017
···· P ··P·· ··		
Date analysed	-	27/09/2017
Isopropyl Alcohol	µg/m³	0
Tubo Sampling rato	ml /min	1 000
		1,000
Tube Sampling Time	mins	0.5
i dae eampinig i me		0.0
Volume sampled	m ³	0.00050000

Method ID	Methodology Summary
AT-003	Gases determined by GC-FID/TCD using methods ASTM 1945, 1946 and USEPA 3C.
AT-008	Determination of volatile organic compounds in charcoal tubes/badges/sorbents using CS2 extraction, based on NIOSH methods. Desorption efficiencies are not applied to results in ug/tube.
	Note where μ g/m ³ results are supplied for SKC badges, the factors used are for 575-001, if 575-001 data is unavailable for an analyte then use 575-002 then 575-003 (exposure time must be supplied).
TO15	USEPA TO15 - Analysis of VOC's in air following USEPA TO15 protocols

QUALITY CONTROL: Permanent Gas analysis					Du	plicate		Spike Re	covery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			26/09/2017	1	26/09/2017	26/09/2017		26/09/2017	
Date analysed	-			26/09/2017	1	26/09/2017	26/09/2017		26/09/2017	
Methane (CH ₄)	%	0.01	AT-003	<0.01	1	<0.01	<0.01	0	99	
Carbon Dioxide (CO ₂)	%	0.01	AT-003	<0.01	1	0.44	0.44	0	98	
Oxygen (O ₂)	%	0.01	AT-003	<0.01	1	20	20	0	99	
Carbon Monoxide (CO)	%	0.01	AT-003	<0.01	1	<0.01	<0.01	0	99	
Helium (He)	%	0.01	AT-003	<0.01	1	<0.01	<0.01	0	91	[NT]

QUALITY CONT	ers + ug/m3 calc	Duplicate					Spike Re	covery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Vacuum before Shipment	Hg"			[NT]	3	-30	-30	0	[NT]	[NT]
Vacuum before Analysis	Hg"			[NT]	3	-5	-5	0	[NT]	[NT]
Date prepared	-			04/10/2017	3	04/10/2017	04/10/2017		04/10/2017	[NT]
Date analysed	-			04/10/2017	3	04/10/2017	04/10/2017		04/10/2017	[NT]
Propylene	ppbv	0.5	TO15	<0.5	3	<0.5	<0.5	0	117	[NT]
Dichlorodifluoromethane	ppbv	0.5	TO15	<0.5	3	<1	<1	0	[NT]	[NT]
Chloromethane	ppbv	0.5	TO15	<0.5	3	<0.5	<0.5	0	[NT]	[NT]
1,2-Dichlorotetrafluoroethane	ppbv	0.5	TO15	<0.5	3	<0.5	<0.5	0	[NT]	[NT]
Vinyl chloride	ppbv	0.5	TO15	<0.5	3	<0.5	<0.5	0	[NT]	[NT]
1,3-Butadiene	ppbv	0.5	TO15	<0.5	3	<0.5	<0.5	0	[NT]	[NT]
Bromomethane	ppbv	0.5	TO15	<0.5	3	<0.5	<0.5	0	[NT]	[NT]
Chloroethane	ppbv	0.5	TO15	<0.5	3	<0.5	<0.5	0	[NT]	[NT]
Ethanol	ppbv	0.5	TO15	<0.5	3	17	16	6	[NT]	[NT]
Acrolein	ppbv	0.5	TO15	<0.5	3	<0.5	<0.5	0	[NT]	[NT]
Trichlorofluoromethane (Freon 11)	ppbv	0.5	TO15	<0.5	3	<0.5	<0.5	0	[NT]	[NT]
Acetone	ppbv	5	TO15	<5	3	6	6	0	[NT]	[NT]
Isopropyl Alcohol	ppbv	0.5	TO15	<0.5	3	57	58	2	[NT]	[NT]
1,1-Dichloroethene	ppbv	0.5	TO15	<0.5	3	<0.5	<0.5	0	[NT]	[NT]
1,1,2-Trichlorotrifluoroethane	ppbv	0.5	TO15	<0.5	3	<0.5	<0.5	0	[NT]	[NT]
Methylene chloride (Dichloromethane)	ppbv	5	TO15	<5	3	<5	<5	0	[NT]	[NT]
Carbon Disulfide	ppbv	0.5	TO15	<0.5	3	<0.5	<0.5	0	[NT]	[NT]
trans-1,2-dichloroethene	ppbv	0.5	TO15	<0.5	3	<0.5	<0.5	0	[NT]	[NT]
МТВЕ	ppbv	0.5	TO15	<0.5	3	<0.5	<0.5	0	[NT]	[NT]
1,1- Dichloroethane	ppbv	0.5	TO15	<0.5	3	<0.5	<0.5	0	[NT]	[NT]
Vinyl Acetate	ppbv	0.5	TO15	<0.5	3	<0.5	<0.5	0	[NT]	[NT]
MEK	ppbv	0.5	TO15	<0.5	3	<0.5	<0.5	0	[NT]	[NT]
Hexane	ppbv	0.5	TO15	<0.5	3	<0.5	<0.5	0	94	[NT]
cis-1,2-Dichloroethene	ppbv	0.5	TO15	<0.5	3	<0.5	<0.5	0	[NT]	[NT]
Ethyl Acetate	ppbv	0.5	TO15	<0.5	3	<0.5	<0.5	0	[NT]	[NT]
Chloroform	ppbv	0.5	TO15	<0.5	3	26	27	4	[NT]	[NT]
Tetrahydrofuran	ppbv	0.5	TO15	<0.5	3	<0.5	<0.5	0	[NT]	[NT]
1,1,1-Trichloroethane	ppbv	0.5	TO15	<0.5	3	<0.5	<0.5	0	[NT]	[NT]
1,2-Dichloroethane	ppbv	0.5	TO15	<0.5	3	<0.5	<0.5	0	[NT]	[NT]
Benzene	ppbv	0.5	TO15	<0.5	3	<0.5	<0.5	0	101	[NT]
Carbon tetrachloride	ppbv	0.5	TO15	<0.5	3	<0.5	<0.5	0	[NT]	[NT]
Cyclohexane	ppbv	0.5	TO15	<0.5	3	<0.5	<0.5	0	102	[NT]
Heptane	ppbv	0.5	TO15	<0.5	3	<0.5	<0.5	0	106	[NT]
Trichloroethene	ppbv	0.5	TO15	<0.5	3	<0.5	<0.5	0	[NT]	[NT]

QUALITY CONT	TROL: TO15 in Canisters + ug/m3 calc					Du	plicate		Spike Re	covery %
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
1,2-Dichloropropane	ppbv	0.5	TO15	<0.5	3	<0.5	<0.5	0		[NT]
1,4-Dioxane	ppbv	0.5	TO15	<0.5	3	<0.5	<0.5	0		[NT]
Bromodichloromethane	ppbv	0.5	TO15	<0.5	3	0.5	0.5	0		[NT]
Methyl Methacrylate	ppbv	0.5	TO15	<0.5	3	1	1	0		[NT]
МІВК	ppbv	0.5	TO15	<0.5	3	0.6	0.6	0		[NT]
cis-1,3-Dichloropropene	ppbv	0.5	TO15	<0.5	3	<0.5	<0.5	0		[NT]
trans-1,3-Dichloropropene	ppbv	0.5	TO15	<0.5	3	<0.5	<0.5	0		[NT]
Toluene	ppbv	0.5	TO15	<0.5	3	150	150	0	106	[NT]
1,1,2-Trichloroethane	ppbv	0.5	TO15	<0.5	3	<0.5	<0.5	0		[NT]
Methyl Butyl Ketone	ppbv	0.5	TO15	<0.5	3	<0.5	<0.5	0		[NT]
Dibromochloromethane	ppbv	0.5	TO15	<0.5	3	<0.5	<0.5	0		[NT]
Tetrachloroethene	ppbv	0.5	TO15	<0.5	3	0.6	0.6	0		[NT]
1,2-Dibromoethane	ppbv	0.5	TO15	<0.5	3	<0.5	<0.5	0		[NT]
Chlorobenzene	ppbv	0.5	TO15	<0.5	3	<0.5	<0.5	0		[NT]
Ethylbenzene	ppbv	0.5	TO15	<0.5	3	<0.5	<0.5	0	107	[NT]
m-& p-Xylene	ppbv	1	TO15	<1	3	<1	<1	0	108	[NT]
Styrene	ppbv	0.5	TO15	<0.5	3	<0.5	<0.5	0	123	[NT]
o-Xylene	ppbv	0.5	TO15	<0.5	3	<0.5	<0.5	0	109	[NT]
Bromoform	ppbv	0.5	TO15	<0.5	3	<0.5	<0.5	0		[NT]
1,1,2,2-Tetrachloroethane	ppbv	0.5	TO15	<0.5	3	<0.5	<0.5	0		[NT]
4-ethyl toluene	ppbv	0.5	TO15	<0.5	3	<0.5	<0.5	0	121	[NT]
1,3,5-Trimethylbenzene	ppbv	0.5	TO15	<0.5	3	<0.5	<0.5	0	122	[NT]
1,2,4-Trimethylbenzene	ppbv	0.5	TO15	<0.5	3	<0.5	<0.5	0	119	[NT]
1,3-Dichlorobenzene	ppbv	0.5	TO15	<0.5	3	0.9	0.9	0		[NT]
Benzyl chloride	ppbv	0.5	TO15	<0.5	3	<0.5	<0.5	0		[NT]
1,4-Dichlorobenzene	ppbv	0.5	TO15	<0.5	3	<0.5	<0.5	0		[NT]
1,2-Dichlorobenzene	ppbv	0.5	TO15	<0.5	3	<0.5	<0.5	0		[NT]
1,2,4-Trichlorobenzene	ppbv	0.5	TO15	<0.5	3	<0.5	<0.5	0		[NT]
Naphthalene	ppbv	0.5	TO15	<0.5	3	0.8	0.7	13		[NT]
Hexachloro- 1,3-butadiene	ppbv	0.5	TO15	<0.5	3	<0.5	<0.5	0		[NT]
Surrogate-Bromochloromethane	% rec		TO15	95	3	93	90	3	97	[NT]
Surrogate -1,4-Difluorobenzene	% rec		TO15	95	3	97	96	1	96	[NT]
Surrogate-Chlorobenzene-D5	% rec		TO15	87	3	95	94	1	96	[NT]

QUALITY C	ONTROL: V	OC in Ca		Du	Spike Re	covery %				
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			26/09/2017	[NT]		[NT]	[NT]	26/09/2017	
Date analysed	-			27/09/2017	[NT]		[NT]	[NT]	27/09/2017	
Isopropyl Alcohol	µg/tube	5	AT-008	<5	[NT]		[NT]	[NT]	96	
VOC Surrogate 1	%		AT-008	110	[NT]		[NT]	[NT]	113	

Result Definiti	ons
NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control	ol Definitions
Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.
Australian Drinking	Nator Quidalinga recommand that Thermatalerant Caliform, Ecosal Entergagesi, & E. Cali Javala are less than

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.



CHAIN OF CUSTODY DESPATCH SHEET

Project No:					Suburb							To:	Envi	viroLab			
Project Name:					Order N	lumber					12 Ashley Street Chatswood 2067						
Project Manage	r:PG				Sample	r:	KP					Attn: Aileen Hie					
Emails:												Phone: (02) 9910 6200					
Date Required:	S	Standard	and the second			1.1.1	Success.	S. S.				Email:	AHie	e@envirolab.co	m.a	<u>u</u>	
Prior Storage:		Shelved			Do samp	les conta	in 'potentia	I' HBM?	N	0] (l	f YES, then	handle, trar	nsport and store in ac	corda	nce with F	PM HAZID)
		pled	Sample Type	Containe r			Canister	s				Sec. 1	С	arbon Tubes			
Sample ID	Lab ID	Date Sam			Start Vac	Stop Vac	Can ID	Reg No.	T015	TPH Fractions	General Gases	Sample Duration	Flow Rate	Tube ID	IPA	Hold	Notes/preservation
BH3.A	1	22/09/17	Canister		-30	-6	1692	493	x		X	9m10s					
BH3.A	2	22/09/17	carbon tube									5min	1L/min	5817301133	1.4.4	Х	General Gases (O2,CO2,CH4,CO and He)
BD1/20172209	3	22/09/17	Canister		-30	-6	3496	1560	Х			8m15s					
BD1/20172209	4	22/09/17	carbon tube	100				S		11		5min	1L/min	5171704977		Х	
shroud	5	22/09/17	carbon tube	1999			1977			11		30sec	1L/min	5817109813	X	had a	
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						i. i								security (inte	ael/Br	oken/Non	
	6.19	1.1.1.1.1.1					11 11					Sec.					
	1. T. M.																
PQL (S) mg/kg				all a				1. 1 mar 1						ANZECC PQLs	req	'd for al	water analytes
PQL = practical	quanti	tation limit.	If none given	, default to	Laborate	ory Meth	od Detecti	ion Limit				Lab Re	eport/Ref	erence No:			
Metals to Analys	se: 8HN	a unless sp	ecified here:	Pr	linguich	od t		Tranen	orte	d to		oratory	hy:			<u> </u>	
Send Results to	:	Douglas Pa	artners Ptv Ltd		dre 🔿		0	iranspo	Jite	uit	/ Idl	Joratory		Phone:			Fax:
Signed:	1863845			Received	by	UQUAL	toll	- 91	5		-	T	Date & T	ime:			T WAT



Envirolab Services Pty Ltd ABN 37 112 535 645 12 Ashley St Chatswood NSW 2067 ph 02 9910 6200 fax 02 9910 6201 customerservice@envirolab.com.au www.envirolab.com.au

CERTIFICATE OF ANALYSIS 176675

Client Details	
Client	Douglas Partners Pty Ltd
Attention	Lisa Teng, Wen-Fei Yuan
Address	96 Hermitage Rd, West Ryde, NSW, 2114

Sample Details	
Your Reference	85822.03, Geotechnical and Contamination
Number of Samples	4 Water
Date samples received	28/09/2017
Date completed instructions received	28/09/2017

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Please refer to the last page of this report for any comments relating to the results.

Report Details						
Date results requested by	06/10/2017					
Date of Issue	09/10/2017					
NATA Accreditation Number 2901. This document shall not be reproduced except in full.						
Accredited for compliance with ISO/IEC 1	7025 - Testing. Tests not covered by NATA are denoted with *					

Results Approved By

Dragana Tomas, Senior Chemist Jaimie Loa-Kum-Cheung, Senior Chemist Nancy Zhang, Assistant Lab Manager Nick Sarlamis, Inorganics Supervisor Steven Luong, Chemist

Authorised By

کھ

David Springer, General Manager



vTRH(C6-C10)/BTEXN in Water				
Our Reference		176675-1	176675-3	176675-4
Your Reference	UNITS	BH2	Trip spike	Trip blank
Date Sampled		28/09/2017	28/09/2017	28/09/2017
Type of sample		Water	Water	Water
Date extracted	-	29/09/2017	29/09/2017	29/09/2017
Date analysed	-	04/10/2017	03/10/2017	03/10/2017
TRH C ₆ - C ₉	μg/L	<10		[NA]
TRH C6 - C10	µg/L	<10		[NA]
TRH C ₆ - C ₁₀ less BTEX (F1)	µg/L	<10		[NA]
Benzene	µg/L	<1	94%	<1
Toluene	µg/L	<1	102%	<1
Ethylbenzene	µg/L	<1	90%	<1
m+p-xylene	μg/L	<2	92%	<2
o-xylene	µg/L	<1	83%	<1
Naphthalene	µg/L	<1		[NA]
Surrogate Dibromofluoromethane	%	102	98	96
Surrogate toluene-d8	%	101	106	85
Surrogate 4-BFB	%	90	86	93

VOCs in water			
Our Reference		176675-1	176675-2
Your Reference	UNITS	BH2	BD1/20172809
Date Sampled		28/09/2017	28/09/2017
Type of sample		Water	Water
Date extracted	-	29/09/2017	29/09/2017
Date analysed	-	04/10/2017	04/10/2017
Dichlorodifluoromethane	µg/L	<10	<10
Chloromethane	µg/L	<10	<10
Vinyl Chloride	µg/L	<10	<10
Bromomethane	μg/L	<10	<10
Chloroethane	µg/L	<10	<10
Trichlorofluoromethane	µg/L	<10	<10
1,1-Dichloroethene	μg/L	<1	<1
Trans-1,2-dichloroethene	µg/L	<1	<1
1,1-dichloroethane	μg/L	<1	<1
Cis-1,2-dichloroethene	µg/L	<1	<1
Bromochloromethane	µg/L	<1	<1
Chloroform	µg/L	5	5
2,2-dichloropropane	µg/L	<1	<1
1,2-dichloroethane	µg/L	<1	<1
1,1,1-trichloroethane	µg/L	<1	<1
1,1-dichloropropene	µg/L	<1	<1
Cyclohexane	µg/L	<1	<1
Carbon tetrachloride	µg/L	<1	<1
Benzene	µg/L	<1	<1
Dibromomethane	µg/L	<1	<1
1,2-dichloropropane	µg/L	<1	<1
Trichloroethene	µg/L	<1	<1
Bromodichloromethane	µg/L	<1	<1
trans-1,3-dichloropropene	µg/L	<1	<1
cis-1,3-dichloropropene	µg/L	<1	<1
1,1,2-trichloroethane	µg/L	<1	<1
Toluene	µg/L	<1	<1
1,3-dichloropropane	µg/L	<1	<1
Dibromochloromethane	µg/L	<1	<1
1,2-dibromoethane	µg/L	<1	<1
Tetrachloroethene	µg/L	<1	<1
1,1,1,2-tetrachloroethane	µg/L	<1	<1
Chlorobenzene	µg/L	<1	<1
Ethylbenzene	µg/L	<1	<1
Bromoform	µg/L	<1	<1

VOCs in water			
Our Reference		176675-1	176675-2
Your Reference	UNITS	BH2	BD1/20172809
Date Sampled		28/09/2017	28/09/2017
Type of sample		Water	Water
m+p-xylene	μg/L	<2	<2
Styrene	μg/L	<1	<1
1,1,2,2-tetrachloroethane	μg/L	<1	<1
o-xylene	μg/L	<1	<1
1,2,3-trichloropropane	μg/L	<1	<1
Isopropylbenzene	µg/L	<1	<1
Bromobenzene	µg/L	<1	<1
n-propyl benzene	μg/L	<1	<1
2-chlorotoluene	μg/L	<1	<1
4-chlorotoluene	μg/L	<1	<1
1,3,5-trimethyl benzene	μg/L	<1	<1
Tert-butyl benzene	µg/L	<1	<1
1,2,4-trimethyl benzene	μg/L	<1	<1
1,3-dichlorobenzene	μg/L	<1	<1
Sec-butyl benzene	μg/L	<1	<1
1,4-dichlorobenzene	μg/L	<1	<1
4-isopropyl toluene	μg/L	<1	<1
1,2-dichlorobenzene	μg/L	<1	<1
n-butyl benzene	μg/L	<1	<1
1,2-dibromo-3-chloropropane	μg/L	<1	<1
1,2,4-trichlorobenzene	μg/L	<1	<1
Hexachlorobutadiene	μg/L	<1	<1
1,2,3-trichlorobenzene	μg/L	<1	<1
Surrogate Dibromofluoromethane	%	102	103
Surrogate toluene-d8	%	101	100
Surrogate 4-BFB	%	90	89

svTRH (C10-C40) in Water		
Our Reference		176675-1
Your Reference	UNITS	BH2
Date Sampled		28/09/2017
Type of sample		Water
Date extracted	-	29/09/2017
Date analysed	-	29/09/2017
TRH C ₁₀ - C ₁₄	µg/L	<50
TRH C ₁₅ - C ₂₈	µg/L	<100
TRH C ₂₉ - C ₃₆	µg/L	<100
TRH >C ₁₀ - C ₁₆	µg/L	<50
TRH >C10 - C16 less Naphthalene (F2)	µg/L	<50
TRH >C ₁₆ - C ₃₄	µg/L	<100
TRH >C ₃₄ - C ₄₀	µg/L	<100
Surrogate o-Terphenyl	%	99

PAHs in Water		
Our Reference		176675-1
Your Reference	UNITS	BH2
Date Sampled		28/09/2017
Type of sample		Water
Date extracted	-	29/09/2017
Date analysed	-	29/09/2017
Naphthalene	µg/L	<1
Acenaphthylene	µg/L	<1
Acenaphthene	µg/L	<1
Fluorene	µg/L	<1
Phenanthrene	µg/L	<1
Anthracene	µg/L	<1
Fluoranthene	µg/L	<1
Pyrene	µg/L	<1
Benzo(a)anthracene	µg/L	<1
Chrysene	µg/L	<1
Benzo(b,j+k)fluoranthene	µg/L	<2
Benzo(a)pyrene	µg/L	<1
Indeno(1,2,3-c,d)pyrene	µg/L	<1
Dibenzo(a,h)anthracene	µg/L	<1
Benzo(g,h,i)perylene	µg/L	<1
Benzo(a)pyrene TEQ	µg/L	<5
Total +ve PAH's	µg/L	NIL (+)VE
Surrogate p-Terphenyl-d14	%	113

OP in water Trace ANZECCF/ADWG		
Our Reference		176675-1
Your Reference	UNITS	BH2
Date Sampled		28/09/2017
Type of sample		Water
Date extracted	-	04/10/20107
Date analysed	-	08/10/2017
Azinphos-methyl (Guthion)	µg/L	<0.02
Bromophos ethyl	µg/L	<0.2
Chlorpyriphos	µg/L	<0.009
Chlorpyriphos-methyl	µg/L	<0.2
Diazinon	µg/L	<0.01
Dichlorovos	µg/L	<0.2
Dimethoate	µg/L	<0.15
Ethion	µg/L	<0.2
Fenitrothion	µg/L	<0.2
Malathion	µg/L	<0.05
Parathion	μg/L	<0.004
Methyl Parathion	µg/L	<0.2
Ronnel	µg/L	<0.2
Surrogate p-Terphenyl-d ₁₄	%	71

OCP in water - Trace level		
Our Reference		176675-1
Your Reference	UNITS	BH2
Date Sampled		28/09/2017
Type of sample		Water
Date extracted	-	04/10/2017
Date analysed	-	08/10/2017
НСВ	µg/L	<0.001
alpha-BHC	µg/L	<0.001
gamma-BHC	μg/L	<0.001
beta-BHC	µg/L	<0.001
Heptachlor	µg/L	<0.001
delta-BHC	µg/L	<0.001
Aldrin	µg/L	<0.001
Heptachlor Epoxide	µg/L	<0.001
gamma-Chlordane	μg/L	<0.001
alpha-Chlordane	µg/L	<0.001
Endosulfan I	µg/L	<0.002
pp-DDE	µg/L	<0.001
Dieldrin	μg/L	<0.001
Endrin	µg/L	<0.001
pp-DDD	μg/L	<0.001
Endosulfan II	µg/L	<0.002
DDT	µg/L	<0.001
Endosulfan Sulphate	μg/L	<0.001
Methoxychlor	μg/L	<0.001
Mirex	μg/L	<0.002
Surrogate p-Terphenyl-d ₁₄	%	76

PCB in water - trace level Aroclors		
Our Reference		176675-1
Your Reference	UNITS	BH2
Date Sampled		28/09/2017
Type of sample		Water
Date prepared	-	04/10/2017
Date analysed	-	08/10/2017
Aroclor 1016	µg/L	<0.01
Aroclor 1221	µg/L	<0.01
Aroclor 1232	µg/L	<0.01
Aroclor 1242	µg/L	<0.01
Aroclor 1248	µg/L	<0.01
Aroclor 1254	µg/L	<0.01
Aroclor 1260	µg/L	<0.01
Surrogate p-Terphenyl-d14	%	71

Total Phenolics in Water		
Our Reference		176675-1
Your Reference	UNITS	BH2
Date Sampled		28/09/2017
Type of sample		Water
Date extracted	-	29/09/2017
Date analysed	-	29/09/2017
Total Phenolics (as Phenol)	mg/L	<0.05

HM in water - dissolved		
Our Reference		176675-1
Your Reference	UNITS	BH2
Date Sampled		28/09/2017
Type of sample		Water
Date prepared	-	29/09/2017
Date analysed	-	29/09/2017
Arsenic-Dissolved	µg/L	<1
Cadmium-Dissolved	µg/L	<0.1
Chromium-Dissolved	µg/L	<1
Copper-Dissolved	µg/L	10
Lead-Dissolved	µg/L	<1
Mercury-Dissolved	µg/L	<0.05
Nickel-Dissolved	µg/L	12
Zinc-Dissolved	µg/L	71

Method ID	Methodology Summary
Ext-054	Analysed by MPL Envirolab
Inorg-031	Total Phenolics by segmented flow analyser (in line distillation with colourimetric finish). Solids are extracted in a caustic media prior to analysis.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Metals-022	Determination of various metals by ICP-MS.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS.
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013.
Org-012/017	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS and/or GC-MS/MS.
Org-013	Water samples are analysed directly by purge and trap GC-MS.
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Water					Duplicate Spike Recov				covery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			29/09/2017	[NT]		[NT]	[NT]	29/09/2017	
Date analysed	-			04/10/2017	[NT]		[NT]	[NT]	04/10/2017	
TRH C ₆ - C ₉	µg/L	10	Org-016	<10	[NT]		[NT]	[NT]	101	
TRH C ₆ - C ₁₀	µg/L	10	Org-016	<10	[NT]		[NT]	[NT]	101	
Benzene	µg/L	1	Org-016	<1	[NT]		[NT]	[NT]	97	
Toluene	µg/L	1	Org-016	<1	[NT]		[NT]	[NT]	101	
Ethylbenzene	µg/L	1	Org-016	<1	[NT]		[NT]	[NT]	101	
m+p-xylene	µg/L	2	Org-016	<2	[NT]		[NT]	[NT]	103	
o-xylene	µg/L	1	Org-016	<1	[NT]		[NT]	[NT]	101	
Naphthalene	µg/L	1	Org-013	<1	[NT]		[NT]	[NT]	[NT]	
Surrogate Dibromofluoromethane	%		Org-016	98	[NT]		[NT]	[NT]	93	
Surrogate toluene-d8	%		Org-016	101	[NT]		[NT]	[NT]	107	
Surrogate 4-BFB	%		Org-016	92	[NT]		[NT]	[NT]	104	

QUALITY CONTROL: VOCs in water				Duj	ıplicate		Spike Red	covery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			29/09/2017	[NT]	[NT]		[NT]	29/09/2017	
Date analysed	-			04/10/2017	[NT]	[NT]		[NT]	04/10/2017	
Dichlorodifluoromethane	µg/L	10	Org-013	<10	[NT]	[NT]		[NT]	[NT]	
Chloromethane	µg/L	10	Org-013	<10	[NT]	[NT]		[NT]	[NT]	
Vinyl Chloride	µg/L	10	Org-013	<10	[NT]	[NT]		[NT]	[NT]	
Bromomethane	µg/L	10	Org-013	<10	[NT]	[NT]		[NT]	[NT]	
Chloroethane	µg/L	10	Org-013	<10	[NT]	[NT]		[NT]	[NT]	
Trichlorofluoromethane	µg/L	10	Org-013	<10	[NT]	[NT]		[NT]	[NT]	
1,1-Dichloroethene	µg/L	1	Org-013	<1	[NT]	[NT]		[NT]	[NT]	
Trans-1,2-dichloroethene	µg/L	1	Org-013	<1	[NT]	[NT]		[NT]	[NT]	
1,1-dichloroethane	µg/L	1	Org-013	<1	[NT]	[NT]		[NT]	91	
Cis-1,2-dichloroethene	µg/L	1	Org-013	<1	[NT]	[NT]		[NT]	[NT]	
Bromochloromethane	µg/L	1	Org-013	<1	[NT]	[NT]		[NT]	[NT]	
Chloroform	µg/L	1	Org-013	<1	[NT]	[NT]		[NT]	96	
2,2-dichloropropane	µg/L	1	Org-013	<1	[NT]	[NT]		[NT]	[NT]	
1,2-dichloroethane	µg/L	1	Org-013	<1	[NT]	[NT]		[NT]	98	
1,1,1-trichloroethane	µg/L	1	Org-013	<1	[NT]	[NT]		[NT]	104	
1,1-dichloropropene	µg/L	1	Org-013	<1	[NT]	[NT]		[NT]	[NT]	
Cyclohexane	µg/L	1	Org-013	<1	[NT]	[NT]		[NT]	[NT]	
Carbon tetrachloride	µg/L	1	Org-013	<1	[NT]	[NT]		[NT]	[NT]	
Benzene	µg/L	1	Org-013	<1	[NT]	[NT]		[NT]	[NT]	
Dibromomethane	µg/L	1	Org-013	<1	[NT]	[NT]		[NT]	[NT]	
1,2-dichloropropane	µg/L	1	Org-013	<1	[NT]	[NT]		[NT]	[NT]	
Trichloroethene	µg/L	1	Org-013	<1	[NT]	[NT]		[NT]	83	
Bromodichloromethane	µg/L	1	Org-013	<1	[NT]	[NT]		[NT]	100	
trans-1,3-dichloropropene	µg/L	1	Org-013	<1	[NT]	[NT]		[NT]	[NT]	
cis-1,3-dichloropropene	µg/L	1	Org-013	<1	[NT]	[NT]		[NT]	[NT]	
1,1,2-trichloroethane	µg/L	1	Org-013	<1	[NT]	[NT]		[NT]	[NT]	
Toluene	µg/L	1	Org-013	<1	[NT]	[NT]		[NT]	[NT]	
1,3-dichloropropane	µg/L	1	Org-013	<1	[NT]	[NT]		[NT]	[NT]	
Dibromochloromethane	µg/L	1	Org-013	<1	[NT]	[NT]		[NT]	102	
1,2-dibromoethane	µg/L	1	Org-013	<1	[NT]	[NT]		[NT]	[NT]	
Tetrachloroethene	µg/L	1	Org-013	<1	[NT]	[NT]		[NT]	105	
1,1,1,2-tetrachloroethane	µg/L	1	Org-013	<1	[NT]	[NT]		[NT]	[NT]	
Chlorobenzene	µg/L	1	Org-013	<1	[NT]	[NT]		[NT]	[NT]	
Ethylbenzene	µg/L	1	Org-013	<1	[NT]	[NT]		[NT]	[NT]	
Bromoform	µg/L	1	Org-013	<1	[NT]	[NT]		[NT]	[NT]	
m+p-xylene	µg/L	2	Org-013	<2	[NT]	[NT]		[NT]	[NT]	
Styrene	µg/L	1	Org-013	<1	[NT]	[NT]		[NT]	[NT]	
1,1,2,2-tetrachloroethane	µg/L	1	Org-013	<1	[NT]	[NT]		[NT]	[NT]	
o-xylene	µg/L	1	Org-013	<1	[NT]	[NT]		[NT]	[NT]	

QUALITY	CONTROL	: VOCs ir	n water			Du	plicate		Spike Re	covery %
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
1,2,3-trichloropropane	µg/L	1	Org-013	<1	[NT]		[NT]	[NT]	[NT]	
Isopropylbenzene	µg/L	1	Org-013	<1	[NT]		[NT]	[NT]	[NT]	
Bromobenzene	µg/L	1	Org-013	<1	[NT]		[NT]	[NT]	[NT]	
n-propyl benzene	µg/L	1	Org-013	<1	[NT]		[NT]	[NT]	[NT]	
2-chlorotoluene	µg/L	1	Org-013	<1	[NT]		[NT]	[NT]	[NT]	
4-chlorotoluene	µg/L	1	Org-013	<1	[NT]		[NT]	[NT]	[NT]	
1,3,5-trimethyl benzene	µg/L	1	Org-013	<1	[NT]		[NT]	[NT]	[NT]	
Tert-butyl benzene	µg/L	1	Org-013	<1	[NT]		[NT]	[NT]	[NT]	
1,2,4-trimethyl benzene	µg/L	1	Org-013	<1	[NT]		[NT]	[NT]	[NT]	
1,3-dichlorobenzene	µg/L	1	Org-013	<1	[NT]		[NT]	[NT]	[NT]	
Sec-butyl benzene	µg/L	1	Org-013	<1	[NT]		[NT]	[NT]	[NT]	
1,4-dichlorobenzene	µg/L	1	Org-013	<1	[NT]		[NT]	[NT]	[NT]	
4-isopropyl toluene	µg/L	1	Org-013	<1	[NT]		[NT]	[NT]	[NT]	
1,2-dichlorobenzene	µg/L	1	Org-013	<1	[NT]		[NT]	[NT]	[NT]	
n-butyl benzene	µg/L	1	Org-013	<1	[NT]		[NT]	[NT]	[NT]	
1,2-dibromo-3-chloropropane	µg/L	1	Org-013	<1	[NT]		[NT]	[NT]	[NT]	
1,2,4-trichlorobenzene	µg/L	1	Org-013	<1	[NT]		[NT]	[NT]	[NT]	
Hexachlorobutadiene	µg/L	1	Org-013	<1	[NT]		[NT]	[NT]	[NT]	
1,2,3-trichlorobenzene	µg/L	1	Org-013	<1	[NT]		[NT]	[NT]	[NT]	
Surrogate Dibromofluoromethane	%		Org-013	98	[NT]		[NT]	[NT]	93	
Surrogate toluene-d8	%		Org-013	101	[NT]		[NT]	[NT]	107	
Surrogate 4-BFB	%		Org-013	92	[NT]		[NT]	[NT]	104	

QUALITY CONTROL: svTRH (C10-C40) in Water					Duplicate Spike Recove			covery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date extracted	-			29/09/2017	[NT]		[NT]	[NT]	29/09/2017	
Date analysed	-			29/09/2017	[NT]		[NT]	[NT]	29/09/2017	
TRH C ₁₀ - C ₁₄	µg/L	50	Org-003	<50	[NT]		[NT]	[NT]	91	
TRH C ₁₅ - C ₂₈	µg/L	100	Org-003	<100	[NT]		[NT]	[NT]	121	
TRH C ₂₉ - C ₃₆	µg/L	100	Org-003	<100	[NT]		[NT]	[NT]	116	
TRH >C ₁₀ - C ₁₆	µg/L	50	Org-003	<50	[NT]		[NT]	[NT]	91	
TRH >C ₁₆ - C ₃₄	µg/L	100	Org-003	<100	[NT]		[NT]	[NT]	121	
TRH >C ₃₄ - C ₄₀	µg/L	100	Org-003	<100	[NT]		[NT]	[NT]	116	
Surrogate o-Terphenyl	%		Org-003	99	[NT]	[NT]	[NT]	[NT]	101	[NT]

QUALITY CONTROL: PAHs in Water							plicate	Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			29/09/2017	[NT]		[NT]	[NT]	29/09/2017	
Date analysed	-			29/09/2017	[NT]		[NT]	[NT]	29/09/2017	
Naphthalene	µg/L	1	Org-012	<1	[NT]		[NT]	[NT]	70	
Acenaphthylene	µg/L	1	Org-012	<1	[NT]		[NT]	[NT]	[NT]	
Acenaphthene	µg/L	1	Org-012	<1	[NT]		[NT]	[NT]	[NT]	
Fluorene	µg/L	1	Org-012	<1	[NT]		[NT]	[NT]	104	
Phenanthrene	µg/L	1	Org-012	<1	[NT]		[NT]	[NT]	115	
Anthracene	µg/L	1	Org-012	<1	[NT]		[NT]	[NT]	[NT]	
Fluoranthene	µg/L	1	Org-012	<1	[NT]		[NT]	[NT]	94	
Pyrene	µg/L	1	Org-012	<1	[NT]		[NT]	[NT]	93	
Benzo(a)anthracene	µg/L	1	Org-012	<1	[NT]		[NT]	[NT]	[NT]	
Chrysene	µg/L	1	Org-012	<1	[NT]		[NT]	[NT]	105	
Benzo(b,j+k)fluoranthene	µg/L	2	Org-012	<2	[NT]		[NT]	[NT]	[NT]	
Benzo(a)pyrene	µg/L	1	Org-012	<1	[NT]		[NT]	[NT]	104	
Indeno(1,2,3-c,d)pyrene	µg/L	1	Org-012	<1	[NT]		[NT]	[NT]	[NT]	
Dibenzo(a,h)anthracene	µg/L	1	Org-012	<1	[NT]		[NT]	[NT]	[NT]	
Benzo(g,h,i)perylene	µg/L	1	Org-012	<1	[NT]		[NT]	[NT]	[NT]	
Surrogate p-Terphenyl-d14	%		Org-012	124	[NT]	[NT]	[NT]	[NT]	97	[NT]

QUALITY CONTROL: OP in water Trace ANZECCF/ADWG						Du		Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			04/10/2017	[NT]		[NT]	[NT]	04/10/2017	
Date analysed	-			08/10/2017	[NT]		[NT]	[NT]	08/10/2017	
Azinphos-methyl (Guthion)	µg/L	0.02	Ext-054	<0.02	[NT]		[NT]	[NT]	[NT]	
Bromophos ethyl	µg/L	0.2	Ext-054	<0.2	[NT]		[NT]	[NT]	[NT]	
Chlorpyriphos	µg/L	0.009	Ext-054	<0.009	[NT]		[NT]	[NT]	88	
Chlorpyriphos-methyl	µg/L	0.2	Ext-054	<0.2	[NT]		[NT]	[NT]	88	
Diazinon	µg/L	0.01	Ext-054	<0.01	[NT]		[NT]	[NT]	[NT]	
Dichlorovos	µg/L	0.2	Ext-054	<0.2	[NT]		[NT]	[NT]	[NT]	
Dimethoate	µg/L	0.15	Ext-054	<0.15	[NT]		[NT]	[NT]	[NT]	
Ethion	µg/L	0.2	Ext-054	<0.2	[NT]		[NT]	[NT]	91	
Fenitrothion	µg/L	0.2	Ext-054	<0.2	[NT]		[NT]	[NT]	86	
Malathion	µg/L	0.05	Ext-054	<0.05	[NT]		[NT]	[NT]	[NT]	
Parathion	µg/L	0.004	Ext-054	<0.004	[NT]		[NT]	[NT]	[NT]	
Methyl Parathion	µg/L	0.2	Ext-054	<0.2	[NT]		[NT]	[NT]	[NT]	
Ronnel	µg/L	0.01	Ext-054	<0.2	[NT]		[NT]	[NT]	[NT]	
Surrogate p-Terphenyl-d ₁₄	%		Ext-054	76	[NT]	[NT]	[NT]	[NT]	95	[NT]

QUALITY CONTROL: OCP in water - Trace level					Duplicate				Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]	
Date extracted	-			04/10/2017	[NT]		[NT]	[NT]	04/10/2017		
Date analysed	-			08/10/2017	[NT]		[NT]	[NT]	08/10/2017		
НСВ	µg/L	0.001	Org-005	<0.001	[NT]		[NT]	[NT]	[NT]		
alpha-BHC	µg/L	0.001	Org-005	<0.001	[NT]		[NT]	[NT]	86		
gamma-BHC	µg/L	0.001	Org-005	<0.001	[NT]		[NT]	[NT]	[NT]		
beta-BHC	µg/L	0.001	Org-005	<0.001	[NT]		[NT]	[NT]	86		
Heptachlor	µg/L	0.001	Org-005	<0.001	[NT]		[NT]	[NT]	88		
delta-BHC	µg/L	0.001	Org-005	<0.001	[NT]		[NT]	[NT]	[NT]		
Aldrin	µg/L	0.001	Org-005	<0.001	[NT]		[NT]	[NT]	89		
Heptachlor Epoxide	µg/L	0.001	Org-005	<0.001	[NT]		[NT]	[NT]	83		
gamma-Chlordane	µg/L	0.001	Org-005	<0.001	[NT]		[NT]	[NT]	[NT]		
alpha-Chlordane	µg/L	0.001	Org-005	<0.001	[NT]		[NT]	[NT]	[NT]		
Endosulfan I	µg/L	0.002	Org-005	<0.002	[NT]		[NT]	[NT]	[NT]		
pp-DDE	µg/L	0.001	Org-005	<0.001	[NT]		[NT]	[NT]	94		
Dieldrin	µg/L	0.001	Org-005	<0.001	[NT]		[NT]	[NT]	93		
Endrin	µg/L	0.001	Org-005	<0.001	[NT]		[NT]	[NT]	[NT]		
pp-DDD	µg/L	0.001	Org-005	<0.001	[NT]		[NT]	[NT]	86		
Endosulfan II	µg/L	0.002	Org-005	<0.002	[NT]		[NT]	[NT]	[NT]		
DDT	µg/L	0.001	Org-005	<0.001	[NT]		[NT]	[NT]	[NT]		
Endosulfan Sulphate	µg/L	0.001	Org-005	<0.001	[NT]		[NT]	[NT]	67		
Methoxychlor	µg/L	0.001	Org-005	<0.001	[NT]		[NT]	[NT]	[NT]		
Mirex	µg/L	0.002	Org-012	<0.002	[NT]		[NT]	[NT]	[NT]		
Surrogate p-Terphenyl-d ₁₄	%		Org-012	76	[NT]	[NT]	[NT]	[NT]	95	[NT]	

QUALITY CONTROL: PCB in water - trace level Aroclors						Duplicate Spike Reo					
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]	
Date prepared	-			04/10/2017	[NT]	[NT]		[NT]	04/10/2017	[NT]	
Date analysed	-			08/10/2017	[NT]	[NT]		[NT]	08/10/2017	[NT]	
Aroclor 1016	µg/L	0.01	Org-012/017	<0.01	[NT]	[NT]		[NT]	[NT]	[NT]	
Aroclor 1221	µg/L	0.01	Org-012/017	<0.01	[NT]	[NT]		[NT]	[NT]	[NT]	
Aroclor 1232	µg/L	0.01	Org-012/017	<0.01	[NT]	[NT]		[NT]	[NT]	[NT]	
Aroclor 1242	µg/L	0.01	Org-012/017	<0.01	[NT]	[NT]		[NT]	[NT]	[NT]	
Aroclor 1248	µg/L	0.01	Org-012/017	<0.01	[NT]	[NT]		[NT]	[NT]	[NT]	
Aroclor 1254	µg/L	0.01	Org-012/017	<0.01	[NT]	[NT]		[NT]	106	[NT]	
Aroclor 1260	µg/L	0.01	Org-012/017	<0.01	[NT]	[NT]		[NT]	[NT]	[NT]	
Surrogate p-Terphenyl-d14	%		Ext-054	76	[NT]	[NT]		[NT]	95	[NT]	
Client Reference: 85822.03, Geotechnical and Contamination

QUALITY CONTROL: Total Phenolics in Water					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			29/09/2017	[NT]		[NT]	[NT]	29/09/2017	[NT]
Date analysed	-			29/09/2017	[NT]		[NT]	[NT]	29/09/2017	[NT]
Total Phenolics (as Phenol)	mg/L	0.05	Inorg-031	<0.05	[NT]	[NT]	[NT]	[NT]	101	[NT]

Client Reference: 85822.03, Geotechnical and Contamination

QUALITY CONTROL: HM in water - dissolved						Du	Spike Recovery %			
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			29/09/2017	[NT]		[NT]	[NT]	29/09/2017	
Date analysed	-			29/09/2017	[NT]		[NT]	[NT]	29/09/2017	
Arsenic-Dissolved	µg/L	1	Metals-022	<1	[NT]		[NT]	[NT]	101	
Cadmium-Dissolved	µg/L	0.1	Metals-022	<0.1	[NT]		[NT]	[NT]	103	
Chromium-Dissolved	µg/L	1	Metals-022	<1	[NT]		[NT]	[NT]	97	
Copper-Dissolved	µg/L	1	Metals-022	<1	[NT]		[NT]	[NT]	99	
Lead-Dissolved	µg/L	1	Metals-022	<1	[NT]		[NT]	[NT]	99	
Mercury-Dissolved	µg/L	0.05	Metals-021	<0.05	[NT]		[NT]	[NT]	102	
Nickel-Dissolved	µg/L	1	Metals-022	<1	[NT]		[NT]	[NT]	99	[NT]
Zinc-Dissolved	µg/L	1	Metals-022	<1	[NT]		[NT]	[NT]	97	

Client Reference: 85822.03, Geotechnical and Contamination

Result Definiti	Result Definitions							
NT	Not tested							
NA	Test not required							
INS	Insufficient sample for this test							
PQL	Practical Quantitation Limit							
<	Less than							
>	Greater than							
RPD	Relative Percent Difference							
LCS	Laboratory Control Sample							
NS	Not specified							
NEPM	National Environmental Protection Measure							
NR	Not Reported							

Quality Contro	ol Definitions
Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.
Australian Drinking	Mater Quidelines recommend that Thermotolerant Caliform, Faceal Entergagesi, & F. Cali lovels are less than

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Report Comments

OC/OP/PCB's in water analysed by MPL Laboratories. Report No.201340.

Douglas Partners Geotechnics | Environment | Groundwater

CHAIN OF CUSTODY DESPATCH SHEET

Project No:	85822.03			Suburb: Bondi				To: Envirolabs						
Project Name:	e: Geotechnical and Contamination Investi			nation Investig	i Order Number				12 Ashley Street, Chatswood 2067					
Project Manage	ger: Wen-Fei Yuan Sampler: Lisa Teng						Attn:							
Emails:	<u>'enFe</u>	i.Yuan@do	ouglaspar	rtners.com.a	lisa.	teng@dou	uglaspa	rtners.co	m.au	Phone:				
Date Required:	St	tandard 🗆			and a					Email:				
Prior Storage:	🗆 Esk	у			Do sam	ples contain	o 'potentia	I' HBM?	No 🗆	(If YES, the	nen handle,	transport and store in ac	cordance with FPM HAZID)	
		pled	Sample Type	Container Type					Analytes					
Sample ID	Lab ID	Date Sam	W - Water	G - glass P - plastic	Heavy Metals	OCP/OPP and PCB (trace level)	TRH	PAH	Total Phenols	VOC	BTEX		Notes/preservation	
BH2	1	28/09/17	w	G/P	Х	X	Х	x	x	x	х		Combo 4L	
BD1/20172809	2	28/09/17	w	G						X				
trip spike	3				manti -			1		Line - Str	Х			
trip blank	4	1. S						1.1.1		and the	Х			
	152.5		-										Envirolab Service	
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PQL (S) mg/kg	-	Station and the									-	ANZECC PQLs r	eq'd for all water analytes	
PQL = practical Metals to Analy	quantitise: 8HM	tation limit.	If none g	given, default	to Labor	atory Meth	nod Dete	ction Limi	t	Lab Report/Reference No:				
Total number o	fsampl	es in conta	iner:	Relin	quished	by:	Lt I	Transpo	rted to la	aboratory	by:			
Send Results to	: D	ouglas Part	ners Pty L	td Addr	ess		1.1.1.1.1		0			Phone:	Fax:	
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Appendix E

Data Quality Assessment



DATA QUALITY ASSESSMENT

Q1. Data Quality Objectives

A site investigation for contamination was prepared with reference to the seven step data quality objective (DQO) process which is provided in Appendix B, Schedule B2 of the *National Environment Protection (Assessment of Site Contamination) Measure* 1999 as amended 2013 (NEPC, 2013). The DQO process is outlined in Section 7.1 of the report.

Q2. Field and Laboratory Quality Control

The field and laboratory quality control (QC) procedures and results are summarised in Tables Q1 and Q2. Reference should be made to the fieldwork and analysis procedures in Table Q4 and the laboratory results certificates in Appendix D for further details.

Table Q1: Field QC

ltem	Frequency	Acceptance Criteria	Achievement
Intra-laboratory replicates	5% primary samples	RPD <30% inorganics), <50% (organics)	yes ¹
Trip Spikes	1 per field batch	60-140% recovery	yes
Trip Blanks	1 per field batch	<pql lor<="" td=""><td>yes</td></pql>	yes

NOTE: 1 qualitative assessment of RPD results overall; refer Section Q2.1

Table Q2: Laboratory QC

Item	Frequency	Acceptance Criteria	Achievement
Analytical laboratories used	-	NATA accreditation	yes
Holding times	-	In accordance with NEPC (2013) which references various Australian and international standards	yes ¹
Laboratory / Reagent Blanks	1 per lab batch	<pql< td=""><td>yes</td></pql<>	yes
Laboratory duplicates	10% primary samples	Laboratory specific ¹	yes
Matrix Spikes	1 per lab batch	70-130% recovery (inorganics);	yes
		60-140% (organics);	
		10-140% (SVOC, speciated phenols)	
Surrogate Spikes	organics by GC	70-130% recovery (inorganics);	yes
		60-140% (organics);	
		10-140% (SVOC, speciated phenols)	
Control Samples	1 per lab batch	70-130% recovery (inorganics);	yes
		60-140% (organics);	
		10-140% (SVOC, speciated phenols)	

NOTE: 1 ELS: <5xPQL – any RPD; >5xPQL – 0-50%RP



In summary, the QC data is considered to be of sufficient quality to be acceptable for the assessment.

Q2.1 Sample Splitting Techniques

Replicate samples were collected in the field as a measure of accuracy, precision and repeatability of the results.

Field replicate samples for soil were collected from the same location and an identical depth to the primary sample. Equal portions of the primary sample were placed into the sampling jars and sealed. The sample was split to prevent the loss of volatiles from the soil but not homogenised in a bowl. Replicate samples were labelled with a DP identification number, recorded on DP's bore logs, so as to conceal their relationship to their primary sample from the analytical laboratory.

Groundwater replicate sample were collected by decanting equal portions of groundwater into separately and uniquely labelled groundwater bottles. Sample bottles were filled directly from the pump outlet to minimise disturbance.

Soil vapour replicate samples were collected by collecting replicate samples immediately after primary samples by adopting the same methodology. Flow rates and vacuum pressures were monitoring throughout the sampling process (for carbon back-up tubes) to ensure that the samples were representative and that the air column was not being "drawn down" during sampling, as indicated by a constant flow rate and no increase in vacuum pressure.

Q2.2 Intra-Laboratory Analysis

Intra-laboratory replicates were analysed as an internal check of the reproducibility within the primary laboratory (Envirolab Pty Ltd) and as a measure of consistency of sampling techniques.

A total of six primary soil samples were analysed to one intra-laboratory replicate (17%). Therefore the 5% intra-laboratory replicate sampling requirement was generally met.

The comparative results of analysis between original and replicate samples are summarised in Table Q3.

Analyte	Primary Sample (mg/kg)	Replicate Sample (mg/kg)	Difference	RPD					
BH2/0.5 and BD1 (Soil)									
Arsenic	<4	<4	0	0					
Cadmium	<0.4	0.5	0.1	22					
Chromium	2	2	0	0					
Copper	29	20	9	37					
Lead	140	180	40	25					
Mercury	<0.1	<0.1	0	0					

Table Q3: Intra-laboratory Results – Soils (mg/kg) and Groundwater (µg/L)

Analyte	Primary Sample (mg/kg)	Replicate Sample (mg/kg)	Difference	RPD				
Nickel	2	4	2	67				
Zinc	130	210	80	47				
PAH	180	170	10	6				
B(a)P	16	16	0	0				
BH2/0.5 and BD1 (Groundwater)								
VOC	<pql< td=""><td><pql< td=""><td>0</td><td>0</td></pql<></td></pql<>	<pql< td=""><td>0</td><td>0</td></pql<>	0	0				

The RPD values were within the acceptable range of \pm 30 for inorganic analytes (\pm 50% for organic) with the exception of those shaded and in bold. However, this is not considered to be significant because:

- The typically low actual differences in the concentrations of the replicate pairs where some RPD exceedances occurred; and
- The majority of RPDs within a replicate pair being within the acceptable limits;
- The replicate pairs being collected from fill soils which by its nature is heterogeneous; and
- All other QA/QC parameters met the DQIs.

Therefore the overall intra-laboratory comparisons indicate that the sampling technique was consistent and repeatable and therefore the results are useable and representative of the conditions encountered.

The results of intra-laboratory duplicate analysis for soil vapour are presented in Table Q4.

Note that, where both samples are below LOR/PQL the difference and RPD has been given as zero. Where one sample is reported below LOR/PQL, but a concentration is reported for the other, the LOR/PQL value has been used for calculation of the RPD for the less than LOR/PQL sample.

Sample	R1	BD1 130917	Difference	RPD
Vinyl chloride	<1	<1	0	0
1.1 Dichloraethana	-0	-0	0	0
r, r-Dichloroethene	<2	<2	0	0
trans-1,2-dichloroethene	<2	<2	0	0
cis-1,2-Dichloroethene	<2.0	<2	0	0
Trichloroethene	<2.7	<2.7	0	0
Tetrachloroethene	3	4	1	29
Propylene	<0.9	<0.9	0	0
Dichlorodifluoromethane	<5	<5	0	0

Table Q4: RPD Results – Intra-laboratory Replicate (µg/m³)

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Sample	R1	BD1 130917	Difference	RPD
Ethanol	18	32	14	56
Acetone	10	20	10	67
Isopropyl alcohol	760	140	620	138
MEK	<1.5	<1.5	0	0
Hexane	<1.8	<1.8	0	0
Ethyl Acetate	<1.8	<1.8	0	0
Tetrahydrofuran	<1.5	<1.5	0	0
Cyclohexane	<1.7	<1.7	0	0
Heptane	<2	<2	0	0
Methyl methacrylate	4	4	0	0
MBK	<2	<2	0	0
Toluene	580	560	20	4
Chlorobenzene	<2	<2	0	0
Ethylbenzene	<2	<2	0	0
m-& p-Xylene	<4	<4	0	0
Styrene	<2	<2	0	0
o-Xylene	<2	<2	0	0
1,3,5-Trimethylbenzene	<2.5	<2.5	0	0
1,2,4-Trimethylbenzene	<2.5	<2.5	0	0
1,3-Dichlorobenzene	5	5	0	0
1,4-Dichlorobenzene	<3	<3	0	0

The calculated RPD values were within the acceptable range 0 - 50% RPD and concentration >5xPQL with the exception of those shaded and in bold. However, this is not considered to be significant because: Some of the recorded concentrations <5xPQL;

- The majority of RPDs within a replicate pair being within the acceptable limits; and •
- All other QA/QC parameters met the DQIs. •

Therefore the intra-laboratory replicate comparisons indicate that the sampling techniques were consistent and repeatable.



Q2.3 Field Blanks

Laboratory prepared soil and groundwater field blanks were taken out to the field unopened on each day of sampling, subjected to the same preservation methods as the field samples, then analysed for the purposes of determining whether transfer of contaminants into the blank sample had occurred prior to reaching the laboratory. If this is confirmed then there is also a potential for other samples in the batch to have been impacted. The result of the laboratory analysis for the field blanks is shown in Tables Q5 and Q6. A total of two soil blanks and one water blank were analysed over the course of the investigation.

Sample ID	ТВ
Benzene	<0.2
Toluene	<0.5
Ethylbenzene	<1
M + P Xylene	<2
O Xylene	<1
Naphthalene	<1
TRHC ₆ -C ₁₀ (less BTEX)	<25

Table Q5: Trip Blank Results - Soils (mg/kg)

Table Q6: Trip Blank Results - Groundwater (µg/L)

Sample ID	Trip Blank
Benzene	<1
Toluene	<1
Ethylbenzene	<1
M + P Xylene	<2
O Xylene	<1

Levels of analytes were all below detection limits indicating that the potential that significant cross contamination had not occurred during the course of the round trip from the site to the laboratory.

Trip blanks were not analysed during sub-soil vapour sampling due to sampling, method, direct to Summa Canisters, which are certified by the laboratory prior to shipping as being "cleaned". Leakage from or to the canisters is assessed by comparing the vacuum pressures at the laboratory to site and from completion of sampling to the laboratory. There was no change in vacuum pressure throughout between the lab to sampling or from the completion of sampling to the laboratory indicating that there has been leakage into the cans during transport.



Q2.4 Trip Spikes

A trip spike was taken into the field on each day of sampling and dispatched with the batch sampling run. Results (Tables Q7 and Q8) indicate that the percentage loss for BTEX during the trip was minimal and therefore appropriate preservation techniques were employed. The results of the laboratory analysis for the trip spikes are shown in Tables Q7 and Q8. A total of two soil spikes and one water spike were analysed over the course of the investigation.

Table Q7:	Trip Spike Results	s – Soils ('	% Recoverv)
			,,,

Sample ID	Benzene	Toluene	Ethylbenzene	M + P Xylene	O Xylene
TS	105	102	111	109	111

Table Q8: Trip Spike Results – Groundwater (% Recovery)

Sample ID	Benzene	Toluene	Ethylbenzene	M + P Xylene	O Xylene
Trip Spike	94	102	90	92	83

Results indicate that the percentage loss for BTEX during the trip was minimal and therefore appropriate preservation techniques were employed.

Trip spikes were not analysed in the current assessment due to the sampling media being used.

Q2.5 IPA Shroud and Leak Test

Isopropyl alcohol (IPA or 2-propanol) was introduced into the sub-soil vapour sampling shroud/enclosure to use as tracer gas to test the integrity of the sampling train and for leaks in the soil vapour implant/probe installation. A shroud sample was collected on the day of sampling and tested for the IPA.

ATSM D7663-12 Standard Practice for Active Gas Sampling in the vadose Zone for Vapour Intrusion Evaluations states that a concentration of the tracer gas in the samples of up to 10% of that in the shroud/enclosure is acceptable. DP adopts a more conservative acceptance level of 1% of the concentration in the shroud. However, due to sampling pump failure, a shroud sample was not able to be collected.

However, a field leak test was also undertaken which involved setting up the sampling apparatus and shroud and measuring the VOC levels using a PID. The tracer compound (IPA) was then added to the shroud and the PID level re-measured to assess potential leaks. In each case the pre and post tracer application PID levels were the same indicating that the potential for leaks in the sampling train was low.



Q2.6 Shut-in Test

A shut in test was performed to ensure that there were no leaks in the sample train. Two shut in tests were performed, one on the canister sample train and one on the pump and carbon tube sampling apparatus.

The canister shut-in test involved assembling the sample apparatus to the extent practical (i.e. connecting the summa canister to the regulator), then opening the canister valve to apply the vacuum to the sampling train, while the regulator was still capped.

The carbon back-up tube shut in test involved assembly the sample train (fittings to attach to vapour well, carbon tube, vacuum gauge, rotameter and pump plus the associated tubing connecting the sample train, then clamping the sampling tube between the vapour port and carbon tube, activating the pump until a vacuum of 15 in.Hg was achieved and then the sampling train was clamped at the pump

ATSM D7663-12 Standard Practice for Active Gas Sampling in the vadose Zone for Vapour Intrusion *Evaluations* recommends that a vacuum 15 in.Hg be applied to the sampling train and that the vacuum should not drop by more than 0.5 in. Hg over a period of no less than 1 minute and preferably for 5 minutes.

The vacuum over the observation period of 1 min in the canister shut-in test did not change from a vacuum of -30 in.Hg. The vacuum over the observation period of 1 min in the carbon tube sampling train shut-in test did not change from a vacuum of -15 in.Hg. Therefore it was considered that there were no leaks in the sample train.

Records of the shut in tests are presented in the soil vapour sampling field logs in Appendix C.

Q3. Data Quality Indicators

The reliability of field procedures and analytical results was assessed against the following data quality indicators (DQIs):

- Completeness a measure of the amount of usable data from a data collection activity;
- Comparability the confidence (qualitative) that data may be considered to be equivalent for each sampling and analytical event;
- Representativeness the confidence (qualitative) of data representativeness of media present on-site;
- Precision a measure of variability or reproducibility of data; and
- Accuracy a measure of closeness of the data to the 'true' value.

The DQIs were assessed as outlined in the following Table Q9.



Data Quality Indicator	Method(s) of Achievement
Completeness	Preparation of field logs, sample location plan and chain of custody (COC) records;
	Laboratory sample receipt information received confirming receipt of samples intact and appropriateness of the chain of custody;
	Samples analysed for contaminants of potential concern (COPC) identified in the Conceptual Site Model (CSM);
	Completion of COC documentation;
	NATA endorsed laboratory certificates provided by the laboratory;
	Satisfactory frequency and results for field and laboratory QC samples as discussed in Section Q2.
Comparability	Using appropriate techniques for sample recovery, storage and transportation, which were the same for the duration of the project;
	Works undertaken by appropriately experienced and trained DP environmental scientist / engineer;
	Use of NATA registered laboratories, with test methods the same or similar between laboratories;
	Satisfactory results for field and laboratory QC samples.
Representativeness	Samples were extracted and analysed within holding times;
	Samples were analysed in accordance with the analysis request.
Precision	Acceptable RPD between original samples and replicates;
	Satisfactory results for all other field and laboratory QC samples.
Accuracy	Satisfactory results for all field and laboratory QC samples.

Table Q9: Data Quality Indicators

Based on the above, it is considered that the DQIs have been complied with. As such, it is concluded that the field and laboratory test data obtained are reliable and useable for this assessment.