17 June 2019

Sydney Water Corporation
1 Smith Street
Parramatta NSW 2150

Attention: Amy Dobson

Data Gap Analysis:
Ashbury Reservoir, 165-169 Holden Street, Ashbury NSW

1 Introduction

Progressive Risk Management (PRM) was engaged by Sydney Water Corporation (the client) to undertake a targeted soil investigation as part of a data gap analysis (DGA) for part of lot 1 DP115504 and part of lot 1 DP911478, located at Ashbury Reservoir, 165-169 Holden Street, Ashbury NSW (the site).

It is understood that a portion of the reservoir site has been identified as surplus to the client's needs and is proposed for divestment, with the intention that the site will be developed for low density residential land use with garden/accessible soils.

Figure 1 provides the site locality and **Figure 2** the sampling locations.

2 Background

A previous DSI, *Combined Stage 1 and 2 Detailed Site* Investigation, *Sydney Water Ashfield Reservoir, 165-169 Holden Street, Ashbury NSW,* July 2015, by Parsons Brinckeroff (PB 2015) was undertaken on the site and identified areas of fill impacted by asbestos containing materials (ACM), heavy metals and polycyclic aromatic hydrocarbons (PAHs) that exceed human health criteria for residential land use.

PB (2015) concluded that should the site be divested, remediation of the impacted fill material would be required to meet the requirements of residential land use.

A detailed summary of the PB DSI is provided in Section 5.

The current DGA was requested to provide further delineation of the areas of concern identified in PB (2015) (where possible) and to improve detail surrounding the preparation of a remediation action plan (RAP).

3 Objectives

The objectives of the DGA were to:

- Delineate the previously identified areas of concern in PB (2015).
- Compare analytical data to waste classification criteria for soils which may require offsite disposal as part of the remedial works.
- Discuss any specific remedial considerations to inform the preparation of the RAP.

4 Scope of Works and Methodology

The DGA was completed by PRM in accordance with the following scope of works and methodology:

- Preparation of all relevant safety documentation for the works including Safe Work Method Statement (SWMS) and dial before you dig.
- Locating of underground services prior to intrusive works.
- Excavation, using a 5 Tonne excavator and / or hand tools of nine test pits. Investigation locations were designed to increase the overall site coverage of soil analytical data and to further investigate and delineate previously identified areas of concern at TP14, TP09 and TP03.
- Inspection and logging of each test pit by an experienced consultant, with soil samples collected throughout the various soil profiles, in particular targeting layers of concern previously identified in PB (2015).
- Collection of suspected ACM fragments (if encountered) within fill soil profiles and or on the ground surface of the site.
- Sieving and bulk sampling of layers identified as containing building rubble or those previously identified as a concern for ACM in accordance with the methodology prescribed in *Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia*, May 2009 (WA DoH, 2009).
- Sampling using best practice techniques including collection of soil samples by hand using fresh nitrile gloves into 250 mL laboratory prepared jars and immediate storage on ice in an esky.
- Analysis of soil samples for Potential Contaminants of Concern (identified in PB, 2015) at a NATA accredited laboratory including:
    - Heavy metals (Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Zinc).
    - Total recoverable hydrocarbons (TRH).
    - Benzene, Toluene, Ethyl Benzene, Xylene (BTEX).
    - Polycyclic aromatic hydrocarbons (PAH).
    - Organochlorine- and Organophosphorus Pesticides (OCP/OPP).
    - Polychlorinated Biphenyls (PCB).
    - Asbestos.
    - Toxicity Characteristic Leaching Procedure (TCLP) analysis for lead, nickel and PAHs on selected samples.
- Collection and analysis of relevant quality control / quality assurance samples.
- Preparation of this DGA report in general accordance with relevant guidance derived from the National Environmental Protection Council *National Environmental Protection (Assessment of Contaminated Sites) Measure* (Amendment No. 1), 2013 (NEPM 2013) and relevant NSW EPA endorsed guidance.

It is noted that, the scope of works excluded the area of TP12 (due to the presence of on-site infrastructure immediately east) which was identified with exceedances of residential land use criteria in PB (2015). This will be further delineated at a later stage following the demolition of building structures onsite.

5 Data Quality Objectives

The Data Quality Objective (DQOs) process is a seven-step iterative planning approach that is used to define the type, quantity and quality of data needed to inform decisions relating to the environmental condition of a site.

The process has been completed for this assessment and is provided in **Appendix E.**

6 Previous Site Assessment Summary

The following table provides a summary of the key findings from PB (2015).

Table 1: Summary of Exceedances from PB,2015

Analyte	Results
Heavy metals	• Concentrations of lead exceeded the adopted health investigation level for residential land use (HIL-A) at one sample (TP12_0.5, 490 mg/kg). • Concentrations of zinc exceeded the adopted environmental investigation levels (EILs) at TP11 (0-0.1 mbgl, 400 mg/kg) and TP12 (0.5-0.6 mbgl, 2400 mg/kg) but PB considered it was limited in nature and it did not pose a significant risk to onsite ecological receptors.
PAH	• Concentrations of B(a)P TEQ in four samples exceeded the adopted health investigation level for low density residential (HIL-A) for residential land use (TP03_0.0, 4.1 mg/kg; TP09_1.0, 9.5 mg/kg; TP12_0.5, 4.9 mg/kg; TP14_0.5, 14 mg/kg). • Six insitu soil samples exceeded the adopted environmental screening level (ESL) for B(a)P concentrations for residential land use (TP01_0.05, 1.1 mg/kg; TP03_0.0, 3 mg/kg; TP09_1.0, 7 mg/kg; TP12_0.5, 3.6 mg/kg; TP13_0.05, 1.4 mg/kg; and TP14_0.5, 10 mg/kg) at depths ranging from 0m to 1 mbgl. An additional stockpile sample (TP13_SP, 0.9 mg/kg) also exceeded the adopted ESL for B(a)P.
Asbestos	• ACM in the form of fibre cement sheeting fragments were observed at two locations on the site. The calculated concentration of bonded ACM for the sample collected from TP11_0.0-0.1 m (0.0107 %w/w) was above the adopted health screening level (HSLs) for low density residential (0.01 %w/w). In addition, the adopted criterion of no asbestos material present for surface soils was also exceeded. • The concentration for the sample collected at TP14_0.5-0.6 m (0.0044 %w/w) was below the adopted HSLs, however still requires work health and safety consideration during excavation. • No friable material was observed or returned in laboratory analysis.

PB (2015) concluded that appropriate management and removal of the asbestos, lead and PAH impacts onsite was recommended to meet the criteria for potential future use if the site is divested.

Based on the preliminary findings, PB (2015) estimated that the volume of material impacted by asbestos to be approximately 1,625 m^3. This estimate is based on the assumption that asbestos impact is confined to the upper fill material across the site (described as gravelly clay) which was found to generally range between 0.2 – 0.5 mbgl across the entire site. It was also noted that deeper areas of fill were encountered during subsurface works, however no ACM impact was recorded for these layers.

PB (2015) did however note that some deeper excavation would be required around investigation location TP09 as B(a)P impacts were reported within the underlying sandy fill materials.

A preliminary *insitu* waste classification of site fill material was provided identifying site fill as special waste (to be managed as asbestos) and general solid waste. However, the report recommended that impacted fill be excavated, stockpiled and sampled exsitu to confirm the waste classification prior to disposal to an offsite waste facility.

7 Site Assessment Criteria

To complete the DGA, PRM have adopted the site assessment criteria (SAC) provided in PB (2015) for low density residential land use with accessible soils/gardens, with the exception and addition of the following:

- The ESLs prescribed in NEPM 2013 for B(a)P are classified as low reliability values, and subsequently the higher reliability values outlined in CRC Care *Technical Report No. 39, Risk-based management and remediation guidance for benzo(a)pyrene*, 2017 for fresh B(a)P which are based on more recent research and review have been adopted.
- A conservative asbestos criterion for the intrusive worker has also been nominated by PRM, to allow for consideration of WHS Regulations such as Chapter 8 Asbestos of the *NSW Work Health and Safety Regulation,* 2017. As a preliminary screen, PRM has applied no asbestos in any form (including respirable fibre results which are not quantifiable by the gravimetric HSLs, or asbestos present but <HSLs).
- Given the variation of soil matrix across the fill profiles of the site (sands and clays), the following has been adopted in addition:
    - HSL-A: Residential, 0 m to <1 m, Sand (vapour intrusion).
    - ESL: Residential (coarse grained).
    - Management Limit: Residential (coarse grained).

Given the direct contact HSL-A has been adopted, the less conservative 'intrusive worker' scenarios have not been explicitly compared to data, as the risks are accounted for in the more conservative criteria already applied. Similarly, the Management Limits adopted are for the more conservative coarse-grained criteria to cover differing strata at the site.

Adopted criteria including some additional notes, where necessary, are outlined in the Soil Results Table provided in **Appendix A**.

8 Data Gap Results and Discussion

All areas discussed herein are depicted in **Figures 2-3**. Results are outlined in the Soil Result Tables included in **Appendix A.** Test pit logs are attached in **Appendix B.**

8.1 Subsurface Ground Conditions:

The following subsurface fill conditions were noted during the DGA:

- The DGA test pits identified various fill types and extents at the site, including:
  - Brown sandy clay with gravels / gravelly clay up to 0.8 mbgl.
  - Brown gravelly clay with varying impacts of inclusions including building rubble (i.e fly ash or coal wash, potential slag, brick, concrete, tile) up to 0.8 mbgl.
  - Red brown clay with traces of building rubble including brick and concrete up to 0.6 mbgl.
  - Silty sand / silty sand with traces of charcoal and brick fragments up to 0.2 mbgl.
- No fragments of ACM were noted on the ground surface of the investigation areas or within fill material encountered.
- The fill depth was generally shallow on the north-eastern side of the investigation area at depths of approximately 0.5 m (TP107) and becoming deeper, up to 0.8 m (TP03) as sample locations progressed west.
- The underlying natural soil profile encountered consisted of orange brown clay.

8.2 Soil Analytical Results and Comparison to the SAC

8.2.1 PRM 2018

Seventeen soil samples were analysed from the nine test pits excavated within the investigation area. Samples were selected based on field observations during test pitting works and to delineate the findings of PB (2015). All results were below the adopted SAC for human and ecological health in the residential land use setting with the exception of those presented below.

Table 2: Summary of Exceedances from the DGA

Test Pit	Sample depth (mbgl)	Results
TP103	0.3-0.4	• TRH C16-C34 of 1,500 mg/kg exceeded the adopted ESLs of 1,300 mg/kg (fine-grained) and 300 mg/kg (coarse-grained). • B(a)P of 55 mg/kg exceeded the adopted ESL of 33 mg/kg. • B(a)P TEQ of 79 mg/kg exceeded the adopted HIL of 3 mg/kg. • Total PAH of 790 mg/kg exceeded the adopted HIL of 300 mg/kg.
	0.6-0.7	• B(a)P TEQ of 3.5 mg/kg which exceeded the adopted HIL of 3 mg/kg.
TP07	0.1-0.2	• TRH C16-C34 of 320 mg/kg exceeded the adopted coarse-grained ESL of 300 mg/kg. • B(a)P TEQ of 11 mg/kg which exceeded the adopted HIL of 3 mg/kg.
TP109	0.0-0.1	• Copper of 240 mg/kg which exceeded the adopted EIL of 160 mg/kg. • Zinc of 450 mg/kg which exceeded the adopted EIL of 390 mg/kg.

Source analysis based on the PAH data for TP103_0.3 was undertaken whereby results were compared against datasets for a range of different source reference materials using the PAH Source Analyst[1]. Method 1 and Method 2 both indicate a likely PAH sources of ash from black coal, with Method 1 also indicating potential sources from

[1] www.pahsourceanalyst.com

black coal tar and road-seal. This is consistent with the coal wash / ash product observed within this fill profile and noted in the test pit logs.

The exceedance at TP109 for copper and zinc which marginally exceeds the adopted EIL criteria is likely to benefit from additional analysis of specific soil properties (CEC and pH) to potentially eliminate the need for unnecessary offsite disposal.

No asbestos was identified within any of the soil samples analysed.

All QA/QC field samples taken (including two intra-laboratory duplicates, one trip spike and one trip blank) were within acceptable RPDs and recovery ranges, as shown in **Table B, Appendix A**.

The output from the PAH Source Analyser is attached in **Appendix C.**

8.2.2 Evaluation of PB (2015) Dataset

When evaluating the PB (2015) dataset exceedances identified to the PRM SAC detailed above (specifically the ESLs for B(a)P), the findings from PB (2015) are generally unchanged, with the exception of the following:

- Comparison of the previously exceeded ESL results for B(a)P to the adopted higher reliability values outlined in CRC Care, 2017 indicate the following samples no longer exceed the adopted SAC; TP01_0.05 1.1 mg/kg, TP03_0.0 3 mg/kg, TP09_1.0 7 mg/kg, TP12_0.5 3.6 mg/kg, TP13_0.05 1.4 mg/kg and TP14_0.5 10 mg/kg.
- Stockpile sample TP13_SP (0.9 mg/kg) no longer exceeds adopted ESL criteria for B(a)P.
- Samples identified with elevated Zinc (TP12_0.5 2400 mg/kg and TP11_0.0 400 mg/kg) relative to the SAC (390 mg/kg) are still considered to require remediation, as the limited reasoning provided in PB (2015) is not considered adequate to justify their exclusion. These two areas however are already required for remediation due to other contaminant exceedances and subsequently this is not expected to impact disposal volumes, rather the analytes included in the validation process.

8.2.3 Statistical Analysis

Where appropriate, statistical calculations have been performed on data sets where exceedances of the adopted site criteria occurred. When assessing soil analytical laboratory results, if the 95 % upper confidence limit (UCL) of the mean concentrations for the contaminant of concern is less than the adopted criteria for land use purposes, the data set for that population will be considered to meet the guideline. However, individual concentrations are to be less than 250% of the criteria and the standard deviation should be less than 50% of the criteria.

A review of PB (2015) and PRM (2018) investigation data, including soil logs and site observations, was undertaken to identify individual fill layers and allow statistical calculations to be performed on those fill layers where a suitable dataset was available (i.e. greater than 10 samples).

The only fill body with adequate data to support meaningful statistical analysis was the near surface fill located beneath the asphalt hardstand. The fill layer included ash, slag and charcoal fragments.

Any result greater than 250% of the SAC is deemed a contamination hotspot and thus the UCL is not suitable to be used for site characterisation. Contamination hotspots identified in the aforementioned fill layer include:

- PRM TP103 (0.3-0.4) - TRH C16-C34 of 1,500 mg/kg exceeded the adopted ESLs of 300 mg/kg (coarse-grained).
- PRM TP103 (0.3-0.4) - B(a)P TEQ of 79 mg/kg exceeded the adopted HIL of 3 mg/kg.
- PB TP12 (0.5-0.6) - Zinc of 2,400 mg/kg exceeded the adopted EIL of 390 mg/kg

- PB TP14 (0.05-0.1) - B(a)P TEQ of 14 mg/kg exceeded the adopted HIL of 3 mg/kg.

Once the zinc hotspot result at PB TP12 had been removed from the dataset, all other zinc results for the aforementioned fill layer met the SAC, and therefore calculation of the 95% UCL was not required.

Following removal of the hotspot results, the upper confidence limit (UCL) of the average exceedances of B(a)P TEQ, TRH (C16-C34) and lead was estimated using ProUCL 5.1.

A summary of the statistical analyses is presented in **Table 3**, with Pro UCL output reports included in **Appendix F**.

Table 3: Statistical analysis (95% UCL)

Exposure Scenario & criteria (CR)	95% UCL	Standard Deviation (SD)	UCL < CR	Max Conc. < 250% of CR	SD < 50% of CR
B(a)P TEQ					
HIL-A (3 mg/kg)	2.4	1.429	√	√	√
TRH C16-C34					
ESL (Course) (300 mg/kg)	220	141	√	√	√
Lead					
HIL-A (300 mg/kg)	197.3	128.6	√	√	√

The analytical results and UCL calculations for B(a)P TEQ, TRH (C16-C34) and lead in the aforementioned fill layer indicate the data set meets the SAC.

8.3 Preliminary Waste Classification

- Initial comparison of results to the NSW EPA *Waste Classification* Guidelines, 2014 (EPA 2014) indicated exceedances of CT1 criteria in a number of samples for PAHs, lead and zinc, as shown in **Table C, Appendix A**.
- All samples exceeding CT1 values were analysed for leachability (TCLP) in accordance with six step process outlined in EPA 2014.
- Analytical results for TP103_0.3 had particularly high concentrations for B(a)P and Total PAH exceeding restricted and hazardous criterion. In consideration of the ash / coal wash product noted in this layer during test pit logging, the results for TP103_0.3 have also been compared to the immobilisation approvals used by the EPA under the Protection of the Environment Operations (Waste) Regulation 2014. Specifically, approval 1999/05 relating to *Ash, Ash-contaminated natural excavated materials or coal-contaminated natural excavated material* is considered applicable. The immobilisation approval allows for material to be classified according to the leachable concentration (TCLP) value of B(a)P alone.
- Comparison of all results, including the requested TCLP data, to waste classification criteria and the 1999/05 immobilisation approval, indicates that the fill encountered during the DGA is classified as General Solid Waste (non-putrescible). It is noted that disposal restrictions apply for this material which would need to be considered by the client, as outlined in 1999/05. Areas previously identified by PB 2015 as containing asbestos (TP11 and TP14) were provided a classification of Special Waste (Asbestos) and would need to be excavated and validated separately during remedial works.

All NATA accredited analysis certificates are attached in **Appendix D.**

8.4 Quality Assurance / Quality Control

Detailed laboratory QA/QC results are presented in the laboratory testing certificates presented in Appendix D and summarised in Appendix E.

The summary of the project QA/QC program found that the data is of an acceptable quality to achieve the objectives of this report.

8.5 Summary of Findings:

Field observations and data collected during this DGA, as well as those outline by PB (2015), identified the following with regards to the fill material identified at the site:

PAH

A number of PAH concentrations greater than 250% the human health SAC were identified in the fill material, including:

- PRM TP103 (0.3-0.4) Total PAH of 790mg/kg
- PRM TP103 (0.3-0.4) - B(a)P TEQ of 79 mg/kg
- PRM TP107 (0.1-0.2) – B(a)P TEQ 11mg/kg
- PB TP14 (0.05-0.1) - B(a)P TEQ of 14 mg/kg
- PB TP09 (1.0-1.1) - B(a)P TEQ of 9.5 mg/kg

Other PAH exceedances not able to be addressed via statistical analysis included:

- PB TP03 (0 -0.1) - B(a)P TEQ of 4.1 mg/kg above the adopted human health SAC of 3mg/kg.
- PRM TP103 (0.6-0.7) - B(a)P TEQ of 3.5 mg/kg
- PRM TP103 (0.3-0.4) - B(a)P of 55 mg/kg above the adopted ecological SAC of 33mg/kg.

Source analysis based on the PAH data for TP103_0.3 was undertaken whereby results were compared against datasets for a range of different source reference materials using the PAH Source Analyst[2]. Method 1 and Method 2 both indicate a likely PAH sources of ash from black coal, with Method 1 also indicating potential sources from black coal tar and road-seal. This is consistent with the coal wash / ash product observed within this fill profile and noted in the test pit logs.

The B(a)P TEQ (and PAH results in general) appear to be primarily associated with the ash/slag and charcoal impacted fill identified across the majority of the site.

TRH (C16-C34)

The fill material is impacted by TRH (C16-C34) at concentrations greater than 250% of the adopted SAC for ecological receptors, including:

- PRM TP103 (0.3-0.4) - TRH C16-C34 of 1,500 mg/kg exceeded the adopted ESLs of 300 mg/kg (coarse-grained).

Other TRH exceedances not able to be addressed via statistical analysis included:

- PRM TP107 (0.1-0.2) – TRH (C16-C34) 320mg/kg marginally exceeded the adopted ESLs of 300 mg/kg (coarse-grained).
- PB TP09 (1.0-1.1) TRH (C16-C34) 380mg/kg marginally exceeded the adopted ESLs of 300 mg/kg (coarse-grained).

Heavy metals

The fill material is impacted by heavy metals at concentrations greater than 250% of the adopted SAC for ecological receptors, including:

- PB TP12 (0.5-0.6) - Zinc of 2,400 mg/kg exceeded the adopted EIL of 390 mg/kg

Other heavy metal exceedances not able to be addressed via statistical analysis included:

[2] www.pahsourceanalyst.com

- PRM TP109 (0 -0.1) – copper 240mg/kg marginally exceeded the adopted EIL of 160 mg/kg.
- PRM TP109 (0 -0.1) – zinc 450mg/kg marginally exceeded the adopted EIL of 390 mg/kg.
- PB11(0 -0.1) zinc 400mg/kg marginally exceeded the adopted EIL of 390 mg/kg.

The exceedance at TP109 for copper and zinc which marginally exceeds the adopted EIL criteria is likely to benefit from additional analysis of specific soil properties (CEC and pH) to potentially eliminate the need for unnecessary offsite disposal.

Asbestos

PB identified the following with regard to asbestos at the site:

- ACM in the form of fibre cement sheeting fragments were observed at two locations on the site. The calculated concentration of bonded ACM for the sample collected from TP11_0.0-0.1 m (0.0107 %w/w) was above the adopted health screening level (HSLs) for low density residential (0.01 %w/w). In addition, the adopted criterion of no asbestos material present for surface soils was also exceeded.
- The concentration for the sample collected at TP14_0.5-0.6 m (0.0044 %w/w) was below the adopted HSLs, however still requires work health and safety consideration during excavation.
- No friable material was observed or returned in laboratory analysis.

No asbestos was identified by PRM during the DGA site observations, or within any soil samples analysed.

Waste Classification

Comparison of the data to waste classification criteria indicates the fill material is consistent with General Solid Waste (non-putrescible). This classification requires the adoption of the NSW EPA immobilisation approvals, and subsequently is subject to disposal restrictions. This classification excludes the previously identified asbestos impacted areas at TP11 and TP14 which will require off-site disposal as Special Waste (Asbestos) as outlined in PB (2015). Following additional post-demolition building sampling, all data should be consolidated and a separate, consolidated insitu waste classification provided.

9 Conclusions

With respect to soil/fill quality, the data obtained during the PB (2015) and PRM (2018) investigations indicate that the site is not suitable for low-density residential land use in its current condition without remediation. PRM understand that the client wishes to divest the property as low density residential land use with accessible soils/gardens, with no ongoing restrictions or limitations on title (such as an Environmental Management Plan). As such, the excavation and offsite disposal of unsuitable materials, followed by site validation is considered the most suitable remedial option.

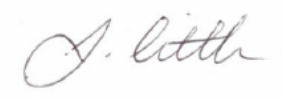
The site is considered to present a risk of unexpected finds relating to asbestos, in particular relating to the building rubble impacted fill towards the southwest and western boundary of the site. This risk should be appropriately managed during the remedial works by visual observations by the supervising environmental consultant during excavation as well as validation sampling following removal.

10 Recommendations

A RAP should be prepared to explore the remedial options for the site in detail and outline the requirements for remediation including estimated disposal volumes for each waste stream. The following is noted to be considered in the RAP design, to minimise the amount of material going offsite and to ensure material is handled under best practises minimising volumes of asbestos impacted material, where possible:

- Following the demolition of site structures and buildings, additional sampling and investigation below building footprint areas should be undertaken.
- All known areas of concern are to be excavated down to natural soil profiles, or unimpacted underlying fill layers which do not present aesthetic (or geotechnical) concern, according to previous data and test pit logs provided by PB (2015) and this DGA.
- Preparation of a final insitu waste classification report once this extra data is obtained, and additional supplementary sampling if required.
- The planned supervision of excavation works by an experienced environmental consultant is considered key to the successful remediation of this site, management of unexpected finds relating to asbestos, and confirmation of insitu waste classification.
- Careful material handling under consultant supervision should be undertaken to remove the requirement for exsitu stockpiling and waste classification recommended in PB (2015).
- An unexpected Finds Protocol should be developed for the site prior to works.

If you have further questions, please do not hesitate to contact the undersigned.



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Progressive Risk Management Pty Ltd

Limitations

This report is confidential and has been prepared by Progressive Risk Management Pty Ltd (PRM) for Sydney Water Corporation (the client). This report may only be used and relied upon by the client and must not be copied to, used by or relied upon by any person other than the client.

This report is limited to the observations made by PRM during the GDA, and was limited to the assessment of contamination in soils only, as detailed in the *Scope of Works and Methodology*.

All results, conclusions and recommendations presented should be reviewed by a competent person before being used for any other purpose. PRM accepts no liability for use of, interpretation of or reliance upon this report by any person or body other than the client. Third parties must make their own independent inquiries.

This report should not be altered amended or abbreviated, issued in part or issued incomplete without prior checking and approval by PRM. PRM accepts no liability that may arise from the alteration, amendment, abbreviation or part-issue or incomplete issue of this report. To the maximum extent permitted by law, all implied warranties and conditions in relation to the services provided by PRM and this report are expressly excluded (save as agreed otherwise with the client).

This report does not provide a complete assessment of the environmental status of the site, and it is limited to the scope and limitations defined herein. Should information become available regarding conditions at the site including previously unknown sources of contamination, PRM reserves the right to review the report in the context of the additional information.

Document Control

Project Details:	
Project Name:	Data Gap Analysis
Site Address:	Ashbury Reservoir - 165-169 Holden Street, Ashbury NSW
Client Name:	Sydney Water Corporation
Project Reference	P033725.001 / C0151

Report Version:					
Version Date:	Review Process:			Issued to:	Summary of changes from previous version:
	Prepared:	Reviewed:	Approved:		
Version 1_Draft 07/03/2018	J. Little	J. Coffey	N.Passlow	Sydney Water	Original draft of report.
Version 2_Draft 13/03/2018	J. Little	J. Coffey	N.Passlow	Sydney Water	Amendments to Version 1 following client comments.
Version 3_Final	J. Little	J. Coffey	N.Passlow	Sydney Water	Amendments to Version 2 following review by the Auditor.
Version 4_Final 29/03/2019	J. Little	J. Coffey	J. Coffey	Sydney Water	Amendments to Version 3 with revised statistical analysis
Version 5_Final 17/06/2019	J. Little	J. Coffey	J. Coffey	Sydney Water	Addressing minor auditor comments

Report Review:					
Report Version / Revision:	Version 5 Final				
Prepared by:		Technical Review by:		Authorised for Issue by:	
					
Name:	Jessica Little	Name:	Jonathan Coffey	Name:	Jonathan Coffey
Position:	Consultant	Position:	Principal, CEnvP (SC)	Position:	Principal, CEnvP (SC)
Date:	17/06/2019	Date:	17/06/2019	Date:	17/06/2019

Figures

Project Reference	P033725
Report Name	Data Gap Analysis
Client	Sydney Water

165 - 169 Holden Street
Ashbury, NSW

Site Location Plan
Figure 1

PROGRESSIVE RISK MANAGEMENT

Scale: 1:5000

Coor. Sys: GDA 1994 MGA Zone56

Legend

Approx. Disposal Area Boundary

Image Source: Sixmaps (2017)

Project Reference	P033725
Report Name	Data Gap Analysis
Client	Sydney Water

165 - 169 Holden Street
Ashbury, NSW

Site Testing Plan
Figure 2

PROGRESSIVE RISK MANAGEMENT

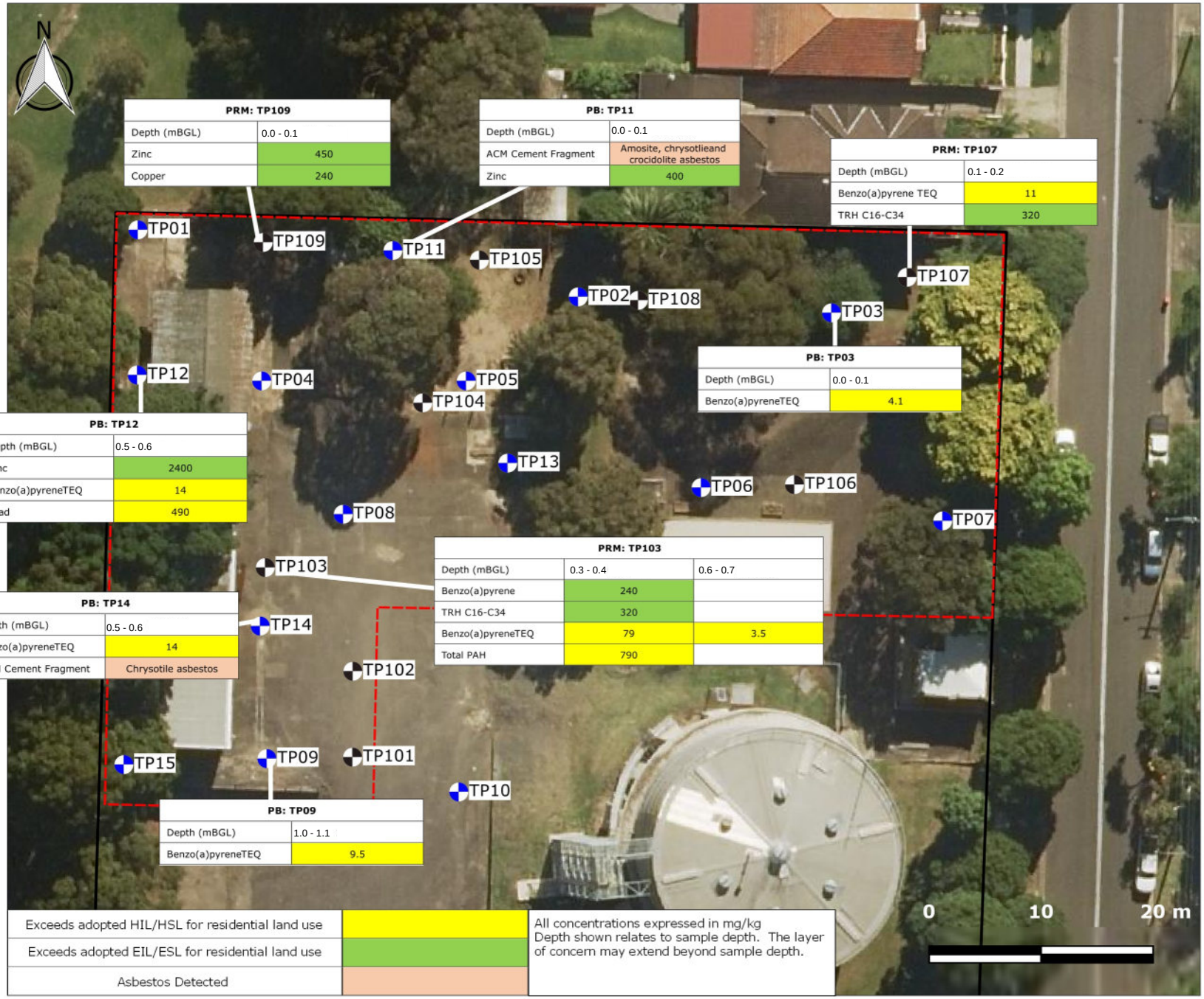
Scale: 1:450

Coor. Sys: GDA 1994 MGA Zone56

Legend

- PB Testpit Locations (2015)
- PRM Testpit Location
- Approx. Disposal Area Boundary
- Approx. Sydney Water Property

Image Source: Sixmaps (2017)



Project Reference	P033725
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165 - 169 Holden Street Ashbury, NSW

Exceedances of SAC Figure 3

PROGRESSIVE RISK MANAGEMENT

Scale: 1:450

Coor. Sys: GDA 1994 MGA Zone56

Legend

- PB Testpit Locations (2015)
- PRM Testpit Location (2017)
- Approx. Disposal Area Boundary

Image Source: Sixmaps (2017)

Appendix A Soil Result Tables

Project Name:	**Data Gap Analysis**
Site Address:	**Ashbury Reservoir, 165-169 Holden Street, Ashbury NSW**
Client Name:	**Sydney Water Corporation**
Project Reference:	**P033725 / C0151**
Analytical Table:	**Table A: Soil and Fragment Results with Statistics**

PRM
Progressive Risk Management

Analyte	TRH (mg/kg)				BTEX (mg/kg)				PAH (mg/kg)						Heavy Metals (mg/kg)								Organochloropesticides (mg/kg)											ACM by weight calculation						
	F1 - TRH C6-C10 less BTEX	F2 - TRH C10-C16 less naphthalene	TRH C16-C34	TRH C34-C40	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene	Benzo(a)pyrene	Benzo(a)pyrene TEQ (half)	Total +ve PAHs	Benzo(a)pyrene TCLP (mg/L)	Total +ve PAHs TCLP (mg/L)	Arsenic	Cadmium	Chromium (VI)	Copper	Lead	Mercury	Nickel	Zinc	Total PCBs (mg/kg)	DDT + DDE + DDD	Aldrin and Dieldrin	Chlordane	Endosulfan	Endrine	Heptachlor	Hexachlorobenzene	Methoxychlor	Total OPPs (mg/kg)	Asbestos ID in Soil as per AS4964^	Trace Analysis*	AFFA Analysis (% w/w)	ACM observed or suspected at a building rubble	Screened soil volume (L)	Weight of screened soil (kg)	Fragment/s positive for containing asbestos	Weight of ACM (kg)	Calculated ACM asbestos percentage (%)	ACM (% w/w)
NEPM 2013 HIL-A	-	-	-	-	-	-	-	-	-	-	3	300	-	-	100	20	100	6000	300	40	400	7400	1	240	6	50	270	10	6	10	300	160	-	-	-						-
NEPM 2013 HSL-A, 0m - <1m, Sand	45	110	-	-	0.5	160	55	40	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NAD	NAD	0.001						0.01
NEPM 2013 HSL-A, 0m - <1m, Clay	50	280	-	-	0.7	480	NL	110	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-									
CRC Care 2011 Direct Contact HSL-A	4400	3300	4500	6300	100	14,000	4500	12,000	1400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						-
NEPM 2013 ML Residential (Coarse)	700	1000	2500	10,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						-
NEPM 2013 EIL Residential[1]	-	-	-	-	-	-	-	-	170	-	-	-	-	-	100	-	830	160	1100	-	190	390	-	180	-	-	-	-	-	-	-	-	-	-	-						-
NEPM 2013 ESL Residential (Fine)	180	120	1300	5600	65	105	125	45	-	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						-
NEPM 2013 ESL Residential (Coarse)	180	120	300	2800	50	85	70	105	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						-
Sample ID	**Sample Depth**	**Layer Depth**	**Description**																																						
PRM TP104_0.1	0.1-0.2	0.0-0.2	Topsoil - Fill dark brown silty sand	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	0.3	<0.5	3	-	-	<4	<0.4	11	29	42	<0.1	14	91	<0.1	<0.1	<LOR	<LOR	<0.1	<0.1	<0.1	<0.1	<0.1	<LOR	NAD	NAD	<0.001	-	10	14.36	-	-	-	<0.01
PRM TP105_0.1	0.1-0.2	0.0-0.1	Topsoil - Fill dark brown silty sand	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	0.84	1.2	8.1			<4	<0.4	29	37	80	<0.1	45	97	<0.1	<0.1	<LOR	<LOR	<0.1	<0.1	<0.1	<0.1	<0.1	<LOR	NAD	NAD	<0.001	Y	10	14.02	-	-	-	<0.01
PRM TP107_0.1	0.1-0.2	0.0-0.2	Topsoil - Fill dark brown silty sand	<25	<50	320	<100	<0.2	<0.5	<1	<1	<0.1	8.1	11	130	<0.001	NIL (+ve)	5	<0.4	11	14	150	0.1	5	62	<0.5	<0.1	<LOR	<LOR	<0.1	<0.1	<0.1	<0.1	<0.1	<LOR	NAD	NAD	-	-	10	12.65	-	-	-	<0.01
PRM TP108_0.0	0.0-0.1	0.0-0.2	Topsoil - Fill dark brown silty sand	<25	<50	150	<100	<0.2	<0.5	<1	<1	<0.1	0.68	1	7.8	-	-	<4	<0.4	12	60	78	<0.1	30	98	<0.2	<0.1	<LOR	<LOR	<0.1	<0.1	<0.1	<0.1	<0.1	<LOR	NAD	NAD	-	-	-	-	-	-	-	-
PRM TP109_0.0	0.0-0.1	0.0-0.2	Topsoil - Fill dark brown silty sand	<25	<50	200	<100	<0.2	<0.5	<1	<1	<0.1	0.3	0.5	3.6	-	-	<4	<0.4	25	240	250	<0.1	35	450	<0.1	<0.1	<LOR	<LOR	<0.1	<0.1	<0.1	<0.1	<0.1	<LOR	NAD	NAD	-	-	-	-	-	-	-	-
PB TP03	0.0-0.1	0.0-0.3	Fill brown silty clay with roots and gravels			180								4.1							26	210			150																			
PB TP05	0.0-0.1	0.0-0.2	Fill brown gravelly clay with gravels and roots			<90								0.7							15	51			67																			
PB TP11	0.0-0.1	0.0-0.35	Fill brown gravelly clay with brick / concrete / ash / slag / FCS			<90								0.4							48	130			400																Y			0.0107
PRM TP101_0.15	0.15-0.2	0.15-0.4	Fill light brown sandy clay with gravel (under asphalt)	<25	<50	140	160	<0.2	<0.5	<1	<1	<0.1	0.1	<0.5	1.2	-	-	<4	<0.4	18	24	16	<0.1	63	31	<0.1	<0.1	<LOR	<LOR	<0.1	<0.1	<0.1	<0.1	<0.1	<LOR	NAD	NAD	-	-	-	-	-	-	-	-
PRM TP102_0.4	0.4-0.5	0.3-0.5	Fill light brown gravelly clay, brick / wire / terracotta (under asphalt)	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	-	-	4	<0.4	5	4	7	<0.1	3	4	<0.1	<0.1	<LOR	<LOR	<0.1	<0.1	<0.1	<0.1	<0.1	<LOR	NAD	NAD	<0.001	Y	10	13.61	-	-	-	<0.01
PRM TP106_0.3	0.3-0.4	0.2-0.5	Fill brown sandy clay, gravels (under asphalt)	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	-	-	<4	<0.4	26	40	3	<0.1	150	36	<0.1	<0.1	<LOR	<LOR	<0.1	<0.1	<0.1	<0.1	<0.1	<LOR	NAD	NAD	-	-	-	-	-	-	-	-
PRM TP103_0.3	0.3-0.4	0.2-0.5	Fill grey gravelly clay, fly ash / coal wash (under asphalt)	<25	<50	1500	170	<0.2	<0.5	<1	<1	<0.1	55	79	790	<0.001	NIL (+ve)	5	<0.4	18	28	59	<0.1	54	120	<0.1	<0.1	<LOR	<LOR	<0.1	<0.1	<0.1	<0.1	<0.1	<LOR	NAD	NAD	<0.001	Y	10	14.61	-	-	-	<0.01
PB TP01	0.05-0.15	0.05-0.2	Fill grey fly ash (under asphalt)			<90								1.5							51	170			260																			
PB TP04	0.05-0.15	0.05-0.2	Fill grey clayey gravel (under asphalt)			200								0.2							86	120			160																			
PB TP07	0.05-0.15	0.05-0.35	Fill grey clayey gravel (under asphalt)			<90								0.4							43	34			47																			
PB TP08	0.05-0.15	0.05-0.3	Fill brown gravelly clay with ash (under asphalt)			240								<0.2							40	16			67																			
PB TP10	0.05-0.1	0.05-0.25	Fill grey gravelly clay with concrete / charcoal / slag (under asphalt)			180								<0.2							110	76			180																			
PB TP12	0.05-0.1	0.05-0.67	Fill grey clayey gravel with basalt and minor charcoal (under asphalt)			<90								0.9							79	64			190																			
PB TP12	0.5-0.6	0.05-0.67	Fill grey clayey gravel with basalt and minor charcoal (under asphalt)			120								4.9							13	490			2400																			
PB TP13	0.05-0.1	0.05-0.3	Fill grey gravelly clay with concrete / charcoal / ash / roots (under asphalt)			110								1.8							35	64			70																			
PB TP14	0.05-0.1	0.05-0.3	Fill grey gravelly sandy clay (under asphalt)			540								14							31	82			140																Y			<0.01
			95 % UCL			220								2.4								197			194.4																			
PRM TP104_0.4	0.4-0.5	0.2-0.6	Fill brown red clay, brick / concrete	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	-	-	<4	<0.4	40	36	18	<0.1	120	59	<0.1	<0.1	<LOR	<LOR	<0.1	<0.1	<0.1	<0.1	<0.1	<LOR	NAD	NAD	<0.001	Y	10	15.87	-	-	-	<0.01
PRM TP105_0.4	0.4-0.5	0.2-0.6	Fill brown red clay with gravels, concrete	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	0.56	0.8	5	-	-	<4	<0.4	23	42	43	<0.1	45	64	<0.1	<0.1	<LOR	<LOR	<0.1	<0.1	<0.1	<0.1	<0.1	<LOR	NAD	NAD	<0.001	-	10	15.28	-	-	-	<0.01
PRM TP107_0.3	0.3-0.4	0.2-0.5	Fill brown red clay with gravels, brick	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	0.58	0.8	7.2	-	-	8	<0.4	15	7	61	0.1	2	44	<0.1	<0.1	<LOR	<LOR	<0.1	<0.1	<0.1	<0.1	<0.1	<LOR	NAD	NAD	-	Y	10	13.72	-	-	-	<0.01
PB TP02	0.5-0.6	0.5-0.9	Fill grey gravelly clay with gravels			<90								0.9							20	110			71																			
PB TP15	0.5-0.6	0.2-0.6	Fill brown gravelly sandy clay, brick / slag			<90								0.5							56	13			74																			
PB TP09	0.5-0.6	0.44-0.9	Fill brown gravelly clay, brick / terracotta / concrete / slag			<90								0.8							57	59			79																			
PRM TP103_0.6	0.6-0.7	0.5-0.8	Fill light brown gravelly clay, brick / tile	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	2.4	3.5	34	<0.001	NIL (+ve)	6	<0.4	12	16	88	0.1	3	59	<0.1	<0.1	<LOR	<LOR	<0.1	<0.1	<0.1	<0.1	<0.1	<LOR	NAD	NAD	<0.001	Y	10	14.04	-	-	-	<0.01
PB TP09	1.0-1.1	0.9-2.1	Fill yellow sand, bricks / some slag			380								9.5							33	61			52																			
PB TP15	1.0-1.1	0.6-1.2	Fill yellow sand, bricks / concrete / terracotta			<90								1							25	99			100																			
PB TP06	0.45-0.55	0.25-0.55	Fill white sandstone and sand, clinker / slag (under asphalt)			270								<0.2							15	17			44																			
PB TP15	2.0-2.1	2.0-2.2	Fill dark brown clay, gravels / brick			-								0.5							17	110			180																			
PRM TP101_0.6	0.6-0.7	0.4-1	Natural orange brown clay	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	-	-	5	<0.4	6	6	11	<0.1	3	4	<0.1	<0.1	<LOR	<LOR	<0.1	<0.1	<0.1	<0.1	<0.1	<LOR	NAD	NAD	-	-	10	13.42	-	-	-	<0.01
PRM TP102_0.6	0.6-0.7	0.5-1.2	Natural orange brown clay	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	-	-	<4	<0.4	4	6	6	<0.1	1	2	<0.1	<0.1	<LOR	<LOR	<0.1	<0.1	<0.1	<0.1	<0.1	<LOR	NAD	NAD	-	-	10	14.92	-	-	-	<0.01
PRM TP103_0.9	0.9-1.0	0.8-1.1	Natural orange brown clay	-	-	-	-	-	-	-	-	-	0.06	<0.5	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PRM TP106_0.7	0.7-0.8	0.5-0.8	Natural orange brown clay	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	-	-	<4	<0.4	8	<1	8	<0.1	1	1	<0.1	<0.1	<LOR	<LOR	<0.1	<0.1	<0.1	<0.1	<0.1	<LOR	NAD	NAD	-	-	-	-	-	-	-	-
PB TP07	0.5-0.6	0.35-0.9	Red brown clay			-								<0.2							1.1	15			8																			
PB TP09	2.1-2.2	2.1-2.5	Shale			-								<0.2							9.5	7			4.2																			
PB TP10	0.5-0.6	0.25-1.0	Grey red clay			-								<0.2							2.9	8			3.6																			
PB TP12	1.0-1.1	0.67-1.4	Red brown clay			-								-							-	14			-																			
PB TP14	1.0-1.1	0.95-1.3	Red grey clay			-								<0.2							10	18			33																			
PB TP15	2.9-3.0	2.2-3.0	Shale			-								<0.2							30	10			9.7																			

Notes

^Laboratory ID in soil has been presented even when quantities are below reporting limit of 0.1 g/kg as per AS4964

* Trace analysis of respirable fibres, not able to be included in gravimetric analysis methods

[1]: Adopted from PB DSI Ashbury, Dated July 2015

LOR = Limit of Reporting

NL = Not Limiting

NAD = No Asbestos Detected

Project Name:	Data Gap Analysis
Site Address:	Ashbury Reservoir, 165-169 Holden Street, Ashbury NSW
Client Name:	Sydney Water Corporation
Project Reference:	P033725 / C0151
Analytical Table:	**Table B: Field QA Results**

PROGRESSIVE RISK MANAGEMENT

Analyte (Soil)		TRH (mg/kg)				BTEX (mg/kg)				PAH (mg/kg)				Heavy Metals (mg/kg)								Total PCBs (mg/kg)	Organochloropesticides (mg/kg)									Total OPPs (mg/kg)
		F1 - TRH C6-C10 less BTEX	F2 - TRH C10-C16 less naphthalene	TRH C16-C34	TRH C34-C40	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene	Benzo(a)pyrene	Benzo(a)pyrene TEQ	Total +ve	Arsenic	Cadmium	Chromium (VI)	Copper	Lead	Mercury	Nickel	Zinc		DDT + DDE + DDD	Aldrin and Dieldrin	Chlordane	Endosulfan	Endrine	Heptachlor	Hexachlorobenzene	Methoxychlor	
Sample ID	**Type**																															
TP107_0.3	Primary	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0.58	0.8	7.2	8	<0.4	15	7	61	0.1	2	44	<0.1	<0.1	<LOR	<LOR	<0.1	<0.1	<0.1	<0.1	<0.1	<LOR
DUP01	Intra Dup	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0.61	0.9	7.2	9	<0.4	15	8	69	0.1	2	55	<0.1	<0.1	<LOR	<LOR	<0.1	<0.1	<0.1	<0.1	<0.1	<LOR
RPD Calculation (%):		-	-	-	-	-	-	-	-	-	5%	-	0%	-	-	0%	13%	12%	-	-	22%	-	-	-	-	-	-	-	-	-	-
Within range:		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
TP108_0.0	Primary	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0.68	1	7.8	<4	<0.4	12	60	78	<0.1	30	98	<0.1	<0.1	<LOR	<LOR	<0.1	<0.1	<0.1	<0.1	<0.1	<LOR
DUP02	Intra Dup	<10	<50	150	<100	<0.2	<0.5	<0.5	<0.5	<1	0.99	1.5	11	<4	<0.4	10	61	86	<0.1	30	91	<0.1	<0.1	<LOR	<LOR	<0.1	<0.1	<0.1	<0.1	<0.1	<LOR
RPD Calculation (%):		-	-	-	-	-	-	-	-	-	37%	40%	34%	-	-	18%	2%	10%	-	0%	7%	-	-	-	-	-	-	-	-	-	-
Within range:		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
BLK001	Trip Blank	<25	-	-	-	<0.2	<0.5	<1	<1	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Within range:		Yes	-	-	-	Yes	Yes	Yes	Yes	Yes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SPK001	Trip Spike	-	-	-	-	96%	96%	98%	98%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Within range:		-	-	-	-	Yes	Yes	Yes	Yes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes

LOR = Limit of Reporting

An assessment of field quality control samples was completed by calculating the RPD of duplicate samples. A RPD of +/- 30 % for inorganic analytes and +/- 50 % for organic analytes is generally considered typically acceptable by NSW EPA.
RPD was not reported in the following circumstances:
- Where the laboratory limit of reporting (LOR) are different and both samples are below the LOR.
- One sample is below the LOR and the other has a recorded detection below the other laboratory LOR.
- Both results are less than or equal to 5 times the LOR.

Project Name:	Data Gap Analysis
Site Address:	Ashbury Reservoir, 165-169 Holden Street, Ashbury NSW
Client Name:	Sydney Water Corporation
Project Reference:	P033725 / C0151
Analytical Table:	**Table C: Waste Criteria Comparison**

PROGRESSIVE RISK MANAGEMENT

Analyte		TRH (mg/kg)					BTEX (mg/kg)				PAH (mg/kg)			Heavy Metals (mg/kg)													Asbestos	
		C6-C9	C10 - C14	C15 - C28	C29 - C36	Sum C10 - C36	Benzene	Toluene	Ethylbenzene	Xylenes	Benoz(a)pyrene	Total +ve PAHs	Benzo(a)pyrene TCLP (ug/L)	Arsenic	Cadmium	Chromium (VI)	Copper	Lead	Mercury	Nickel	Zinc	Lead TCLP (mg/L)	Nickel TCLP (mg/L)	Total PCBs (mg/kg)	Total OCPs (mg/kg)	Total OPPs (mg/kg)	Asbestos ID in Soil~	Asbestos Containing Material
General Solid Waste (<CT1)		650	-	-	-	10000	10	288	600	1000	0.8	200	-	100	20	100	-	100	4	40	-	-	-	<50	<50	-	-	-
Restricted Solid Waste (<CT2)		2600	-	-	-	40000	40	1152	2400	4000	3.2	800	-	400	80	400	-	400	16	160	-	-	-	<50	<50	-	-	-
Hazardous Waste (>CT2)		>2600	-	-	-	>40000	>40	>1152	>2400	>4000	>3.2	>800	-	>400	>80	>400	-	>400	>16	>160	-	-	-	>50	>50	-	-	-
General Solid Waste (<SCC1 / TCLP1)		650	-	-	-	10000	10	288	600	1000	10	200	0.04	500	100	1900	-	1500	50	1050	-	5	2	<50	<50	-	-	-
Restricted Solid Waste (<SCC2 / TCLP2)		2600	-	-	-	40000	40	1152	2400	4000	23	800	0.16	2000	400	7600	-	6000	200	4200	-	20	8	<50	<50	-	-	-
Hazardous Waste (>SCC2 / TCLP2)		>2600	-	-	-	>40000	>40	>1152	>2400	>4000	>23	>800	>0.16	>2000	>400	>7600	-	>6000	>200	>4200	-	>20	>8	>50	>50	-	-	-
Special Waste (Asbestos)		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NAD	NAD
Sample ID	**Depth**																											
TP101_0.15	0.15-0.2	<25	<50	<100	180	330	<0.2	<0.5	<1	<1	0.1	1.2	-	<4	<0.4	18	24	16	<0.1	63	31	-	0.04	<0.1	<LOR	<LOR	NAD	-
TP101_0.6	0.6-0.7	<25	<50	<100	<100	<LOR	<0.2	<0.5	<1	<1	<0.05	<0.05	-	5	<0.4	6	6	11	<0.1	3	4	-	-	<0.1	<LOR	<LOR	NAD	-
TP102_0.4	0.4-0.5	<25	<50	<100	<100	<LOR	<0.2	<0.5	<1	<1	<0.05	<0.05	-	4	<0.4	5	4	7	<0.1	3	4	-	-	<0.1	<LOR	<LOR	NAD	-
TP102_0.6	0.6-0.7	<25	<50	<100	<100	<LOR	<0.2	<0.5	<1	<1	<0.05	<0.05	-	<4	<0.4	4	6	6	<0.1	1	2	-	-	<0.1	<LOR	<LOR	NAD	-
TP103_0.3	0.3-0.4	<25	<50	1100	520	1670	<0.2	<0.5	<1	<1	55	790	<0.001^	5	<0.4	18	28	59	<0.1	54	120	-	<0.02	<0.1	<LOR	<LOR	NAD	-
TP103_0.6	0.6-0.7	<25	<50	<100	<100	<LOR	<0.2	<0.5	<1	<1	2.4	34	<0.001	6	<0.4	12	16	88	0.1	3	59	-	-	<0.1	<LOR	<LOR	NAD	-
TP103_0.9	0.9-1.0	-	-	-	-	-	-	-	-	-	0.06	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP104_0.1	0.1-0.2	<25	<50	<100	<100	<LOR	<0.2	<0.5	<1	<1	0.3	3	-	<4	<0.4	11	29	42	<0.1	14	91	-	-	<0.1	<LOR	<LOR	NAD	-
TP104_0.4	0.4-0.5	<25	<50	<100	<100	<LOR	<0.2	<0.5	<1	<1	<0.05	<0.05	-	<4	<0.4	40	36	18	<0.1	120	59	-	<0.02	<0.1	<LOR	<LOR	NAD	-
TP105_0.1	0.1-0.2	<25	<50	<100	<100	<LOR	<0.2	<0.5	<1	<1	0.84	8.1	<0.001	<4	<0.4	29	37	80	<0.1	45*	97	-	-	<0.1	<LOR	<LOR	NAD	-
TP105_0.4	0.4-0.5	<25	<50	<100	<100	<LOR	<0.2	<0.5	<1	<1	0.56	5	-	<4	<0.4	23	42	43	<0.1	45	64	-	0.03	<0.1	<LOR	<LOR	NAD	-
TP106_0.3	0.3-0.4	<25	<50	<100	<100	<LOR	<0.2	<0.5	<1	<1	<0.05	<0.05	-	<4	<0.4	26	40	3	<0.1	150	36	-	0.03	<0.1	<LOR	<LOR	NAD	-
TP106_0.7	0.7-0.8	<25	<50	<100	<100	<LOR	<0.2	<0.5	<1	<1	<0.05	<0.05	-	<4	<0.4	8	<1	8	<0.1	1	1	-	-	<0.1	<LOR	<LOR	NAD	-
TP107_0.1	0.1-0.2	<25	<50	260	100	410	<0.2	<0.5	<1	<1	8.1	130	<0.001	5	<0.4	11	14	150	0.1	5	62	0.06	-	<0.5	<LOR	<LOR	NAD	-
TP107_0.3	0.3-0.4	<25	<50	<100	<100	<LOR	<0.2	<0.5	<1	<1	0.58	7.2	-	8	<0.4	15	7	61	0.1	2	44	-	-	<0.1	<LOR	<LOR	NAD	-
TP109_0.0	0.0-0.1	<25	<50	130	120	300	<0.2	<0.5	<1	<1	0.3	3.6	-	<4	<0.4	25	240	250	<0.1	35	450	0.61	-	<0.1	<LOR	<LOR	NAD	-

Notes

^SCC criteria can be ignored based on the adopted immobilisation approval 1999/05 for this area. TCLP results only can be referred to for waste classification.

* TCLP undertaken on other sample within same location and subsequently compared to SCC1 criteria also

~Laboratory ID in soil has been presented even when quantities are below reporting limit

LOR = Limit of Reporting

NAD = No Asbestos Detected

Appendix B Test Pit Logs

PROGRESSIVE RISK MANAGEMENT

TP101

PROJECT NUMBER P033725
PROJECT NAME Data Gap Analysis
CLIENT Sydney Water
ADDRESS 165-169 Holden Street, Ashbury, NSW

METHOD Excavator
TOTAL DEPTH 1.3mBGL
DATE 21/02/2018
LOGGED BY BM

COORDINATES E: 326561.82 , N: 6247454.51
COORD SYS GDA 94 MGA 56
SURFACE ELEVATION -
CHECKED BY JC

COMMENTS

Depth (m)	Moisture	Samples	Sample Type	Weight of 10L (kg)	Graphic Log	Material Description	Additional Observations
0.1	D					ASPHALT & ROAD BASE	No ACM observed No Staining observed No Odours observed
0.2	D	TP101_0.15-0.2	J			FILL - SANDY CLAY with gravels: low plasticity, brown / light brown	No ACM observed No Staining observed No Odours observed
0.3							
0.4	D						
0.5						CLAY: medium plasticity, orange / brown, iron stone gravel inclusions	No ACM observed No Staining observed No Odours observed Material showed characteristics of possibly reworked natural material.
0.6		TP101_0.6 - 0.7	J & B	13.42			
0.7							
0.8							
0.9							A disused sewer pipe was encountered at approx. 0.9m
1	D						
1.1						SHALE: Extremely weathered, light brown / grey	
1.2							
1.3							
1.4						END OF TEST PIT	
1.5							
1.6							
1.7							
1.8							
1.9							

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PROGRESSIVE RISK MANAGEMENT

TP102

PROJECT NUMBER P033725
PROJECT NAME Data Gap Analysis
CLIENT Sydney Water
ADDRESS 165-169 Holden Street, Ashbury, NSW

METHOD Excavator
TOTAL DEPTH 1.2
DATE 21/02/2018
LOGGED BY BM

COORDINATES E:326558.23, N:6247462.35
COORD SYS GDA 94 MGA 56
SURFACE ELEVATION -
CHECKED BY JC

COMMENTS

Depth (m)	Moisture	Samples	Sample Type	Weight of 10L (kg)	Graphic Log	Material Description	Additional Observations
0.1	D					ASPHALT & ROAD BASE	No ACM observed No Staining observed No Odours observed
0.2							
0.3	D					FILL - GRAVELLY CLAY: low plasticity, brown / lightbrown	No ACM observed No Staining observed No Odours observed Minor inclusions observed (wire, brick fragments, terracotta pipe)
0.4		TP102_0.4 - 0.5	J & B	13.61			
0.5	D					CLAY: medium plasticity, orange / brown, iron stone gravel inclusions	No ACM observed No Staining observed No Odours observed Material showed characteristics of possibly reworked natural material.
0.6		TP102_0.6 - 0.7	J & B	14.92			
0.7							
0.8							
0.9							
1							
1.1	D					SHALE: Extremely weathered, light brown / grey	
1.2						END OF TEST PIT	
1.3							
1.4							
1.5							
1.6							
1.7							
1.8							
1.9							

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PROGRESSIVE RISK MANAGEMENT

TP103

PROJECT NUMBER P033725
PROJECT NAME Data Gap Analysis
CLIENT Sydney Water
ADDRESS 165-169 Holden Street, Ashbury, NSW
METHOD Excavator
TOTAL DEPTH 1.2
DATE 21/02/2018
LOGGED BY BM
COORDINATES E:326545.94 , N:6247471.58
COORD SYS GDA 94 MGA 56
SURFACE ELEVATION -
CHECKED BY JC

COMMENTS

Depth (m)	Moisture	Samples	Sample Type	Weight of 10L (kg)	Graphic Log	Material Description	Additional Observations
0.1	D					ASPHALT & ROAD BASE	No ACM observed No Staining observed No Odours observed
0.2	D					FILL - GRAVELLY CLAY: low plasticity, grey	No ACM observed No Staining observedNo Odours observedInclusions observed (fly ash / coal wash? brick and concrete fragments)
0.3		TP103_0.3 - 0.4	J & B	14.61			
0.4							
0.5	D					FILL - GRAVELLY CLAY: low plasticity, brown / lightbrown	No ACM observed No Staining observed No Odours observed Minor inclusions observed (brick fragments, tile)
0.6		TP103_0.6 - 0.7	J & B	14.04			
0.7							
0.8	D					CLAY: medium plasticity, orange / brown, iron stone gravel inclusions	No ACM observed No Staining observed No Odours observed
0.9		TP103_0.9 - 1.0	J				
1							
1.1	D					SHALE: Extremely weathered, light brown / grey	
1.2						END OF TEST PIT	
1.3							
1.4							
1.5							
1.6							
1.7							
1.8							
1.9							

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PROGRESSIVE RISK MANAGEMENT

TP104

PROJECT NUMBER P033725
PROJECT NAME Data Gap Analysis
CLIENT Sydney Water
ADDRESS 165-169 Holden Street, Ashbury, NSW
METHOD Excavator
TOTAL DEPTH 1.1
DATE 21/02/2018
LOGGED BY BM
COORDINATES E:326559.56 , N:6247488.72
COORD SYS GDA 94 MGA 56
SURFACE ELEVATION -
CHECKED BY JC

COMMENTS

Depth (m)	Moisture	Samples	Sample Type	Weight of 10L (kg)	Graphic Log	Material Description	Additional Observations
0.1	D	TP104_0.1 - 0.2	J & B	14.36		FILL - SILTY SAND (Topsoil): fine grained, dark brown	No ACM observed No Staining observed No Odours observed
0.4	D	TP104_0.4 - 0.5	J & B	15.87		FILL - CLAY: low plasticity, brown / red brown	No ACM observed No Staining observed No Odours observed Minor inclusions observed (brick and concrete fragments)
0.8	D	TP104_0.8 - 0.9	J			CLAY: medium plasticity, orange / brown, iron stone gravel inclusions	No ACM observed No Staining observed No Odours observed
1.1						END OF TEST PIT	

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PROGRESSIVE RISK MANAGEMENT

TP105

PROJECT NUMBER P033725
PROJECT NAME Data Gap Analysis
CLIENT Sydney Water
ADDRESS 165-169 Holden Street, Ashbury, NSW

METHOD Excavator
TOTAL DEPTH 0.9
DATE 21/02/2018
LOGGED BY BM

COORDINATES E:326567.03 , N:6247494.32
COORD SYS GDA 94 MGA 56
SURFACE ELEVATION -
CHECKED BY JC

COMMENTS

Depth (m)	Moisture	Samples	Sample Type	Weight of 10L (kg)	Graphic Log	Material Description	Additional Observations
0.1	D	TP105_0.1 - 0.2	J & B	14.02		FILL - SILTY SAND (Topsoil): fine grained, dark brown	No ACM observed No Staining observed No Odours observed Minor inclusions observed (tile and concrete fragments)
0.4	D	TP105_0.4 - 0.5	J & B	15.28		FILL - CLAY: low plasticity, brown / red brown, trace gravels	No ACM observed No Staining observed No Odours observed Large concrete pieces observed at top of layer. Possibly associated with former building or structure.
0.7	D	TP105_0.7 - 0.8	J			CLAY: medium plasticity, orange / brown, iron stone gravel inclusions	No ACM observed No Staining observed No Odours observed
0.9						END OF TEST PIT	

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PROGRESSIVE RISK MANAGEMENT

TP106

PROJECT NUMBER P033725
PROJECT NAME Data Gap Analysis
CLIENT Sydney Water
ADDRESS 165-169 Holden Street, Ashbury, NSW

METHOD Excavator
TOTAL DEPTH 0.8
DATE 21/02/2018
LOGGED BY BM

COORDINATES E:326595.97 , N:6247479.29
COORD SYS GDA 94 MGA 56
SURFACE ELEVATION -
CHECKED BY JC

COMMENTS

Depth (m)	Moisture	Samples	Sample Type	Weight of 10L (kg)	Graphic Log	Material Description	Additional Observations
0.1	D					ASPHALT & ROAD BASE	No ACM observed No Staining observed No Odours observed
0.2	D					FILL - SANDY CLAY: low plasticity, brown / light brown, gravel inclusions	No ACM observed No Staining observed No Odours observed
0.3		TP106_0.3 - 0.4	J				
0.4							
0.5	D					CLAY: medium plasticity, orange / brown, iron stone gravel inclusions	No ACM observed No Staining observed No Odours observed
0.6							
0.7		TP106_0.7 - 0.8	J				
0.8						END OF TEST PIT	
0.9							
1							
1.1							
1.2							
1.3							
1.4							
1.5							
1.6							
1.7							
1.8							
1.9							

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PROGRESSIVE RISK MANAGEMENT

TP107

PROJECT NUMBER P033725
PROJECT NAME Data Gap Analysis
CLIENT Sydney Water
ADDRESS 165-169 Holden Street, Ashbury, NSW

METHOD Excavator
TOTAL DEPTH 0.8
DATE 21/02/2018
LOGGED BY BM

COORDINATES E:326605.94 , N:6247497.33
COORD SYS GDA 94 MGA 56
SURFACE ELEVATION -
CHECKED BY JC

COMMENTS

Depth (m)	Moisture	Samples	Sample Type	Weight of 10L (kg)	Graphic Log	Material Description	Additional Observations
0.1	D	TP107_0.1 - 0.2	J & B	12.65		FILL - SILTY SAND (Topsoil): fine grained, dark brown	No ACM observed No Staining observed No Odours observed Minor inclusions observed (charcoal)
0.3	D	TP107_0.3 - 0.4 + DUP101	J & B	13.72		FILL -GRAVELLY CLAY: low plasticity, brown / redbrown	No ACM observed No Staining observed No Odours observed Large concrete pieces observed at top of layer. Minor inclusions observed (brick fragments)
0.6	D	TP107_0.6 - 0.7	J			CLAY: medium plasticity, orange / brown, iron stone gravel inclusions	No ACM observed No Staining observed No Odours observed
0.8						END OF TEST PIT	

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PROGRESSIVE RISK MANAGEMENT

TP108

PROJECT NUMBER P033725
PROJECT NAME Data Gap Analysis
CLIENT Sydney Water
ADDRESS 165-169 Holden Street, Ashbury, NSW

METHOD Shovel
TOTAL DEPTH 0.2
DATE 21/02/2018
LOGGED BY BM

COORDINATES E:326582.06 , N:6247498.76
COORD SYS GDA 94 MGA 56
SURFACE ELEVATION -
CHECKED BY JC

COMMENTS

Depth (m)	Moisture	Samples	Sample Type	Weight of 10L (kg)	Graphic Log	Material Description	Additional Observations
0.1	D	TP108_0.0 - 0.1 + DUP102	J			FILL - SILTY SAND (Topsoil): fine grained, dark brown	No ACM observed No Staining observed No Odours observed Minor inclusions observed (charcoal, brick fragment)
0.2						END OF TEST PIT	
0.3							
0.4							
0.5							
0.6							
0.7							
0.8							
0.9							
1							
1.1							
1.2							
1.3							
1.4							
1.5							
1.6							
1.7							
1.8							
1.9							

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PROGRESSIVE RISK MANAGEMENT

TP109

PROJECT NUMBER P033725
PROJECT NAME Data Gap Analysis
CLIENT Sydney Water
ADDRESS 165-169 Holden Street, Ashbury, NSW

METHOD Shovel
TOTAL DEPTH 0..2
DATE 21/02/2018
LOGGED BY BM

COORDINATES E:326544.83 N:6247502.40
COORD SYS GDA 94 MGA 56
SURFACE ELEVATION -
CHECKED BY JC

COMMENTS

Depth (m)	Moisture	Samples	Sample Type	Weight of 10L (kg)	Graphic Log	Material Description	Additional Observations
0.1	D	TP109_0.0 - 0.1	J			FILL - SILTY SAND (Topsoil): fine grained, dark brown	No ACM observed No Staining observed No Odours observed Minor inclusions observed (charcoal, brick fragment)
0.2						END OF TEST PIT	
0.3							
0.4							
0.5							
0.6							
0.7							
0.8							
0.9							
1							
1.1							
1.2							
1.3							
1.4							
1.5							
1.6							
1.7							
1.8							
1.9							

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Appendix C PAH Source Analyser Output

PAH Source Analyst

- Home
- Background Documentation
- PAH Source Properties
- Upload PAH Data
- Method 1 Output
- Method 2 Output
- Terms and Conditions
- Contact Us

Method 1:

Correlation Coefficient **Key:** • **Very Good** (>0.95) • **Reasonable** (0.75-0.85) • **Good** (0.85-0.95) • **Poor** (<0.75)

Reference Material	TP103_0.3
Black Coal Tar 1	0.25
Black Coal Tar 2	0.71
Black Coal Tar 3	**0.95**
Brown Coal Tar	-0.12
Steelworks Tar 1	0.64
Steelworks Tar 2	0.43
Weathered Coal Tar	0.64
Creosote 1	0.63
Creosote 2	0.22
Weathered Creosote	0.7
Ash form Black Coal 1	**0.94**
Ash from Black Coal 2	**0.98**
Ash from Black Coal 3	**0.93**
Ash from Brown Coal	**0.91**
Bitumen	0.22
Coke	**0.92**
Waste Oil Petrol	0.43
Waste Oil Diesel	0.73
Roadseal	**0.96**

ENVIRONMENTAL EARTH SCIENCES INTERNATIONAL

PAH Source Analyst

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- Contact Us

Method 2:

Pyrene Normalised, Summed Difference **Key:** • **Very Good** (<1) • **Reasonable** (2-3) • **Good** (1-2) • **Poor** (>3)

Reference Material	TP103_0.3
Black Coal Tar 1	8.84
Black Coal Tar 2	**2.81**
Black Coal Tar 3	**1.74**
Brown Coal Tar	15.69
Steelworks Tar 1	3.59
Steelworks Tar 2	4.04
Weathered Coal Tar	4.24
Creosote 1	6.09
Creosote 2	9.21
Weathered Creosote	4.34
Ash form Black Coal 1	**1.17**
Ash from Black Coal 2	**0.94**
Ash from Black Coal 3	**1.6**
Ash from Brown Coal	**1.58**
Bitumen	11.38
Coke	**1.4**
Waste Oil Petrol	5.04
Waste Oil Diesel	3.21
Roadseal	**1.22**

Appendix D NATA Accredited Laboratory Results

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 185713

Client Details

Client	Progressive Risk Management Pty Ltd
Attention	Jonathan Coffey
Address	79 Darley Rd, Manly, NSW, 2095

Sample Details

Your Reference	**PO33725.001 - Ashbury**
Number of Samples	24 soil
Date samples received	21/02/2018
Date completed instructions received	21/02/2018

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	28/02/2018
Date of Issue	28/02/2018

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Asbestos Approved By
Analysed by Asbestos Approved Identifier: Jessica Hie, Lucy Zhu
Authorised by Asbestos Approved Signatory: Lulu Scott

Results Approved By
Jeremy Faircloth, Organics Supervisor
Leon Ow, Chemist
Lulu Scott, Asbestos Supervisor
Steven Luong, Senior Chemist

Authorised By

David Springer, General Manager

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		185713-1	185713-2	185713-3	185713-4	185713-5
Your Reference	UNITS	TP101	TP101	TP102	T1P02	TP103
Depth		0.15-0.2	0.6-0.7	0.4-0.5	0.6-0.7	0.3-0.4
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	22/02/2018	22/02/2018	22/02/2018	22/02/2018	22/02/2018
Date analysed	-	26/02/2018	26/02/2018	26/02/2018	26/02/2018	26/02/2018
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
naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	107	104	103	109	104

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		185713-6	185713-8	185713-9	185713-11	185713-12
Your Reference	UNITS	TP103	TP104	TP104	TP105	TP105
Depth		0.6-0.7	0.1-0.2	0.4-0.5	0.1-0.2	0.4-0.5
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	22/02/2018	22/02/2018	22/02/2018	22/02/2018	22/02/2018
Date analysed	-	26/02/2018	26/02/2018	26/02/2018	26/02/2018	26/02/2018
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
naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	105	105	105	109	113

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		185713-14	185713-15	185713-16	185713-17	185713-19
Your Reference	UNITS	TP106	TP106	TP107	TP107	TP108
Depth		0.3-0.4	0.7-0.8	0.1-0.2	0.3-0.4	0.0-0.1
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	22/02/2018	22/02/2018	22/02/2018	22/02/2018	22/02/2018
Date analysed	-	26/02/2018	26/02/2018	26/02/2018	26/02/2018	26/02/2018
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
naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	105	102	108	105	109

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		185713-20	185713-21	185713-22	185713-23	185713-24
Your Reference	UNITS	TP109	0001DUP01	0001DUP02	0001SPK	0001BLANK
Depth		0.0-0.1	-	-	-	-
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	22/02/2018	22/02/2018	22/02/2018	22/02/2018	22/02/2018
Date analysed	-	26/02/2018	26/02/2018	26/02/2018	26/02/2018	26/02/2018
TRH C_6 - C_9	mg/kg	<25	<25	<25	[NA]	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	[NA]	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	[NA]	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	96%	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	96%	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	98%	<1
m+p-xylene	mg/kg	<2	<2	<2	99%	<2
o-Xylene	mg/kg	<1	<1	<1	98%	<1
naphthalene	mg/kg	<1	<1	<1	[NA]	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	[NA]	<1
Surrogate aaa-Trifluorotoluene	%	105	105	106	101	108

svTRH (C10-C40) in Soil						
Our Reference		185713-1	185713-2	185713-3	185713-4	185713-5
Your Reference	UNITS	TP101	TP101	TP102	T1P02	TP103
Depth		0.15-0.2	0.6-0.7	0.4-0.5	0.6-0.7	0.3-0.4
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	22/02/2018	22/02/2018	22/02/2018	22/02/2018	22/02/2018
Date analysed	-	23/02/2018	23/02/2018	23/02/2018	23/02/2018	23/02/2018
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	1,100
TRH C_{29} - C_{36}	mg/kg	180	<100	<100	<100	520
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	140	<100	<100	<100	1,500
TRH >C_{34} -C_{40}	mg/kg	160	<100	<100	<100	170
Total +ve TRH (>C10-C40)	mg/kg	310	<50	<50	<50	1,700
Surrogate o-Terphenyl	%	83	80	81	81	133

svTRH (C10-C40) in Soil						
Our Reference		185713-6	185713-8	185713-9	185713-11	185713-12
Your Reference	UNITS	TP103	TP104	TP104	TP105	TP105
Depth		0.6-0.7	0.1-0.2	0.4-0.5	0.1-0.2	0.4-0.5
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	22/02/2018	22/02/2018	22/02/2018	22/02/2018	22/02/2018
Date analysed	-	23/02/2018	23/02/2018	23/02/2018	23/02/2018	23/02/2018
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	78	82	84	89	89

svTRH (C10-C40) in Soil						
Our Reference		185713-14	185713-15	185713-16	185713-17	185713-19
Your Reference	UNITS	TP106	TP106	TP107	TP107	TP108
Depth		0.3-0.4	0.7-0.8	0.1-0.2	0.3-0.4	0.0-0.1
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	22/02/2018	22/02/2018	22/02/2018	22/02/2018	22/02/2018
Date analysed	-	23/02/2018	23/02/2018	23/02/2018	23/02/2018	23/02/2018
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	260	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	100	<100	130
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	320	<100	150
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	320	<50	150
Surrogate o-Terphenyl	%	84	85	92	86	88

svTRH (C10-C40) in Soil				
Our Reference		185713-20	185713-21	185713-22
Your Reference	UNITS	TP109	0001DUP01	0001DUP02
Depth		0.0-0.1	-	-
Type of sample		soil	soil	soil
Date extracted	-	22/02/2018	22/02/2018	22/02/2018
Date analysed	-	23/02/2018	23/02/2018	23/02/2018
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	130	<100	<100
TRH C_{29} - C_{36}	mg/kg	120	<100	130
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	200	<100	150
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	200	<50	150
Surrogate o-Terphenyl	%	99	84	88

PAHs in Soil						
Our Reference		185713-1	185713-2	185713-3	185713-4	185713-5
Your Reference	UNITS	TP101	TP101	TP102	T1P02	TP103
Depth		0.15-0.2	0.6-0.7	0.4-0.5	0.6-0.7	0.3-0.4
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	22/02/2018	22/02/2018	22/02/2018	22/02/2018	22/02/2018
Date analysed	-	22/02/2018	22/02/2018	22/02/2018	22/02/2018	22/02/2018
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	1.2
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	0.9
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	4.2
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	5.0
Phenanthrene	mg/kg	0.1	<0.1	<0.1	<0.1	120
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	42
Fluoranthene	mg/kg	0.2	<0.1	<0.1	<0.1	150
Pyrene	mg/kg	0.2	<0.1	<0.1	<0.1	130
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	58
Chrysene	mg/kg	0.1	<0.1	<0.1	<0.1	72
Benzo(b,j+k)fluoranthene	mg/kg	0.2	<0.2	<0.2	<0.2	87
Benzo(a)pyrene	mg/kg	0.1	<0.05	<0.05	<0.05	55
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	31
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	5.1
Benzo(g,h,i)perylene	mg/kg	0.1	<0.1	<0.1	<0.1	29
Total +ve PAH's	mg/kg	1.2	<0.05	<0.05	<0.05	790
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	79
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	79
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	79
Surrogate p-Terphenyl-d14	%	101	97	95	93	104

PAHs in Soil						
Our Reference		185713-6	185713-8	185713-9	185713-11	185713-12
Your Reference	UNITS	TP103	TP104	TP104	TP105	TP105
Depth		0.6-0.7	0.1-0.2	0.4-0.5	0.1-0.2	0.4-0.5
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	22/02/2018	22/02/2018	22/02/2018	22/02/2018	22/02/2018
Date analysed	-	22/02/2018	22/02/2018	22/02/2018	22/02/2018	22/02/2018
Naphthalene	mg/kg	0.2	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	0.7	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	0.5	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	5.7	0.3	<0.1	0.4	0.3
Anthracene	mg/kg	1.4	<0.1	<0.1	0.2	<0.1
Fluoranthene	mg/kg	5.5	0.6	<0.1	1.3	0.7
Pyrene	mg/kg	5.6	0.5	<0.1	1.2	0.7
Benzo(a)anthracene	mg/kg	2.3	0.2	<0.1	0.7	0.4
Chrysene	mg/kg	3.2	0.3	<0.1	0.7	0.6
Benzo(b,j+k)fluoranthene	mg/kg	3.7	0.5	<0.2	1	0.9
Benzo(a)pyrene	mg/kg	2.4	0.3	<0.05	0.84	0.56
Indeno(1,2,3-c,d)pyrene	mg/kg	1.5	0.2	<0.1	0.7	0.4
Dibenzo(a,h)anthracene	mg/kg	0.3	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	1.5	0.2	<0.1	0.7	0.5
Total +ve PAH's	mg/kg	34	3.0	<0.05	8.1	5.0
Benzo(a)pyrene TEQ calc (zero)	mg/kg	3.5	<0.5	<0.5	1.1	0.7
Benzo(a)pyrene TEQ calc(half)	mg/kg	3.5	<0.5	<0.5	1.2	0.8
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	3.5	<0.5	<0.5	1.2	0.8
Surrogate p-Terphenyl-d14	%	99	96	97	95	97

PAHs in Soil						
Our Reference		185713-14	185713-15	185713-16	185713-17	185713-19
Your Reference	UNITS	TP106	TP106	TP107	TP107	TP108
Depth		0.3-0.4	0.7-0.8	0.1-0.2	0.3-0.4	0.0-0.1
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	22/02/2018	22/02/2018	22/02/2018	22/02/2018	22/02/2018
Date analysed	-	22/02/2018	22/02/2018	22/02/2018	22/02/2018	22/02/2018
Naphthalene	mg/kg	<0.1	<0.1	3.7	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	0.2	<0.1	0.2
Acenaphthene	mg/kg	<0.1	<0.1	3.4	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	1.8	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	29	0.6	0.7
Anthracene	mg/kg	<0.1	<0.1	5.1	0.2	0.2
Fluoranthene	mg/kg	<0.1	<0.1	24	1.4	1.2
Pyrene	mg/kg	<0.1	<0.1	21	1.4	1.3
Benzo(a)anthracene	mg/kg	<0.1	<0.1	6.4	0.6	0.5
Chrysene	mg/kg	<0.1	<0.1	11	0.8	0.8
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	14	1	1
Benzo(a)pyrene	mg/kg	<0.05	<0.05	8.1	0.58	0.68
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	3.0	0.4	0.5
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	0.7	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	2.7	0.4	0.6
Total +ve PAH's	mg/kg	<0.05	<0.05	130	7.2	7.8
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	11	0.8	0.9
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	11	0.8	1
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	11	0.9	1.0
Surrogate p-Terphenyl-d14	%	93	96	100	97	97

PAHs in Soil				
Our Reference		185713-20	185713-21	185713-22
Your Reference	UNITS	TP109	0001DUP01	0001DUP02
Depth		0.0-0.1	-	-
Type of sample		soil	soil	soil
Date extracted	-	22/02/2018	22/02/2018	22/02/2018
Date analysed	-	22/02/2018	22/02/2018	22/02/2018
Naphthalene	mg/kg	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	0.2
Acenaphthene	mg/kg	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.2	0.6	0.8
Anthracene	mg/kg	<0.1	0.2	0.2
Fluoranthene	mg/kg	0.5	1.3	1.6
Pyrene	mg/kg	0.5	1.3	1.8
Benzo(a)anthracene	mg/kg	0.2	0.6	0.8
Chrysene	mg/kg	0.3	0.8	1.2
Benzo(b,j+k)fluoranthene	mg/kg	0.6	1	2
Benzo(a)pyrene	mg/kg	0.3	0.61	0.99
Indeno(1,2,3-c,d)pyrene	mg/kg	0.4	0.4	0.8
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	0.2
Benzo(g,h,i)perylene	mg/kg	0.6	0.4	0.9
Total +ve PAH's	mg/kg	3.6	7.2	11
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	0.8	1.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	0.5	0.9	1.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	0.6	0.9	1.5
Surrogate p-Terphenyl-d14	%	102	97	98

Organochlorine Pesticides in soil						
Our Reference		185713-1	185713-2	185713-3	185713-4	185713-5
Your Reference	UNITS	TP101	TP101	TP102	T1P02	TP103
Depth		0.15-0.2	0.6-0.7	0.4-0.5	0.6-0.7	0.3-0.4
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	22/02/2018	22/02/2018	22/02/2018	22/02/2018	22/02/2018
Date analysed	-	22/02/2018	22/02/2018	22/02/2018	22/02/2018	22/02/2018
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	105	100	100	98	95

Organochlorine Pesticides in soil						
Our Reference		185713-6	185713-8	185713-9	185713-11	185713-12
Your Reference	UNITS	TP103	TP104	TP104	TP105	TP105
Depth		0.6-0.7	0.1-0.2	0.4-0.5	0.1-0.2	0.4-0.5
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	22/02/2018	22/02/2018	22/02/2018	22/02/2018	22/02/2018
Date analysed	-	22/02/2018	22/02/2018	22/02/2018	22/02/2018	22/02/2018
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	102	98	100	96	102

Organochlorine Pesticides in soil						
Our Reference		185713-14	185713-15	185713-16	185713-17	185713-19
Your Reference	UNITS	TP106	TP106	TP107	TP107	TP108
Depth		0.3-0.4	0.7-0.8	0.1-0.2	0.3-0.4	0.0-0.1
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	22/02/2018	22/02/2018	22/02/2018	22/02/2018	22/02/2018
Date analysed	-	22/02/2018	22/02/2018	22/02/2018	22/02/2018	22/02/2018
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	98	98	100	98	95

Organochlorine Pesticides in soil				
Our Reference		185713-20	185713-21	185713-22
Your Reference	UNITS	TP109	0001DUP01	0001DUP02
Depth		0.0-0.1	-	-
Type of sample		soil	soil	soil
Date extracted	-	22/02/2018	22/02/2018	22/02/2018
Date analysed	-	22/02/2018	22/02/2018	22/02/2018
HCB	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	%	102	98	98

Organophosphorus Pesticides						
Our Reference		185713-1	185713-2	185713-3	185713-4	185713-5
Your Reference	UNITS	TP101	TP101	TP102	T1P02	TP103
Depth		0.15-0.2	0.6-0.7	0.4-0.5	0.6-0.7	0.3-0.4
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	22/02/2018	22/02/2018	22/02/2018	22/02/2018	22/02/2018
Date analysed	-	22/02/2018	22/02/2018	22/02/2018	22/02/2018	22/02/2018
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	105	100	100	98	95

Organophosphorus Pesticides						
Our Reference		185713-6	185713-8	185713-9	185713-11	185713-12
Your Reference	UNITS	TP103	TP104	TP104	TP105	TP105
Depth		0.6-0.7	0.1-0.2	0.4-0.5	0.1-0.2	0.4-0.5
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	22/02/2018	22/02/2018	22/02/2018	22/02/2018	22/02/2018
Date analysed	-	22/02/2018	22/02/2018	22/02/2018	22/02/2018	22/02/2018
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	102	98	100	96	102

Organophosphorus Pesticides						
Our Reference		185713-14	185713-15	185713-16	185713-17	185713-19
Your Reference	UNITS	TP106	TP106	TP107	TP107	TP108
Depth		0.3-0.4	0.7-0.8	0.1-0.2	0.3-0.4	0.0-0.1
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	22/02/2018	22/02/2018	22/02/2018	22/02/2018	22/02/2018
Date analysed	-	22/02/2018	22/02/2018	22/02/2018	22/02/2018	22/02/2018
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	98	98	100	98	95

Organophosphorus Pesticides				
Our Reference		185713-20	185713-21	185713-22
Your Reference	UNITS	TP109	0001DUP01	0001DUP02
Depth		0.0-0.1	-	-
Type of sample		soil	soil	soil
Date extracted	-	22/02/2018	22/02/2018	22/02/2018
Date analysed	-	22/02/2018	22/02/2018	22/02/2018
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	%	102	98	98

PCBs in Soil						
Our Reference		185713-1	185713-2	185713-3	185713-4	185713-5
Your Reference	UNITS	TP101	TP101	TP102	T1P02	TP103
Depth		0.15-0.2	0.6-0.7	0.4-0.5	0.6-0.7	0.3-0.4
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	22/02/2018	22/02/2018	22/02/2018	22/02/2018	22/02/2018
Date analysed	-	22/02/2018	22/02/2018	22/02/2018	22/02/2018	22/02/2018
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	105	100	100	98	95

PCBs in Soil						
Our Reference		185713-6	185713-8	185713-9	185713-11	185713-12
Your Reference	UNITS	TP103	TP104	TP104	TP105	TP105
Depth		0.6-0.7	0.1-0.2	0.4-0.5	0.1-0.2	0.4-0.5
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	22/02/2018	22/02/2018	22/02/2018	22/02/2018	22/02/2018
Date analysed	-	22/02/2018	22/02/2018	22/02/2018	22/02/2018	22/02/2018
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	102	98	100	96	102

PCBs in Soil						
Our Reference		185713-14	185713-15	185713-16	185713-17	185713-19
Your Reference	UNITS	TP106	TP106	TP107	TP107	TP108
Depth		0.3-0.4	0.7-0.8	0.1-0.2	0.3-0.4	0.0-0.1
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	22/02/2018	22/02/2018	22/02/2018	22/02/2018	22/02/2018
Date analysed	-	22/02/2018	22/02/2018	22/02/2018	22/02/2018	22/02/2018
Aroclor 1016	mg/kg	<0.1	<0.1	<0.5	<0.1	<0.2
Aroclor 1221	mg/kg	<0.1	<0.1	<0.5	<0.1	<0.2
Aroclor 1232	mg/kg	<0.1	<0.1	<0.5	<0.1	<0.2
Aroclor 1242	mg/kg	<0.1	<0.1	<0.5	<0.1	<0.2
Aroclor 1248	mg/kg	<0.1	<0.1	<0.5	<0.1	<0.2
Aroclor 1254	mg/kg	<0.1	<0.1	<0.5	<0.1	<0.2
Aroclor 1260	mg/kg	<0.1	<0.1	<0.5	<0.1	<0.2
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.5	<0.1	<0.2
Surrogate TCLMX	%	98	98	100	98	95

PCBs in Soil				
Our Reference		185713-20	185713-21	185713-22
Your Reference	UNITS	TP109	0001DUP01	0001DUP02
Depth		0.0-0.1	-	-
Type of sample		soil	soil	soil
Date extracted	-	22/02/2018	22/02/2018	22/02/2018
Date analysed	-	22/02/2018	22/02/2018	22/02/2018
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1
Surrogate TCLMX	%	102	98	98

Acid Extractable metals in soil						
Our Reference		185713-1	185713-2	185713-3	185713-4	185713-5
Your Reference	UNITS	TP101	TP101	TP102	T1P02	TP103
Depth		0.15-0.2	0.6-0.7	0.4-0.5	0.6-0.7	0.3-0.4
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	22/02/2018	22/02/2018	22/02/2018	22/02/2018	22/02/2018
Date analysed	-	22/02/2018	22/02/2018	22/02/2018	22/02/2018	22/02/2018
Arsenic	mg/kg	<4	5	4	<4	5
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	18	6	5	4	18
Copper	mg/kg	24	6	4	6	28
Lead	mg/kg	16	11	7	6	59
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	63	3	3	1	54
Zinc	mg/kg	31	4	4	2	120

Acid Extractable metals in soil						
Our Reference		185713-6	185713-8	185713-9	185713-11	185713-12
Your Reference	UNITS	TP103	TP104	TP104	TP105	TP105
Depth		0.6-0.7	0.1-0.2	0.4-0.5	0.1-0.2	0.4-0.5
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	22/02/2018	22/02/2018	22/02/2018	22/02/2018	22/02/2018
Date analysed	-	22/02/2018	22/02/2018	22/02/2018	22/02/2018	22/02/2018
Arsenic	mg/kg	6	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	12	11	40	29	23
Copper	mg/kg	16	29	36	37	42
Lead	mg/kg	88	42	18	80	43
Mercury	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	3	14	120	45	45
Zinc	mg/kg	59	91	59	97	64

Acid Extractable metals in soil						
Our Reference		185713-14	185713-15	185713-16	185713-17	185713-19
Your Reference	UNITS	TP106	TP106	TP107	TP107	TP108
Depth		0.3-0.4	0.7-0.8	0.1-0.2	0.3-0.4	0.0-0.1
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	22/02/2018	22/02/2018	22/02/2018	22/02/2018	22/02/2018
Date analysed	-	22/02/2018	22/02/2018	22/02/2018	22/02/2018	22/02/2018
Arsenic	mg/kg	<4	<4	5	8	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	26	8	11	15	12
Copper	mg/kg	40	<1	14	7	60
Lead	mg/kg	3	8	150	61	78
Mercury	mg/kg	<0.1	<0.1	0.1	0.1	<0.1
Nickel	mg/kg	150	1	5	2	30
Zinc	mg/kg	36	1	62	44	98

Acid Extractable metals in soil					
Our Reference		185713-20	185713-21	185713-22	185713-25
Your Reference	UNITS	TP109	0001DUP01	0001DUP02	TP101 - [TRIPLICATE]
Depth		0.0-0.1	-	-	0.15-0.2
Type of sample		soil	soil	soil	soil
Date prepared	-	22/02/2018	22/02/2018	22/02/2018	22/02/2018
Date analysed	-	22/02/2018	22/02/2018	22/02/2018	22/02/2018
Arsenic	mg/kg	<4	9	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	25	15	10	21
Copper	mg/kg	240	8	61	52
Lead	mg/kg	250	69	86	14
Mercury	mg/kg	<0.1	0.1	<0.1	<0.1
Nickel	mg/kg	35	2	30	73
Zinc	mg/kg	450	55	91	36

Moisture						
Our Reference		185713-1	185713-2	185713-3	185713-4	185713-5
Your Reference	UNITS	TP101	TP101	TP102	T1P02	TP103
Depth		0.15-0.2	0.6-0.7	0.4-0.5	0.6-0.7	0.3-0.4
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	22/02/2018	22/02/2018	22/02/2018	22/02/2018	22/02/2018
Date analysed	-	22/02/2018	22/02/2018	22/02/2018	22/02/2018	22/02/2018
Moisture	%	8.3	12	11	9.2	8.3

Moisture						
Our Reference		185713-6	185713-8	185713-9	185713-11	185713-12
Your Reference	UNITS	TP103	TP104	TP104	TP105	TP105
Depth		0.6-0.7	0.1-0.2	0.4-0.5	0.1-0.2	0.4-0.5
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	22/02/2018	22/02/2018	22/02/2018	22/02/2018	22/02/2018
Date analysed	-	22/02/2018	22/02/2018	22/02/2018	22/02/2018	22/02/2018
Moisture	%	9.6	3.7	10	4.6	5.9

Moisture						
Our Reference		185713-14	185713-15	185713-16	185713-17	185713-19
Your Reference	UNITS	TP106	TP106	TP107	TP107	TP108
Depth		0.3-0.4	0.7-0.8	0.1-0.2	0.3-0.4	0.0-0.1
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	22/02/2018	22/02/2018	22/02/2018	22/02/2018	22/02/2018
Date analysed	-	22/02/2018	22/02/2018	22/02/2018	22/02/2018	22/02/2018
Moisture	%	10	16	6.4	5.8	4.0

Moisture				
Our Reference		185713-20	185713-21	185713-22
Your Reference	UNITS	TP109	0001DUP01	0001DUP02
Depth		0.0-0.1	-	-
Type of sample		soil	soil	soil
Date prepared	-	22/02/2018	22/02/2018	22/02/2018
Date analysed	-	22/02/2018	22/02/2018	22/02/2018
Moisture	%	3.4	7.0	6.5

Asbestos ID - soils						
Our Reference		185713-1	185713-2	185713-4	185713-14	185713-15
Your Reference	UNITS	TP101	TP101	T1P02	TP106	TP106
Depth		0.15-0.2	0.6-0.7	0.6-0.7	0.3-0.4	0.7-0.8
Type of sample		soil	soil	soil	soil	soil
Date analysed	-	27/02/2018	27/02/2018	27/02/2018	27/02/2018	27/02/2018
Sample mass tested	g	Approx. 40g	Approx. 30g	Approx. 40g	Approx. 35g	Approx. 30g
Sample Description	-	Brown coarse-grained soil & rocks	Beige clayey soil	Beige clayey soil	Brown sandy soil	Beige clayey soil
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected

Asbestos ID - soils					
Our Reference		185713-16	185713-17	185713-19	185713-20
Your Reference	UNITS	TP107	TP107	TP108	TP109
Depth		0.1-0.2	0.3-0.4	0.0-0.1	0.0-0.1
Type of sample		soil	soil	soil	soil
Date analysed	-	27/02/2018	27/02/2018	27/02/2018	27/02/2018
Sample mass tested	g	Approx. 35g	Approx. 35g	Approx. 35g	Approx. 30g
Sample Description	-	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected

Asbestos ID - soils NEPM - ASB-001						
Our Reference		185713-3	185713-5	185713-6	185713-8	185713-9
Your Reference	UNITS	TP102	TP103	TP103	TP104	TP104
Depth		0.4-0.5	0.3-0.4	0.6-0.7	0.1-0.2	0.4-0.5
Type of sample		soil	soil	soil	soil	soil
Date analysed	-	28/02/2018	28/02/2018	28/02/2018	28/02/2018	28/02/2018
Sample mass tested	g	1,125.32	829.16	959.57	1,399.01	1,298.49
Sample Description	-	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected
Total Asbestos#1	g/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected
ACM >7mm Estimation*	g	–	–	–	–	–
FA and AF Estimation*	g	–	–	–	–	–
ACM >7mm Estimation*	%(w/w)	<0.01	<0.01	<0.01	<0.01	<0.01
FA and AF Estimation*#2	%(w/w)	<0.001	<0.001	<0.001	<0.001	<0.001

Asbestos ID - soils NEPM - ASB-001			
Our Reference		185713-11	185713-12
Your Reference	UNITS	TP105	TP105
Depth		0.1-0.2	0.4-0.5
Type of sample		soil	soil
Date analysed	-	28/02/2018	28/02/2018
Sample mass tested	g	1,274.28	1,198.71
Sample Description	-	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected
Total Asbestos#1	g/kg	<0.1	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected	No visible asbestos detected
ACM >7mm Estimation*	g	–	–
FA and AF Estimation*	g	–	–
ACM >7mm Estimation*	%(w/w)	<0.01	<0.01
FA and AF Estimation*#2	%(w/w)	<0.001	<0.001

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.
ASB-001	Asbestos ID - Identification of asbestos in soil samples using Polarised Light Microscopy and Dispersion Staining Techniques. Minimum 500mL soil sample was analysed as recommended by "National Environment Protection (Assessment of site contamination) Measure, Schedule B1 and "The Guidelines from the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia - May 2009" with a reporting limit of 0.1g/kg (0.01% w/w) as per Australian Standard AS4964-2004. Results reported denoted with * are outside our scope of NATA accreditation. **NOTE** #1 Total Asbestos g/kg was analysed and reported as per Australian Standard AS4964 (This is the sum of ACM >7mm, <7mm and FA/AF) **NOTE** #2 The screening level of 0.001% w/w asbestos in soil for FA and AF only applies where the FA and AF are able to be quantified by gravimetric procedures. This screening level is not applicable to free fibres. Estimation = Estimated asbestos weight Results reported with "--" is equivalent to no visible asbestos identified using Polarised Light microscopy and Dispersion Staining Techniques.
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
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.

Method ID	Methodology Summary
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's. 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.
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 are actually at the PQL. This is the most conservative 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 are zero. This is the least conservative approach and 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 are half the stipulated PQL. Hence a mid-point 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.
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.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	185713-2
Date extracted	-			22/02/2018	11	22/02/2018	22/02/2018		22/02/2018	22/02/2018
Date analysed	-			26/02/2018	11	26/02/2018	26/02/2018		26/02/2018	26/02/2018
TRH C_6 - C_9	mg/kg	25	Org-016	<25	11	<25	<25	0	114	109
TRH C_6 - C_{10}	mg/kg	25	Org-016	<25	11	<25	<25	0	114	109
Benzene	mg/kg	0.2	Org-016	<0.2	11	<0.2	<0.2	0	110	105
Toluene	mg/kg	0.5	Org-016	<0.5	11	<0.5	<0.5	0	113	107
Ethylbenzene	mg/kg	1	Org-016	<1	11	<1	<1	0	112	108
m+p-xylene	mg/kg	2	Org-016	<2	11	<2	<2	0	118	113
o-Xylene	mg/kg	1	Org-016	<1	11	<1	<1	0	114	108
naphthalene	mg/kg	1	Org-014	<1	11	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-016	108	11	109	106	3	109	105

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	1	22/02/2018	22/02/2018		[NT]	[NT]
Date analysed	-			[NT]	1	26/02/2018	26/02/2018		[NT]	[NT]
TRH C_6 - C_9	mg/kg	25	Org-016	[NT]	1	<25	<25	0	[NT]	[NT]
TRH C_6 - C_{10}	mg/kg	25	Org-016	[NT]	1	<25	<25	0	[NT]	[NT]
Benzene	mg/kg	0.2	Org-016	[NT]	1	<0.2	<0.2	0	[NT]	[NT]
Toluene	mg/kg	0.5	Org-016	[NT]	1	<0.5	<0.5	0	[NT]	[NT]
Ethylbenzene	mg/kg	1	Org-016	[NT]	1	<1	<1	0	[NT]	[NT]
m+p-xylene	mg/kg	2	Org-016	[NT]	1	<2	<2	0	[NT]	[NT]
o-Xylene	mg/kg	1	Org-016	[NT]	1	<1	<1	0	[NT]	[NT]
naphthalene	mg/kg	1	Org-014	[NT]	1	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-016	[NT]	1	107	109	2	[NT]	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	185713-2
Date extracted	-			22/02/2018	11	22/02/2018	22/02/2018		22/02/2018	22/02/2018
Date analysed	-			23/02/2018	11	23/02/2018	23/02/2018		23/02/2018	23/02/2018
TRH C_{10} - C_{14}	mg/kg	50	Org-003	<50	11	<50	<50	0	113	119
TRH C_{15} - C_{28}	mg/kg	100	Org-003	<100	11	<100	<100	0	98	95
TRH C_{29} - C_{36}	mg/kg	100	Org-003	<100	11	<100	<100	0	108	108
TRH >C_{10} -C_{16}	mg/kg	50	Org-003	<50	11	<50	<50	0	113	119
TRH >C_{16} -C_{34}	mg/kg	100	Org-003	<100	11	<100	110	10	98	95
TRH >C_{34} -C_{40}	mg/kg	100	Org-003	<100	11	<100	<100	0	108	108
Surrogate o-Terphenyl	%		Org-003	83	11	89	96	8	83	80

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	1	22/02/2018	22/02/2018		[NT]	[NT]
Date analysed	-			[NT]	1	23/02/2018	23/02/2018		[NT]	[NT]
TRH C_{10} - C_{14}	mg/kg	50	Org-003	[NT]	1	<50	<50	0	[NT]	[NT]
TRH C_{15} - C_{28}	mg/kg	100	Org-003	[NT]	1	<100	<100	0	[NT]	[NT]
TRH C_{29} - C_{36}	mg/kg	100	Org-003	[NT]	1	180	160	12	[NT]	[NT]
TRH >C_{10} -C_{16}	mg/kg	50	Org-003	[NT]	1	<50	<50	0	[NT]	[NT]
TRH >C_{16} -C_{34}	mg/kg	100	Org-003	[NT]	1	140	120	15	[NT]	[NT]
TRH >C_{34} -C_{40}	mg/kg	100	Org-003	[NT]	1	160	170	6	[NT]	[NT]
Surrogate o-Terphenyl	%		Org-003	[NT]	1	83	82	1	[NT]	[NT]

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	185713-2
Date extracted	-			22/02/2018	11	22/02/2018	22/02/2018		22/02/2018	22/02/2018
Date analysed	-			22/02/2018	11	22/02/2018	22/02/2018		22/02/2018	22/02/2018
Naphthalene	mg/kg	0.1	Org-012	<0.1	11	<0.1	<0.1	0	94	92
Acenaphthylene	mg/kg	0.1	Org-012	<0.1	11	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-012	<0.1	11	<0.1	<0.1	0	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-012	<0.1	11	<0.1	<0.1	0	92	90
Phenanthrene	mg/kg	0.1	Org-012	<0.1	11	0.4	0.5	22	90	88
Anthracene	mg/kg	0.1	Org-012	<0.1	11	0.2	0.2	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-012	<0.1	11	1.3	1.2	8	92	90
Pyrene	mg/kg	0.1	Org-012	<0.1	11	1.2	1.2	0	79	77
Benzo(a)anthracene	mg/kg	0.1	Org-012	<0.1	11	0.7	0.8	13	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-012	<0.1	11	0.7	0.7	0	124	119
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-012	<0.2	11	1	1	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-012	<0.05	11	0.84	0.86	2	96	95
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012	<0.1	11	0.7	0.7	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012	<0.1	11	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012	<0.1	11	0.7	0.8	13	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-012	97	11	95	98	3	94	92

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	1	22/02/2018	22/02/2018		[NT]	[NT]
Date analysed	-			[NT]	1	22/02/2018	22/02/2018		[NT]	[NT]
Naphthalene	mg/kg	0.1	Org-012	[NT]	1	<0.1	<0.1	0	[NT]	[NT]
Acenaphthylene	mg/kg	0.1	Org-012	[NT]	1	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-012	[NT]	1	<0.1	<0.1	0	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-012	[NT]	1	<0.1	<0.1	0	[NT]	[NT]
Phenanthrene	mg/kg	0.1	Org-012	[NT]	1	0.1	<0.1	0	[NT]	[NT]
Anthracene	mg/kg	0.1	Org-012	[NT]	1	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-012	[NT]	1	0.2	0.2	0	[NT]	[NT]
Pyrene	mg/kg	0.1	Org-012	[NT]	1	0.2	0.2	0	[NT]	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-012	[NT]	1	<0.1	0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-012	[NT]	1	0.1	0.2	67	[NT]	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-012	[NT]	1	0.2	0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-012	[NT]	1	0.1	0.1	0	[NT]	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012	[NT]	1	0.1	0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012	[NT]	1	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012	[NT]	1	0.1	0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-012	[NT]	1	101	96	5	[NT]	[NT]

QUALITY CONTROL: Organochlorine Pesticides in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	185713-2
Date extracted	-			22/02/2018	11	22/02/2018	22/02/2018		22/02/2018	22/02/2018
Date analysed	-			22/02/2018	11	22/02/2018	22/02/2018		22/02/2018	22/02/2018
HCB	mg/kg	0.1	Org-005	<0.1	11	<0.1	<0.1	0	[NT]	[NT]
alpha-BHC	mg/kg	0.1	Org-005	<0.1	11	<0.1	<0.1	0	102	99
gamma-BHC	mg/kg	0.1	Org-005	<0.1	11	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-005	<0.1	11	<0.1	<0.1	0	82	77
Heptachlor	mg/kg	0.1	Org-005	<0.1	11	<0.1	<0.1	0	75	69
delta-BHC	mg/kg	0.1	Org-005	<0.1	11	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-005	<0.1	11	<0.1	<0.1	0	93	88
Heptachlor Epoxide	mg/kg	0.1	Org-005	<0.1	11	<0.1	<0.1	0	89	84
gamma-Chlordane	mg/kg	0.1	Org-005	<0.1	11	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-005	<0.1	11	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-005	<0.1	11	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-005	<0.1	11	<0.1	<0.1	0	101	96
Dieldrin	mg/kg	0.1	Org-005	<0.1	11	<0.1	<0.1	0	86	82
Endrin	mg/kg	0.1	Org-005	<0.1	11	<0.1	<0.1	0	90	78
pp-DDD	mg/kg	0.1	Org-005	<0.1	11	<0.1	<0.1	0	66	63
Endosulfan II	mg/kg	0.1	Org-005	<0.1	11	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-005	<0.1	11	<0.1	<0.1	0	[NT]	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-005	<0.1	11	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-005	<0.1	11	<0.1	<0.1	0	101	98
Methoxychlor	mg/kg	0.1	Org-005	<0.1	11	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-005	104	11	96	102	6	96	96

QUALITY CONTROL: Organochlorine Pesticides in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	1	22/02/2018	22/02/2018		[NT]	[NT]
Date analysed	-			[NT]	1	22/02/2018	22/02/2018		[NT]	[NT]
HCB	mg/kg	0.1	Org-005	[NT]	1	<0.1	<0.1	0	[NT]	[NT]
alpha-BHC	mg/kg	0.1	Org-005	[NT]	1	<0.1	<0.1	0	[NT]	[NT]
gamma-BHC	mg/kg	0.1	Org-005	[NT]	1	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-005	[NT]	1	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-005	[NT]	1	<0.1	<0.1	0	[NT]	[NT]
delta-BHC	mg/kg	0.1	Org-005	[NT]	1	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-005	[NT]	1	<0.1	<0.1	0	[NT]	[NT]
Heptachlor Epoxide	mg/kg	0.1	Org-005	[NT]	1	<0.1	<0.1	0	[NT]	[NT]
gamma-Chlordane	mg/kg	0.1	Org-005	[NT]	1	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-005	[NT]	1	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-005	[NT]	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-005	[NT]	1	<0.1	<0.1	0	[NT]	[NT]
Dieldrin	mg/kg	0.1	Org-005	[NT]	1	<0.1	<0.1	0	[NT]	[NT]
Endrin	mg/kg	0.1	Org-005	[NT]	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-005	[NT]	1	<0.1	<0.1	0	[NT]	[NT]
Endosulfan II	mg/kg	0.1	Org-005	[NT]	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-005	[NT]	1	<0.1	<0.1	0	[NT]	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-005	[NT]	1	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-005	[NT]	1	<0.1	<0.1	0	[NT]	[NT]
Methoxychlor	mg/kg	0.1	Org-005	[NT]	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-005	[NT]	1	105	100	5	[NT]	[NT]

QUALITY CONTROL: Organophosphorus Pesticides						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	185713-2
Date extracted	-			22/02/2018	11	22/02/2018	22/02/2018		22/02/2018	22/02/2018
Date analysed	-			22/02/2018	11	22/02/2018	22/02/2018		22/02/2018	22/02/2018
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-008	<0.1	11	<0.1	<0.1	0	[NT]	[NT]
Bromophos-ethyl	mg/kg	0.1	Org-008	<0.1	11	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos	mg/kg	0.1	Org-008	<0.1	11	<0.1	<0.1	0	101	101
Chlorpyriphos-methyl	mg/kg	0.1	Org-008	<0.1	11	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-008	<0.1	11	<0.1	<0.1	0	[NT]	[NT]
Dichlorvos	mg/kg	0.1	Org-008	<0.1	11	<0.1	<0.1	0	108	100
Dimethoate	mg/kg	0.1	Org-008	<0.1	11	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-008	<0.1	11	<0.1	<0.1	0	109	110
Fenitrothion	mg/kg	0.1	Org-008	<0.1	11	<0.1	<0.1	0	107	104
Malathion	mg/kg	0.1	Org-008	<0.1	11	<0.1	<0.1	0	114	106
Parathion	mg/kg	0.1	Org-008	<0.1	11	<0.1	<0.1	0	95	96
Ronnel	mg/kg	0.1	Org-008	<0.1	11	<0.1	<0.1	0	103	102
Surrogate TCMX	%		Org-008	104	11	96	102	6	96	96

QUALITY CONTROL: Organophosphorus Pesticides						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	1	22/02/2018	22/02/2018		[NT]	[NT]
Date analysed	-			[NT]	1	22/02/2018	22/02/2018		[NT]	[NT]
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-008	[NT]	1	<0.1	<0.1	0	[NT]	[NT]
Bromophos-ethyl	mg/kg	0.1	Org-008	[NT]	1	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos	mg/kg	0.1	Org-008	[NT]	1	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos-methyl	mg/kg	0.1	Org-008	[NT]	1	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-008	[NT]	1	<0.1	<0.1	0	[NT]	[NT]
Dichlorvos	mg/kg	0.1	Org-008	[NT]	1	<0.1	<0.1	0	[NT]	[NT]
Dimethoate	mg/kg	0.1	Org-008	[NT]	1	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-008	[NT]	1	<0.1	<0.1	0	[NT]	[NT]
Fenitrothion	mg/kg	0.1	Org-008	[NT]	1	<0.1	<0.1	0	[NT]	[NT]
Malathion	mg/kg	0.1	Org-008	[NT]	1	<0.1	<0.1	0	[NT]	[NT]
Parathion	mg/kg	0.1	Org-008	[NT]	1	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-008	[NT]	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-008	[NT]	1	105	100	5	[NT]	[NT]

QUALITY CONTROL: PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	185713-2
Date extracted	-			22/02/2018	11	22/02/2018	22/02/2018		22/02/2018	22/02/2018
Date analysed	-			22/02/2018	11	22/02/2018	22/02/2018		22/02/2018	22/02/2018
Aroclor 1016	mg/kg	0.1	Org-006	<0.1	11	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-006	<0.1	11	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-006	<0.1	11	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-006	<0.1	11	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-006	<0.1	11	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-006	<0.1	11	<0.1	<0.1	0	84	82
Aroclor 1260	mg/kg	0.1	Org-006	<0.1	11	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCLMX	%		Org-006	104	11	96	102	6	96	96

QUALITY CONTROL: PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	1	22/02/2018	22/02/2018		[NT]	[NT]
Date analysed	-			[NT]	1	22/02/2018	22/02/2018		[NT]	[NT]
Aroclor 1016	mg/kg	0.1	Org-006	[NT]	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-006	[NT]	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-006	[NT]	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-006	[NT]	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-006	[NT]	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-006	[NT]	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1260	mg/kg	0.1	Org-006	[NT]	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCLMX	%		Org-006	[NT]	1	105	100	5	[NT]	[NT]

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	185713-2
Date prepared	-			22/02/2018	11	22/02/2018	22/02/2018		22/02/2018	22/02/2018
Date analysed	-			22/02/2018	11	22/02/2018	22/02/2018		22/02/2018	22/02/2018
Arsenic	mg/kg	4	Metals-020	<4	11	<4	<4	0	102	85
Cadmium	mg/kg	0.4	Metals-020	<0.4	11	<0.4	<0.4	0	92	80
Chromium	mg/kg	1	Metals-020	<1	11	29	27	7	100	86
Copper	mg/kg	1	Metals-020	<1	11	37	38	3	106	107
Lead	mg/kg	1	Metals-020	<1	11	80	110	32	98	87
Mercury	mg/kg	0.1	Metals-021	<0.1	11	<0.1	<0.1	0	99	95
Nickel	mg/kg	1	Metals-020	<1	11	45	46	2	100	91
Zinc	mg/kg	1	Metals-020	<1	11	97	93	4	99	91

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	1	22/02/2018	22/02/2018		[NT]	[NT]
Date analysed	-			[NT]	1	22/02/2018	22/02/2018		[NT]	[NT]
Arsenic	mg/kg	4	Metals-020	[NT]	1	<4	<4	0	[NT]	[NT]
Cadmium	mg/kg	0.4	Metals-020	[NT]	1	<0.4	<0.4	0	[NT]	[NT]
Chromium	mg/kg	1	Metals-020	[NT]	1	18	21	15	[NT]	[NT]
Copper	mg/kg	1	Metals-020	[NT]	1	24	40	50	[NT]	[NT]
Lead	mg/kg	1	Metals-020	[NT]	1	16	17	6	[NT]	[NT]
Mercury	mg/kg	0.1	Metals-021	[NT]	1	<0.1	<0.1	0	[NT]	[NT]
Nickel	mg/kg	1	Metals-020	[NT]	1	63	99	44	[NT]	[NT]
Zinc	mg/kg	1	Metals-020	[NT]	1	31	41	28	[NT]	[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 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 185713-1 for Cu. Therefore a triplicate result has been issued as laboratory sample number 185713-25.

PCBs in Soil (smaple 16,19) - PQL has been raised due to interference from analytes(other than those being tested) in the sample/s.

Asbestos: A portion of the supplied sample was sub-sampled for asbestos analysis according to Envirolab procedures. We cannot guarantee that this sub-sample is indicative of the entire sample. Envirolab recommends supplying 40-50g of sample in its own container.
Note: Samples 185713-1, 14-16, 19, 20 were sub-sampled from jars provided by the client.

Asbestos-ID in soil: NEPM
This report is consistent with the reporting recommendations in the National Environment Protection (Assessment of Site Contamination) Measure, Schedule B1, May 2013.
This is reported outside our scope of NATA accreditation.

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CERTIFICATE OF ANALYSIS 185713-A

Client Details

Client	Progressive Risk Management Pty Ltd
Attention	Ben McGiffin
Address	79 Darley Rd, Manly, NSW, 2095

Sample Details

Your Reference	**PO33725.001 - Ashbury**
Number of Samples	Additional Testing on 9 Soils
Date samples received	21/02/2018
Date completed instructions received	28/02/2018

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	05/03/2018
Date of Issue	05/03/2018

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Accredited for compliance with ISO/IEC 17025 - Testing. **Tests not covered by NATA are denoted with ***

Asbestos Approved By
Analysed by Asbestos Approved Identifier: Jessica Hie, Lucy Zhu
Authorised by Asbestos Approved Signatory: Lulu Scott

Results Approved By
Jeremy Faircloth, Organics Supervisor
Long Pham, Team Leader, Metals
Steven Luong, Senior Chemist

Authorised By

David Springer, General Manager

PAHs in Soil		
Our Reference		185713-A-7
Your Reference	UNITS	TP103
Depth		0.9-1.0
Type of sample		soil
Date extracted	-	28/02/2018
Date analysed	-	28/02/2018
Naphthalene	mg/kg	<0.1
Acenaphthylene	mg/kg	<0.1
Acenaphthene	mg/kg	<0.1
Fluorene	mg/kg	<0.1
Phenanthrene	mg/kg	0.2
Anthracene	mg/kg	<0.1
Fluoranthene	mg/kg	0.1
Pyrene	mg/kg	0.2
Benzo(a)anthracene	mg/kg	<0.1
Chrysene	mg/kg	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2
Benzo(a)pyrene	mg/kg	0.06
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1
Total +ve PAH's	mg/kg	0.5
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5
Surrogate p-Terphenyl-d14	%	87

Moisture		
Our Reference		185713-A-7
Your Reference	UNITS	TP103
Depth		0.9-1.0
Type of sample		soil
Date prepared	-	28/02/2018
Date analysed	-	01/03/2018
Moisture	%	19

Metals in TCLP USEPA1311						
Our Reference		185713-A-1	185713-A-5	185713-A-6	185713-A-9	185713-A-11
Your Reference	UNITS	TP101	TP103	TP103	TP104	TP105
Depth		0.15-0.2	0.3-0.4	0.6-0.7	0.4-0.5	0.1-0.2
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	02/03/2018	02/03/2018	28/02/2018	02/03/2018	28/02/2018
Date analysed	-	02/03/2018	02/03/2018	[NA]	02/03/2018	[NA]
pH of soil for fluid# determ.	pH units	8.2	7.8	7.5	7.6	7.7
pH of soil TCLP (after HCl)	pH units	1.7	1.7	1.7	1.7	1.7
Extraction fluid used	-	1	1	1	1	1
pH of final Leachate	pH units	5.0	5.0	5.0	5.0	5.0
Nickel in TCLP	mg/L	0.04	<0.02	[NA]	<0.02	[NA]

Metals in TCLP USEPA1311				
Our Reference		185713-A-12	185713-A-14	185713-A-16
Your Reference	UNITS	TP105	TP106	TP107
Depth		0.4-0.5	0.3-0.4	0.1-0.2
Type of sample		soil	soil	soil
Date extracted	-	02/03/2018	02/03/2018	02/03/2018
Date analysed	-	02/03/2018	02/03/2018	02/03/2018
pH of soil for fluid# determ.	pH units	8.3	8.1	7.6
pH of soil TCLP (after HCl)	pH units	1.7	1.7	1.7
Extraction fluid used	-	1	1	1
pH of final Leachate	pH units	5.3	5.0	5.0
Lead in TCLP	mg/L	[NA]	[NA]	0.06
Nickel in TCLP	mg/L	0.03	0.03	[NA]

PAHs in TCLP (USEPA 1311)					
Our Reference		185713-A-5	185713-A-6	185713-A-11	185713-A-16
Your Reference	UNITS	TP103	TP103	TP105	TP107
Depth		0.3-0.4	0.6-0.7	0.1-0.2	0.1-0.2
Type of sample		soil	soil	soil	soil
Date extracted	-	01/03/2018	01/03/2018	01/03/2018	01/03/2018
Date analysed	-	01/03/2018	01/03/2018	01/03/2018	01/03/2018
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	NIL (+)VE	NIL (+)VE	NIL (+)VE	NIL (+)VE
Surrogate p-Terphenyl-d14	%	84	78	86	93

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.
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
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.
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 are actually at the PQL. This is the most conservative 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 are zero. This is the least conservative approach and 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 are half the stipulated PQL. Hence a mid-point 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.

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-7	[NT]
Date extracted	-			28/02/2018	[NT]	[NT]	[NT]	[NT]	28/02/2018	[NT]
Date analysed	-			28/02/2018	[NT]	[NT]	[NT]	[NT]	28/02/2018	[NT]
Naphthalene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	92	[NT]
Acenaphthylene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	86	[NT]
Phenanthrene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	91	[NT]
Anthracene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	80	[NT]
Pyrene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	83	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	97	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-012	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-012	<0.05	[NT]	[NT]	[NT]	[NT]	95	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-012	90	[NT]	[NT]	[NT]	[NT]	114	[NT]

QUALITY CONTROL: Metals in TCLP USEPA1311					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			02/03/2018	1	02/03/2018	02/03/2018		02/03/2018	[NT]
Date analysed	-			02/03/2018	1	02/03/2018	02/03/2018		02/03/2018	[NT]
Lead in TCLP	mg/L	0.03	Metals-020 ICP-AES	<0.03	[NT]	[NT]	[NT]	[NT]	97	[NT]
Nickel in TCLP	mg/L	0.02	Metals-020 ICP-AES	<0.02	1	0.04	0.03	29	99	[NT]

QUALITY CONTROL: PAHs in TCLP (USEPA 1311)					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date extracted	-			01/03/2018	[NT]	[NT]	[NT]	[NT]	01/03/2018	[NT]
Date analysed	-			01/03/2018	[NT]	[NT]	[NT]	[NT]	01/03/2018	[NT]
Naphthalene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	[NT]	[NT]	78	[NT]
Acenaphthylene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Acenaphthene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluorene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	[NT]	[NT]	75	[NT]
Phenanthrene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	[NT]	[NT]	84	[NT]
Anthracene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluoranthene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	[NT]	[NT]	76	[NT]
Pyrene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	[NT]	[NT]	77	[NT]
Benzo(a)anthracene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chrysene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	[NT]	[NT]	87	[NT]
Benzo(bjk)fluoranthene in TCLP	mg/L	0.002	Org-012	<0.002	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(a)pyrene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	[NT]	[NT]	97	[NT]
Indeno(1,2,3-c,d)pyrene - TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibenzo(a,h)anthracene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(g,h,i)perylene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-012	99	[NT]	[NT]	[NT]	[NT]	86	[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 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.

Envirolab Services Pty Ltd
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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 185713-B

Client Details

Client	Progressive Risk Management Pty Ltd
Attention	Jessica Little
Address	79 Darley Rd, Manly, NSW, 2095

Sample Details

Your Reference	**PO33725.001 - Ashbury**
Number of Samples	Additional Testing on 1 Soil
Date samples received	21/02/2018
Date completed instructions received	01/03/2018

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	05/03/2018
Date of Issue	05/03/2018

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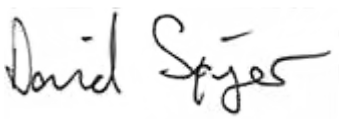
Accredited for compliance with ISO/IEC 17025 - Testing. **Tests not covered by NATA are denoted with ***

Asbestos Approved By
Analysed by Asbestos Approved Identifier: Jessica Hie, Lucy Zhu
Authorised by Asbestos Approved Signatory: Lulu Scott
Results Approved By
Long Pham, Team Leader, Metals

Authorised By



David Springer, General Manager

Metals in TCLP USEPA1311		
Our Reference		185713-B-20
Your Reference	UNITS	TP109
Depth		0.0-0.1
Type of sample		soil
Date extracted	-	02/03/2018
Date analysed	-	02/03/2018
pH of soil for fluid# determ.	pH units	8.2
pH of soil TCLP (after HCl)	pH units	1.7
Extraction fluid used	-	1
pH of final Leachate	pH units	5.1
Lead in TCLP	mg/L	0.61

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.

QUALITY CONTROL: Metals in TCLP USEPA1311					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			02/03/2018	[NT]	[NT]	[NT]	[NT]	02/03/2018	[NT]
Date analysed	-			02/03/2018	[NT]	[NT]	[NT]	[NT]	02/03/2018	[NT]
Lead in TCLP	mg/L	0.03	Metals-020 ICP-AES	<0.03	[NT]	[NT]	[NT]	[NT]	97	[NT]

Result Definitions

NT	Not tested
NA	Test not required
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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.

COC 21/2 5:54pm

CHAIN OF CUSTODY - Client

ENVIROLAB GROUP - National phone number 1300 42 43 44

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12 Ashley St, Chatswood, NSW 2067
Ph 02 9910 6200 / sydney@envirolab.com.au

Perth Lab - MPL Laboratories
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Ph 08 9317 2505 / lab@mpl.com.au

Melbourne Lab - Envirolab Services
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Ph 03 9763 2500 / melbourne@envirolab.com.au

Brisbane Office - Envirolab Services
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Ph 07 3266 9532 / brisbane@envirolab.com.au

Adelaide Office - Envirolab Services
7a The Parade, Norwood, SA 5067

Client:	Progressive Risk Management	**Project Details:**	P033725.001 - Ashbury
Contact Person:	Ben McGiffin	**Envirolab Quote:**	17SY425
Project Mgr:	Jonathan Coffey	**Date results required:**	
Sampler:	Ben McGiffin	**or (circle)**	
Mobile:	0401 313 206	**Same day (100%)** / **1 day (50%)** / **2 day (25%)**	
Email:	results@progressiverm.com.au	**3 day (12.5%)** / **Standard**	
		Lab Comments:	

Sample information					Tests Required																	Comments
Envirolab Sample ID	Client Sample ID or information	Depth	Date sampled	Type of sample	Combo 6a	Combo 6	Asbestos in Soil (NEPM)	BTEX	TRH													Provide as much information about the sample as you can
1	TP101_0.15-0.2	0.15-0.2		Soil	X																	
2	TP101_0.6-0.7	0.6-0.7		Soil	X																	
3	TP102_0.4-0.5	0.4-0.5		Soil		X																
4	TP102_0.6-0.7	0.6-0.7		Soil	X																	
5	TP103_0.3-0.4	0.3-0.4		Soil		X																
6	TP103_0.6-0.7	0.6-0.7		Soil		X																
7	TP103_0.9-1.0	0.9-1.0		Soil																		
8	TP104_0.1-0.2	0.8-0.9		Soil		X																
9	TP104_0.4-0.5	0.4-0.5		Soil		X																
10	TP104_0.8-0.9	0.8-0.9		Soil																		
11	TP105_0.1-0.2	0.1-0.2		Soil		X																
12	TP105_0.4-0.5	0.4-0.5		Soil		X																
13	TP105_0.7-0.8	0.7-0.8		Soil																		
14	TP106_0.3-0.4	0.3-0.4		Soil	X																	
15	TP106_0.7-0.8	0.7-0.8		Soil	X																	
16	TP107_0.1-0.2	0.1-0.2		Soil	X																	
17	TP107_0.3-0.4	0.3-0.4		Soil	X																	
18	TP107_0.6-0.7	0.6-0.7		Soil																		
19	TP108_0.0-0.1	0.0-0.1		Soil	X																	
20	TP109_0.0-0.1	0.0-0.1		Soil	X																	
2	TP101_0.6-0.7	0.6-0.7		Bulk Soil																		
3	TP102_0.4-0.5	0.4-0.5		Bulk Soil			X															
4	TP102_0.6-0.7	0.6-0.7		Bulk Soil																		
5	TP103_0.3-0.4	0.3-0.4		Bulk Soil			X															
6	TP103_0.6-0.7	0.6-0.7		Bulk Soil			X															
8	TP104_0.1-0.2	0.1-0.2		Bulk Soil			X															
9	TP104_0.4-0.5	0.4-0.5		Bulk Soil			X															
11	TP105_0.1-0.2	0.1-0.2		Bulk Soil			X															
12	TP105_0.4-0.5	0.4-0.5		Bulk Soil			X															
NR 14	TP107_0.1-0.2	0.1-0.2		Bulk Soil																		
17	~~TP107_0.3-0.4~~			Bulk Soil																		
21	001Dup01			Soil		X																
22	001Dup02			Soil		X																
23	001Spike			Soil				X														
24	001Blank			Soil				X	X													

Relinquished by (Company):		**Received by (Company):**	ELS
Print Name:		**Print Name:**	JE
Date & Time:		**Date & Time:**	21.2.18 17:00
Signature:		**Signature:**	

Lab use only:
Samples Received: Cool or Ambient (circle one)
Temperature Received at: 14.5 **(if applicable)**
Transported by: Hand delivered / courier

ENVIROLAB GROUP
Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200

Job No: 185713

Date Received: 21.2.18
Time Received: 17:00
Received by: JE
Temp: Cool/Ambient 14.5°C
Cooling: Ice/Icepack
Security: Intact/Broken/None

Appendix E Data Quality Objectives and Review of Quality Assurance / Quality Control

Data Quality Objectives: Data Gap Analysis at 165-169 Holden Street, Ashbury NSW

Step 1 – Define the Problem

Concise Description of the Problem

PRM understand that Sydney Water propose to divest the site with intentions for low density residential land use.

A Data Gap Analysis (DGA) was required to provide further delineation of areas of concern, identified in *Combined Stage 1 and 2 Detailed Site Investigation, Sydney Water Ashfield Reservoir, 165-169 Holden Street, Ashbury NSW, July 2015,* by Parsons Brinckeroff (PB 2015). PB (2015) identified areas of fill impacted by asbestos containing material (ACM), heavy metals and polycyclic aromatic hydrocarbons (PAHs) that exceeded human health criteria for residential land use.

The findings the DGA will be used to improve detail surrounding the development of a remediation action plan for the site.

Planning Team Members and Decision Makers

The project was commissioned by Sydney Water. The PRM team included:

Ben McGiffin – PRM Environmental Consultant

Jessica Little – PRM Environmental Consultant

Jonathan Coffey – PRM Principal Consultant

Summary of Available Resources, Constraints and Deadlines

The previous Combined Stage 1 and 2 Detailed Site Assessment by PB (2015) was available for review.

There are existing building within the site boundary which presented an access constraint as outlined in Section 4. Further assessment following building demolition will be required.

Step 2 – Identify the Decision

1.1. Decision Statement Linking the Principal Study Question to Possible Actions that will Solve the Problem

Based on the decision making process for assessing urban redevelopment sites detailed in Appendix A *Guidelines for the NSW Site Auditor Scheme (NSW EPA 2017)* which has been modified to the specific project objectives of this DGA, the following decisions were required to be made:

- Has the extent of contaminated fill material identified in PB (2015) been appropriately delineated?
- Do the chemicals of potential concern, outlined in the PB (2015) report pose a risk to future site receptors?
- What is the extent of remediation required to make the site suitable for proposed residential land use?

Step 3 – Identification of Inputs into the Decision

List of Informational Inputs Needed to Resolve the Decision Statement

- PB (2015) Combined PSI DSI report.
- Findings of current subsurface investigation including test pitting, soil sampling and laboratory analysis.

Identification of the Media to be Assessed

Soil was the media selected for assessment based on the scope of works and the findings of previous site assessments.

List of Environmental Variables or Characteristics that will be Measured

The following analytical suite was adopted for soil assessment:

- Heavy metals (Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Zinc).
- Total recoverable hydrocarbons (TRH).
- Benzene, Toluene, Ethyl Benzene, Xylene (BTEX).
- Polycyclic aromatic hydrocarbons (PAH).
- Organochlorine- and Organophosphorus Pesticides (OCP/OPP).
- Polychlorinated Biphenyls (PCB).
- Asbestos.
- Toxicity Characteristic Leaching Procedure (TCLP) analysis for lead, nickel and PAHs on selected samples.

Identification of Site Criteria of Each Medium of Concern

The assessment criteria adopted for the project included ASC NEPM (2013) Health Investigation Levels (HIL) and Health Screening Levels (HSLs) for residential land use.

Generic Ecological Investigation Levels (EIL) and Ecological Screening Levels (ESLs) were also adopted to assess potential risk to site ecological receptors.

Identification of Analytical Methods that are Required for Chemicals of Potential Concern so that Assessment can be made Relative to the Site Criteria.

The table below outlines the analytical methods of the NATA accredited primary laboratory Envirolab Services.

Soil Analytical Methods	
Analyte	**Analytical Metho**
Metals	ICP – AES (USEPA 200.7)
BTEX / TRH	Purge and Trap / GC-MS
OCP/OPP/PAH	GC/ECD/MS
Asbestos	PLM / Dip. Stain (AS4964)

List of Informational Inputs Required to Resolve the Decision Statement

- Field observations and visual / olfactory indications of contamination.

- Laboratory analysis of soil.
- Updated conceptual site model.

Step 4 – Defining the Study Boundary

Detailed Description of the Spatial and Temporal Boundaries of the Problem

The lateral project boundary is presented in Figure 2 Appendix A. The vertical extent of the investigation is the maximum depth of investigation.

The temporal boundaries of the project are limited to the time that field works were conducted. Only one round of soil sampling conducted for this DGA.

Practical Constraints that May Interfere with the Study

There are existing buildings within the site boundary which limit access to all site areas. Additional investigation within the building footprints will be required following demolition.

Step 5 – Developing Decision Rules

The decision rules adopted to answer the decisions outlines in Section 2 are summarised in the following table.

Summary of Decision Rules	
Decision to be Made	**Decision Rule**
Has the extent of contaminated fill material identified in PB (2015) been appropriately delineated?	Yes, if no further contaminated material identified during DGA subsurface investigation. Otherwise no.
Do the chemicals of potential concern, outlined in the PB (2015) report pose a risk to future site receptors?	Yes if: • Analytical results exceed the adopted site acceptance criteria. • The investigation identified aesthetic issues including odours and or soil staining. Otherwise No
What is the extent of remediation required to make the site suitable for proposed residential land use?	Remediation extent will be dictated by the findings of the DGA test pits and laboratory results. If analytical results exceed the adopted site criteria or aesthetic issues are identified at a testing location, then remediation of that area is required.

Step 6 – Specify Limits on Decision Errors

Step 6 of the DQO process requires the assessment of project data against data quality indicators (DQIs) established in relation to precision, accuracy, representativeness, comparability and completeness (PARCC parameters). Project DQIs are summarised bellow.

Table 6 : Summary of Data Quality Objectives and Indicators		
Data Quality Objective	**Frequency Conducted**	**Data Quality Indicator**
Precision		
Intra-laboratory field duplicates	1/10 Samples	>5x LOR: 50% RPD Not required for asbestos testing
Laboratory duplicates (Envirolab)	1/20 Samples	>5x LOR: 50% RPD Not required for asbestos testing
Laboratory Method blanks	1/20 Samples	< LOR Not required for asbestos testing

Accuracy		
Matrix Spikes	1/20 Samples	Acceptable Recoveries: 70 to 130% for metals and inorganics. 60-140% for organics No required for asbestos testing.
Laboratory Control Spike	1/20 Samples	Acceptable Recoveries: 70 to 130% for metals and inorganics. 60-140% for organics No required for asbestos testing.
Surrogate Spike	1/20 Samples	Acceptable Recoveries: 70 to 130% for metals and inorganics. 60-140% for organics No required for asbestos testing.
Representativeness		
Sample handling, storage and transport appropriate for media and analytes	All samples	All samples
Rinsate blanks	1 per day per equipment	Not required due to sampling protocols to prevent cross contamination
Trip Spike	1 per media	60-140% recovery
Samples extracted and analysed within holding times	Hold Times: Organics – 7 days Inorganics – 6 months	
Comparability		
Standard operating procedures used for sample collection and handling	All samples	Required for all samples
Standard analytical methods used for all analyses	All samples	Required for all samples
Consisted field conditions, sampling staff and laboratory analysis	All samples	Required for duration of project
Limits of reporting appropriate and consistent	All samples	Required for all samples
Completeness		
Soil description and COC's completed and appropriate	All samples	Required for all samples
Appropriate documentation for testing	All samples	Required for all samples

Step 7 – Optimise Design

The Optimum Manner in which to Collect the Data Required to meet the Objectives for the Assessment and which will meet the Project DQO's

To achieve the project DQOs and answer the principle study question (Step 2), a combined grid based and judgemental sampling program was selected. Judgemental sampling locations were selected to further delineate hotspot areas identified in the PB (2015) report.

Also, following review of the PB (2015) data, site areas were identified as having limited testing and a grid based testing pattern was implemented to fill this data gap.

Assessment of QA/QC Data Quality Objectives	Frequency	Frequency Achieved?	DQI	DQI Met?
Precision				
Intra-laboratory field duplicates	1/10	Yes: 2 field duplicates were collected for 17 primary samples	>5*LOR: 50% RPD	Yes –
Laboratory Duplicates	1/20	Yes: 6 laboratory duplicates were completed	>5*LOR: 50% RPD	Yes – with the exception of sample 185713-13-48 which reported RPD >50% for Copper. RPD exceedance was attributed to inhomogeneous nature of the sample and a4 laboratory triplicate analysis confirmed this finding.
Laboratory method blanks	1/10 primary samples	Yes 2 blanks were analysed	<LOR	Yes: All analytes <LOR
Accuracy				
Laboratory Matrix Spikes	1/10	Yes	Acceptable Recoveries: 70 – 130% for metals and inorganics & 60 – 140% for organics	Yes
Surrogate spikes	1/10	Yes		Yes
Representativeness				
Samples handling, storage and transport appropriate for media	All samples	Yes	Received by laboratory cooled with containers in good condition	Yes: Laboratory SRA advice indicates samples were received by the laboratory in good condition.
Trip Spike	Min: 1 per sampling event	Yes: 1 trip spikes was used during sampling works (water and soil)	70-130% recovery	Yes
Samples extracted and analysed within holding times	All samples	Yes	Hold times: 7 days organics 6 months inorganics	Yes: all samples analysed within holding times.

Assessment of QA/QC				
Data Quality Objectives	**Frequency**	**Frequency Achieved?**	**DQI**	**DQI Met?**
Comparability				
Standard operating procedures used for samples collection and handling	All Samples	Yes	Approved methodology to be used for all sample collection and handling	Yes: See the main report for sample collection and handling methodology.
Standard analytical methods used for all analyses	All Samples	Yes	Approved methodology to be used for all sample analysis	All samples were analysed by a NATA accredited laboratory using approved methodology.
Consistent field conditions and laboratory analysis	All Samples	Yes	Consistent field sampling and laboratory analysis.	Yes: Samples were collected in the field over one sampling event by the same PRM staff members. All samples were analysed by Envirolab Services.
Limits of reporting appropriate and consistent	All Samples	Yes	-	Yes: With the exception of PCB in samples 185713-16 and 185713-19 with the LOR raised due to interference from other analytes not tested. The raised LOR for these samples is still less than the adopted SAC and does not impact the data useability.
Completeness				
Soil description and COCs completed and appropriate	All Samples	Yes	Appropriate documentation to be provided	Yes: Borehole logs and laboratory certificates are presented in Appendices.

Appendix F 95% UCL Calculations

Project Name:	**Data Gap Analysis**
Site Address:	**165-169 Holden Street, Ashbury NSW**
Client Name:	**Sydney Water Corporation**
Project Reference:	**P033725 / C0151**
Analytical Table:	**Table A1: 95% UCL Raw Data Summary**

Sample	B(a)P TEQ	Lead	Zinc	TRH (Coarse)
1	0.25	16	31	140
2	0.25	7	4	50
3	0.25	3	36	50
4	1.5	59	120	45
5	0.2	170	260	200
6	0.4	120	160	45
7	0.1	34	47	240
8	0.1	16	67	180
9	0.9	76	180	45
10	4.9	64	190	120
11	1.8	490	70	110
12		64	140	540
13		82		

UCL Statistics for Uncensored Full Data Sets

User Selected Options	
Date/Time of Computation	ProUCL 5.128/03/2019 5:37:25 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Lead

General Statistics

Total Number of Observations	13	Number of Distinct Observations	11
		Number of Missing Observations	0
Minimum	3	Mean	92.38
Maximum	490	Median	64
SD	128.6	Std. Error of Mean	35.66
Coefficient of Variation	1.392	Skewness	2.819

Normal GOF Test

Shapiro Wilk Test Statistic	0.64	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.866	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.301	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.234	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	155.9	95% Adjusted-CLT UCL (Chen-1995)	180.8
		95% Modified-t UCL (Johnson-1978)	160.6

Gamma GOF Test

A-D Test Statistic	0.331	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.767	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.162	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.245	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.813	k star (bias corrected MLE)	0.677
Theta hat (MLE)	113.6	Theta star (bias corrected MLE)	136.5
nu hat (MLE)	21.14	nu star (bias corrected)	17.59
MLE Mean (bias corrected)	92.38	MLE Sd (bias corrected)	112.3
		Approximate Chi Square Value (0.05)	9.097
Adjusted Level of Significance	0.0301	Adjusted Chi Square Value	8.239

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	178.7	95% Adjusted Gamma UCL (use when n<50)	197.3

Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.965	**Shapiro Wilk Lognormal GOF Test**	
5% Shapiro Wilk Critical Value	0.866	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.197	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.234	Data appear Lognormal at 5% Significance Level	
Data appear Lognormal at 5% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	1.099	Mean of logged Data	3.797
Maximum of Logged Data	6.194	SD of logged Data	1.366
Assuming Lognormal Distribution			
95% H-UCL	454.6	90% Chebyshev (MVUE) UCL	227.4
95% Chebyshev (MVUE) UCL	284.8	97.5% Chebyshev (MVUE) UCL	364.4
99% Chebyshev (MVUE) UCL	520.8		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution at 5% Significance Level			
Nonparametric Distribution Free UCLs			
95% CLT UCL	151	95% Jackknife UCL	155.9
95% Standard Bootstrap UCL	149.2	95% Bootstrap-t UCL	261.2
95% Hall's Bootstrap UCL	404.1	95% Percentile Bootstrap UCL	156.2
95% BCA Bootstrap UCL	182.3		
90% Chebyshev(Mean, Sd) UCL	199.4	95% Chebyshev(Mean, Sd) UCL	247.8
97.5% Chebyshev(Mean, Sd) UCL	315.1	99% Chebyshev(Mean, Sd) UCL	447.2
Suggested UCL to Use			
95% Adjusted Gamma UCL	197.3		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

UCL Statistics for Uncensored Full Data Sets

User Selected Options	
Date/Time of Computation	ProUCL 5.128/03/2019 5:36:03 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

TRH (Coarse)

General Statistics

Total Number of Observations	12	Number of Distinct Observations	9
		Number of Missing Observations	0
Minimum	45	Mean	147.1
Maximum	540	Median	115
SD	141.2	Std. Error of Mean	40.75
Coefficient of Variation	0.96	Skewness	2.194

Normal GOF Test

Shapiro Wilk Test Statistic	0.735	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.859	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.235	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.243	Data appear Normal at 5% Significance Level

Data appear Approximate Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	220.3	95% Adjusted-CLT UCL (Chen-1995)	241.7
		95% Modified-t UCL (Johnson-1978)	224.6

Gamma GOF Test

A-D Test Statistic	0.61	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.744	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.234	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.249	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.664	k star (bias corrected MLE)	1.304
Theta hat (MLE)	88.38	Theta star (bias corrected MLE)	112.8
nu hat (MLE)	39.94	nu star (bias corrected)	31.29
MLE Mean (bias corrected)	147.1	MLE Sd (bias corrected)	128.8
		Approximate Chi Square Value (0.05)	19.51
Adjusted Level of Significance	0.029	Adjusted Chi Square Value	18.1

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	235.9	95% Adjusted Gamma UCL (use when n<50)	254.2

Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.888	**Shapiro Wilk Lognormal GOF Test**	
5% Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.236	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.243	Data appear Lognormal at 5% Significance Level	
Data appear Lognormal at 5% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	3.807	Mean of logged Data	4.661
Maximum of Logged Data	6.292	SD of logged Data	0.822
Assuming Lognormal Distribution			
95% H-UCL	282.8	90% Chebyshev (MVUE) UCL	250.5
95% Chebyshev (MVUE) UCL	299.1	97.5% Chebyshev (MVUE) UCL	366.6
99% Chebyshev (MVUE) UCL	499.1		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution at 5% Significance Level			
Nonparametric Distribution Free UCLs			
95% CLT UCL	214.1	95% Jackknife UCL	220.3
95% Standard Bootstrap UCL	212.4	95% Bootstrap-t UCL	278.5
95% Hall's Bootstrap UCL	493.9	95% Percentile Bootstrap UCL	219.2
95% BCA Bootstrap UCL	242.5		
90% Chebyshev(Mean, Sd) UCL	269.3	95% Chebyshev(Mean, Sd) UCL	324.7
97.5% Chebyshev(Mean, Sd) UCL	401.6	99% Chebyshev(Mean, Sd) UCL	552.5
Suggested UCL to Use			
95% Student's-t UCL	220.3		
When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test			
When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

UCL Statistics for Uncensored Full Data Sets

User Selected Options	
Date/Time of Computation	ProUCL 5.128/03/2019 5:38:01 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Zinc

General Statistics

Total Number of Observations	12	Number of Distinct Observations	12
		Number of Missing Observations	0
Minimum	4	Mean	108.8
Maximum	260	Median	95
SD	78.42	Std. Error of Mean	22.64
Coefficient of Variation	0.721	Skewness	0.487

Normal GOF Test

Shapiro Wilk Test Statistic	0.946	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.859	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.189	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.243	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	149.4	95% Adjusted-CLT UCL (Chen-1995)	149.4
		95% Modified-t UCL (Johnson-1978)	149.9

Gamma GOF Test

A-D Test Statistic	0.297	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.748	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.156	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.25	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.405	k star (bias corrected MLE)	1.109
Theta hat (MLE)	77.41	Theta star (bias corrected MLE)	98.05
nu hat (MLE)	33.71	nu star (bias corrected)	26.62
MLE Mean (bias corrected)	108.8	MLE Sd (bias corrected)	103.3
		Approximate Chi Square Value (0.05)	15.86
Adjusted Level of Significance	0.029	Adjusted Chi Square Value	14.6

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	182.6	95% Adjusted Gamma UCL (use when n<50)	198.3

Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.866	**Shapiro Wilk Lognormal GOF Test**	
5% Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.167	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.243	Data appear Lognormal at 5% Significance Level	
Data appear Lognormal at 5% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	1.386	Mean of logged Data	4.293
Maximum of Logged Data	5.561	SD of logged Data	1.148
Assuming Lognormal Distribution			
95% H-UCL	426.8	90% Chebyshev (MVUE) UCL	270.7
95% Chebyshev (MVUE) UCL	334.2	97.5% Chebyshev (MVUE) UCL	422.4
99% Chebyshev (MVUE) UCL	595.5		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution at 5% Significance Level			
Nonparametric Distribution Free UCLs			
95% CLT UCL	146	95% Jackknife UCL	149.4
95% Standard Bootstrap UCL	143.9	95% Bootstrap-t UCL	155
95% Hall's Bootstrap UCL	149.7	95% Percentile Bootstrap UCL	145.4
95% BCA Bootstrap UCL	146.8		
90% Chebyshev(Mean, Sd) UCL	176.7	95% Chebyshev(Mean, Sd) UCL	207.4
97.5% Chebyshev(Mean, Sd) UCL	250.1	99% Chebyshev(Mean, Sd) UCL	334
Suggested UCL to Use			
95% Student's-t UCL	149.4		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

UCL Statistics for Uncensored Full Data Sets

User Selected Options	
Date/Time of Computation	ProUCL 5.128/03/2019 5:36:35 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

B(a)P TEQ

General Statistics

Total Number of Observations	11	Number of Distinct Observations	8
		Number of Missing Observations	0
Minimum	0.1	Mean	0.968
Maximum	4.9	Median	0.25
SD	1.429	Std. Error of Mean	0.431
Coefficient of Variation	1.475	Skewness	2.451

Normal GOF Test

Shapiro Wilk Test Statistic	0.653	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.85	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.291	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.251	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	1.749	95% Adjusted-CLT UCL (Chen-1995)	2.017
		95% Modified-t UCL (Johnson-1978)	1.802

Gamma GOF Test

A-D Test Statistic	0.703	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.761	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.26	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.265	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.775	k star (bias corrected MLE)	0.624
Theta hat (MLE)	1.249	Theta star (bias corrected MLE)	1.551
nu hat (MLE)	17.05	nu star (bias corrected)	13.74
MLE Mean (bias corrected)	0.968	MLE Sd (bias corrected)	1.225
		Approximate Chi Square Value (0.05)	6.391
Adjusted Level of Significance	0.0278	Adjusted Chi Square Value	5.595

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	2.081	95% Adjusted Gamma UCL (use when n<50)	2.377

Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.919	**Shapiro Wilk Lognormal GOF Test**	
5% Shapiro Wilk Critical Value	0.85	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.225	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.251	Data appear Lognormal at 5% Significance Level	
Data appear Lognormal at 5% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	-2.303	Mean of logged Data	-0.801
Maximum of Logged Data	1.589	SD of logged Data	1.256
Assuming Lognormal Distribution			
95% H-UCL	3.991	90% Chebyshev (MVUE) UCL	1.965
95% Chebyshev (MVUE) UCL	2.454	97.5% Chebyshev (MVUE) UCL	3.133
99% Chebyshev (MVUE) UCL	4.466		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution at 5% Significance Level			
Nonparametric Distribution Free UCLs			
95% CLT UCL	1.677	95% Jackknife UCL	1.749
95% Standard Bootstrap UCL	1.64	95% Bootstrap-t UCL	2.887
95% Hall's Bootstrap UCL	4.044	95% Percentile Bootstrap UCL	1.718
95% BCA Bootstrap UCL	2.045		
90% Chebyshev(Mean, Sd) UCL	2.26	95% Chebyshev(Mean, Sd) UCL	2.846
97.5% Chebyshev(Mean, Sd) UCL	3.658	99% Chebyshev(Mean, Sd) UCL	5.254
Suggested UCL to Use			
95% Adjusted Gamma UCL	2.377		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			