



Douglas Partners

Geotechnics | Environment | Groundwater

Report on
Preliminary Site Investigation (Contamination) with
Limited Sampling

Taronga Wildlife Hospital, Sydney

Prepared for
Taronga Conservation Society Australia

Project 99931.00
August 2022

Integrated Practical Solutions





Douglas Partners

Geotechnics | Environment | Groundwater

Document History

Document details

Project No.	99931.00	Document No.	R.003.Rev1
Document title	Report on Preliminary Site Investigation (Contamination) with Limited Sampling Taronga Wildlife Hospital, Sydney		
Site address	Taronga Zoo, Bradleys Head Rd, Mosman, NSW, 2088		
Report prepared for	Taronga Conservation Society Australia		
File name	99931.00.R.003.Rev1		


Document status and review

Status	Prepared by	Reviewed by	Date issued
Revision 0	Sam Balian	Mike Nash	6 October 2021
Revision 0A	Sam Balian	Mike Nash	8 December 2021
Revision 1	Mike Nash	Mike Nash	12 August 2022

Distribution of copies

Status	Electronic	Paper	Issued to
Revision 0	1	-	Paul De Alwis, Taronga Conservation Society Australia
Revision 0A	1	-	Kristine Marshall, Taronga Conservation Society Australia
Revision 1	1	-	Nick Virgona, Taronga Conservation Society Australia

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

	Signature	Date
Author	 pp	12 August 2022
Reviewer		12 August 2022



FS 604853

Douglas Partners Pty Ltd
ABN 75 053 980 117
www.douglaspartners.com.au
96 Hermitage Road
West Ryde NSW 2114
PO Box 472
West Ryde NSW 1685
Phone (02) 9809 0666

Table of Contents

	Page
1. Introduction.....	1
2. Site Description	1
3. Geology and Hydrogeology.....	2
4. Scope of Works.....	3
5. Site History	3
5.1 Aerial Photographs	3
5.2 Historical Land Uses	4
5.3 Contaminated Land Public Register	4
5.4 Groundwater Bore Search	4
5.5 Previous Investigation of UST	4
6. Previous Assessments.....	5
7. Site Inspection and Discussion with Taronga Staff.....	5
8. Initial Conceptual Site Model.....	6
9. Field Work Methods	7
10. Field Work Results	7
11. Laboratory Testing	8
12. Selected Comparative Criteria	8
13. Discussion of Results	8
14. Preliminary Waste Classification Advice.....	9
15. Conclusions and Recommendations	10
16. Limitations	11
Appendix A: About This Report	
Appendix B: Drawings	
Appendix C: Site History Information	
Appendix D: Field Work Results	
Appendix E: Laboratory Test Results	

Report on Preliminary Site Investigation (Contamination) with Limited Sampling Taronga Wildlife Hospital, Sydney Taronga Zoo

1. Introduction

This report presents the results of a Preliminary Site Investigation (Contamination) undertaken for the proposed Nutrition Centre Project at Taronga Zoo. The work was commissioned by the Taronga Conservation Society Australia and was undertaken in accordance with Douglas Partners' proposal SYD201344.002.Rev1 dated 8 December 2020.

It is understood that a new animal hospital facility is proposed on the existing Reptile World exhibit site (known as the Serpentaria building). The development will mainly be for staff use only, and a public forecourt will give zoo guests a view of front-of-house hospital operations. The development will involve the demolition of various structures, some earthworks, and construction of a two-storey animal hospital with a second-level plant room, a dedicated Level 3 plant room, and pedestrian linkage from Level 1 to the basement level of the proposed Nutrition Centre.

The Preliminary Site Investigation was undertaken to:

- Assess the previous land uses and likely subsurface conditions to determine the potential for soil and groundwater contamination on the site;
- Provide a preliminary assessment of the suitability of the site for the proposed development; and
- Provide recommendations for additional investigation, if required.

The Preliminary Site Investigation has been prepared to address the requirements of *State Environmental Planning Policy No 55 - Remediation of Land*. The overall approach for the Preliminary Site Investigation included a review of available historical information, an inspection of the site by an engineer, the drilling of boreholes, soil sampling and laboratory analysis. Details of the site history are given in this report, as well as comments on the issues outlined above.

Douglas Partners (DP) also undertook a geotechnical investigation of the site for both the Taronga Wildlife Hospital and Nutrition Centre projects, the results of which are outlined in the *Report on Geotechnical Investigation* for Project 99931.00 dated December 2021.

This report has not been specifically prepared for site audit purposes.

2. Site Description

The development covers the area from the base of the slope to the west of the main security entrance south about 150 m towards the chimpanzee enclosure and Reptile (serpentarium) exhibit. There are several brick buildings, framed storage sheds as well as the Reptile (serpentarium) exhibit within the proposed development area.

The site has been terraced and there are several cuttings and retaining walls which support structures and walking paths/roadways. Sandstone outcrops and cuttings are evident in the area of the works. Ground surface levels nearby the area range from about RL 62 m to RL 73 m AHD. The higher levels were encountered at the crest of the slope near the main security entrance.

Taronga Zoo is located on Lot 22, DP 843294. The portion of the site proposed for redevelopment is shown on Drawing 1 in Appendix B.

3. Geology and Hydrogeology

The *Sydney 1:100 000 Geological Series Sheet* shows that the site is underlain by Hawkesbury Sandstone which typically comprises medium to coarse-grained quartz sandstone with minor shale and laminite lenses. An extract from the geological map is shown in Figure 1.



Figure 1: Extract from geological map

The regional groundwater table is likely to be well below the bedrock surface. Near-surface Hawkesbury Sandstone generally exhibits low permeabilities which result in very low groundwater yields. Groundwater use from this aquifer is therefore unlikely to be significant.

Groundwater is likely to follow the surface topography and flow to the south.

4. Scope of Works

The scope of the Preliminary Site Investigation with limited sampling was as follows:

- Review various historical documents including aerial photographs, historical title deeds, the EPA Contaminated Land register and groundwater bore licences to determine the nature of previous activities that may have occurred on the site;
- Review results of previous investigations of the nearby underground petroleum storage system (UPSS) and previous underground storage tanks (USTs) to the west of the site;
- Undertake a brief site inspection;
- Drill ten boreholes (noting that five of the ten boreholes, WH3, WH4, WH6, WH7 and WH8 are located within the designated site boundary of the proposed Nutrition Centre), collect soil samples and undertake laboratory analysis for a range of common contaminants including:
 - o Total recoverable hydrocarbons (TRH);
 - o Benzene, toluene, ethylbenzene, xylene (BTEX);
 - o Polycyclic aromatic hydrocarbons (PAH);
 - o Organochlorine pesticides and organophosphorus pesticides (OCP & OPP);
 - o Polychlorinated biphenyls (PCB);
 - o Heavy metals (As, Cd, Cr, Cu, Pb, Hg, Ni and Zn); and
 - o Asbestos.
- Provide a Preliminary Site Investigation report which comments on the historical uses of the site, the potential for soil and groundwater contamination to be present and provides recommendations for follow up action (if required).

5. Site History

5.1 Aerial Photographs

A review of aerial photographs from 1930, 1951, 1961, 1994, 2005 and 2009 was undertaken to evaluate the land-use patterns on the site. The 1930 photograph shows that the development site is generally undeveloped and covered with vegetation. Some structures are present towards the south-west of the site and some access paths/roads are evident.

The 1951 photograph shows some development on and adjacent to the site. Numerous buildings are evident including what may be a pool-type structure to the east. The 1961 photograph shows similar conditions although some of the vegetation in the north-east of the site has been cleared.

The 1994 photograph shows several of the smaller back-of-house buildings and pavements within the site. On-grade vehicle parking facilities also exist to the east of the site. Due to the resolution of the 1994 photograph it is hard to make out individual buildings, but the site appears similar between the 1994 and 2005 photograph. The 2018 photograph shows similar conditions to the 2005 photograph although the building to the east of the site appears to have been demolished and reconstructed.

Scanned images of the aerial photographs are provided in Appendix C.

5.2 Historical Land Uses

The Taronga Zoo site was originally Crown land known as Ashton Park. Control of the land was passed to the Zoological Society of NSW between 1912 and 1916 and the zoo was officially opened in 1916. Ownership of the land was officially transferred to the Zoological Parks Board of NSW in 1992.

Taronga Zoo has been progressively developed since its inception and changes to site layout and exhibits have occurred intermittently throughout the zoo's operation. Fill is known to have been imported to the site in the past and asbestos-containing material (ACM) has been identified in existing filling in numerous areas of the site. Title deed information is provided in Appendix C.

5.3 Contaminated Land Public Register

A search undertaken on 16 February 2021 indicated that the development site is not on the Public Register of Notices issues under the Contaminated Land Management Act 1997. No sites within the Mosman Council local government area are listed on the register.

5.4 Groundwater Bore Search

A search of licensed groundwater bores in the Mosman area indicated that there are no licensed groundwater bores within Taronga Zoo.

5.5 Previous Investigation of UST

DP has undertaken several investigations in the vicinity of two underground storage tanks (USTs) located in the north-western corner of Taronga Zoo, (i.e., to the west of the current investigation area) adjacent to the Facilities Building.

The previous investigation in the vicinity of the USTs included the drilling of test bores and installation of groundwater wells (Report entitled UST System Leakage and Contamination, Taronga Zoo, Mosman, 27 March 2007, reference 44703).

Significant hydrocarbon contamination was identified in the tank pit backfill soils, the groundwater within the tank pit and the seepage sample. Free product, several millimetres thick, was identified on the phreatic surface within the tank pit.

Following advice from DP on the contamination present within the tank pit and advice from Gilbarco on the standard of the UST installation, zoo management decided to replace the tanks with a modern underground petrol storage system, including fibreglass tanks. The old tanks and backfill sands were removed along with the surrounding impacted sand and rock. The excavated material was stockpiled within the zoo property for remediation. It was noted during the tank removal works that a stormwater service line crossed the tank pit at the northern end, and it is considered possible that this provides a migration pathway for down-gradient seepage.

DP conducted an inspection and validation of the tank pit following the removal of the pre-existing USTs. Samples were collected from the walls and base of the tank-pit for validation purposes. The samples were analysed for TPH, BTEX, PAH, phenols and heavy metals. The samples collected were generally within the adopted assessment criteria, however, significant hydrocarbon contamination was identified in one sample (sample V8) on the south-western side of the tank pit (the down-gradient side of the tank pit).

Following the replacement of the USTs DP has undertaken routine monitoring of four wells located hydraulically down-gradient of the USTs at 6 monthly intervals (project series 73545), including measurement of the groundwater levels and visual inspection of the water column. During the course of the monitoring there has been no evidence of petroleum hydrocarbon groundwater contamination in the vicinity of the USTs.

6. Previous Assessments

Douglas Partners has previously undertaken contamination assessments at Taronga Zoo including:

- Preliminary Contamination Assessment for the Top Entrance and Staff Carpark (Project 37522A dated April 2005);
- Contamination Assessment for the Amazonian Exhibit Area (Project 45819B dated February 2009);
- Contamination Assessment for the 'Heart of the Zoo' Area (Project 71144 dated June 2009);
- Report on Preliminary Site Investigation (Contamination) for the proposed Sumatran tiger redevelopment (Project 73809.01 dated 30 March 2015); and
- Report on Preliminary Site Investigation (Contamination) for the proposed Institute of Science and Learning Centre (Project 85159.00 dated December 2015).

Information from these previous assessments by Douglas Partners was used in the current assessment where relevant.

7. Site Inspection and Discussion with Taronga Staff

A brief site walkover was undertaken by an Associate Engineer on 11 January 2021. Discussions about previous site uses were undertaken with zoo staff in a meeting on 2 March 2021. The inspection and discussions with zoo staff indicated:

- The area proposed for redevelopment currently houses back-of-house facilities including several brick buildings and framed storage sheds as well as the 'Reptile World' animal enclosure;
- There is an operational underground petroleum storage system (UPSS) which incorporates the UST (refer to comments in Section 5.5) to the west of the proposed development;
- Previously there was possibly an incinerator, as well as underground and above ground petroleum storage and bowsers located within the proposed development area although precise locations are unknown;
- Chemicals are not known to be currently stored within the redevelopment area;

- Known likely sources of asbestos in the area are underground services and building materials. Pieces of asbestos containing fibre cement have previously been observed nearby to the location of borehole WH8 prior to this investigation;
- All solid waste is removed from the site and recycled or disposed of in an appropriate manner; and
- All liquid waste is treated at an on-site treatment plant prior to being recycled for use within the zoo.

8. Initial Conceptual Site Model

The site appears to have been continually developed since the early to mid-20th Century for use as a zoological facility. The aerial photographs suggest most of the development in the area of interest has been post-1950.

On the basis of the information contained in this report, potentially contaminating activities that may have occurred on the site include:

- The placement of fill on the site;
- Contaminants associated with the current (offsite) UPSS and UST;
- Contaminants associated with the previous (suspected) incinerator, underground and above ground petroleum storage and bowsers;
- Contaminants associated with demolition activities (e.g., lead, asbestos, synthetic mineral fibres and polychlorinated biphenyls (PCBs));
- Contaminants associated with maintenance of the buildings on the site (e.g., pesticides and herbicides);
- Hazardous building materials (e.g., lead, asbestos, synthetic mineral fibres and PCBs etc.); and
- Naturally occurring elements in the soils and rock underlying the site (e.g., heavy metals).

The regional groundwater table is likely to be at considerable depth. The groundwater monitoring undertaken for the UPSS to the west of the site likely encountered perched ephemeral water and seepage which has shown no evidence of petroleum hydrocarbon groundwater contamination. The quality of the groundwater should therefore not hinder the proposed development.

Soil vapour intrusion and/or ground gas is currently considered to be a very low risk on the site and would only need to be considered if significant concentrations of volatile organic compounds are encountered on the site. This is considered unlikely for the site in its present state, however there is a potential risk if the current UPSS and associated UST to the west of the site is damaged or not properly monitored and maintained or if areas of hydrocarbon contamination from previous petroleum storage are uncovered.

The human receptors to soil contamination are likely to be the workers/visitors to the redeveloped site. Construction personnel and nearby workers may also be receptors during the construction phase of the redevelopment project.

The ecological receptors are likely to be limited to the flora and fauna that grow / live on areas of the site in which vegetation is proposed. The area is not known to be ecologically significant.

Exposure pathways are expected to be limited to dermal contact with soils on the site by humans, ingestion of soils and vegetation by fauna, and phytotoxic exposure to flora.

9. Field Work Methods

Ten cored boreholes (WH1 to WH9 and PF1) were drilled to depths of between 5.5 m and 12.0 m using a Hanjin D8 drilling rig. The boreholes were commenced using solid flight augers to drill through the soil to the top of rock. Soil samples were collected at regular intervals for laboratory testing in each borehole. Soon after rock was encountered, the bores were advanced using NMLC-sized diamond core drilling equipment to obtain 50 mm diameter continuous samples of the rock for identification and strength testing purposes.

Environmental sampling was performed according to standard operating procedures outlined in the DP Field Procedures Manual. All sampling data was recorded on DP chain of custody sheets. The general sampling and sample management procedures comprised:

- Collection of samples into laboratory-prepared glass jars with Teflon lined lids by hand, capping immediately and ensuring headspace within the sample jar is minimised;
- Screening for volatile contaminants using a photo-ionisation detection (PID) instrument;
- A new disposable nitrile glove was worn by the field scientist / engineer for each sample collected thereby precluding potential cross-contamination;
- Labelling of sample containers with individual and unique identification details, including project number, sample location and sample depth (where applicable); and
- Placement of the sample jars into a cooled, insulated and sealed container for transport to the laboratory.

10. Field Work Results

The subsurface conditions encountered in the boreholes are presented in the borehole logs in Appendix D. Notes defining descriptive terms and classification methods are also included in Appendix D. The boreholes encountered:

- **FILL** - typically asphalt, gravelly or clayey sand, and roadbase to depths of between 0.34 m to 1.23 m in all boreholes apart from WH2 and WH4 which encountered fill to depths of approximately 3.1 m. This deeper fill included the above material plus concrete, timber and asbestos containing fibre cement at depth in WH2. Traces of ash were encountered at some locations; overlying
- **SANDSTONE BEDROCK** - sandstone bedrock from depths of between 0.1 m and 3.6 m to the base of the bores at 5.5 m to 12.0 m depth. The rock was generally medium and high strength.

Natural soils were not encountered in the boreholes.

Groundwater was not observed whilst augering in any of the boreholes. The use of water as a drilling fluid during NMLC diamond coring of the bedrock precluded further observation of the groundwater levels below the bedrock surface during the field work.

Areas of deeper fill were encountered in boreholes WH2 and WH4; it is likely deeper fill may be encountered where filling has been required to achieve current site levels, for example at the top of cuttings and batters and in any natural gullies that may have previously run through the site.

The PID reading were generally low and typical of background levels.

11. Laboratory Testing

Envirolab Services Pty Ltd (Envirolab) was commissioned to undertake the analysis of the soil samples. A summary of the results is provided in Table E1 and E2 in Appendix E. The detailed report sheets and chain-of-custody documentation are also included in Appendix E.

12. Selected Comparative Criteria

The National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended 2013, Schedule B1 – Guideline on Investigation Levels for Soil and Groundwater (NEPC, 2013) provides Tier 1 investigation and screening levels for contaminants in various environmental media including soil, groundwater and soil vapour.

Given the current and proposed land use, the site is assumed to be a category 'D' site (i.e., Health-based Investigation Level (HIL) D) which uses include commercial and industrial, which assumes typical commercial or light industrial properties, consisting of single or multistorey buildings where work areas are on the ground floor (constructed on a ground level slab) or above subsurface structures (such as basement car parks or storage areas). Ecological-based assessment is based on the relevant investigation and screening levels/added concentrations for fine-grained sites due to the clayey nature of the soil profile.

The preliminary Tier 1 site assessment criteria adopted are shown in Table E3 in Appendix E.

13. Discussion of Results

Twenty soil (fill) samples (excluding a QA / QC duplicate) from ten test locations were analysed for metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc), TRH, BTEX, PAH, OCP, OPP and PCB. All the samples analysed recorded concentrations of these analytes that were below the adopted site assessment criteria.

Some pieces of fibre cement were encountered between 2.3 m and 3.1 m depth in WH2. One piece was tested and was found to contain chrysotile asbestos. There were no other obvious signs of possible asbestos containing materials in any of the other samples collected from the boreholes. Although borehole WH2 is one of the five boreholes located beyond the designated site boundary, the results of all ten boreholes are considered to be relevant as they represent the typical conditions across the site, and as such, the potential presence of asbestos cannot be ignored.

Twenty soil (fill) samples from were analysed for asbestos (presence / absence). Asbestos was not detected in any of the soil samples analysed (excluding the sample collected near to where the pieces of asbestos containing fibre cement were encountered).

14. Preliminary Waste Classification Advice

All materials requiring removal from the site will need to be classified in accordance with Waste Classification Guidelines (NSW EPA, 2014). The laboratory testing undertaken during this investigation can be used to provide a preliminary indication of the classification of the materials requiring disposal.

The waste classification guidelines include the following six-step process for waste classification:

- Establish if the waste is 'special waste';
- Establish if the waste is 'liquid waste';
- Establish if the waste is 'pre-classified' by the EPA;
- Establish if the waste possesses hazardous characteristics;
- Determine the contaminant concentrations of the waste; and
- Establish if the waste is putrescible.

Fragments of asbestos containing fibre cement were encountered in WH2 and are known to have previously been observed in other areas of the site. Any asbestos containing waste would be classified as Special Waste - Asbestos. Visual inspection and the laboratory analysis indicated that asbestos was not present in the rest of the soil samples tested. Asbestos is known to be present at the site, as such it is recommended that further investigation be carried out prior to or during construction (but post-demolition) to further delineate areas of possible asbestos contamination and to provide further waste classification advice.

The soil samples did not contain clinical waste or tyres and therefore the soils on the site are not classified as special waste due to other non-asbestos inclusions.

The samples analysed were not in liquid form and therefore could not be described as liquid waste.

The EPA has pre-classified glass, plastic, rubber, bricks, concrete, building and demolition waste, and asphalt waste as General Solid Waste (non-putrescible). The fill material contained some of these materials but was typically in a soil matrix and could therefore not be pre-classified.

The samples analysed did not possess any obvious hazardous characteristics and could not be described as hazardous waste prior to chemical analysis. All samples analysed were assessed on a visual and tactile basis as being incapable of significant biological transformation and are therefore considered to be non-putrescible.

The total concentrations in the samples of fill tested were compared to the CT1 threshold criteria provided in the guidelines. Of the twenty samples tested there was one exceedance for PAHs, seven exceedances for B(a)P, one exceedance for lead and four exceedances for nickel.

Toxicity characteristic leaching procedure (TCLP) testing was undertaken for PAHs on the four samples with the highest B(a)P readings including the PAH exceedance. TCLP testing was also carried out on all samples with lead and nickel exceedances. All results were below the TCLP1 criteria, with all reported concentration below the SCC1 criteria apart from PAHs and B(a)P in one sample, however the exceedance in this sample is likely as a result of ash contamination and can therefore be assessed based on their TCLP values alone in accordance with immobilisation approval 1999/05. Therefore, all samples tested meet the requirements of General Solid Waste (non-putrescible) based on the SCC1 and TCLP1. CT1, SCC1 and TCLP1 criteria are shown in Table E4 of Appendix E.

Although asbestos was not observed or detected in the soil samples analysed, pieces of asbestos containing fibre cement were encountered in fill at a depth of 2.34-3.1 m bgl in WH2 and has previously been observed on the site. It is also not uncommon to encounter asbestos in fill on established sites. Such encounters should be dealt with under an Asbestos and Unexpected Finds Protocol in the Construction Environmental Management Plan. Any soils containing asbestos would also be classified as Special Waste - Asbestos.

The natural rock below the fill should be able to be described as virgin excavated natural material (VENM) upon excavation, provided it is not cross-contaminated during excavation works. VENM can usually be transported to a site for use as fill rather than requiring disposal at landfill.

Given the preliminary nature of the assigned waste classification, which was based on limited sampling, further testing and observations as well as a formal waste classification are required if materials are to be excavated and removed from the site.

15. Conclusions and Recommendations

The site history information indicates that the wider zoo site was converted from vacant (assumed) Crown land to Taronga in the early part of the 20th Century. There were no obvious indicators of contaminating activities on the site other than imported fill, possible historical incinerators and petroleum storage tanks, and in the later years demolition of buildings that may have contained asbestos-containing material. Obvious sources of contamination were not observed in the assessment area during the recent inspection, apart from the asbestos containing fibre cement in WH2. There is a risk of contamination if the current UPSS to the west of the site is damaged or not properly monitored and maintained.

The laboratory testing indicated that the contaminant concentrations in the soil samples analysed were within the adopted site assessment criteria (i.e., the health-based and ecological-based investigation / screening levels).

Asbestos was not encountered in the current soil samples analysed, however a piece of fibre cement containing chrysotile asbestos was encountered in the fill in WH2. The presence of asbestos elsewhere on the site should therefore not be discounted due to demolition activities that have been undertaken on the site and the presence of building materials observed in the fill at some borehole locations. Note that the presence of asbestos in the fill would result in a classification of 'Special Waste - Asbestos'.

On the basis of the results of this Preliminary Site Investigation, there is little to suggest that activities with a high potential for causing soil and groundwater contamination have been undertaken on the site to date. Any existing fill that is present on the site will need to be assessed for the presence of asbestos materials during construction. An Asbestos and Unexpected Finds Protocol should be incorporated into the Construction Environmental Management Plan for the project so that procedures are in place for handling asbestos and any old storage tanks and associated contaminants.

Based on the results of this preliminary site investigation, it is therefore considered that the site can be made suitable for the proposed development. However, further investigation would be required to fully characterise the site and assist in waste classification. Any materials encountered that are deemed unsuitable will need to be removed as part of the construction process.

All materials requiring removal from the site will need to be classified in accordance with *Waste Classification Guidelines* (NSW EPA, 2014). The demolition contractor should ensure that the demolition works are undertaken in an appropriate manner and that cross-contamination of the site does not occur.

Removal of asbestos and other hazardous building materials (if present) should be undertaken by a suitably licensed contractor and an asbestos clearance certificate provided before waste classification, disposal or site validation is undertaken. It is also recommended that a hazardous buildings materials survey be undertaken for the site.

16. Limitations

Douglas Partners (DP) has prepared this report for this project at Taronga Zoo in accordance with DP's proposal SSYD201344.P.002.Rev1 dated 8 December 2020 and acceptance received from Mr Paul Alwis. The work was carried out under DP's Conditions of Engagement. This report is provided for the exclusive use of Taronga Conservation Society Australia for this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of DP, does so entirely at its own risk and without recourse to DP for any loss or damage. In preparing this report DP has necessarily relied upon information provided by the client and/or their agents.

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

DP's advice is based upon the conditions encountered during this investigation. The accuracy of the advice provided by DP in this report may be affected by undetected variations in ground conditions across the site between and beyond the sampling and/or testing locations. The advice may also be limited by budget constraints imposed by others or by site accessibility.

The advice provided relating to provisional waste classification is preliminary only and is subject to confirmation during excavation, through visual and analytical (if required) processes. Note Part 5.6, Section 143 of The Protection of the Environment Operations Act 1997 states that it is an offence for waste to be transported to a place that cannot lawfully be used as a facility to accept that waste. It is the duty of the owner and transporter of the waste to ensure that the waste is disposed of appropriately. DP does not accept liability for the unlawful disposal of waste materials from any site. DP accepts no responsibility for the material tracking, loading, management, transport or disposal of waste from the site.

The assessment of atypical safety hazards arising from this advice is restricted to the (geotechnical / environmental / groundwater) components set out in this report and based on known project conditions and stated design advice and assumptions. While some recommendations for safe controls may be provided, detailed 'safety in design' assessment is outside the current scope of this report and requires additional project data and assessment.

Building demolition materials, such as concrete, timber and asbestos containing fibre cement sheet fragments were, located in previous below-ground filling, and these are considered as indicative of the possible presence of hazardous building materials (HBM), including asbestos.

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

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

Douglas Partners Pty Ltd

Appendix A

About This Report

Introduction

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

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

Copyright

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

Borehole and Test Pit Logs

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

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

Groundwater

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

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

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

Reports

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

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

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

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

continued next page

About this Report

Site Anomalies

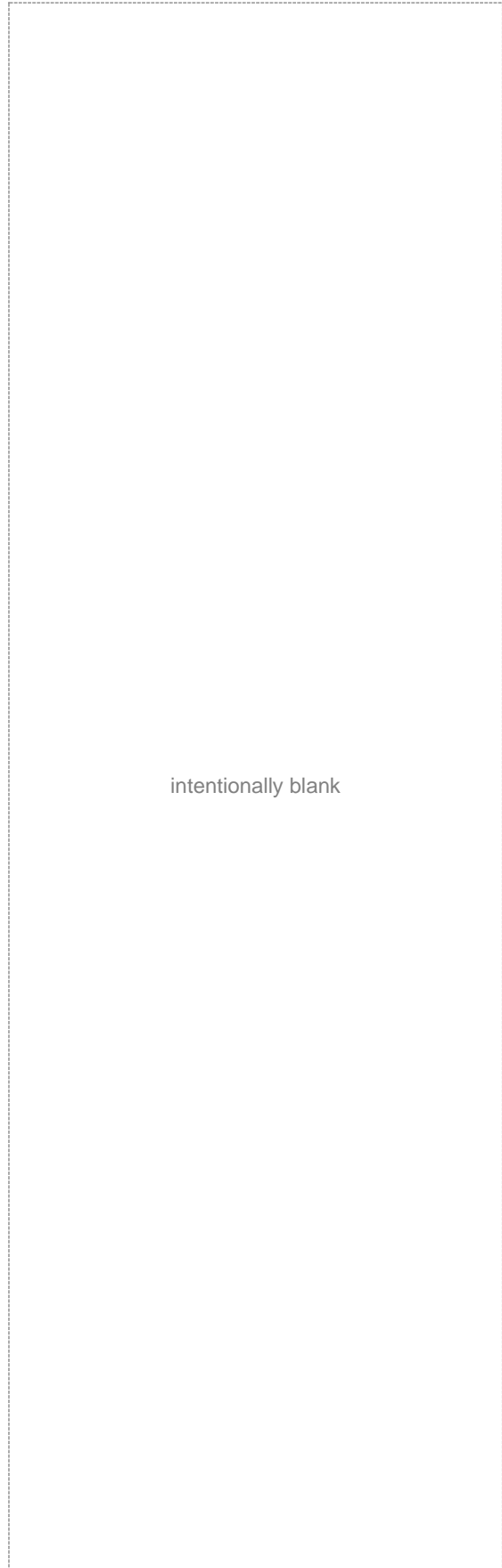
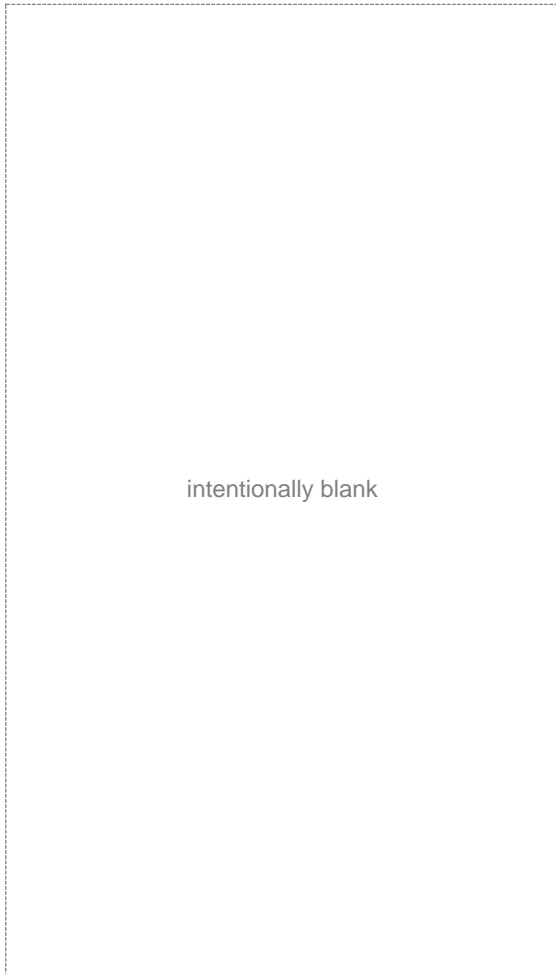
In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, DP requests that it be immediately notified. Most problems are much more readily resolved when conditions are exposed rather than at some later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

Information for Contractual Purposes

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

Site Inspection

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



Appendix B

Drawings



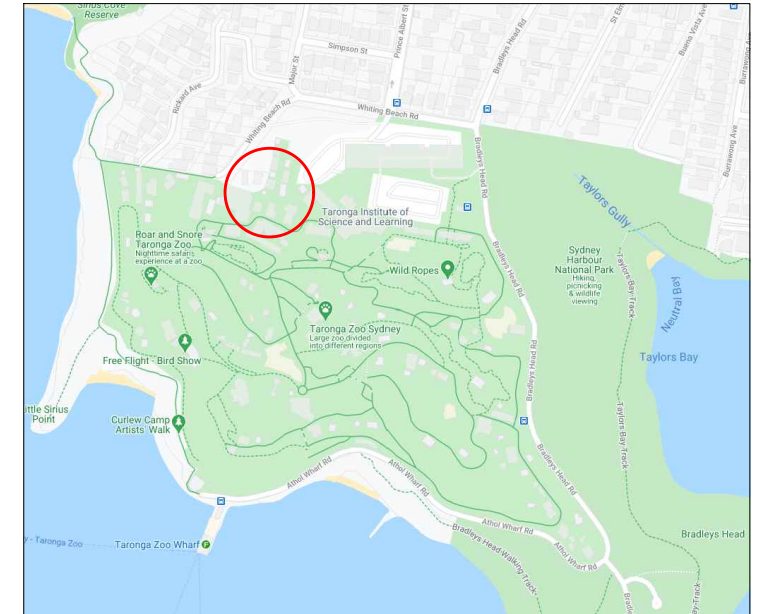
RL given to top of
VISIBLE rock outcrop;
likely to be higher as
shotcrete is covering
some of the rock

Proposed Taronga Wildlife
Hospital, Sydney -
Nutrition Centre Outline

Approximate location of
current underground
petroleum storage system

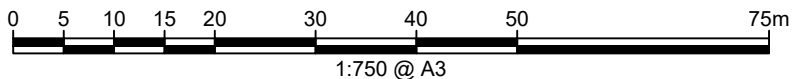
Bottom of this blockwall
appears to look like
Sandstone (excavation
marks present in some)

Proposed Taronga
Wildlife Hospital, Sydney
Outline



SITE LOCALITY

NOTE:
1: Base image from MetroMap.com.au (Dated 30.07.2021)
2: Proposed building extents and levels were estimated based on the Schematic Design Architectural Drawings (By: DWP Australia Pty Ltd, Project No. TWH 20-0527, Issues D and P, Dated 10.09.2021 and 24.11.2021 respectively)

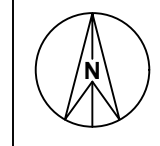


- LEGEND**
- Test Bore Location and Number
 - DCP Location and Number
 - Rough Outline of Rock Outcrop
 - Proposed Development Site



CLIENT: Taronga Conservation Society Australia
OFFICE: Sydney DRAWN BY: CJ/MG
SCALE: 1:750 @ A3 DATE: 01.12.2021

TITLE: **Location of Boreholes**
Taronga Wildlife Hospital, Sydney - Nutrition Centre
Taronga Zoo, Mosman



PROJECT No: 99931.00
DRAWING No: 1
REVISION: 3

Appendix C

Site History Information



Photo 1 – Aerial photograph from 1930

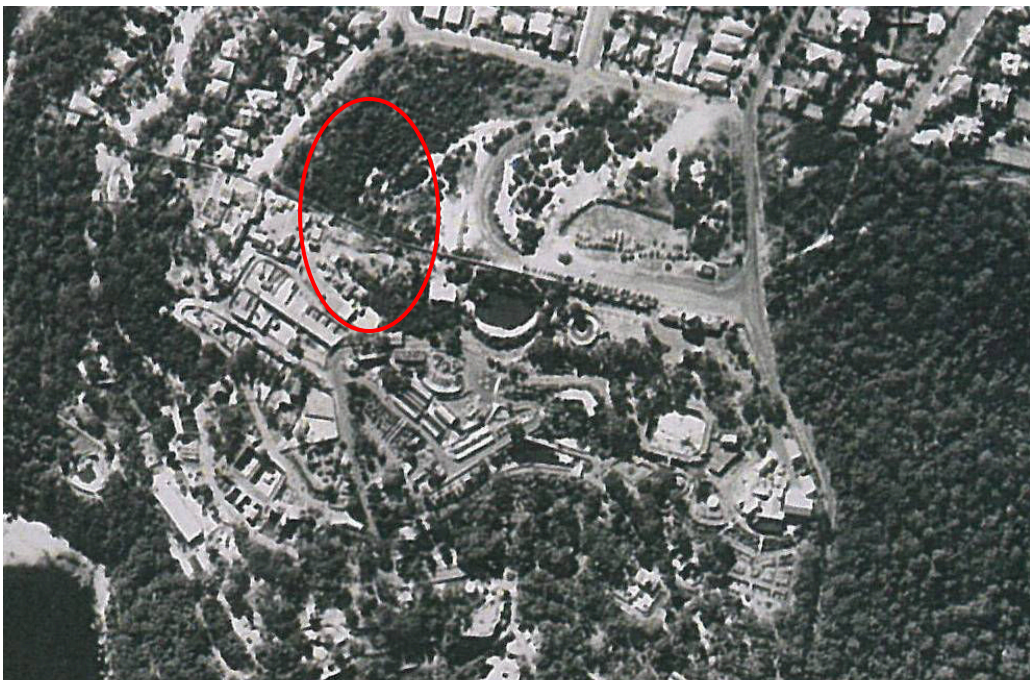


Photo 2 – Aerial photograph from 1951



Historical Aerial Photographs
Taronga Wildlife Hospital , Sydney
- Nutrition Centre

PROJECT: 99931.00

PLATE No: A1

REV: 0

CLIENT: Taronga Conservation Soc.

DATE: 23-Feb-21



Photo 3 – Aerial photograph from 1961



Photo 4 – Aerial photograph from 1994



Historical Aerial Photographs

**Taronga Wildlife Hospital , Sydney
- Nutrition Centre**

CLIENT: Taronga Conservation Soc.

PROJECT: 99931.00

PLATE No: A2

REV: 0

DATE: 23-Feb-21



Photo 5 – Aerial photograph from 2005



Photo 6 – Aerial photograph from 2018



Historical Aerial Photographs

**Taronga Wildlife Hospital , Sydney
- Nutrition Centre**

CLIENT: Taronga Conservation Soc.

PROJECT: 99931.00

PLATE No: A3

REV: 0

DATE: 23-Feb-21

ACN: 093 398 611
ABN: 61 093 412 474

Peter S. Hopley Pty Limited
Legal Searchers

1 Boronia Avenue
Mount Annan , NSW , 2567
Mobile: 0412 199 304
Fax 9233 4590 (Attn Box 29)

SUMMARY AS TO OWNERS.

Property: Taronga Zoo

Description: Lot 22 D.P. 843294

The part of the subject land formerly comprised in Lot 5 D.P. 727103 (shown highlighted yellow on D.P. 843294), was Crown Land prior to the issue of Folio Identifier 5/727103, dated 21.09.1992. **This land was Transferred to Zoological Parks Board of New South Wales by Transfer dated 27.10.1992.**

D.P. 727103 describes lot 5 therein as being the residue area of Ashton Park dedicated 29.11.1918.

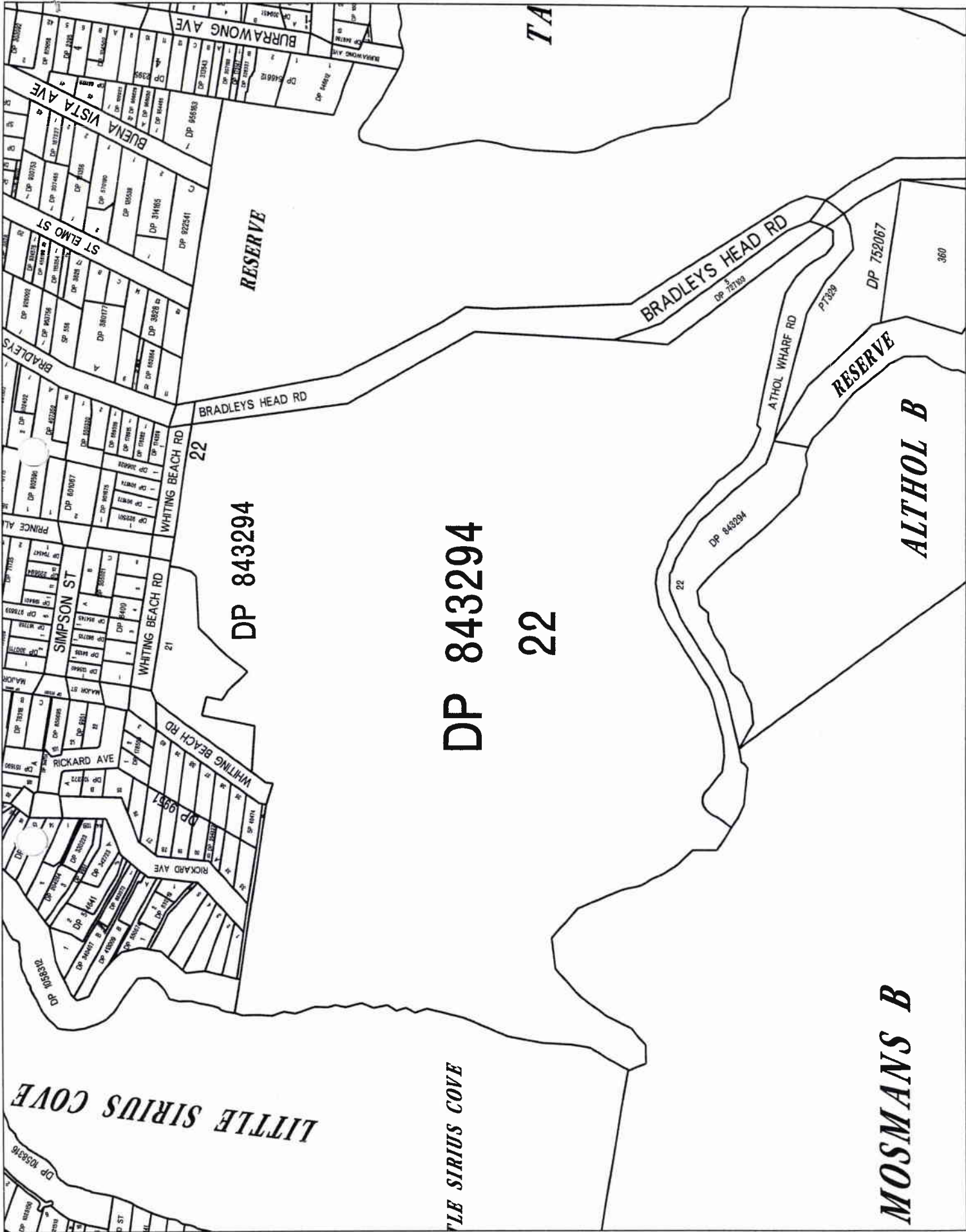
The title to the remainder of the land prior to Volume 12162 Folio 4 was Crown Land. This title issued to the Zoological Parks Board of New South Wales on 19.07.1973.

An inspection of Crown Plan 13677 - 3000 disclosed the site of the Zoo to have been formerly comprised within an area known as Ashton Park.(Dedication of Park now revoked). It is also noted dedicated for Zoological Gardens by various Gazettes dated 24.04.1912, 22.04.1914, 29.11.1918 & 14.10.1932. Now revoked 22.12.1950.

70 acres parcel was dedicated for Zoological Gardens by Gazette dated 22.12.1950 then subsequently revoked by Taronga Park Zoological Act, 1956.

This 70 acres "Taronga Zoological Park" was dedicated as a Public Park by Taronga Zoological Part Act, 1956.



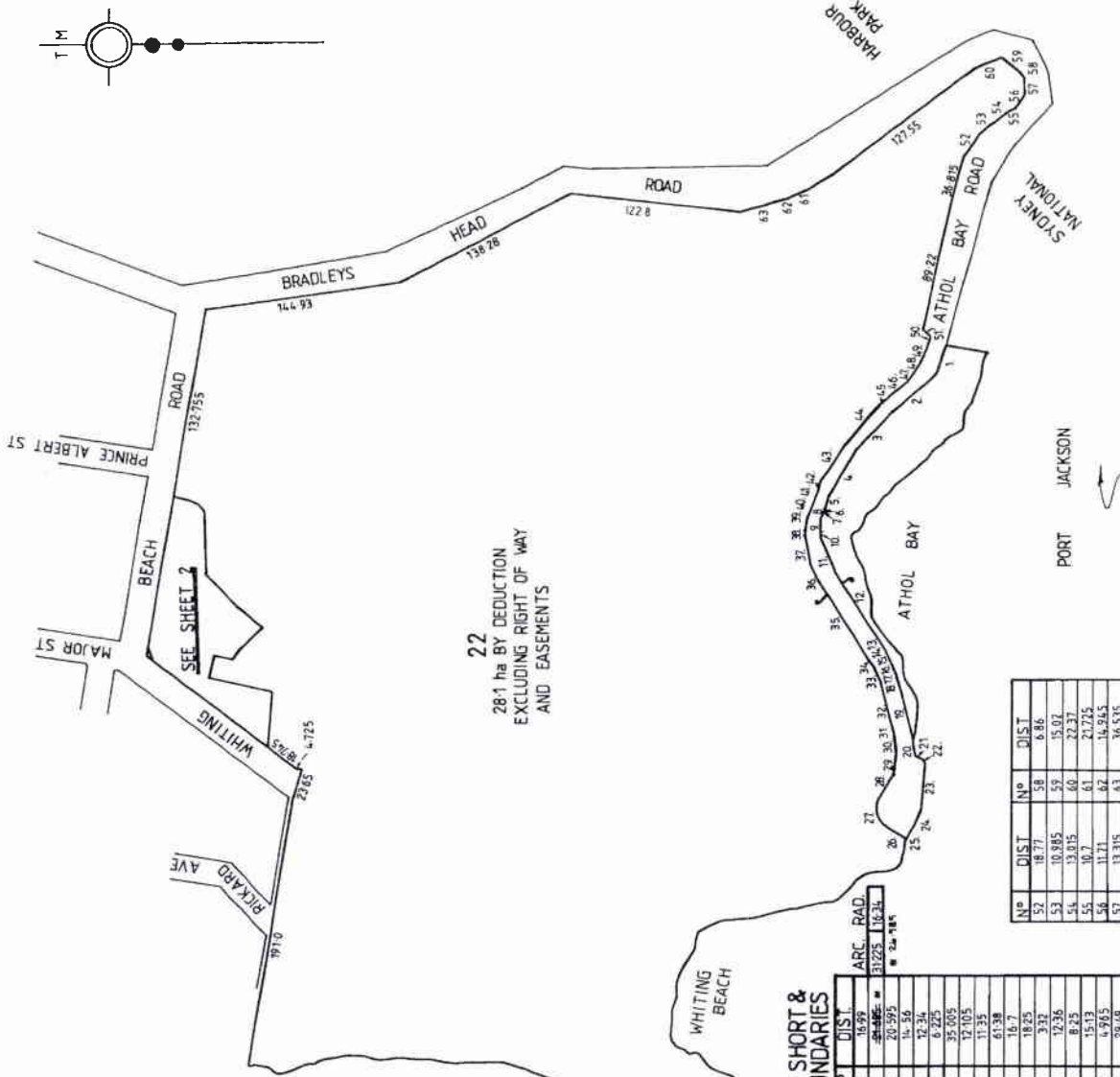


SIGNATURE AND SEALS ONLY.

Plan Drawing only to appear in this space

OFFICE USE ONLY

DP 843294
 Registered 6/12/1994
 Title System: TORRENS
 ALGUISITION (NOT A CURRENT PURPOSE) PLAN AT REGN. SEE SEC. 327AA L.G.A. ACT)
 Ref. Map: U1852 - B3, B4 & B14
 Last Plan: _____
 PLAN OF SUBDIVISION OF LOT 2 DP 820325
 Lengths are in metres. Reduction Ratio: 1:2500
 LOA MOSMAN
 Locality: MOSMAN
 Parish: WILLOUGHBY
 County: CUMBERLAND
 This is sheet 1 of my plan in 2 sheets (Delete if inapplicable)
 DONALD ROSS BUCHAN
 CIVIL ENGINEER
 12 TH AUJUST 1994
 Surveyor registered under Surveyors Act 1972
 Plans used in preparation of survey/compilation:
 DP 820325 10364 - 2030
 DP 727103 2871 - 3000
 DP 9951 10364 - 2030
 DP 543295 12454 - 3000
 DP 107023
 PANEL FOR USE ONLY for statements of intention to dedicate public roads, restrictions on the use of land or positive covenants.
 IT IS INTENDED TO DEDICATE LOT 23 THE AREA DESIGNATED ROAD WHITTING TO THE PUBLIC PURSUANT TO SEC 11 OF THE ROADS ACT.

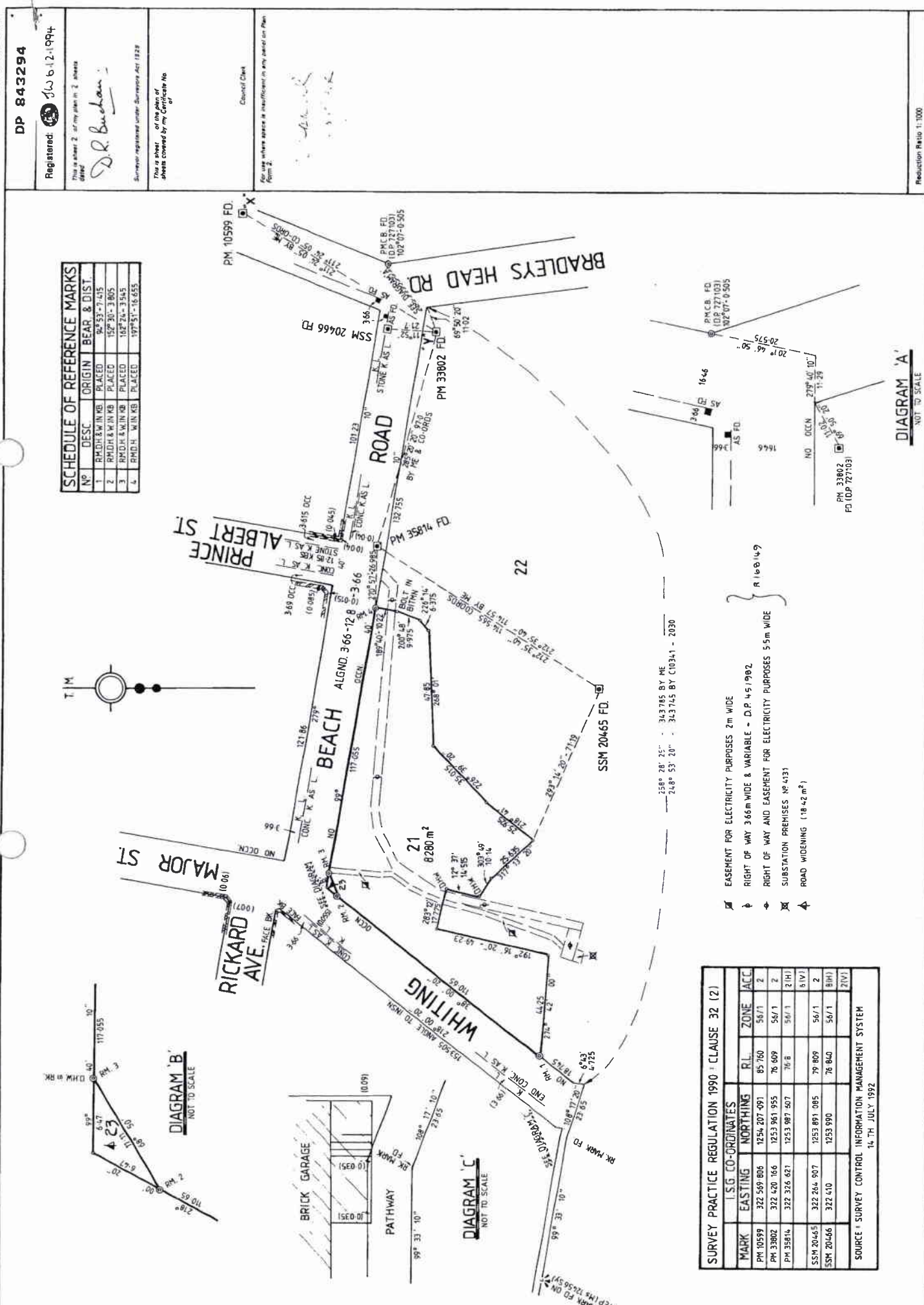


22
28.1 ha BY DEDUCTION EXCLUDING RIGHT OF WAY AND EASEMENTS

SCHEDULE OF SHORT & CURVED BOUNDARIES

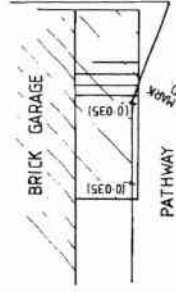
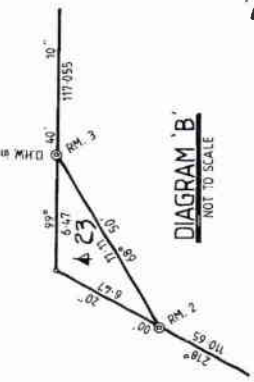
Nº	DIST	Nº	DIST	ARC	RAD
1	217.24	26	18.77		
2	43.895	27	20.997	3323	10.34
3	43.15	28	20.997		
4	49.70	29	12.36		
5	9.275	30	12.36		
6	0.425	31	6.225		
7	2.875	32	32.605		
8	3.775	33	12.105		
9	13.865	34	11.35		
10	2.01	35	61.138		
11	24.07	36	16.7		
12	67.97	37	18.25		
13	3.92	38	3.17		
14	6.17	39	12.36		
15	9.275	40	8.25		
16	6.07	41	15.13		
17	4.005	42	19.15		
18	32.23	43	39.48		
19	23.94	44	43.715		
20	32.665	45	5.035		
21	5.895	46	27.81		
22	5.065	47	8.275		
23	34.305	48	18.46		
24	1.33	49	18.46		
25	9.87	50	2.875		
26		51	4.745		

Nº	DIST	Nº	DIST
52	18.71	58	8.86
53	10.985	59	15.02
54	13.015	60	22.37
55	10.7	61	21.225
56	11.71	62	16.945
57	13.315	63	36.535



SCHEDULE OF REFERENCE MARKS

Nº	DESC.	ORIGIN	BEAR. & DIST.
1	RMDH & WIN KB	PLACED	90° 53' - 7.475
2	RMDH & WIN KB	PLACED	152° 30' - 3.805
3	RMDH & WIN KB	PLACED	162° 24' - 3.545
4	RMDH & WIN KB	PLACED	177° 51' - 6.655



SURVEY PRACTICE REGULATION 1990 - CLAUSE 32 (2)

MARK	EASTING	NORTHING	R.L.	ZONE	ACC.
PM 10599	322 589 806	1254 207 091	85 760	56/1	2
PM 33802	322 520 166	1253 961 955	76 609	56/1	2
PM 35814	322 326 621	1253 987 407	76 6	56/1	2 (H)
SSM 20465	322 264 907	1253 891 095	79 809	56/1	2
SSM 20466	322 410	1253 990	76 840	56/1	2 (H)
SSM 20466	322 410	1253 990	76 840	56/1	2 (H)

SOURCE: SURVEY CONTROL INFORMATION MANAGEMENT SYSTEM
14-JULY-1992

- EASEMENT FOR ELECTRICITY PURPOSES 2m WIDE
- RIGHT OF WAY 3.66m WIDE & VARIABLE - D.P. 45/1982
- RIGHT OF WAY AND EASEMENT FOR ELECTRICITY PURPOSES 5.5m WIDE
- SUBSTATION PREMISES Nº 4131
- ROAD WIDENING 18.42 m²

DIAGRAM 'A'
NOT TO SCALE

Plan Drawing only to appear in this application

Reduction Ratio 1:1000

SURVEYOR'S REFERENCE: 12819

D P 727103

Registered 12-12-1988

This is sheet 2 of my plan in 2 sheets dated 24th MARCH, 1988.

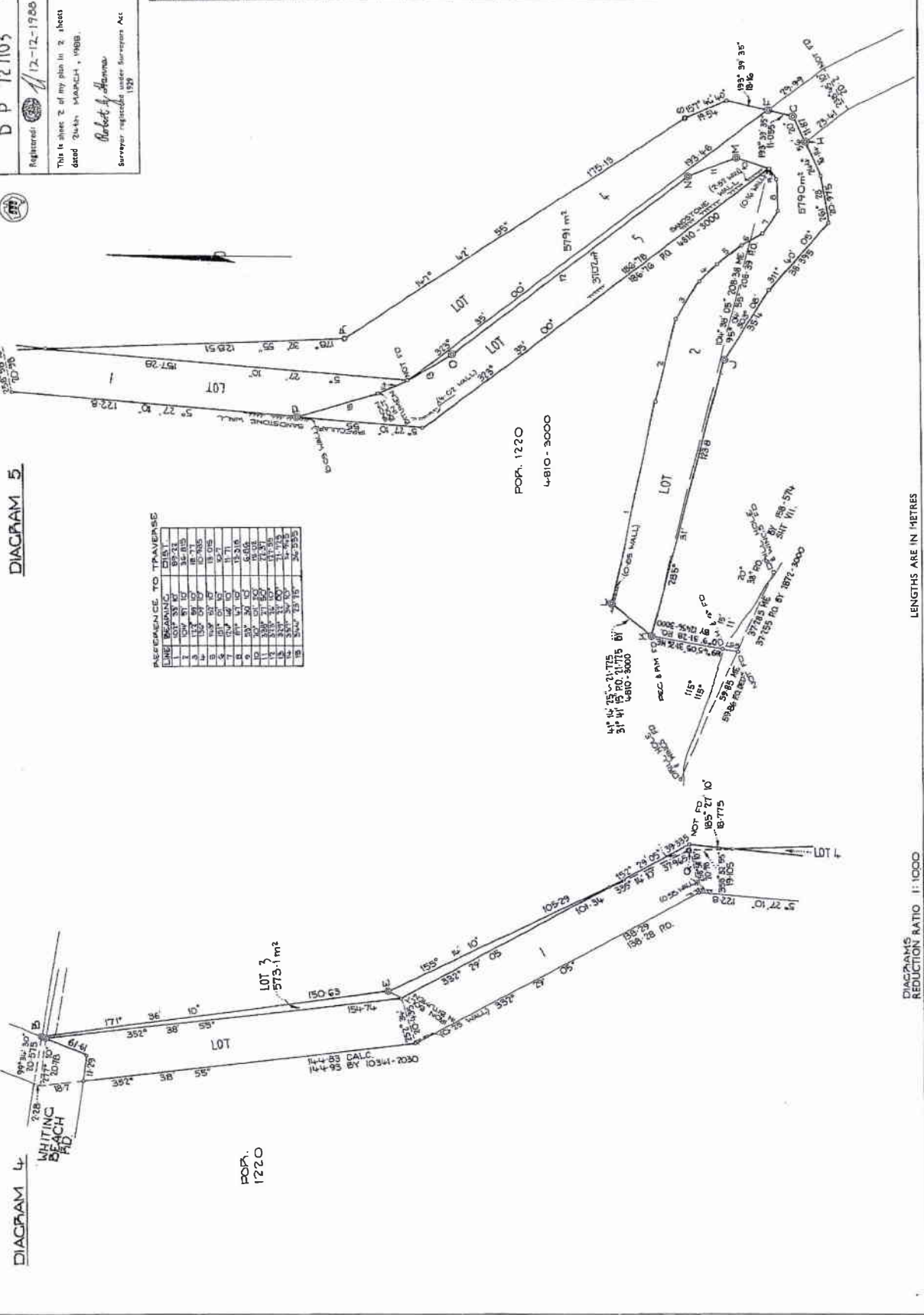
Robert J. Howard
 Surveyor registered under Surveyors Act 1979

WARNING: CREASING OR FOLDING WILL LEAD TO REJECTION

DIAGRAM 5

REFERENCE TO TRAVERSE

LINE	BEARING	DISTANCE
1	104° 51' 10"	3.6 81.5
2	113° 59' 10"	18.7 43.5
3	103° 07' 40"	18.0 41.5
4	101° 01' 10"	11.2 25.5
5	103° 50' 10"	6.0 14.0
6	104° 01' 10"	11.2 25.5
7	103° 59' 10"	18.7 43.5
8	104° 51' 10"	3.6 81.5
9	104° 51' 10"	3.6 81.5
10	104° 51' 10"	3.6 81.5
11	104° 51' 10"	3.6 81.5
12	104° 51' 10"	3.6 81.5
13	104° 51' 10"	3.6 81.5
14	104° 51' 10"	3.6 81.5
15	104° 51' 10"	3.6 81.5
16	104° 51' 10"	3.6 81.5
17	104° 51' 10"	3.6 81.5
18	104° 51' 10"	3.6 81.5
19	104° 51' 10"	3.6 81.5
20	104° 51' 10"	3.6 81.5



This negative is a photograph made as a permanent record of a document in the custody of the Registrar General this day, 15th December, 1988.

10 20 30 40 50 60 70 80 90 100 110 120 130 140



D P 820325

Registered SH 26.9 1091

This is sheet 2 of my plan in 2 sheets

Surveyor registered under Surveyors Act 1929

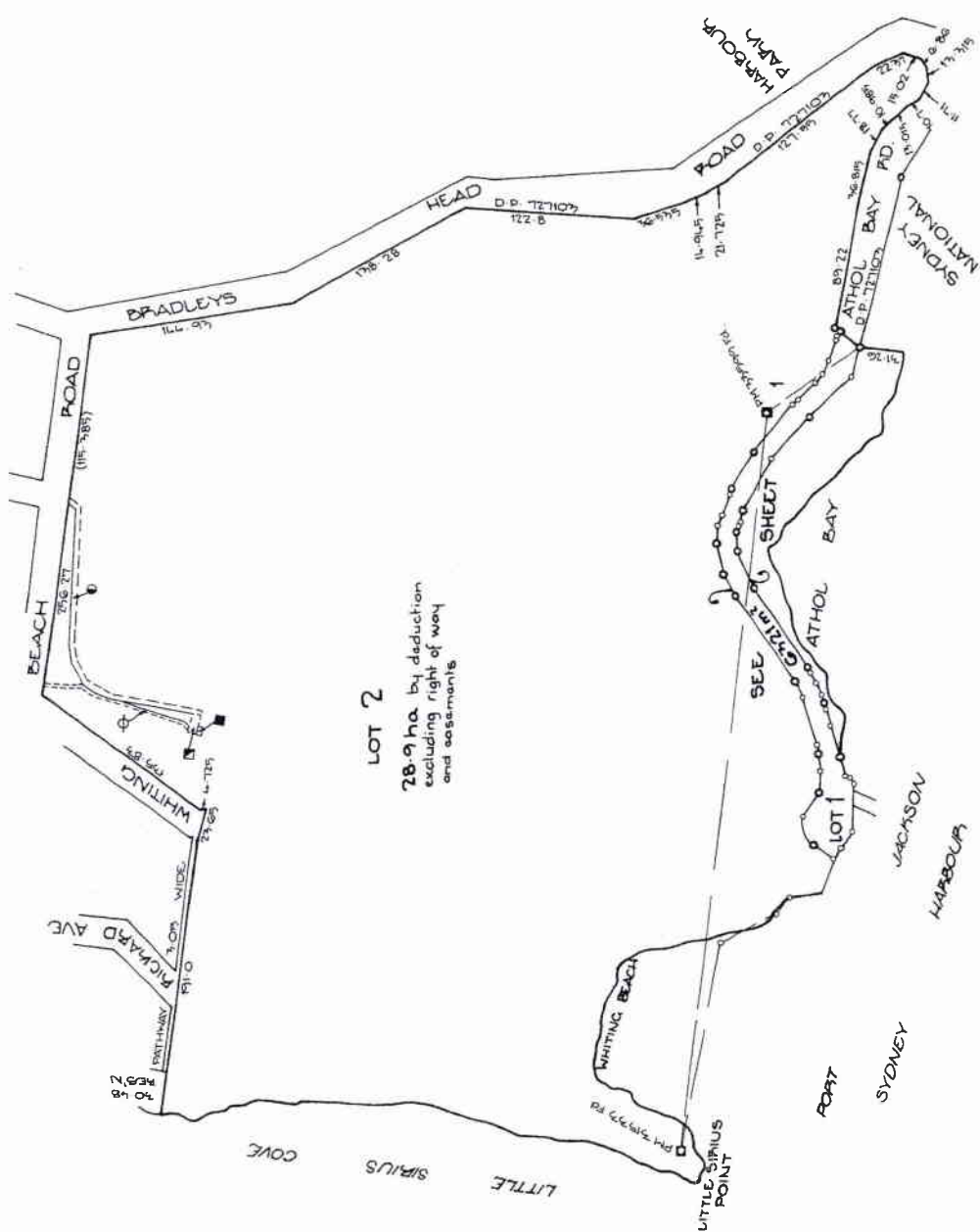
This is sheet of the plan of streets covered by my Certificate No. of

Surveyor's Clerk

For use where space is insufficient in any panel on Plan Form 2.

Reduction Ratio 1:

SURVEYOR'S REFERENCE



LOT 2
 28.9 ha by deduction
 excluding right of way
 and easements

AREA BY DEDUCTION

PORTION 1720	1.29 15 ha
PORTION 1720A	+ 0.1242 ha
LOT 5 D.P. 172107	+ 0.7702 ha
PROPOSED ROAD LOT 1	- 0.6721 ha
S.C.C. SUBSTATION PREMISES	- 0.0021 ha
RIGHT OF WAY	- 0.0889 ha
S.C.C. EASEMENT	- 0.0246 ha
TOTAL	28.9000 ha

- RIGHT OF WAY 3.65 WIDE 1. VARIABLE - D.P. 171982
- EASEMENT FOR ELECTRICITY PURPOSES 2.0 WIDE
- RIGHT OF WAY 1.5 EASEMENT FOR ELECTRICITY PURPOSES 1.5 WIDE
- LOT 1 D.P. 171982 - SUBSTATION PREMISES N.P. 1719

REDUCTION RATIO : 1:2500

Plan Drawing only to appear in this space

DP 820725
 Registered: SH 26-9-1991
 Title System: TORRENS
 Purpose: PUBLIC ROADS ACT 1982
 Ref. Map: U1852-B4
 U1852-B4
 U1852-B4

PLAN OF SUBDIVISION OF PORTION 1720 & PORTION 1209 & LOT 5 IN D.P. 121103
 Lengths are in metres. Reduction Ratio 1:1000
 Surveyor: MOSMAN
 Locality: ATHOL BAY
 Parish: WILLOUGHBY Sh 4
 County: CUMBERLAND
 This is sheet 1 of my plan in 2 sheets

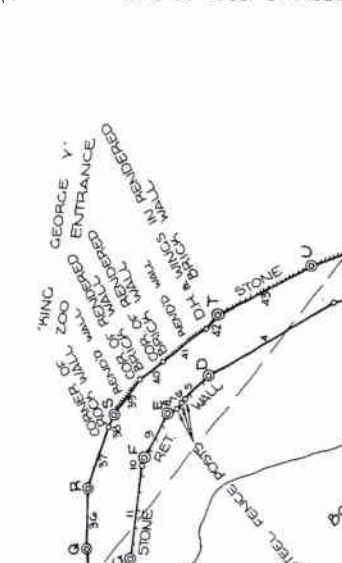
Surveyor: ROBERT GEORGE HANNA
 of M.L.O. BRACATOWN
 A surveyor registered under the Surveyors Act, 1926 as amended, hereby certifies that the survey mentioned in this plan, as appearing on this plan, was made by him or under his supervision and in accordance with the provisions of the Surveyors Act, 1926 as amended, and that the same is a true and correct copy of the original as kept by him or under his supervision.
 Date: 28th July 1988
 Signature: Robert George Hanna
 Stationer registered under the Stationers Act, 1926 as amended
 Station: Dutton Line of Athol, Parish of Willooughby, County of Cumberland
 Plans used in preparation of survey/completions:
 1:6000-1000
 D.P. 121103
 D.P. 121107

PANEL FOR USE ONLY for statements of intention to dedicate public roads or to create public reserves, drainage reserves, easements or restrictions as to user.
 LAND PROPOSED TO BE RESUMED FOR ROAD - LOT 1 (Gov. Gaz. 19th Sept. 1991)

PLAN HEADINGS MENDED IN COVER SHEET
 PLAN AMENDED IN LTO SK 11000
 DISTANCE LINE 27 AMENDED IN LTO WITH SURVEYORS CONSENT WIDE 21/3/97
 23 10 1997

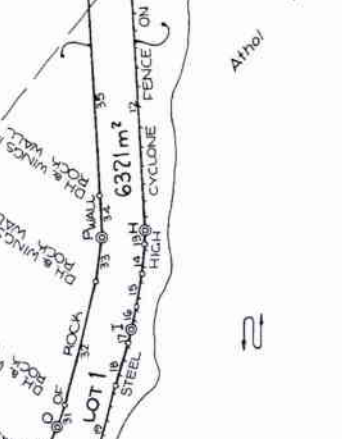
REFERENCE TO BOUNDARIES

N°	BEARING	DISTANCE	N°	BEARING	DISTANCE
1	285° 29' 30"	22.68	24	293° 42'	14.43
2	316° 45' 30"	40.895	25	30° 12' 20"	9.87
3	315° 10' 20"	41.51	26	34° 51'	16.93
4	300° 44' 20"	40.7	27	71° 21' 10"	41.665
5	285° 20' 50"	9.525	28	125° 06' 10"	20.955
6	264° 33' 20"	0.4	29	56° 24' 30"	14.56
7	287° 34' 10"	2.875	30	84° 53' 30"	6.225
8	307° 45'	2.72	31	87° 43' 30"	12.34
9	263° 34' 20"	13.805	32	74° 30' 30"	35.005
10	259° 45'	2.01	33	67° 21' 50"	12.105
11	248° 08' 10"	26.07	34	58° 26' 50"	11.35
12	236° 44' 30"	67.97	35	56° 42'	61.36
13	241° 04' 10"	3.92	36	41° 25' 30"	16.7
14	245° 46' 40"	8.12	37	79° 59' 50"	18.25
15	250° 27' 20"	9.775	38	60° 35' 50"	3.32
16	253° 19' 30"	6.07	39	95° 51' 20"	12.36
17	255° 01' 10"	4.005	40	113° 01' 10"	8.25
18	253° 30'	12.25	41	112° 12' 30"	15.13
19	255° 51' 50"	23.94	42	100° 03' 50"	4.965
20	257° 39' 30"	12.665	43	123° 14' 40"	29.45
21	207° 30' 20"	3.855	44	150° 15' 30"	43.765
22	230° 53' 20"	5.065	45	145° 11' 20"	5.055
23	274° 38' 20"	34.305	46	138° 59' 10"	22.61
			47	129° 03' 30"	8.275
			48	118° 25' 40"	10.42
			49	111° 10'	15.545
			50	104° 43'	2.855
			51	221° 14' 30"	16.95
			52	41° 14' 30"	4.745



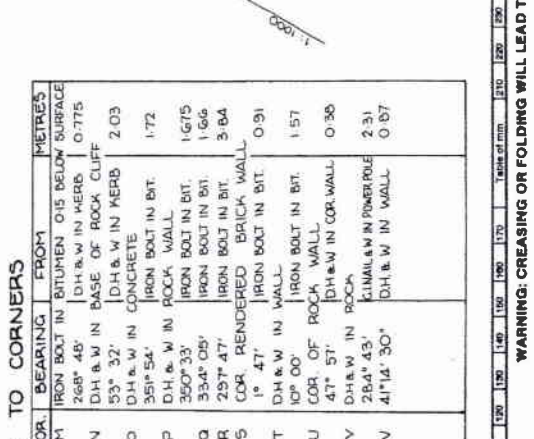
REFERENCE TO TRAVERSE

N°	BEARING	DIST.
1	251° 18' 20"	10.66
2	276° 44' 40"	26.51
3	315° 10'	15.46
4	336° 22' 50"	11.305
5	309° 33' 40"	49.645



REFERENCE TO CORNERS

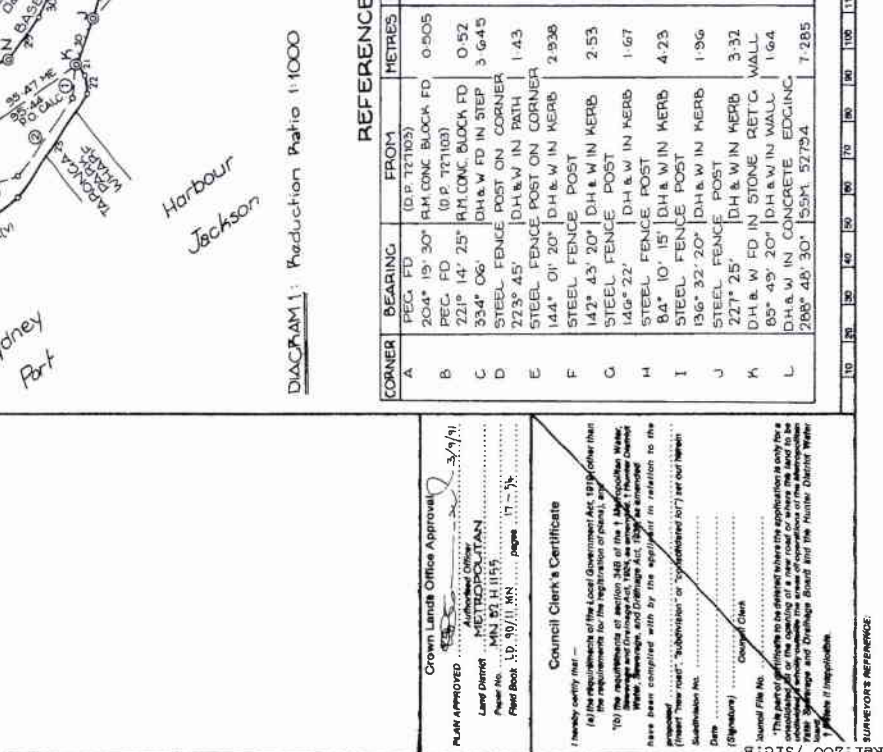
CORNER	BEARING	FROM	METRES	TO	BEARING	FROM	METRES	TO	BEARING	FROM	METRES
A	204° 19' 30"	RH CONC BLOCK FD	0.505	M	268° 48'	IRON BOLT IN BITUPHEN OHS BELOW SURFACE	0.775				
B	221° 14' 25"	RH CONC BLOCK FD	0.52	N	93° 32'	D.H. & W. IN BASE OF ROCK CLIFF	2.03				
C	334° 06'	D.H. & W. IN STEP	3.645	O	395° 54'	D.H. & W. IN CONCRETE	1.72				
D	223° 45'	D.H. & W. IN PATH	1.43	P	350° 33'	IRON BOLT IN BIT	1.675				
E	144° 01' 20"	D.H. & W. IN KERB	2.936	Q	354° 05'	IRON BOLT IN BIT	1.66				
F	142° 43' 20"	D.H. & W. IN KERB	2.53	R	257° 47'	IRON BOLT IN BIT	3.84				
G	146° 22'	D.H. & W. IN KERB	1.67	S	1° 47'	IRON BOLT IN BIT	0.91				
H	84° 10' 15"	D.H. & W. IN KERB	4.23	T	109° 00'	IRON BOLT IN BIT	1.57				
I	136° 32' 20"	D.H. & W. IN KERB	1.96	U	47° 57'	COR. OF ROCK WALL	0.38				
J	227° 25'	D.H. & W. IN KERB	3.32	V	284° 43'	D.H. & W. IN POWER POLE	2.31				
K	65° 49' 20"	D.H. & W. IN STONE RETG. WALL	1.64	W	41° 14' 30"	D.H. & W. IN WALL	0.87				
L	286° 48' 30"	CONCRETE EDGING	7.285								



PLAN FORM 2 SIGNATURE AND SEALS ONLY
 Crown Lands Office Approval
 Date: 3/9/91
 Land District: METROPOLITAN
 Paper No.: MN 57, H 1155
 Plan No.: 17, 74

Council Clerk's Certificate
 I hereby certify that:
 (a) the requirements of the Local Government Act, 1979 (Other than the requirements for the registration of plans), and
 (b) the requirements of section 246 of the 1979 Metropolitan Water, Sewerage, and Drainage Act, 1979 as amended have been complied with by the applicant in relation to the proposed:
 (Insert "first name" "subdivision" or "development") per our plans
 Subdivision No.:
 Date:
 (Signature):
 Council Clerk

Surveyors references:
 Ref: DP 820725 / Str: 2
 Reg: RP12402 / Doc: DP 0820225 P / Rev: 19-Mar-2001 / Ss: SC OK / Prt: 11-Nov-2004 20:47 / Egs: 2



LegalStream Australia Pty Ltd

ABN: 80 002 801 498

Level 10, 135 King Street, SYDNEY, NSW 2000, AUSTRALIA * DX 654 Sydney
Phone: (02) 9231 0122 Fax: (02) 9233 6411 www.legalstream.com.au

An approved
LPI NSW
Information Broker

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - HISTORICAL SEARCH

SEARCH DATE

10/11/2004 8:46PM

FOLIO: 5/727103

First Title(s): 5/727103
Prior Title(s): CROWN LAND

Recorded	Number	Type of Instrument	C.T. Issue
21/9/1992	DP822431	DEPOSITED PLAN	LOT RECORDED FOLIO NOT CREATED
25/9/1992	DP727103	DEPOSITED PLAN	FOLIO CREATED CT NOT ISSUED
27/10/1992	E850966	TRANSFER	EDITION 1
14/3/2001	7474587	DEPARTMENTAL DEALING	FOLIO CANCELLED

*** END OF SEARCH ***



Johnson
Registrar General

GRANT OF LAND

(UNDER THE ZOOLOGICAL PARKS BOARD ACT, 1973)

ELIZABETH the SECOND, by the Grace of God of the United Kingdom, Australia and Her other Realms and Territories Queen, Head of the Commonwealth, Defender of the Faith:-

TO ALL to whom these Presents shall come, Greeting:-

WHEREAS by the Zoological Parks Board Act, 1973 it is provided (inter alia) that notwithstanding anything in the Crown Lands Consolidation Act, 1913 the Governor of Our State of New South Wales may grant any of the lands described in Schedules 3 and 4 to the said Zoological Parks Board Act, 1973 (being the lands hereinafter described and intended to be hereby granted) to the ZOOLOGICAL PARKS BOARD OF NEW SOUTH WALES the body corporate constituted under the said Zoological Parks Board Act, 1973 (hereinafter called the GRANTEE) for an estate in fee simple subject to such exceptions reservations and conditions as are specified in the Grant AND WHEREAS the said Zoological Parks Board Act, 1973 came into force on the fourth day of June 1973 NOW KNOW YE that in pursuance of the said Zoological Parks Board Act, 1973 WE HAVE GRANTED and for Us Our Heirs and Successors DO HEREBY GRANT unto the GRANTEE and its Assigns subject to the provisions of the said Zoological Parks Board Act, 1973 and to the exceptions reservations and conditions hereinafter contained ALL THAT parcel of land in Our said State containing by admeasurement twenty nine point one five hectares be the same more or less situated in the County of Cumberland Parish of Willoughby at Mosman Being Portion 1220 as shown in plan catalogued No. C.10341-2030 in the Department of Lands ALSO ALL THAT parcel of land containing by admeasurement one thousand two hundred and thirty nine square metres be the same more or less situated as aforesaid Being Portion 1209 as shown in plan catalogued No. C.9638-2030 in the Department of Lands As per plan on page 3 hereof with all Rights and Appurtenances whatsoever thereto belonging TO HOLD unto the GRANTEE and its Assigns for ever for the purposes of the said Zoological Parks Board Act, 1973 PROVIDED NEVERTHELESS AND WE DO HEREBY RESERVE AND EXCEPT unto Us Our Heirs and Successors all minerals which the said lands contain with full power and authority for Us Our Heirs and Successors and such person

12162 Fol. 4

(Page 1) Vol.

PERSONS ARE CAUTIONED AGAINST ALTERING OR ADDING TO THIS CERTIFICATE OR ANY NOTIFICATION HEREON

or persons as shall from time to time be authorised by Us or Them to enter upon the said lands and to search for mine dig and remove the said minerals AND ALSO all such parts and so much of the said lands as may hereafter be required for publicways in over and through the same to be set out by Our Governor for the time being of Our said State or some person by him authorised in that respect with full power for Us Our Heirs and Successors and for Our Governor as aforesaid by such person or persons as shall be by Us Them or him authorised in that behalf to make and conduct all such public ways and the right of full and free ingress egress and regress into out of and upon the said lands for the several purposes aforesaid or any of them IN TESTIMONY WHEREOF We have caused this Our Grant to be Sealed with the Seal of Our said State

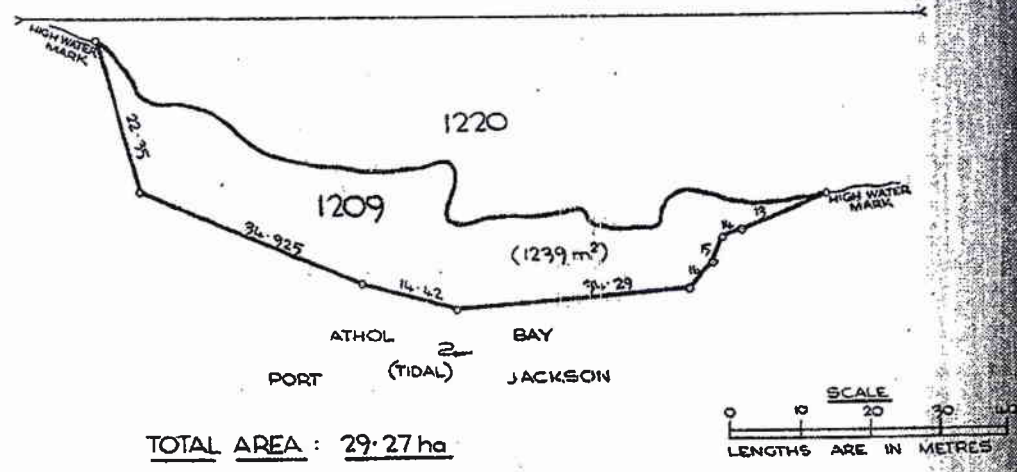
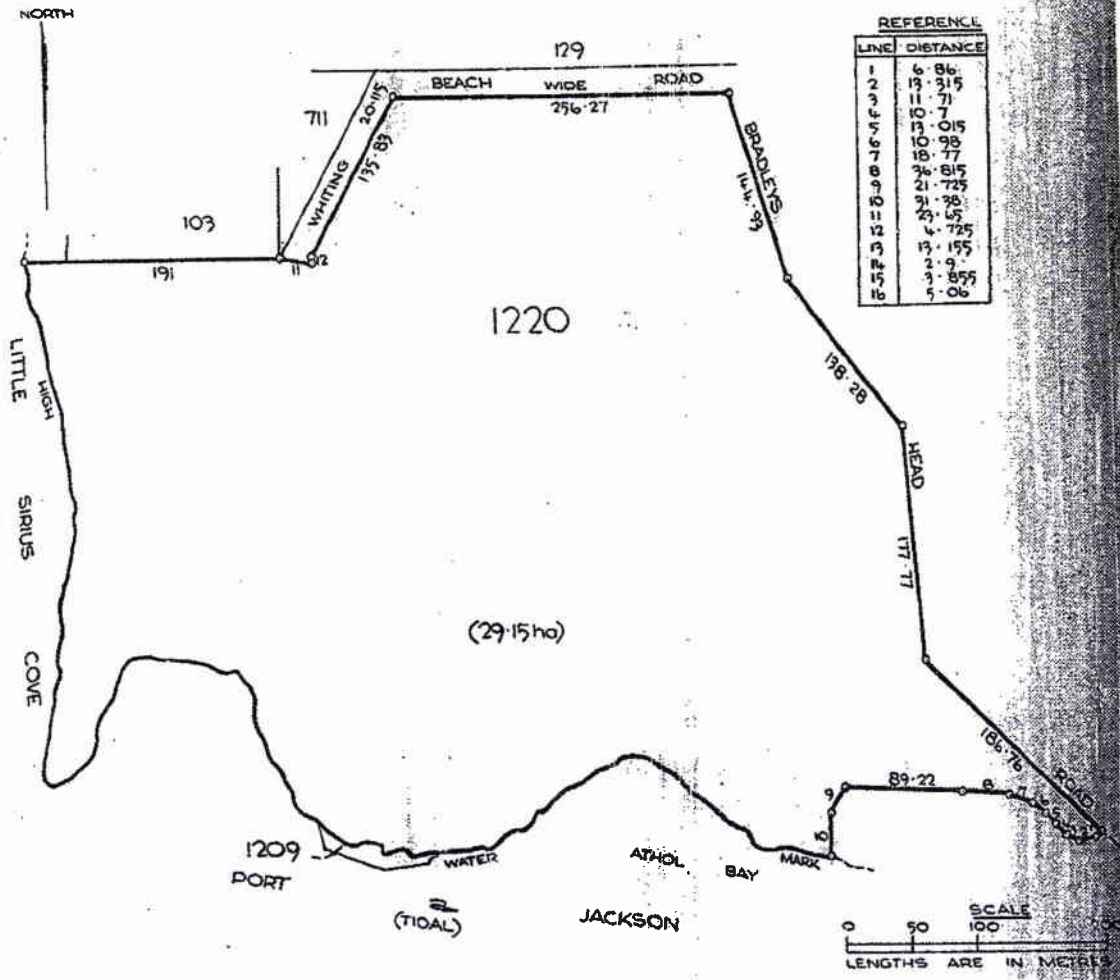
Robertson
WITNESS Our Governor of Our State of New South Wales and its Dependencies in the Commonwealth of Australia, at Sydney in Our said State, this sixth day of July in the twenty second year of Our Reign and in the year of Our Lord one thousand nine hundred and seventy three

A. A. Beetles

Governor.

Vh. 12/62 Vol. 4

PLAN REFERRED TO



SCHEDULE OF REGISTERED PROPRIETORS

R 310 V. C. N. BIRTH, OAKMOUNT, PA.

REGISTERED PROPRIETOR			SCHEDULE OF REGISTERED PROPRIETORS		ENTERED		CANCELLATION	
NATURE	INSTRUMENT NUMBER	DATE	NATURE	INSTRUMENT NUMBER	DATE	ENTERED	REGISTERED PROPRIETOR	
Lease	A168149P	---						
PARTICULARS			ENTERED		SIGNATURE OF REGISTER GENERAL		CANCELLATION	
of substitution premises shown in plan with A168149 together with a right of way and easement for electricity purposes over other parts of the land within described as in Sydney County Council Dist of A168149. 20-12-2024.			19-6-19					

DT 6/13/19
A168149/10
750 44
DR 82032578

LegalStream Australia Pty Ltd

ABN: 80 002 801 498

Level 10, 135 King Street, SYDNEY, NSW 2000, AUSTRALIA * DX 654 Sydney
Phone: (02) 9231 0122 Fax: (02) 9233 6411 www.legalstream.com.au

An approved
LPI NSW
Information Broker

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - HISTORICAL SEARCH

SEARCH DATE

10/11/2004 8:46PM

FOLIO: 2/820325

First Title(s): VOL 12162 FOL 4

Prior Title(s): VOL 12162 FOL 4

Recorded	Number	Type of Instrument	C.T. Issue
-----	-----	-----	-----
26/9/1991	DP820325	DEPOSITED PLAN	LOT RECORDED FOLIO NOT CREATED
15/3/1995	075284	APPLICATION	FOLIO CREATED CT NOT ISSUED
8/5/1995	062051	DEPARTMENTAL DEALING	FOLIO CANCELLED
18/9/1997	3423995	DEPARTMENTAL DEALING	FOLIO CANCELLED
23/12/1999	6451883	DEPARTMENTAL DEALING	

*** END OF SEARCH ***

zoo

PRINTED ON 10/11/2004

LegalStream Australia Pty Ltd

ABN: 80 002 801 498
Level 10, 135 King Street, SYDNEY, NSW 2000, AUSTRALIA * DX 654 Sydney
Phone: (02) 9231 0122 Fax: (02) 9233 6411 www.legalstream.com.au

An approved
LPI NSW
Information Broker

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - HISTORICAL SEARCH

SEARCH DATE

10/11/2004 8:46PM

FOLIO: 22/843294

First Title(s) : VOL 12162 FOL 4
Prior Title(s) : 2/820325

Recorded	Number	Type of Instrument	C.T. Issue
6/12/1994	DP843294	DEPOSITED PLAN	LOT RECORDED FOLIO NOT CREATED
8/5/1995	062051	APPLICATION	FOLIO CREATED CT NOT ISSUED
18/9/1997	3423995	DEPARTMENTAL DEALING	
PRIOR TITLES(S) AS AMENDED: 2/820325, 5/727103.			
14/3/2001	7474590	DEPARTMENTAL DEALING	

*** END OF SEARCH ***

LegalStream Australia Pty Ltd

ABN: 80 002 801 498

Level 10, 135 King Street, SYDNEY, NSW 2000, AUSTRALIA * DX 654 Sydney

Phone: (02) 9231 0122 Fax: (02) 9233 6411 www.legalstream.com.au

An approved

LPI NSW

Information Broker

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - TITLE SEARCH

FOLIO: 22/843294

SEARCH DATE	TIME	EDITION NO	DATE
10/11/2004	8:45 PM	-	-

CERTIFICATE OF TITLE HAS NOT ISSUED

LAND

LOT 22 IN DEPOSITED PLAN 843294

AT ATHOL BAY

LOCAL GOVERNMENT AREA: MOSMAN

PARISH OF WILLOUGHBY COUNTY OF CUMBERLAND

TITLE DIAGRAM: DP843294

FIRST SCHEDULE

ZOOLOGICAL PARKS BOARD OF NEW SOUTH WALES

SECOND SCHEDULE (2 NOTIFICATIONS)

1. LAND EXCLUDES MINERALS AND IS SUBJECT TO RESERVATIONS AND CONDITIONS IN FAVOUR OF THE CROWN - SEE CROWN GRANT(S)
- * 2. R168149 LEASE TO SYDNEY COUNTY COUNCIL OF SUBSTATION PREMISES NO. 4131 SHOWN IN DP451982. TOGETHER WITH A RIGHT OF WAY & EASEMENT FOR ELECTRICITY PURPOSES OVER ANOTHER PART OF THE LAND ABOVE DESCRIBED. EXPIRES 26.12.2024

NOTATIONS

NOTE: LODGED DEALINGS SHOULD BE ACCOMPANIED BY PRIOR CERTIFICATE OF TITLES VOL 12162 FOL 4 & 5/727103
UNREGISTERED DEALINGS: NIL

*** END OF SEARCH ***

ZOO

PRINTED ON 10/11/2004

LEGALSTREAM AUSTRALIA hereby certifies that the information contained in this document has been provided electronically by the Registrar General in accordance with Section 96B(2) of the Real Property Act, 1900.

*ANY ENTRIES PRECEDED BY AN ASTERIX DO NOT APPEAR ON THE CURRENT EDITION OF THE CERTIFICATE OF TITLE
WARNING: THE INFORMATION APPEARING UNDER NOTATIONS HAS NOT BEEN FORMALLY RECORDED IN THE REGISTER

Appendix D

Field Work Results



Sampling

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

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

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

Test Pits

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

Large Diameter Augers

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

Continuous Spiral Flight Augers

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

reliability, due to the remoulding, possible mixing or softening of samples by groundwater.

Non-core Rotary Drilling

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

Continuous Core Drilling

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

Standard Penetration Tests

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

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

The test results are reported in the following form.

- In the case where full penetration is obtained with successive blow counts for each 150 mm of, say, 4, 6 and 7 as:
4,6,7
N=13
- In the case where the test is discontinued before the full penetration depth, say after 15 blows for the first 150 mm and 30 blows for the next 40 mm as:
15, 30/40 mm

Sampling Methods

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

Dynamic Cone Penetrometer Tests / Perth Sand Penetrometer Tests

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

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



Description and Classification Methods

The methods of description and classification of soils and rocks used in this report are generally based on Australian Standard AS1726:2017, Geotechnical Site Investigations. In general, the descriptions include strength or density, colour, structure, soil or rock type and inclusions.

Soil Types

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

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

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

Type	Particle size (mm)
Coarse gravel	19 - 63
Medium gravel	6.7 - 19
Fine gravel	2.36 – 6.7
Coarse sand	0.6 - 2.36
Medium sand	0.21 - 0.6
Fine sand	0.075 - 0.21

Definitions of grading terms used are:

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

The proportions of secondary constituents of soils are described as follows:

In fine grained soils (>35% fines)

Term	Proportion of sand or gravel	Example
And	Specify	Clay (60%) and Sand (40%)
Adjective	>30%	Sandy Clay
With	15 – 30%	Clay with sand
Trace	0 - 15%	Clay with trace sand

In coarse grained soils (>65% coarse)

- with clays or silts

Term	Proportion of fines	Example
And	Specify	Sand (70%) and Clay (30%)
Adjective	>12%	Clayey Sand
With	5 - 12%	Sand with clay
Trace	0 - 5%	Sand with trace clay

In coarse grained soils (>65% coarse)

- with coarser fraction

Term	Proportion of coarser fraction	Example
And	Specify	Sand (60%) and Gravel (40%)
Adjective	>30%	Gravelly Sand
With	15 - 30%	Sand with gravel
Trace	0 - 15%	Sand with trace gravel

The presence of cobbles and boulders shall be specifically noted by beginning the description with 'Mix of Soil and Cobbles/Boulders' with the word order indicating the dominant first and the proportion of cobbles and boulders described together.

Soil Descriptions

Cohesive Soils

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

Description	Abbreviation	Undrained shear strength (kPa)
Very soft	VS	<12
Soft	S	12 - 25
Firm	F	25 - 50
Stiff	St	50 - 100
Very stiff	VSt	100 - 200
Hard	H	>200
Friable	Fr	-

Cohesionless Soils

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

Relative Density	Abbreviation	Density Index (%)
Very loose	VL	<15
Loose	L	15-35
Medium dense	MD	35-65
Dense	D	65-85
Very dense	VD	>85

Soil Origin

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

- Residual soil - derived from in-situ weathering of the underlying rock;
- Extremely weathered material – formed from in-situ weathering of geological formations. Has soil strength but retains the structure or fabric of the parent rock;
- Alluvial soil – deposited by streams and rivers;

- Estuarine soil – deposited in coastal estuaries;
- Marine soil – deposited in a marine environment;
- Lacustrine soil – deposited in freshwater lakes;
- Aeolian soil – carried and deposited by wind;
- Colluvial soil – soil and rock debris transported down slopes by gravity;
- Topsoil – mantle of surface soil, often with high levels of organic material.
- Fill – any material which has been moved by man.

Moisture Condition – Coarse Grained Soils

For coarse grained soils the moisture condition should be described by appearance and feel using the following terms:

- Dry (D) Non-cohesive and free-running.
- Moist (M) Soil feels cool, darkened in colour.
Soil tends to stick together.
Sand forms weak ball but breaks easily.
- Wet (W) Soil feels cool, darkened in colour.
Soil tends to stick together, free water forms when handling.

Moisture Condition – Fine Grained Soils

For fine grained soils the assessment of moisture content is relative to their plastic limit or liquid limit, as follows:

- 'Moist, dry of plastic limit' or 'w < PL' (i.e. hard and friable or powdery).
- 'Moist, near plastic limit' or 'w ≈ PL' (i.e. soil can be moulded at moisture content approximately equal to the plastic limit).
- 'Moist, wet of plastic limit' or 'w > PL' (i.e. soils usually weakened and free water forms on the hands when handling).
- 'Wet' or 'w ≈ LL' (i.e. near the liquid limit).
- 'Wet' or 'w > LL' (i.e. wet of the liquid limit).



Rock Strength

Rock strength is defined by the Unconfined Compressive Strength and it refers to the strength of the rock substance and not the strength of the overall rock mass, which may be considerably weaker due to defects.

The Point Load Strength Index $I_{s(50)}$ is commonly used to provide an estimate of the rock strength and site specific correlations should be developed to allow UCS values to be determined. The point load strength test procedure is described by Australian Standard AS4133.4.1-2007. The terms used to describe rock strength are as follows:

Strength Term	Abbreviation	Unconfined Compressive Strength MPa	Point Load Index * $I_{s(50)}$ MPa
Very low	VL	0.6 - 2	0.03 - 0.1
Low	L	2 - 6	0.1 - 0.3
Medium	M	6 - 20	0.3 - 1.0
High	H	20 - 60	1 - 3
Very high	VH	60 - 200	3 - 10
Extremely high	EH	>200	>10

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

Degree of Weathering

The degree of weathering of rock is classified as follows:

Term	Abbreviation	Description
Residual Soil	RS	Material is weathered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are no longer visible, but the soil has not been significantly transported.
Extremely weathered	XW	Material is weathered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are still visible
Highly weathered	HW	The whole of the rock material is discoloured, usually by iron staining or bleaching to the extent that the colour of the original rock is not recognisable. Rock strength is significantly changed by weathering. Some primary minerals have weathered to clay minerals. Porosity may be increased by leaching, or may be decreased due to deposition of weathering products in pores.
Moderately weathered	MW	The whole of the rock material is discoloured, usually by iron staining or bleaching to the extent that the colour of the original rock is not recognisable, but shows little or no change of strength from fresh rock.
Slightly weathered	SW	Rock is partially discoloured with staining or bleaching along joints but shows little or no change of strength from fresh rock.
Fresh	FR	No signs of decomposition or staining.
<i>Note: If HW and MW cannot be differentiated use DW (see below)</i>		
Distinctly weathered	DW	Rock strength usually changed by weathering. The rock may be highly discoloured, usually by iron staining. Porosity may be increased by leaching or may be decreased due to deposition of weathered products in pores.

Rock Descriptions

Degree of Fracturing

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

Term	Description
Fragmented	Fragments of <20 mm
Highly Fractured	Core lengths of 20-40 mm with occasional fragments
Fractured	Core lengths of 30-100 mm with occasional shorter and longer sections
Slightly Fractured	Core lengths of 300 mm or longer with occasional sections of 100-300 mm
Unbroken	Core contains very few fractures

Rock Quality Designation

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

$$\text{RQD \%} = \frac{\text{cumulative length of 'sound' core sections} \geq 100 \text{ mm long}}{\text{total drilled length of section being assessed}}$$

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

Stratification Spacing

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

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

Symbols & Abbreviations

Douglas Partners



Introduction

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

Drilling or Excavation Methods

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

Water

▷	Water seep
▽	Water level

Sampling and Testing

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

Description of Defects in Rock

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

Defect Type

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

Orientation

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

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

Coating or Infilling Term

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

Coating Descriptor

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

Shape

cu	curved
ir	irregular
pl	planar
st	stepped
un	undulating

Roughness

po	polished
ro	rough
sl	slickensided
sm	smooth
vr	very rough

Other

fg	fragmented
bnd	band
qtz	quartz

Symbols & Abbreviations

Graphic Symbols for Soil and Rock

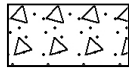
General



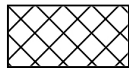
Asphalt



Road base



Concrete



Filling

Soils



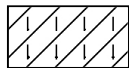
Topsoil



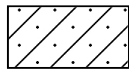
Peat



Clay



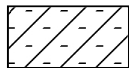
Silty clay



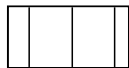
Sandy clay



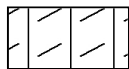
Gravelly clay



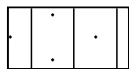
Shaly clay



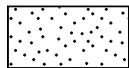
Silt



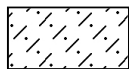
Clayey silt



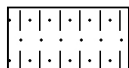
Sandy silt



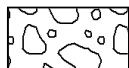
Sand



Clayey sand



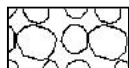
Silty sand



Gravel



Sandy gravel



Cobbles, boulders



Talus

Sedimentary Rocks



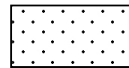
Boulder conglomerate



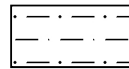
Conglomerate



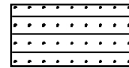
Conglomeratic sandstone



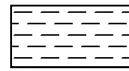
Sandstone



Siltstone



Laminite



Mudstone, claystone, shale

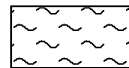


Coal

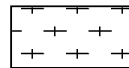


Limestone

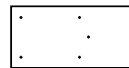
Metamorphic Rocks



Slate, phyllite, schist

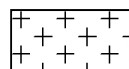


Gneiss

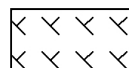


Quartzite

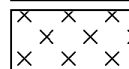
Igneous Rocks



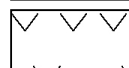
Granite



Dolerite, basalt, andesite



Dacite, epidote



Tuff, breccia



Porphyry

BOREHOLE LOG

CLIENT: Taronga Conservation Society Australia
PROJECT: Taronga Wildlife Hospital, Sydney - Nutrition Centre
LOCATION: Bradleys Head Road, Mosman

SURFACE LEVEL: 62.1 AHD
EASTING: 337180
NORTHING: 6254000
DIP/AZIMUTH: 90°/--

BORE No: PF1
PROJECT No: 99931.00
DATE: 20/1/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing				
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium			High	Very High	Ex High	B - Bedding	J - Joint	S - Shear	F - Fault
62.03	0.03	ASPHALTIC CONCRETE																	A/E			PID < 1 ppm
61.34	0.34	FILL/SAND: fine to medium, yellow-brown, with fine sandstone gravel, moist, apparently loose																				PL(A) = 0.3
		SANDSTONE: medium to coarse grained, orange and pale grey, low to medium then medium strength, moderately weathered, fractured to slightly fractured, Hawkesbury Sandstone																	C	100	95	PL(A) = 0.3
	1																					0.94m: B0°, pl, ro, cly vn 1.13m: Ds, 20mm 1.15m: B0°, pl, ro, cly co 10mm
	2																					1.75m: Cs, 30mm 2.04m: Cs, 50mm
	2.53	SANDSTONE: medium to coarse grained, pale grey, medium to high strength, fresh, slightly fractured, Hawkesbury Sandstone																				PL(A) = 0.4 2.39m: B0°, ir, ro, cly vn
	3																					PL(A) = 0.6
	4																					PL(A) = 0.7
	5																					3.97m: B0°, pl, ro, cly co 5mm 4.48m: Cs, 30mm 4.6m: B0°, pl, ro, cly co 2mm
	5.55	Bore discontinued at 5.55m - Target depth reached																				PL(A) = 1.9 PL(A) = 1.6
	6																					
	7																					
	8																					
	9																					

RIG: Hanjin D8 **DRILLER:** Hagstrom **LOGGED:** KR **CASING:** HQ to 0.3m
TYPE OF BORING: Solid flight auger (TC-bit) to 0.34m, NMLC drilling to 5.55m
WATER OBSERVATIONS: No free groundwater observed whilst augering
REMARKS:

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Taronga Conservation Society Australia
PROJECT: Taronga Wildlife Hospital, Sydney - Nutrition Centre
LOCATION: Bradleys Head Road, Mosman

SURFACE LEVEL: 64.7 AHD
EASTING: 337223
NORTHING: 6254031
DIP/AZIMUTH: 90°/-

BORE No: WH1
PROJECT No: 99931.00
DATE: 14/1/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing								
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium			High	Very High	Ex High	B - Bedding	J - Joint	S - Shear	F - Fault	Type	Core Rec. %	RQD %	Test Results & Comments
	0.05	ASPHALTIC CONCRETE																								
	0.25	FILL/ROADBASE: Gravelly SAND, fine to medium, grey-brown, fine igneous gravel, with silt, moist																	A/E							PID=2 ppm
	0.7	FILL/SAND: fine to medium, dark brown, with silt, clay, trace fine igneous gravel and ash, moist, apparently medium dense																	A/E							PID<1 ppm
	1.0	FILL/SAND: fine to medium, yellow-brown, with fine sandstone gravel, moist, apparently medium dense																	A/E*							PID<1 ppm
	2.0	SANDSTONE: medium to coarse grained, pale grey, medium to high then medium strength, fresh, slightly fractured, Hawkesbury Sandstone																	C	100	97					2,B refusal PL(A) = 1.1
	3.0																									PL(A) = 0.7
	3.23-3.65m	fractured to slightly fractured, some siltstone laminations																								PL(A) = 0.5
	4.0																									PL(A) = 0.4
	5.0																									PL(A) = 0.7
	5.71	Bore discontinued at 5.71m - Target depth reached																								

RIG: Hanjin D8 **DRILLER:** Hagstrom **LOGGED:** KR **CASING:** HQ to 5.7m
TYPE OF BORING: Solid flight auger (TC-bit) to 1.00m, NMLC drilling to 5.71m
WATER OBSERVATIONS: No free groundwater observed whilst augering
REMARKS: *Blind duplicate taken at 0.9-1.0m (BD3/20210114).

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PLD	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Taronga Conservation Society Australia
PROJECT: Taronga Wildlife Hospital, Sydney - Nutrition Centre
LOCATION: Bradleys Head Road, Mosman

SURFACE LEVEL: 73.2 AHD
EASTING: 337247
NORTHING: 6254004
DIP/AZIMUTH: 90°/--

BORE No: WH2
PROJECT No: 99931.00
DATE: 12/1/2021
SHEET 1 OF 2

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing									
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium			High	Very High	Ex High	B - Bedding	J - Joint	S - Shear	F - Fault	Type	Core Rec. %	RQD %	Test Results & Comments	
73	0.05	ASPHALTIC CONCRETE																									
73	0.2	CONCRETE SLAB																								PID<1 ppm	
73	0.8	FILL/Clayey SAND: fine to medium, yellow-brown, with fine sandstone gravel, trace ash, moist, apparently medium dense to dense																								PID<1 ppm	
73	1	FILL/SAND: fine to medium, dark brown and brown, with clay, silt, fine sandstone gravel, trace ash, moist, apparently dense																								6,5,4 N = 9	
73	1.8	1.5m: trace carbonaceous material																								PID<1 ppm	
73	2	FILL/SAND: fine to medium, pale grey, trace clay, fine sandstone gravel, silt, ash, moist, apparently dense																								4/50,B	
71	2.15	CONCRETE																								refusal	
71	2.34	FILL/Gravelly CLAY: low plasticity, yellow-brown and brown, fine sandstone and igneous gravel, trace timber, fibre cement fragments (confirmed asbestos containing material), w<PL													2.5m: CORE LOSS: 600mm												PID<1 ppm
70	3	SANDSTONE: medium to coarse grained, yellow-brown and red-brown, medium then high strength, moderately weathered, slightly fractured, Hawkesbury Sandstone																								PL(A) = 0.5	
70	3.1	SANDSTONE: medium to coarse grained, pale grey, medium to high then high strength, fresh, slightly fractured, Hawkesbury Sandstone																								PL(A) = 1.6	
68	4																									PL(A) = 1.3	
68	4.5																									PL(A) = 0.9	
68	5														4.72m: B0°, pl, ro, cly co 1mm												PL(A) = 1
68	6														5.29m: B5°, pl, ro, cly co 2mm												PL(A) = 1.5
67	7														7.16m: B0°, pl, ro, cly co 2mm												PL(A) = 1.4
66	8														7.8m: Ds, 40mm												PL(A) = 1.8
66	9														8.86m: B0°, pl, ro, cly co 1mm												PL(A) = 0.7
64	9.78	SANDSTONE: as below																									

RIG: Hanjin D8 **DRILLER:** Hagstrom **LOGGED:** KR **CASING:** HQ to 2.1m

TYPE OF BORING: Diacore (250mm) to 0.2m, solid flight auger (TC-bit) to 2.15m, NMLC drilling to 12.00m

WATER OBSERVATIONS: No free groundwater observed whilst augering

REMARKS: *Blind duplicate taken at 0.2-0.3m (BD1/20200112). **2 confirmed asbestos containing material fragments found within 2.5-3.1m from coring; sample taken of all fill return in core barrel from 2.5-3.1m. 100% loss of drilling water return from 2.15m-3.10m

A Auger sample	G Gas sample	PID Photo ionisation detector (ppm)
B Bulk sample	P Piston sample	PL(A) Point load axial test Is(50) (MPa)
BLK Block sample	U Tube sample (x mm dia.)	PL(D) Point load diametral test Is(50) (MPa)
C Core drilling	W Water sample	pp Pocket penetrometer (kPa)
D Disturbed sample	> Water seep	S Standard penetration test
E Environmental sample	≡ Water level	V Shear vane (kPa)

BOREHOLE LOG

CLIENT: Taronga Conservation Society Australia
PROJECT: Taronga Wildlife Hospital, Sydney - Nutrition Centre
LOCATION: Bradleys Head Road, Mosman

SURFACE LEVEL: 73.2 AHD
EASTING: 337247
NORTHING: 6254004
DIP/AZIMUTH: 90°/--

BORE No: WH2
PROJECT No: 99931.00
DATE: 12/1/2021
SHEET 2 OF 2

RL	Depth (m)	Description of Strata	Degree of Weathering				Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing							
			EW	HW	MW	SW		FS	FR	Ex Low	Very Low	Low			Medium	High	Very High	Ex High	B - Bedding	J - Joint	S - Shear	F - Fault	Type	Core Rec. %
80		SANDSTONE: medium to coarse grained, pale grey, massive, medium to high and high strength, fresh, slightly fractured, Hawkesbury Sandstone (continued)																					PL(A) = 1	
11		11.04-11.70m: bedding dipping at 10 degrees														10.97m: Ds, 30mm					C	100	99	PL(A) = 1.5
12	12.0	Bore discontinued at 12.0m - Target depth reached																			C	100	100	PL(A) = 1.5
13																								
14																								
15																								
16																								
17																								
18																								
19																								

RIG: Hanjin D8 **DRILLER:** Hagstrom **LOGGED:** KR **CASING:** HQ to 2.1m
TYPE OF BORING: Diacore (250mm) to 0.2m, solid flight auger (TC-bit) to 2.15m, NMLC drilling to 12.00m
WATER OBSERVATIONS: No free groundwater observed whilst augering
REMARKS: *Blind duplicate taken at 0.2-0.3m (BD1/20200112). **2 confirmed asbestos containing material fragments found within 2.5-3.1m from coring; sample taken of all fill return in core barrel from 2.5-3.1m. 100% loss of drilling water return from 2.15m-3.10m

A Auger sample	G Gas sample	PLD Photo ionisation detector (ppm)
B Bulk sample	P Piston sample	PL(A) Point load axial test ls(50) (MPa)
BLK Block sample	U Tube sample (x mm dia.)	PL(D) Point load diametral test ls(50) (MPa)
C Core drilling	W Water sample	pp Pocket penetrometer (kPa)
D Disturbed sample	> Water seep	S Standard penetration test
E Environmental sample	≡ Water level	V Shear vane (kPa)



BOREHOLE LOG

CLIENT: Taronga Conservation Society Australia
PROJECT: Taronga Wildlife Hospital, Sydney - Nutrition Centre
LOCATION: Bradleys Head Road, Mosman

SURFACE LEVEL: 67.0 AHD
EASTING: 337214
NORTHING: 6253978
DIP/AZIMUTH: 90°/-

BORE No: WH3
PROJECT No: 99931.00
DATE: 14/1/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing									
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium			High	Very High	Ex High	0.01	0.05	0.10	0.50	1.00	B - Bedding	J - Joint	S - Shear	F - Fault
67	0.03	ASPHALTIC CONCRETE																									
	0.15	FILL/ROADBASE: Gravelly SAND, fine to medium, grey-brown, fine igneous gravel, with silt, moist																						A/E			PID<1 ppm
	0.5	FILL/SAND: fine to medium, dark brown, with silt, clay, trace fine igneous gravel and ash, moist																									PL(A) = 0.7
	0.65	FILL/SANDSTONE BOULDER: red-brown, medium strength																									
	0.73	CONCRETE																									
	1.34	SANDSTONE: medium to coarse grained, red-brown and yellow-brown, medium to high strength, moderately weathered, fractured to slightly fractured, Hawkesbury Sandstone																									0.73m: CORE LOSS: 610mm
																								C	61	61	1.42m: B0°, pl, ro, cly co 1mm
																											1.8m: Ds, 40mm 1.84m: Cs, 20mm 1.86m: Ds, 40mm
																											PL(A) = 0.4 PL(A) = 0.6
																								C	100	100	PL(A) = 1.2
																								C	100	100	PL(A) = 0.6
																								C	100	100	PL(A) = 0.8 PL(A) = 0.7 PL(A) = 0.9

BOREHOLE LOG

CLIENT: Taronga Conservation Society Australia
PROJECT: Taronga Wildlife Hospital, Sydney - Nutrition Centre
LOCATION: Bradleys Head Road, Mosman

SURFACE LEVEL: 73.0 AHD
EASTING: 337240
NORTHING: 6253975
DIP/AZIMUTH: 90°/-

BORE No: WH4
PROJECT No: 99931.00
DATE: 12 - 13/1/2021
SHEET 2 OF 2

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing										
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium			High	Very High	Ex High	0.01	0.05	0.10	0.50	1.00	B - Bedding	J - Joint	S - Shear	F - Fault	Type
8		SANDSTONE: medium to coarse grained, pale grey, medium to high strength, fresh, slightly fractured, Hawkesbury Sandstone (continued)																										PL(A) = 1.1
11																										C	100	98
11.56		Bore discontinued at 11.56m - Target depth reached																										
12																												
13																												
14																												
15																												
16																												
17																												
18																												
19																												

RIG: Hanjin D8 **DRILLER:** Hagstrom **LOGGED:** KR **CASING:** HQ to 3.7m
TYPE OF BORING: Solid flight auger (TC-bit) to 3.07m, NMLC drilling to 11.56m
WATER OBSERVATIONS: No free groundwater observed whilst augering
REMARKS:

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Taronga Conservation Society Australia
PROJECT: Taronga Wildlife Hospital, Sydney - Nutrition Centre
LOCATION: Bradleys Head Road, Mosman

SURFACE LEVEL: 61.2 AHD
EASTING: 337174
NORTHING: 6253932
DIP/AZIMUTH: 90°/-

BORE No: WH5
PROJECT No: 99931.00
DATE: 15/1/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing				
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium			High	Very High	Ex High	B - Bedding	J - Joint	S - Shear	F - Fault
61	0.05	ASPHALTIC CONCRETE																				
	0.25	FILL/SAND: fine to medium, brown-grey, trace silt, fine igneous gravel, moist																	A/E			
	0.4																		A/E			
	0.78	FILL/Gravelly SAND: fine to medium, grey, fine igneous gravel, moist																	A/E			
	1	FILL/SAND: fine to medium, yellow-brown and grey, trace fine igneous gravel, moist to wet																				PL(A) = 0.9
	2	SANDSTONE: medium to coarse grained, pale grey, medium to high strength, slightly weathered, slightly fractured, Hawkesbury Sandstone																	C	100	100	PL(A) = 1
	3	SANDSTONE: medium to coarse grained, pale grey, high strength, fresh, unbroken, Hawkesbury Sandstone																				PL(A) = 0.9
	3.15																					PL(A) = 1.5
	4	SANDSTONE: medium to coarse grained, pale grey, high strength, fresh, unbroken, Hawkesbury Sandstone																	C	100	100	PL(A) = 1.4
	5																					PL(A) = 1.4
	5.5	Bore discontinued at 5.5m - Target depth reached																				PL(A) = 2
	6																					
	7																					
	8																					
	9																					

RIG: Hanjin D8 **DRILLER:** Hagstrom **LOGGED:** KR **CASING:** HQ to 0.75m
TYPE OF BORING: Solid flight auger (TC-bit) to 0.78m, NMLC drilling to 5.50m
WATER OBSERVATIONS: No free groundwater observed whilst augering
REMARKS:

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PLD	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Taronga Conservation Society Australia
PROJECT: Taronga Wildlife Hospital, Sydney - Nutrition Centre
LOCATION: Bradleys Head Road, Mosman

SURFACE LEVEL: 65.0 AHD
EASTING: 337199
NORTHING: 6253952
DIP/AZIMUTH: 90°/--

BORE No: WH6
PROJECT No: 99931.00
DATE: 18/1/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing				
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium			High	Very High	Ex High	B - Bedding	J - Joint	S - Shear	F - Fault
	0.05	ASPHALTIC CONCRETE																	A/E*			PID<1 ppm
	0.15	FILL/ROADBASE: Gravelly SAND, fine to medium, grey-brown, fine igneous gravel, with silt, moist																	A/E			PID<1 ppm
	0.3	FILL/SAND: fine to medium, pale-brown, trace fine sandstone gravel, moist																	A/E			PID1.1 ppm
	1.23	FILL/SAND: fine to medium, dark-brown and yellow-brown, trace silt and ash, clay, moist, apparently medium dense																	S			3.5/75,B refusal
	2	SANDSTONE: medium to coarse grained, red-brown, medium strength, moderately weathered, slightly fractured, Hawkesbury Sandstone																	C	100	100	PID<1 ppm PL(A) = 0.4 PL(A) = 0.4
	3	2.70-3.14m: medium to high strength band																				PL(A) = 0.8
	4	SANDSTONE: medium to coarse grained, pale grey and red-brown, low to medium strength, highly to moderately weathered, fractured, Hawkesbury Sandstone																	C	100	90	PL(A) = 0.5 PL(A) = 0.5
	4.21	SANDSTONE: medium to coarse grained, pale-grey, high strength, fresh, slightly fractured, Hawkesbury Sandstone																				PL(A) = 1.2
	5																					PL(A) = 1.5
	6																					PL(A) = 1.2
	7	7.12-7.82m: slightly weathered																	C	100	100	PL(A) = 1.5
	8	8.20-8.43m: low strength band																				PL(A) = 0.2
	8.43	Bore discontinued at 8.43m - Target depth reached																				

RIG: Hanjin D8 **DRILLER:** Hagstrom **LOGGED:** KR **CASING:** HQ to 1.2m
TYPE OF BORING: Solid flight auger (TC-bit) to 1.23m, NMLC drilling to 8.43m
WATER OBSERVATIONS: No free groundwater observed whilst augering
REMARKS: *No asbestos sample taken for 0.15-0.25m sample

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	≻	Water seep
E	Environmental sample	≻	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Taronga Conservation Society Australia
PROJECT: Taronga Wildlife Hospital, Sydney - Nutrition Centre
LOCATION: Bradleys Head Road, Mosman

SURFACE LEVEL: 67.9 AHD
EASTING: 337224
NORTHING: 6253936
DIP/AZIMUTH: 90°/-

BORE No: WH7
PROJECT No: 99931.00
DATE: 13/1/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Degree of Weathering				Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing							
			EW	HW	MW	SW		FS	FR	Ex Low	Very Low	Low			Medium	High	Very High	Ex High	B - Bedding	J - Joint	S - Shear	F - Fault	Type	Core Rec. %
	0.1	ASPHALTIC CONCRETE																						
	0.25	FILL/ROADBASE: Gravelly SAND, fine to medium, grey-brown, fine igneous gravel, with silt, moist																			A/E			PID<1 ppm
	1	FILL/SAND: yellow-brown, fine to medium, with fine sandstone gravel, moist, apparently medium dense																			A/E			PID<1 ppm 4,4,4 N = 8 PID<1 ppm PID<1 ppm
	1.61	SANDSTONE: medium to coarse grained, red-brown, medium to high strength, moderately weathered, slightly fractured, Hawkesbury Sandstone																			C	100	100	PL(A) = 1.8 PL(A) = 1.4 PL(A) = 0.6
	3																							PL(A) = 0.5 PL(A) = 0.7
	3.9	SANDSTONE: medium to coarse grained, pale grey, medium to high strength, fresh, slightly fractured, Hawkesbury Sandstone																						PL(A) = 1
	4																							PL(A) = 1
	5																							PL(A) = 1.2
	6																							PL(A) = 0.9
	6.26	SANDSTONE: medium to coarse grained, yellow-brown, medium to high strength, moderately weathered, slightly fractured, Hawkesbury Sandstone																						PL(A) = 1.6
	7.11	Bore discontinued at 7.11m - Target depth reached																						

RIG: Hanjin D8 **DRILLER:** Hagstrom **LOGGED:** KR **CASING:** HQ to 1.6m
TYPE OF BORING: Solid flight auger (TC-bit) to 1.61m, NMLC drilling to 7.11m
WATER OBSERVATIONS: No free groundwater observed whilst augering
REMARKS:

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PLD	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Taronga Conservation Society Australia
PROJECT: Taronga Wildlife Hospital, Sydney - Nutrition Centre
LOCATION: Bradleys Head Road, Mosman

SURFACE LEVEL: 71.6 AHD
EASTING: 337250
NORTHING: 6253945
DIP/AZIMUTH: 90°/-

BORE No: WH8
PROJECT No: 99931.00
DATE: 13/1/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Degree of Weathering				Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing				
			EW	HW	SW	FS		FR	Ex Low	Very Low	Low	Medium			High	Very High	Ex High	B - Bedding	J - Joint	S - Shear	F - Fault
	0.03 - 0.1	ASPHALTIC CONCRETE																A/E			PID<1 ppm PID=1 ppm
	0.1 - 1.55	FILL/ROADBASE: Gravelly SAND, fine to medium, grey-brown, fine igneous gravel, with silt, moist, apparently medium dense FILL/SAND: fine to medium, brown, grey and yellow, with fine sandstone and igneous gravel, clay, silt, trace ash, apparently medium dense to dense 1.20-1.45m: low plasticity, yellow-brown sandy clay fill band																A/E*			PID<1 ppm 6,6,6 N = 12 PID<1 ppm PID<1 ppm PL(A) = 1.1
	1.55 - 4.0	SANDSTONE: medium to coarse grained, red-brown then pale grey and yellow, high strength, moderately to slightly weathered, unbroken, Hawkesbury Sandstone																C	100	100	PL(A) = 1.4
	4.0 - 6.0	SANDSTONE: medium to coarse grained, pale grey, high then medium strength, fresh, slightly fractured, Hawkesbury Sandstone																C	100	96	PL(A) = 1.4
	6.0 - 8.30	SANDSTONE: medium grained with 20-40% fine grained laminations, pale grey, medium to high strength, fresh, slightly fractured, Hawkesbury Sandstone																C	100	99	PL(A) = 0.6 PL(A) = 0.7 PL(A) = 0.9
	8.30 - 8.51	8.30-8.51m: high strength band Bore discontinued at 8.51m - Target depth reached																			PL(A) = 1.2

RIG: Hanjin D8 **DRILLER:** Hagstrom **LOGGED:** KR **CASING:** HQ to 1.5m
TYPE OF BORING: Solid flight auger (TC-bit) to 1.55m, NMLC drilling to 8.51m
WATER OBSERVATIONS: No free groundwater observed whilst augering
REMARKS: *Blind duplicate taken at 0.9-1.0m (BD2/20210113).

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PLD	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Taronga Conservation Society Australia
PROJECT: Taronga Wildlife Hospital, Sydney - Nutrition Centre
LOCATION: Bradleys Head Road, Mosman

SURFACE LEVEL: 62.4 AHD
EASTING: 337218
NORTHING: 6253889
DIP/AZIMUTH: 90°/--

BORE No: WH9
PROJECT No: 99931.00
DATE: 15/1/2021
SHEET 1 OF 2

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing				
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium			High	Very High	Ex High	B - Bedding	J - Joint	S - Shear	F - Fault
62.4	0.05	PAVERS																	A/E			PID<1 ppm
62.3	0.7	FILL/SAND: fine to medium, grey-brown, brown and dark brown, with silt, trace fine igneous, sandstone gravel and ash, moist																	A/E*			PID=1 ppm
62.1	1	SANDSTONE: medium to coarse grained, yellow-brown then pale grey, medium to high strength, slightly weathered, slightly fractured, Hawkesbury Sandstone																	A/E			PID=2 ppm
61.8	2																		C	100	99	PL(A) = 0.8
61.5	2.53	SANDSTONE: medium to coarse grained, pale grey then yellow-brown, medium strength with very low strength and clay bands, highly to moderately weathered, fractured, Hawkesbury Sandstone																				1.85m: B0°, pl, ro, cly co 1mm 1.86m: B0°, pl, ro, cly co 1mm 2.36m: B0°, ir, ro, cly co 10mm 2.52m: B0°, pl, ro, cly co 10mm 2.64m: Ds, 30mm 2.67m: Cs, 50mm 2.72m: Ds, 60mm 2.78m: Cs, 20mm 3.1m: B0°, pl, ro, cly co 1mm 3.2m: B0°, pl, ro, mi 3.32m: B0°, pl, ro, cly vn 3.38m: B0°, pl, ro, cly vn 3.4m: Cs, 10mm 4.28m: CORE LOSS: 50mm
61.2	3.41	SANDSTONE: medium to coarse grained, yellow-brown and pale grey, medium to high strength, moderately weathered and fresh, slightly fractured, Hawkesbury Sandstone																	C	100	68	PL(A) = 0.7
60.9	4.33	SANDSTONE: medium to coarse grained, yellow-brown and pale grey, medium to high strength, moderately weathered and fresh, slightly fractured, Hawkesbury Sandstone																	C	98	94	PL(A) = 1
60.6	5																					5.39m: Cs, 30mm
60.3	6																		C	100	79	PL(A) = 0.8 PL(A) = 1.2 PL(A) = 0.9
59.9	6.67	SANDSTONE: medium to coarse grained, pale grey and dark grey, moderately weathered and fresh, fractured, Hawkesbury Sandstone																				6.74m: Ds, 30mm 6.84m: Cs, 20mm 6.86m: Ds, 40mm 7m: Ds, 80mm 7.18m: B5°, un, pl, sm, cly vn 7.41m: B5°, ir, ro, cly co 1mm 7.92m: Ds, 80mm
59.6	7	6.70-8.40m: siltstone clasts and bands																	C	100	97	PL(A) = 0.5 PL(A) = 0.1
59.3	8																					
59.0	8.3	SANDSTONE: medium to coarse grained, pale grey, medium to high strength, fresh, slightly fractured, Hawkesbury Sandstone																				8.65m: B0°, pl, ro, cly co 5mm
58.7	9																					PL(A) = 0.7 PL(A) = 1.1

RIG: Hanjin D8 **DRILLER:** Hagstrom **LOGGED:** KR **CASING:** HQ to 1.6m
TYPE OF BORING: Solid flight auger (TC-bit) to 0.70m, NMLC drilling to 10.19m
WATER OBSERVATIONS: No free groundwater observed whilst augering
REMARKS: *Blind duplicate taken at 0.4-0.5m (BD4/20210115).

A Auger sample	G Gas sample	PID Photo ionisation detector (ppm)
B Bulk sample	P Piston sample	PL(A) Point load axial test Is(50) (MPa)
BLK Block sample	U Tube sample (x mm dia.)	PL(D) Point load diametral test Is(50) (MPa)
C Core drilling	W Water sample	pp Pocket penetrometer (kPa)
D Disturbed sample	> Water seep	sp Standard penetration test
E Environmental sample	≡ Water level	V Shear vane (kPa)

BOREHOLE LOG

CLIENT: Taronga Conservation Society Australia
PROJECT: Taronga Wildlife Hospital, Sydney - Nutrition Centre
LOCATION: Bradleys Head Road, Mosman

SURFACE LEVEL: 62.4 AHD
EASTING: 337218
NORTHING: 6253889
DIP/AZIMUTH: 90°/--

BORE No: WH9
PROJECT No: 99931.00
DATE: 15/1/2021
SHEET 2 OF 2

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing									
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium			High	Very High	Ex High	0.01	0.05	0.10	0.50	1.00	B - Bedding	J - Joint	S - Shear	F - Fault
	10.19	Bore discontinued at 10.19m - Target depth reached																									PL(A) = 1.2
52																											
51	11																										
50	12																										
49	13																										
48	14																										
47	15																										
46	16																										
45	17																										
44	18																										
43	19																										

RIG: Hanjin D8 **DRILLER:** Hagstrom **LOGGED:** KR **CASING:** HQ to 1.6m
TYPE OF BORING: Solid flight auger (TC-bit) to 0.70m, NMLC drilling to 10.19m
WATER OBSERVATIONS: No free groundwater observed whilst augering
REMARKS: *Blind duplicate taken at 0.4-0.5m (BD4/20210115).

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



Appendix E

Laboratory Test Results

Table E1: Contaminant Concentrations in Soil

Sample/ Depth (m)	B	T	E	X	F1	F2	+PAH	B.TEQ	B(a)P	+OCP	+OPP	+PCB	Asbestos	As	Cd	Cr	Cu	Pb	Hg	Ni	Zn	
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	(Y/N)	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	
WH1 0.1-0.2	<0.2	<0.5	<1	<3	<25	<50	<0.05	<0.5	<0.05	NT	NT	NT	N	<4	<0.4	10	56	2	<0.1	79	26	
WH1 0.4-0.5	<0.2	<0.5	<1	<3	<25	<50	0.62	<0.5	0.1	NIL	NIL	NIL	N	<4	<0.4	10	40	12	<0.1	51	34	
WH1 0.9-1.0	<0.2	<0.5	<1	<3	<25	<50	<0.05	<0.5	<0.05	NT	NT	NT	N	<4	<0.4	9	8	3	<0.1	11	8	
WH2 0.2-0.3	<0.2	<0.5	<1	<3	<25	<50	2	<0.5	0.2	NIL	NIL	NIL	N	<4	<0.4	9	12	24	<0.1	13	44	
WH2 1.9-2.0	<0.2	<0.5	<1	<3	<25	<50	8	1.2	0.87	NT	NT	NT	N	<4	<0.4	6	5	73	<0.1	1	38	
WH3 0.15-0.25	<0.2	<0.5	<1	<3	<25	<50	15	2.2	1.5	NIL	NIL	NIL	N	<4	<0.4	29	27	11	<0.1	32	29	
WH4 0.4-0.5	<0.2	<0.5	<1	<3	<25	89	260	38	26	NIL	NIL	NIL	N	<4	<0.4	9	36	12	0.1	12	39	
WH4 0.9-1.0	<0.2	<0.5	<1	<3	<25	<50	49	7.2	5	NT	NT	NT	N	7	<0.4	29	12	35	<0.1	4	49	
WH4 2.4-2.5	<0.2	<0.5	<1	<3	<25	<50	1.5	<0.5	0.1	NT	NT	NT	N	<4	<0.4	19	1	10	<0.1	<1	53	
WH5 0.1-0.2	<0.2	<0.5	<1	<3	<25	<50	<0.05	<0.5	<0.05	NT	NT	NT	N	<4	<0.4	98	24	4	<0.1	75	37	
WH5 0.4-0.6	<0.2	<0.5	<1	<3	<25	<50	<0.05	<0.5	<0.05	NIL	NIL	NIL	N	<4	<0.4	35	8	4	<0.1	30	25	
WH6 0.3-0.5	<0.2	<0.5	<1	<3	<25	<50	23	2.3	1.6	NT	NT	NT	N	<4	<0.4	12	16	29	<0.1	10	52	
WH6 0.9-1.0	<0.2	<0.5	<1	<3	<25	<50	<0.05	<0.5	<0.05	NIL	NIL	NIL	N	5	<0.4	8	3	4	<0.1	<1	12	
WH7 0.3-0.5	<0.2	<0.5	<1	<3	<25	<50	<0.05	<0.5	<0.05	NIL	NIL	NIL	N	<4	<0.4	9	28	10	<0.1	6	24	
WH7 1.4-1.5	<0.2	<0.5	<1	<3	<25	<50	<0.05	<0.5	<0.05	NT	NT	NT	N	<4	<0.4	13	4	10	<0.1	2	18	
WH8 0.3-0.5	<0.2	<0.5	<1	<3	<25	<50	<0.05	<0.5	<0.05	NIL	NIL	NIL	N	<4	<0.4	10	6	5	<0.1	9	9	
WH8 1.45-1.55	<0.2	<0.5	<1	<3	<25	<50	9.6	1.3	0.88	NT	NT	NT	N	<4	<0.4	13	9	11	<0.1	3	20	
WH9 0.1-0.2	<0.2	<0.5	<1	<3	<25	<50	6.4	1.1	0.79	NIL	NIL	NIL	N	<4	<0.4	16	44	23	<0.1	71	58	
WH9 0.6-0.7	<0.2	<0.5	<1	<3	<25	<50	7.5	1.2	0.82	NT	NT	NT	N	7	<0.4	13	26	120	<0.1	36	70	
PF1 0.05-0.15	<0.2	<0.5	<1	<3	<25	<50	<0.05	<0.5	<0.05	NIL	NIL	NIL	N	<4	<0.4	8	14	8	<0.1	4	38	
BD1/20210112 -							6	0.9	0.62					<4	<0.4	12	20	25	<0.1	7	42	
BD3/20210114							<0.5	1.2	<0.5					<5	<1	11	<5	<5	<0.1	4	<5	
TS -	102%	103%	102%																			
TB -	<0.2	<0.5	<1	<3	<25																	

Notes: B = Benzene; T = Toluene; E = Ethylbenzene; X = Xylene; Naph. = Naphthalene; F1 = (C₆ – C₁₀) – BTEX; F2 = (C₁₁ – C₁₆) – Naphthalene; +PAH = Positive polycyclic aromatic hydrocarbons; B.TEQ = Carcinogenic PAHs (as B(a)P TEQ); B(a)P = Benzo(a)pyrene
OCP = Organochlorine pesticides; OPP = Organophosphorus pesticides; PCB = Polychlorinated biphenyls; As = Arsenic; Cd = Cadmium; Cr = Chromium; Cu = Copper; Pb = Lead; Hg = Mercury; Ni = Nickel; Zn = Zinc; NIL = below detection limits
NT = not tested; NA = not applicable

Table E2: Toxicity Characteristic Leaching Procedure Testing Results

Sample/ Depth (m)	+PAH mg/L	B(a)P mg/L	Pb mg/L	Ni mg/L
WH1 0.1-0.2				0.1
WH1 0.4-0.5				0.05
WH3 0.15-0.25	NIL(+)/VE	<0.001		
WH4 0.4-0.5	NIL(+)/VE	<0.001		
WH4 0.9-1.0	NIL(+)/VE	<0.001		
WH5 0.1-0.2				0.02
WH6 0.3-0.5	NIL(+)/VE	<0.001		
WH9 0.1-0.2				0.04
WH9 0.6-0.7			0.05	

Table E3: NEPM Investigation/Screening Levels¹

Sample/ Depth (m)	B mg/kg	T mg/kg	E mg/kg	X mg/kg	F1 mg/kg	F2 mg/kg	+PAH mg/kg	B.TEQ mg/kg	B(a)P ² mg/kg	+OCP mg/kg	+OPP mg/kg	+PCB mg/kg	Asbestos (Y/N)	As mg/kg	Cd mg/kg	Cr mg/kg	Cu mg/kg	Pb mg/kg	Hg mg/kg	Ni mg/kg	Zn mg/kg
Health-Based ¹	3			230	260		4000	40		Various	Various	1		3000	900	3600	24000	1500	730	6000	400000
Ecological-Based ¹	75	135	165	180	215	170			72					160		660	280	1800		290	620
Management Limit					700	1000															

Notes: B = Benzene; T = Toluene; E = Ethylbenzene; X = Xylene; Naph. = Naphthalene; F1 = (C₆ – C₁₀) – BTEX; F2 = (C₁₁ – C₁₆) – Naphthalene; +PAH = Positive polycyclic aromatic hydrocarbons; B.TEQ = Carcinogenic PAHs (as B(a)P TEQ); B(a)P = Benzo(a)pyrene
OCP = Organochlorine pesticides; OPP = Organophosphorus pesticides; PCB = Polychlorinated biphenyls; As = Arsenic; Cd = Cadmium; Cr = Chromium; Cu = Copper; Pb = Lead; Hg = Mercury; Ni = Nickel; Zn = Zinc;

¹Based on National Environment Protect (Assessment of Site Contamination) Measure 1999 (updated 2013) for 'D' commercial and industrial sites, assumed sandy soils with > 10% clay content, pH of 6.0 and CEC of 10 cmol/kg

²Based on advice in CRC Care Technical Report no. 39

Table E4: Waste Classification Criteria¹

Sample/ Depth (m)	B mg/kg	T mg/kg	E mg/kg	X mg/kg	C ₆ -C ₉ mg/kg	C ₁₀ -C ₃₆ mg/kg	+PAH mg/kg	B.TEQ mg/kg	B(a)P mg/kg	+OCP ² mg/kg	+OPP ² mg/kg	+PCB mg/kg	Asbestos (Y/N)	As mg/kg	Cd mg/kg	Cr mg/kg	Cu mg/kg	Pb mg/kg	Hg mg/kg	Ni mg/kg	Zn mg/kg
General Solid Waste																					
CT1	10	288	600	1000	650	10000	200	N/A	0.8	<50	<50	<50	N	100	20	100	N/A	100	4	40	N/A
SCC1	18	518	1080	1800	650	10000	200	N/A	10	<50	<50	<50	N	500	100	1900	N/A	1500	50	1050	N/A
TCLP1 (mg/L)	0.5	14.4	30	50	N/A	N/A	N/A	N/A	0.04	N/A	N/A	N/A	N/A	5	1	5	N/A	5	0.2	2	N/A

Notes: B = Benzene; T = Toluene; E = Ethylbenzene; X = Xylene; C₆ – C₉ TRH; C₁₀ – C₃₆ TRH; +PAH = Positive polycyclic aromatic hydrocarbons; B.TEQ = Carcinogenic PAHs (as B(a)P TEQ); OCP = Organochlorine pesticides; OPP = Organophosphorus pesticides;

PCB = Polychlorinated biphenyls; As = Arsenic; Cd = Cadmium; Cr = Chromium; Cu = Copper; Pb = Lead; Hg = Mercury; Ni = Nickel; Zn = Zinc; N/A = not applicable

¹Based on Waste Classification Guidelines (NSW EPA, 2014); ²As part of Scheduled Chemicals

13226

Project No: 99931.00	Suburb: Mosman	To: EnviroLab
Project Name: Taronga Zoo, Wildlife Hospital	Order Number	12 Ashley Street, Chatswood 2067
Project Manager: Sam Balian	Sampler: KR	Attn: Aileen Hie
Emails: Sam.Balian@douglaspartners.com.au		Phone: (02) 9910 6200
Date Required: Same day <input type="checkbox"/> 24 hours <input type="checkbox"/> 48 hours <input type="checkbox"/> 72 hours <input type="checkbox"/> Standard <input type="checkbox"/>		Email: Ahie@envirolab.com.au
Prior Storage: <input type="checkbox"/> Esky <input type="checkbox"/> Fridge <input type="checkbox"/> Shelved Do samples contain 'potential' HBM? Yes <input type="checkbox"/> No <input type="checkbox"/> (if YES, then handle, transport and store in accordance with FPM HAZID)		

Sample ID	Lab ID	Date Sampled	Sample Type		Analytes										Notes/preservation	
			S - soil W - water	G - glass P - plastic	Combo 8	Combo 3a	Asb ID	metals	PAH	BTEX	Asbestos NEPM	pH, CEC, iron, TOC	Aggressivity			
WH1/0.1-0.2	1	14/01/21	S	G/P		X										
WH1/0.4-0.5?	2	14/01/21	S	G/P	X							X				
WH1/0.9-1.0	3	14/01/21	S	G/P		X										
WH2/0.2-0.3	4	12/01/21	S	G/P	X							X				
WH2/1.9-2.0	5	12/01/21	S	G/P		X										
WH3/0.15-0.25	6	14/01/21	S	G/P	X							X				
WH4/0.4-0.5	7	12/01/21	S	G/P	X							X				
WH4/0.9-1.0	8	12/01/21	S	G/P		X										
WH4/2.4-2.5	9	12/01/21	S	G/P		X							X			
WH5/0.1-0.2	10	12/01/21	S	G/P		X										
WH5/0.4-0.6	11	12/01/21	S	G/P	X							X				
WH6/0.3-0.5	12	18/01/21	S	G/P		X										
WH6/0.9-1.0	13	18/01/21	S	G/P	X							X			X	
WH7/0.3-0.5	14	13/01/21	S	G/P	X							X				
WH7/1.4-1.5	15	13/01/21	S	G/P		X							X			
WH8/0.3-0.5	16	13/01/21	S	G/P	X							X				
WH8/1.45-1.55	17	13/01/21	S	G/P		X									X	

ANZECC PQLs req'd for all water analytes

PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit
Metals to Analyse: 8HM unless specified here:

Lab Report/Reference No: 260047

Total number of samples in container: 23 Relinquished by: AS Transported to laboratory by: Courier
Send Results to: Douglas Partners Pty Ltd Address Phone: Fax:



Signed: *Kirk* Received by: Date & Time:

*Updated COC 22/01/2021
13:26.*

Project No: 99931.00	Suburb: Mosman	To: EnviroLab
Project Name: Taronga Zoo, Wildlife Hospital	Order Number	12 Ashley Street, Chatswood 2067
Project Manager: Sam Balian	Sampler: KR	Attn: Aileen Hie
Emails: Sam.Balian@douglaspartners.com.au		Phone: (02) 9910 6200
Date Required: Same day <input type="checkbox"/> 24 hours <input type="checkbox"/> 48 hours <input type="checkbox"/> 72 hours <input type="checkbox"/> Standard <input type="checkbox"/>		Email: Ahie@envirolab.com.au
Prior Storage: <input type="checkbox"/> Esky <input type="checkbox"/> Fridge <input type="checkbox"/> Shelved Do samples contain 'potential' HBM? Yes <input type="checkbox"/> No <input type="checkbox"/> (if YES, then handle, transport and store in accordance with FPM HAZID)		

Sample ID	Lab ID	Sampling Date	Sample Type	Container Type	Analytes										Notes/preservation		
					S	W	C	P									
WH9/0.1-0.2	18	15/01/21	S	G/P	X									X			
WH9/0.6-0.7	19	15/01/21	S	G/P			X										
PF1/0.05-0.15*	20	15/01/21	S	G/P	X									X			Change test to Combo8A if inadequate sample
BD3/20210114	ALS	14/01/21	S	G													*please send BD3/20200114
BD1/20210112	21	12/01/21	S	G				X	X								to ALS for interlab
WH2/ACM	24	12/01/21	S	P			X										analysis of metals and PAH
TS	22												X				
TB	23												X				

PQL (S) mg/kg		ANZECC PQLs req'd for all water analytes <input type="checkbox"/>
PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit		Lab Report/Reference No: 260047
Metals to Analyse: 8HM unless specified here:		
Total number of samples in container: 23	Relinquished by: AS	Transported to laboratory by: urier
Send Results to: Douglas Partners Pty Ltd	Address	Phone: Fax:
Signed: <i>Kirk</i>	Received by:	Date & Time:

Project No: 99931.00		Suburb: Mosman		To: EnviroLab													
Project Name: Taronga Zoo, Wildlife Hospital		Order Number		12 Ashley Street, Chatswood 2067													
Project Manager: Sam Balian		Sampler: KR		Attn: Aileen Hie													
Emails: Sam.Balian@douglaspartners.com.au				Phone: (02) 9910 6200													
Date Required: Same day <input type="checkbox"/> 24 hours <input type="checkbox"/> 48 hours <input type="checkbox"/> 72 hours <input type="checkbox"/> Standard <input checked="" type="checkbox"/>				Email: Ahie@envirolab.com.au													
Prior Storage: <input type="checkbox"/> Esky <input type="checkbox"/> Fridge <input type="checkbox"/> Shelved		Do samples contain 'potential' HBM? Yes <input type="checkbox"/> No <input type="checkbox"/> (If YES, then handle, transport and store in accordance with FPM HAZID)															
Sample ID	Lab ID	Date Sampled	Sample Type	Container Type	Analytes										Notes/preservation		
			S - soil W - water	G - glass P - plastic	Combo 8	Combo 3a	Asb ID	metals	PAH	BTEX	Asbestos NEPM	pH, CEC, iron, TOC	Aggressivity				
✓ WH1/0.2-0.3 <i>124 (0.1-0.2)</i>	1	14/01/21	S	G/P	X								X				<div style="text-align: right;">  <p>EnviroLab Services 12 Ashley St Chatswood NSW 2067 Ph: (02) 9910 6200</p> <p>Job No: 260047</p> <p>Date Received: 21/01/21 Time Received: 16:40 Received By: [Signature] Temp: Cool/Ambient Cooling: Ice/icepack Security: Intact/Broken/None</p> <p>16.9°C</p> <p>2 plastic bags provided</p> <p>2 plastic bags provided</p>  <p>Chatswood NSW Ph: (02) 9910 6200</p> <p>Job No:</p> <p>Date Received: Time Received: Temp: Cool/Ambient Cooling: Ice/icepack Security: Intact/Broken/None</p> </div>
✓ WH1/0.4-0.5	2	14/01/21	S	G/P		X											
✓ WH1/0.9-1.0	3	14/01/21	S	G/P		X											
✓ WH2/0.2-0.3	4	12/01/21	S	G/P	X								X				
✓ WH2/1.9-2.0	5	12/01/21	S	G/P		X											
✓ WH3/0.15-0.25	6	14/01/21	S	G/P	X								X				
✓ WH4/0.4-0.5	7	12/01/21	S	G/P	X								X				
✓ WH4/0.9-1.0	8	12/01/21	S	G/P		X											
✓ WH4/2.4-2.5	9	12/01/21	S	G/P		X							X				
✓ WH5/0.1-0.2	10	12/01/21	S	G/P		X											
✓ WH5/0.4-0.6	11	12/01/21	S	G/P	X								X				
✓ WH6/0.3-0.5	12	18/01/21	S	G/P		X									X		
✓ WH6/0.9-1.0	13	18/01/21	S	G/P	X								X				
✓ WH7/0.3-0.5	14	13/01/21	S	G/P	X								X				
✓ WH7/1.4-1.5	15	13/01/21	S	G/P		X								X			
✓ WH8/0.3-0.5	16	13/01/21	S	G/P	X								X				
✓ WH8/1.45-1.55	17	13/01/21	S	G/P		X									X		
PQL (S) mg/kg					ANZECC PQLs req'd for all water analytes: <input type="checkbox"/>												
PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit					Lab Report/Reference No:												
Metals to Analyse: 8HM unless specified here:					Temp: Cool/Ambient												
Total number of samples in container: 23					Relinquished by: AS												
Send Results to: Douglas Partners Pty Ltd					Address:												
Signed:					Transported to laboratory by: Courier												
Received by:					Phone:												
Date & Time:					Fax:												

Project No: 99931.00	Suburb: Mosman	To: EnviroLab
Project Name: Taronga Zoo, Wildlife Hospital	Order Number	12 Ashley Street, Chatswood 2067
Project Manager: Sam Balian	Sampler: KR	Attn: Aileen Hie
Emails: Sam.Balian@douglaspartners.com.au		Phone: (02) 9910 6200
Date Required: Same day <input type="checkbox"/> 24 hours <input type="checkbox"/> 48 hours <input type="checkbox"/> 72 hours <input type="checkbox"/> Standard <input type="checkbox"/>		Email: Ahie@envirolab.com.au

#260047

Prior Storage: Esky Fridge Shelved Do samples contain 'potential' HBM? **Yes** **No** (if YES, then handle, transport and store in accordance with FPM HAZID)

Sample ID	Lab ID	Sampling Date	Sample Type	Container Type	Analytes								Notes/preservation
			S W	G P									
✓ WH9/0.1-0.2	18	15/01/21	S	G/P	X							X	
✓ WH9/0.6-0.7	19	15/01/21	S	G/P			X						
✓ PF1/0.05-0.15	20	15/01/21	S	G/P	X							X	
✓ BD3/20210114	ALS	14/01/21	S	G									*please send BD3/20200114
✓ BD1/20210112	21	12/01/21	S	G				X	X				to ALS for interlab
✓ WH2/ACM (NO) 22		12/01/21	S	P			X						analysis of metals and PAH
✓ TS	23											X	
✓ TB	23											X	

PQL (S) mg/kg ANZECC PQLs req'd for all water analytes

PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit
 Metals to Analyse: 8HM unless specified here: Lab Report/Reference No: _____

Total number of samples in container: 23 Relinquished by: AS Transported to laboratory by: urier

Send Results to: Douglas Partners Pty Ltd Address Phone: Fax:

Signed: Received by:  Date & Time: 21/01/21 16:40



CERTIFICATE OF ANALYSIS 260047

Client Details

Client	Douglas Partners Pty Ltd
Attention	Sam Balian
Address	96 Hermitage Rd, West Ryde, NSW, 2114

Sample Details

Your Reference	99931.00, Taronga Zoo Wildlife Hospital
Number of Samples	24 SOIL
Date samples received	21/01/2021
Date completed instructions received	22/01/2021

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	01/02/2021
Date of Issue	16/02/2021
Reissue Details	This report replaces R00 created on 01/02/2021 due to: registration error, project ID amended.
NATA Accreditation Number 2901. This document shall not be reproduced except in full.	
Accredited for compliance with ISO/IEC 17025 - Testing. Tests not covered by NATA are denoted with *	

Asbestos Approved By

Analysed by Asbestos Approved Identifier: Panika Wongchanda,
Nyovan Moonean
Authorised by Asbestos Approved Signatory: Lucy Zhu

Results Approved By

Diego Bigolin, Team Leader, Inorganics
Dragana Tomas, Senior Chemist
Hannah Nguyen, Senior Chemist
Josh Williams, Senior Chemist
Loren Bardwell, Senior Chemist
Lucy Zhu, Asbestos Supervisor
Priya Samarawickrama, Senior Chemist
Steven Luong, Organics Supervisor

Authorised By

Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil

Our Reference		260047-1	260047-2	260047-3	260047-4	260047-5
Your Reference	UNITS	WH1	WH1	WH1	WH2	WH2
Depth		0.1-0.2	0.4-0.5	0.9-1.0	0.2-0.3	1.9-2.0
Date Sampled		14/01/2021	14/01/2021	14/01/2021	14/01/2021	14/01/2021
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	27/01/2021	27/01/2021	27/01/2021	27/01/2021	27/01/2021
Date analysed	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
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	<3	<3	<3	<3	<3
Surrogate aaa-Trifluorotoluene	%	81	78	85	85	82

vTRH(C6-C10)/BTEXN in Soil

Our Reference		260047-6	260047-7	260047-8	260047-9	260047-10
Your Reference	UNITS	WH3	WH4	WH4	WH4	WH5
Depth		0.15-0.25	0.4-0.5	0.9-1.0	2.4-2.5	0.1-0.2
Date Sampled		14/01/2021	14/01/2021	14/01/2021	14/01/2021	14/01/2021
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	27/01/2021	27/01/2021	27/01/2021	27/01/2021	27/01/2021
Date analysed	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
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	<3	<3	<3	<3	<3
Surrogate aaa-Trifluorotoluene	%	77	74	75	75	93

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		260047-11	260047-12	260047-13	260047-14	260047-15
Your Reference	UNITS	WH5	WH6	WH6	WH7	WH7
Depth		0.4-0.6	0.3-0.5	0.9-1.0	0.3-0.5	1.4-1.5
Date Sampled		14/01/2021	14/01/2021	14/01/2021	14/01/2021	14/01/2021
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	27/01/2021	29/01/2021	27/01/2021	27/01/2021	27/01/2021
Date analysed	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
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	<3	<3	<3	<3	<3
Surrogate aaa-Trifluorotoluene	%	86	93	107	74	78

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		260047-16	260047-17	260047-18	260047-19	260047-20
Your Reference	UNITS	WH8	WH8	WH9	WH9	PF1
Depth		0.3-0.5	1.45-1.55	0.1-0.2	0.6-0.7	0.05-0.15
Date Sampled		14/01/2021	14/01/2021	14/01/2021	14/01/2021	14/01/2021
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	27/01/2021	27/01/2021	27/01/2021	27/01/2021	27/01/2021
Date analysed	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
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	<3	<3	<3	<3	<3
Surrogate aaa-Trifluorotoluene	%	79	83	78	78	103

vTRH(C6-C10)/BTEXN in Soil			
Our Reference		260047-22	260047-23
Your Reference	UNITS	TS	TB
Depth		-	-
Date Sampled		14/01/2021	14/01/2021
Type of sample		SOIL	SOIL
Date extracted	-	27/01/2021	27/01/2021
Date analysed	-	29/01/2021	29/01/2021
TRH C ₆ - C ₉	mg/kg	[NA]	<25
TRH C ₆ - C ₁₀	mg/kg	[NA]	<25
vTPH C ₆ - C ₁₀ less BTEX (F1)	mg/kg	[NA]	<25
Benzene	mg/kg	102%	<0.2
Toluene	mg/kg	103%	<0.5
Ethylbenzene	mg/kg	102%	<1
m+p-xylene	mg/kg	102%	<2
o-Xylene	mg/kg	103%	<1
naphthalene	mg/kg	[NA]	<1
Total +ve Xylenes	mg/kg	[NA]	<3
Surrogate aaa-Trifluorotoluene	%	94	95

svTRH (C10-C40) in Soil						
Our Reference		260047-1	260047-2	260047-3	260047-4	260047-5
Your Reference	UNITS	WH1	WH1	WH1	WH2	WH2
Depth		0.1-0.2	0.4-0.5	0.9-1.0	0.2-0.3	1.9-2.0
Date Sampled		14/01/2021	14/01/2021	14/01/2021	14/01/2021	14/01/2021
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	27/01/2021	27/01/2021	27/01/2021	27/01/2021	27/01/2021
Date analysed	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
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	130	140	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	130	240	<50	<50	<50
Surrogate o-Terphenyl	%	116	113	100	115	100

svTRH (C10-C40) in Soil						
Our Reference		260047-6	260047-7	260047-8	260047-9	260047-10
Your Reference	UNITS	WH3	WH4	WH4	WH4	WH5
Depth		0.15-0.25	0.4-0.5	0.9-1.0	2.4-2.5	0.1-0.2
Date Sampled		14/01/2021	14/01/2021	14/01/2021	14/01/2021	14/01/2021
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	27/01/2021	27/01/2021	27/01/2021	27/01/2021	27/01/2021
Date analysed	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
TRH C ₁₀ - C ₁₄	mg/kg	<50	56	<50	<50	<50
TRH C ₁₅ - C ₂₈	mg/kg	160	1,600	320	<100	<100
TRH C ₂₉ - C ₃₆	mg/kg	320	1,600	430	<100	<100
TRH >C ₁₀ -C ₁₆	mg/kg	<50	89	<50	<50	<50
TRH >C ₁₀ - C ₁₆ less Naphthalene (F2)	mg/kg	<50	89	<50	<50	<50
TRH >C ₁₆ -C ₃₄	mg/kg	370	2,800	650	<100	<100
TRH >C ₃₄ -C ₄₀	mg/kg	390	990	320	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	770	3,900	970	<50	<50
Surrogate o-Terphenyl	%	104	#	125	116	104

svTRH (C10-C40) in Soil						
Our Reference		260047-11	260047-12	260047-13	260047-14	260047-15
Your Reference	UNITS	WH5	WH6	WH6	WH7	WH7
Depth		0.4-0.6	0.3-0.5	0.9-1.0	0.3-0.5	1.4-1.5
Date Sampled		14/01/2021	14/01/2021	14/01/2021	14/01/2021	14/01/2021
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	27/01/2021	29/01/2021	27/01/2021	27/01/2021	27/01/2021
Date analysed	-	29/01/2021	01/02/2021	29/01/2021	29/01/2021	29/01/2021
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	130	<100	<100
TRH >C ₃₄ -C ₄₀	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	130	<50	<50
Surrogate o-Terphenyl	%	111	88	102	119	95

svTRH (C10-C40) in Soil						
Our Reference		260047-16	260047-17	260047-18	260047-19	260047-20
Your Reference	UNITS	WH8	WH8	WH9	WH9	PF1
Depth		0.3-0.5	1.45-1.55	0.1-0.2	0.6-0.7	0.05-0.15
Date Sampled		14/01/2021	14/01/2021	14/01/2021	14/01/2021	14/01/2021
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	27/01/2021	27/01/2021	27/01/2021	27/01/2021	27/01/2021
Date analysed	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
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	170
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	170
Surrogate o-Terphenyl	%	101	102	115	113	99

PAHs in Soil						
Our Reference		260047-1	260047-2	260047-3	260047-4	260047-5
Your Reference	UNITS	WH1	WH1	WH1	WH2	WH2
Depth		0.1-0.2	0.4-0.5	0.9-1.0	0.2-0.3	1.9-2.0
Date Sampled		14/01/2021	14/01/2021	14/01/2021	14/01/2021	14/01/2021
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	27/01/2021	27/01/2021	27/01/2021	27/01/2021	27/01/2021
Date analysed	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	0.2
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	0.1	0.4
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	0.2
Fluoranthene	mg/kg	<0.1	0.2	<0.1	0.3	1.2
Pyrene	mg/kg	<0.1	0.2	<0.1	0.3	1.3
Benzo(a)anthracene	mg/kg	<0.1	0.1	<0.1	0.3	0.9
Chrysene	mg/kg	<0.1	0.1	<0.1	0.2	0.7
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	0.3	1
Benzo(a)pyrene	mg/kg	<0.05	0.1	<0.05	0.2	0.87
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	0.1	0.4
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	0.2	0.5
Total +ve PAH's	mg/kg	<0.05	0.62	<0.05	2.0	8.0
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	1.1
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	1.2
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	1.2
Surrogate <i>p</i> -Terphenyl-d14	%	102	104	103	103	103

PAHs in Soil						
Our Reference		260047-6	260047-7	260047-8	260047-9	260047-10
Your Reference	UNITS	WH3	WH4	WH4	WH4	WH5
Depth		0.15-0.25	0.4-0.5	0.9-1.0	2.4-2.5	0.1-0.2
Date Sampled		14/01/2021	14/01/2021	14/01/2021	14/01/2021	14/01/2021
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	29/01/2021	27/01/2021	29/01/2021	27/01/2021	27/01/2021
Date analysed	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
Naphthalene	mg/kg	<0.1	<1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.2	6.5	1.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<1	0.1	<0.1	<0.1
Phenanthrene	mg/kg	1	14	3.1	0.2	<0.1
Anthracene	mg/kg	0.5	7.6	1.6	<0.1	<0.1
Fluoranthene	mg/kg	2.2	41	7.5	0.3	<0.1
Pyrene	mg/kg	2.4	46	8.0	0.3	<0.1
Benzo(a)anthracene	mg/kg	1.4	26	5.0	0.1	<0.1
Chrysene	mg/kg	1.2	20	4.2	0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	2.2	37	7.0	0.2	<0.2
Benzo(a)pyrene	mg/kg	1.5	26	5.0	0.1	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	0.8	14	2.5	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	0.2	4.0	0.7	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	1.2	19	3.3	0.1	<0.1
Total +ve PAH's	mg/kg	15	260	49	1.5	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	2.2	38	7.2	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	2.2	38	7.2	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	2.2	38	7.2	<0.5	<0.5
Surrogate <i>p</i> -Terphenyl-d14	%	98	100	97	104	104

PAHs in Soil						
Our Reference		260047-11	260047-12	260047-13	260047-14	260047-15
Your Reference	UNITS	WH5	WH6	WH6	WH7	WH7
Depth		0.4-0.6	0.3-0.5	0.9-1.0	0.3-0.5	1.4-1.5
Date Sampled		14/01/2021	14/01/2021	14/01/2021	14/01/2021	14/01/2021
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	27/01/2021	29/01/2021	29/01/2021	27/01/2021	27/01/2021
Date analysed	-	29/01/2021	30/01/2021	29/01/2021	29/01/2021	29/01/2021
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	0.2	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	0.3	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	3.9	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	1.3	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	4.5	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	3.7	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	2.0	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	1.8	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	2.4	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	1.6	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	0.7	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	0.2	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	0.8	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	23	<0.05	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	2.3	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	2.3	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	2.3	<0.5	<0.5	<0.5
Surrogate <i>p</i> -Terphenyl-d14	%	104	100	85	103	104

PAHs in Soil						
Our Reference		260047-16	260047-17	260047-18	260047-19	260047-20
Your Reference	UNITS	WH8	WH8	WH9	WH9	PF1
Depth		0.3-0.5	1.45-1.55	0.1-0.2	0.6-0.7	0.05-0.15
Date Sampled		14/01/2021	14/01/2021	14/01/2021	14/01/2021	14/01/2021
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	27/01/2021	27/01/2021	27/01/2021	27/01/2021	27/01/2021
Date analysed	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	0.1	0.1	0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	0.9	0.2	0.5	<0.1
Anthracene	mg/kg	<0.1	0.4	0.1	0.2	<0.1
Fluoranthene	mg/kg	<0.1	1.5	0.8	1.0	<0.1
Pyrene	mg/kg	<0.1	1.6	0.9	1.2	<0.1
Benzo(a)anthracene	mg/kg	<0.1	0.9	0.6	0.7	<0.1
Chrysene	mg/kg	<0.1	0.8	0.6	0.6	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	1	1	1	<0.2
Benzo(a)pyrene	mg/kg	<0.05	0.88	0.79	0.82	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	0.5	0.4	0.4	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	0.1	0.1	0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	0.6	0.6	0.6	<0.1
Total +ve PAH's	mg/kg	<0.05	9.6	6.4	7.5	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	1.3	1.1	1.2	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	1.3	1.1	1.2	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	1.3	1.1	1.2	<0.5
Surrogate <i>p</i> -Terphenyl-d14	%	101	112	104	103	102

PAHs in Soil		
Our Reference		260047-21
Your Reference	UNITS	BD1/20210112
Depth		-
Date Sampled		14/01/2021
Type of sample		SOIL
Date extracted	-	27/01/2021
Date analysed	-	29/01/2021
Naphthalene	mg/kg	<0.1
Acenaphthylene	mg/kg	<0.1
Acenaphthene	mg/kg	<0.1
Fluorene	mg/kg	<0.1
Phenanthrene	mg/kg	0.4
Anthracene	mg/kg	0.2
Fluoranthene	mg/kg	0.9
Pyrene	mg/kg	1.0
Benzo(a)anthracene	mg/kg	0.8
Chrysene	mg/kg	0.6
Benzo(b,j+k)fluoranthene	mg/kg	0.8
Benzo(a)pyrene	mg/kg	0.62
Indeno(1,2,3-c,d)pyrene	mg/kg	0.3
Dibenzo(a,h)anthracene	mg/kg	<0.1
Benzo(g,h,i)perylene	mg/kg	0.4
Total +ve PAH's	mg/kg	6.0
Benzo(a)pyrene TEQ calc (zero)	mg/kg	0.8
Benzo(a)pyrene TEQ calc(half)	mg/kg	0.9
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	0.9
Surrogate <i>p</i> -Terphenyl-d14	%	103

Organochlorine Pesticides in soil						
Our Reference		260047-2	260047-4	260047-6	260047-7	260047-11
Your Reference	UNITS	WH1	WH2	WH3	WH4	WH5
Depth		0.4-0.5	0.2-0.3	0.15-0.25	0.4-0.5	0.4-0.6
Date Sampled		14/01/2021	14/01/2021	14/01/2021	14/01/2021	14/01/2021
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	27/01/2021	27/01/2021	29/01/2021	27/01/2021	27/01/2021
Date analysed	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
HCB	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
Surrogate TCMX	%	112	112	108	110	113

Organochlorine Pesticides in soil						
Our Reference		260047-13	260047-14	260047-16	260047-18	260047-20
Your Reference	UNITS	WH6	WH7	WH8	WH9	PF1
Depth		0.9-1.0	0.3-0.5	0.3-0.5	0.1-0.2	0.05-0.15
Date Sampled		14/01/2021	14/01/2021	14/01/2021	14/01/2021	14/01/2021
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	29/01/2021	27/01/2021	27/01/2021	27/01/2021	27/01/2021
Date analysed	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
HCB	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
gamma-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
Endosulfan II	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
Endrin Aldehyde	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
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	%	104	112	110	112	112

Organophosphorus Pesticides in Soil						
Our Reference		260047-2	260047-4	260047-6	260047-7	260047-11
Your Reference	UNITS	WH1	WH2	WH3	WH4	WH5
Depth		0.4-0.5	0.2-0.3	0.15-0.25	0.4-0.5	0.4-0.6
Date Sampled		14/01/2021	14/01/2021	14/01/2021	14/01/2021	14/01/2021
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	27/01/2021	27/01/2021	29/01/2021	27/01/2021	27/01/2021
Date analysed	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
Surrogate TCMX	%	112	112	108	110	113

Organophosphorus Pesticides in Soil						
Our Reference		260047-13	260047-14	260047-16	260047-18	260047-20
Your Reference	UNITS	WH6	WH7	WH8	WH9	PF1
Depth		0.9-1.0	0.3-0.5	0.3-0.5	0.1-0.2	0.05-0.15
Date Sampled		14/01/2021	14/01/2021	14/01/2021	14/01/2021	14/01/2021
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	29/01/2021	27/01/2021	27/01/2021	27/01/2021	27/01/2021
Date analysed	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
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
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyrifos-methyl	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
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
Chlorpyrifos	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
Bromophos-ethyl	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
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	104	112	110	112	112

PCBs in Soil						
Our Reference		260047-2	260047-4	260047-6	260047-7	260047-11
Your Reference	UNITS	WH1	WH2	WH3	WH4	WH5
Depth		0.4-0.5	0.2-0.3	0.15-0.25	0.4-0.5	0.4-0.6
Date Sampled		14/01/2021	14/01/2021	14/01/2021	14/01/2021	14/01/2021
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	27/01/2021	27/01/2021	29/01/2021	27/01/2021	27/01/2021
Date analysed	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
Surrogate TCMX	%	112	112	108	110	113

PCBs in Soil						
Our Reference		260047-13	260047-14	260047-16	260047-18	260047-20
Your Reference	UNITS	WH6	WH7	WH8	WH9	PF1
Depth		0.9-1.0	0.3-0.5	0.3-0.5	0.1-0.2	0.05-0.15
Date Sampled		14/01/2021	14/01/2021	14/01/2021	14/01/2021	14/01/2021
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	29/01/2021	27/01/2021	27/01/2021	27/01/2021	27/01/2021
Date analysed	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
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 TCMX	%	104	112	110	112	112

Acid Extractable metals in soil						
Our Reference		260047-1	260047-2	260047-3	260047-4	260047-5
Your Reference	UNITS	WH1	WH1	WH1	WH2	WH2
Depth		0.1-0.2	0.4-0.5	0.9-1.0	0.2-0.3	1.9-2.0
Date Sampled		14/01/2021	14/01/2021	14/01/2021	14/01/2021	14/01/2021
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date prepared	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Date analysed	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	10	10	9	9	6
Copper	mg/kg	56	40	8	12	5
Lead	mg/kg	2	12	3	24	73
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	79	51	11	13	1
Zinc	mg/kg	26	34	8	44	38

Acid Extractable metals in soil						
Our Reference		260047-6	260047-7	260047-8	260047-9	260047-10
Your Reference	UNITS	WH3	WH4	WH4	WH4	WH5
Depth		0.15-0.25	0.4-0.5	0.9-1.0	2.4-2.5	0.1-0.2
Date Sampled		14/01/2021	14/01/2021	14/01/2021	14/01/2021	14/01/2021
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date prepared	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Date analysed	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Arsenic	mg/kg	<4	<4	7	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	29	9	29	19	98
Copper	mg/kg	27	36	12	1	24
Lead	mg/kg	11	12	35	10	4
Mercury	mg/kg	<0.1	0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	32	12	4	<1	75
Zinc	mg/kg	29	39	49	53	37
Iron	mg/kg	[NA]	[NA]	[NA]	21,000	[NA]

Acid Extractable metals in soil						
Our Reference		260047-11	260047-12	260047-13	260047-14	260047-15
Your Reference	UNITS	WH5	WH6	WH6	WH7	WH7
Depth		0.4-0.6	0.3-0.5	0.9-1.0	0.3-0.5	1.4-1.5
Date Sampled		14/01/2021	14/01/2021	14/01/2021	14/01/2021	14/01/2021
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date prepared	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Date analysed	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Arsenic	mg/kg	<4	<4	5	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	35	12	8	9	13
Copper	mg/kg	8	16	3	28	4
Lead	mg/kg	4	29	4	10	10
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	30	10	<1	6	2
Zinc	mg/kg	25	52	12	24	18
Iron	mg/kg	[NA]	[NA]	[NA]	[NA]	6,300

Acid Extractable metals in soil						
Our Reference		260047-16	260047-17	260047-18	260047-19	260047-20
Your Reference	UNITS	WH8	WH8	WH9	WH9	PF1
Depth		0.3-0.5	1.45-1.55	0.1-0.2	0.6-0.7	0.05-0.15
Date Sampled		14/01/2021	14/01/2021	14/01/2021	14/01/2021	14/01/2021
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date prepared	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Date analysed	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Arsenic	mg/kg	<4	<4	<4	7	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	10	13	16	13	8
Copper	mg/kg	6	9	44	26	14
Lead	mg/kg	5	11	23	120	8
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	9	3	71	36	4
Zinc	mg/kg	9	20	58	70	38

Acid Extractable metals in soil		
Our Reference		260047-21
Your Reference	UNITS	BD1/20210112
Depth		-
Date Sampled		14/01/2021
Type of sample		SOIL
Date prepared	-	28/01/2021
Date analysed	-	28/01/2021
Arsenic	mg/kg	<4
Cadmium	mg/kg	<0.4
Chromium	mg/kg	12
Copper	mg/kg	20
Lead	mg/kg	25
Mercury	mg/kg	<0.1
Nickel	mg/kg	7
Zinc	mg/kg	42

Misc Soil - Inorg						
Our Reference		260047-2	260047-4	260047-6	260047-7	260047-11
Your Reference	UNITS	WH1	WH2	WH3	WH4	WH5
Depth		0.4-0.5	0.2-0.3	0.15-0.25	0.4-0.5	0.4-0.6
Date Sampled		14/01/2021	14/01/2021	14/01/2021	14/01/2021	14/01/2021
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date prepared	-	27/01/2021	27/01/2021	27/01/2021	27/01/2021	27/01/2021
Date analysed	-	27/01/2021	27/01/2021	27/01/2021	27/01/2021	27/01/2021
Total Phenolics (as Phenol)	mg/kg	<5	<5	<5	<5	<5

Misc Soil - Inorg						
Our Reference		260047-13	260047-14	260047-16	260047-18	260047-20
Your Reference	UNITS	WH6	WH7	WH8	WH9	PF1
Depth		0.9-1.0	0.3-0.5	0.3-0.5	0.1-0.2	0.05-0.15
Date Sampled		14/01/2021	14/01/2021	14/01/2021	14/01/2021	14/01/2021
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date prepared	-	27/01/2021	27/01/2021	27/01/2021	27/01/2021	27/01/2021
Date analysed	-	27/01/2021	27/01/2021	27/01/2021	27/01/2021	27/01/2021
Total Phenolics (as Phenol)	mg/kg	<5	<5	<5	<5	<5

Moisture						
Our Reference		260047-1	260047-2	260047-3	260047-4	260047-5
Your Reference	UNITS	WH1	WH1	WH1	WH2	WH2
Depth		0.1-0.2	0.4-0.5	0.9-1.0	0.2-0.3	1.9-2.0
Date Sampled		14/01/2021	14/01/2021	14/01/2021	14/01/2021	14/01/2021
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date prepared	-	27/01/2021	27/01/2021	27/01/2021	27/01/2021	27/01/2021
Date analysed	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Moisture	%	5.7	5.7	9.4	9.4	7.1

Moisture						
Our Reference		260047-6	260047-7	260047-8	260047-9	260047-10
Your Reference	UNITS	WH3	WH4	WH4	WH4	WH5
Depth		0.15-0.25	0.4-0.5	0.9-1.0	2.4-2.5	0.1-0.2
Date Sampled		14/01/2021	14/01/2021	14/01/2021	14/01/2021	14/01/2021
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date prepared	-	27/01/2021	27/01/2021	27/01/2021	27/01/2021	27/01/2021
Date analysed	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Moisture	%	7.9	3.0	11	8.0	9.0

Moisture						
Our Reference		260047-11	260047-12	260047-13	260047-14	260047-15
Your Reference	UNITS	WH5	WH6	WH6	WH7	WH7
Depth		0.4-0.6	0.3-0.5	0.9-1.0	0.3-0.5	1.4-1.5
Date Sampled		14/01/2021	14/01/2021	14/01/2021	14/01/2021	14/01/2021
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date prepared	-	27/01/2021	29/01/2021	27/01/2021	27/01/2021	27/01/2021
Date analysed	-	28/01/2021	01/02/2021	28/01/2021	28/01/2021	28/01/2021
Moisture	%	9.0	6.9	14	6.8	7.8

Moisture						
Our Reference		260047-16	260047-17	260047-18	260047-19	260047-20
Your Reference	UNITS	WH8	WH8	WH9	WH9	PF1
Depth		0.3-0.5	1.45-1.55	0.1-0.2	0.6-0.7	0.05-0.15
Date Sampled		14/01/2021	14/01/2021	14/01/2021	14/01/2021	14/01/2021
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date prepared	-	27/01/2021	27/01/2021	27/01/2021	27/01/2021	27/01/2021
Date analysed	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Moisture	%	8.1	9.6	9.6	11	11

Moisture		
Our Reference		260047-21
Your Reference	UNITS	BD1/20210112
Depth		-
Date Sampled		14/01/2021
Type of sample		SOIL
Date prepared	-	27/01/2021
Date analysed	-	28/01/2021
Moisture	%	9.3

Asbestos ID - soils NEPM						
Our Reference		260047-2	260047-4	260047-6	260047-7	260047-11
Your Reference	UNITS	WH1	WH2	WH3	WH4	WH5
Depth		0.4-0.5	0.2-0.3	0.15-0.25	0.4-0.5	0.4-0.6
Date Sampled		14/01/2021	14/01/2021	14/01/2021	14/01/2021	14/01/2021
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date analysed	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Sample mass tested	g	564.2	797.77	473.05	561.21	686.77
Sample Description	-	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks	Brown fine-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	-	-	-	-	-
FA and AF Estimation*#2	%(w/w)	<0.001	<0.001	<0.001	<0.001	<0.001

Asbestos ID - soils NEPM						
Our Reference		260047-13	260047-14	260047-16	260047-18	260047-20
Your Reference	UNITS	WH6	WH7	WH8	WH9	PF1
Depth		0.9-1.0	0.3-0.5	0.3-0.5	0.1-0.2	0.05-0.15
Date Sampled		14/01/2021	14/01/2021	14/01/2021	14/01/2021	14/01/2021
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date analysed	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Sample mass tested	g	608.29	653.23	465.44	845.08	1,107.22
Sample Description	-	Tan fine-grained soil & rocks	Beige fine-grained soil & rocks	Orange fine-grained soil & rocks	Grey fine-grained soil & rocks	Brown fine-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	-	-	-	-	-
FA and AF Estimation*#2	%(w/w)	<0.001	<0.001	<0.001	<0.001	<0.001

Asbestos ID - soils						
Our Reference		260047-1	260047-3	260047-5	260047-8	260047-9
Your Reference	UNITS	WH1	WH1	WH2	WH4	WH4
Depth		0.1-0.2	0.9-1.0	1.9-2.0	0.9-1.0	2.4-2.5
Date Sampled		14/01/2021	14/01/2021	14/01/2021	14/01/2021	14/01/2021
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date analysed	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
Sample mass tested	g	Approx. 55g	Approx. 50g	Approx. 50g	Approx. 55g	Approx. 45g
Sample Description	-	Brown coarse-grained soil & rocks	Tan coarse-grained soil & rocks	Grey coarse-grained soil & rocks	Brown clayey soil & rocks	Brown clayey 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	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Asbestos comments	-	NO	NO	NO	NO	NO
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected

Asbestos ID - soils						
Our Reference		260047-10	260047-12	260047-15	260047-17	260047-19
Your Reference	UNITS	WH5	WH6	WH7	WH8	WH9
Depth		0.1-0.2	0.3-0.5	1.4-1.5	1.45-1.55	0.6-0.7
Date Sampled		14/01/2021	14/01/2021	14/01/2021	14/01/2021	14/01/2021
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date analysed	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
Sample mass tested	g	Approx. 65g	Approx. 40g	Approx. 65g	Approx. 65g	Approx. 50g
Sample Description	-	Brown clayey soil & rocks	Brown clayey soil & rocks	Brown clayey soil & rocks	Brown clayey soil & rocks	Brown clayey 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	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Asbestos comments	-	NO	NO	NO	NO	NO
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected

Misc Inorg - Soil					
Our Reference		260047-9	260047-13	260047-15	260047-17
Your Reference	UNITS	WH4	WH6	WH7	WH8
Depth		2.4-2.5	0.9-1.0	1.4-1.5	1.45-1.55
Date Sampled		14/01/2021	14/01/2021	14/01/2021	14/01/2021
Type of sample		SOIL	SOIL	SOIL	SOIL
Date prepared	-	21/01/2021	21/01/2021	21/01/2021	21/01/2021
Date analysed	-	21/01/2021	21/01/2021	21/01/2021	21/01/2021
pH 1:5 soil:water	pH Units	5.0	7.6	9.0	8.5
Total Organic Carbon (Walkley Black)	mg/kg	5,600	[NA]	2,000	[NA]
Electrical Conductivity 1:5 soil:water	µS/cm	[NA]	48	[NA]	120
Chloride, Cl 1:5 soil:water	mg/kg	[NA]	<10	[NA]	<10
Sulphate, SO4 1:5 soil:water	mg/kg	[NA]	10	[NA]	57

CEC			
Our Reference		260047-9	260047-15
Your Reference	UNITS	WH4	WH7
Depth		2.4-2.5	1.4-1.5
Date Sampled		14/01/2021	14/01/2021
Type of sample		SOIL	SOIL
Date prepared	-	29/01/2021	29/01/2021
Date analysed	-	29/01/2021	29/01/2021
Exchangeable Ca	meq/100g	6.1	4.8
Exchangeable K	meq/100g	0.1	<0.1
Exchangeable Mg	meq/100g	1.3	0.37
Exchangeable Na	meq/100g	0.24	<0.1
Cation Exchange Capacity	meq/100g	7.8	5.3

Asbestos ID - materials		
Our Reference		260047-24
Your Reference	UNITS	WH2/ACM
Depth		-
Date Sampled		12/01/2021
Type of sample		SOIL
Date analysed	-	27/01/2021
Mass / Dimension of Sample	-	63x35x5mm
Sample Description	-	Grey fibre cement material
Asbestos ID in materials	-	Chrysotile asbestos detected
Trace Analysis	-	[NT]

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	<p>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.</p> <p>Results reported denoted with * are outside our scope of NATA accreditation.</p> <p>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)</p> <p>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.</p> <p>Estimation = Estimated asbestos weight</p> <p>Results reported with "--" is equivalent to no visible asbestos identified using Polarised Light microscopy and Dispersion Staining Techniques.</p>
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-002	Conductivity and Salinity - measured using a conductivity cell at 25°C in accordance with APHA latest edition 2510 and Rayment & Lyons.
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Inorg-031	Total Phenolics by segmented flow analyser (in line distillation with colourimetric finish). Solids are extracted in a caustic media prior to analysis.
Inorg-036	Total Organic Carbon or Matter - A titrimetric method that measures the oxidisable organic content of soils.
Inorg-081	Anions - a range of Anions are determined by Ion Chromatography, in accordance with APHA latest edition, 4110-B. Waters samples are filtered on receipt prior to analysis. Alternatively determined by colourimetry/turbidity using Discrete Analyser.
Metals-020	Determination of various metals by ICP-AES.
Metals-020	Determination of exchangeable cations and cation exchange capacity in soils using 1M Ammonium Chloride exchange and ICP-AES analytical finish.
Metals-021	Determination of Mercury by Cold Vapour AAS.

Method ID	Methodology Summary
Org-020	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-020	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-021	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Org-021	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-022	Determination of VOCs sampled onto coconut shell charcoal sorbent tubes, that can be desorbed using carbon disulphide, and analysed by GC-MS.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS.
Org-022/025	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-MS/GC-MSMS. 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-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS and/or GC-MS/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-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.

Method ID	Methodology Summary
Org-023	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-023	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.

Client Reference: 99931.00, Taronga Zoo Wildlife Hospital

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-13	260047-4
Date extracted	-			27/01/2021	2	27/01/2021	27/01/2021		27/01/2021	27/01/2021
Date analysed	-			29/01/2021	2	29/01/2021	29/01/2021		29/01/2021	29/01/2021
TRH C ₆ - C ₉	mg/kg	25	Org-023	<25	2	<25	<25	0	113	110
TRH C ₆ - C ₁₀	mg/kg	25	Org-023	<25	2	<25	<25	0	113	110
Benzene	mg/kg	0.2	Org-023	<0.2	2	<0.2	<0.2	0	118	114
Toluene	mg/kg	0.5	Org-023	<0.5	2	<0.5	<0.5	0	112	108
Ethylbenzene	mg/kg	1	Org-023	<1	2	<1	<1	0	111	108
m+p-xylene	mg/kg	2	Org-023	<2	2	<2	<2	0	112	110
o-Xylene	mg/kg	1	Org-023	<1	2	<1	<1	0	114	113
naphthalene	mg/kg	1	Org-023	<1	2	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	100	2	78	87	11	98	88

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-14	260047-20
Date extracted	-			[NT]	11	27/01/2021	27/01/2021		27/01/2021	27/01/2021
Date analysed	-			[NT]	11	29/01/2021	29/01/2021		29/01/2021	29/01/2021
TRH C ₆ - C ₉	mg/kg	25	Org-023	[NT]	11	<25	<25	0	89	103
TRH C ₆ - C ₁₀	mg/kg	25	Org-023	[NT]	11	<25	<25	0	89	103
Benzene	mg/kg	0.2	Org-023	[NT]	11	<0.2	<0.2	0	90	86
Toluene	mg/kg	0.5	Org-023	[NT]	11	<0.5	<0.5	0	87	87
Ethylbenzene	mg/kg	1	Org-023	[NT]	11	<1	<1	0	89	94
m+p-xylene	mg/kg	2	Org-023	[NT]	11	<2	<2	0	89	96
o-Xylene	mg/kg	1	Org-023	[NT]	11	<1	<1	0	88	107
naphthalene	mg/kg	1	Org-023	[NT]	11	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	[NT]	11	86	76	12	79	116

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]	18	27/01/2021	27/01/2021		[NT]	[NT]
Date analysed	-			[NT]	18	29/01/2021	29/01/2021		[NT]	[NT]
TRH C ₆ - C ₉	mg/kg	25	Org-023	[NT]	18	<25	<25	0	[NT]	[NT]
TRH C ₆ - C ₁₀	mg/kg	25	Org-023	[NT]	18	<25	<25	0	[NT]	[NT]
Benzene	mg/kg	0.2	Org-023	[NT]	18	<0.2	<0.2	0	[NT]	[NT]
Toluene	mg/kg	0.5	Org-023	[NT]	18	<0.5	<0.5	0	[NT]	[NT]
Ethylbenzene	mg/kg	1	Org-023	[NT]	18	<1	<1	0	[NT]	[NT]
m+p-xylene	mg/kg	2	Org-023	[NT]	18	<2	<2	0	[NT]	[NT]
o-Xylene	mg/kg	1	Org-023	[NT]	18	<1	<1	0	[NT]	[NT]
naphthalene	mg/kg	1	Org-023	[NT]	18	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	[NT]	18	78	84	7	[NT]	[NT]

Client Reference: 99931.00, Taronga Zoo Wildlife Hospital

QUALITY CONTROL: svTRH (C10-C40) in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-13	260047-4
Date extracted	-			27/01/2021	2	27/01/2021	27/01/2021		27/01/2021	27/01/2021
Date analysed	-			28/01/2021	2	28/01/2021	28/01/2021		28/01/2021	28/01/2021
TRH C ₁₀ - C ₁₄	mg/kg	50	Org-020	<50	2	<50	<50	0	89	99
TRH C ₁₅ - C ₂₈	mg/kg	100	Org-020	<100	2	<100	<100	0	85	105
TRH C ₂₉ - C ₃₆	mg/kg	100	Org-020	<100	2	100	<100	0	108	130
TRH >C ₁₀ -C ₁₆	mg/kg	50	Org-020	<50	2	<50	<50	0	89	99
TRH >C ₁₆ -C ₃₄	mg/kg	100	Org-020	<100	2	100	<100	0	85	105
TRH >C ₃₄ -C ₄₀	mg/kg	100	Org-020	<100	2	140	140	0	108	130
Surrogate o-Terphenyl	%		Org-020	115	2	113	113	0	117	78

QUALITY CONTROL: svTRH (C10-C40) in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-12	260047-20
Date extracted	-			[NT]	11	27/01/2021	27/01/2021		27/01/2021	27/01/2021
Date analysed	-			[NT]	11	29/01/2021	29/01/2021		28/01/2021	29/01/2021
TRH C ₁₀ - C ₁₄	mg/kg	50	Org-020	[NT]	11	<50	<50	0	102	106
TRH C ₁₅ - C ₂₈	mg/kg	100	Org-020	[NT]	11	<100	<100	0	99	90
TRH C ₂₉ - C ₃₆	mg/kg	100	Org-020	[NT]	11	<100	<100	0	108	#
TRH >C ₁₀ -C ₁₆	mg/kg	50	Org-020	[NT]	11	<50	<50	0	102	106
TRH >C ₁₆ -C ₃₄	mg/kg	100	Org-020	[NT]	11	<100	<100	0	99	90
TRH >C ₃₄ -C ₄₀	mg/kg	100	Org-020	[NT]	11	<100	<100	0	108	#
Surrogate o-Terphenyl	%		Org-020	[NT]	11	111	102	8	88	87

QUALITY CONTROL: svTRH (C10-C40) in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	18	27/01/2021	27/01/2021		[NT]	[NT]
Date analysed	-			[NT]	18	29/01/2021	29/01/2021		[NT]	[NT]
TRH C ₁₀ - C ₁₄	mg/kg	50	Org-020	[NT]	18	<50	<50	0	[NT]	[NT]
TRH C ₁₅ - C ₂₈	mg/kg	100	Org-020	[NT]	18	<100	<100	0	[NT]	[NT]
TRH C ₂₉ - C ₃₆	mg/kg	100	Org-020	[NT]	18	<100	<100	0	[NT]	[NT]
TRH >C ₁₀ -C ₁₆	mg/kg	50	Org-020	[NT]	18	<50	<50	0	[NT]	[NT]
TRH >C ₁₆ -C ₃₄	mg/kg	100	Org-020	[NT]	18	<100	<100	0	[NT]	[NT]
TRH >C ₃₄ -C ₄₀	mg/kg	100	Org-020	[NT]	18	<100	<100	0	[NT]	[NT]
Surrogate o-Terphenyl	%		Org-020	[NT]	18	115	103	11	[NT]	[NT]

Client Reference: 99931.00, Taronga Zoo Wildlife Hospital

QUALITY CONTROL: PAHs in Soil				Duplicate				Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-13	260047-4
Date extracted	-			29/01/2021	2	27/01/2021	27/01/2021		27/01/2021	27/01/2021
Date analysed	-			30/01/2021	2	29/01/2021	29/01/2021		28/01/2021	28/01/2021
Naphthalene	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	77	105
Acenaphthylene	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	77	97
Fluorene	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	81	102
Phenanthrene	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	83	99
Anthracene	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	<0.1	2	0.2	<0.1	67	77	92
Pyrene	mg/kg	0.1	Org-022/025	<0.1	2	0.2	0.1	67	79	110
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	<0.1	2	0.1	<0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	<0.1	2	0.1	<0.1	0	92	93
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	<0.2	2	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	<0.05	2	0.1	0.06	50	88	94
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	101	2	104	104	0	96	102

QUALITY CONTROL: PAHs in Soil				Duplicate				Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-14	260047-20
Date extracted	-			[NT]	11	27/01/2021	27/01/2021		27/01/2021	27/01/2021
Date analysed	-			[NT]	11	29/01/2021	29/01/2021		28/01/2021	28/01/2021
Naphthalene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	84	77
Acenaphthylene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	92	76
Fluorene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	92	84
Phenanthrene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	84	87
Anthracene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	88	79
Pyrene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	88	81
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	90	94
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	[NT]	11	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	[NT]	11	<0.05	<0.05	0	102	89
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	[NT]	11	104	102	2	96	97

Client Reference: 99931.00, Taronga Zoo Wildlife Hospital

QUALITY CONTROL: PAHs in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	18	27/01/2021	27/01/2021		[NT]	[NT]
Date analysed	-			[NT]	18	29/01/2021	29/01/2021		[NT]	[NT]
Naphthalene	mg/kg	0.1	Org-022/025	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Acenaphthylene	mg/kg	0.1	Org-022/025	[NT]	18	0.1	0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-022/025	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Phenanthrene	mg/kg	0.1	Org-022/025	[NT]	18	0.2	0.3	40	[NT]	[NT]
Anthracene	mg/kg	0.1	Org-022/025	[NT]	18	0.1	0.2	67	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	[NT]	18	0.8	1.1	32	[NT]	[NT]
Pyrene	mg/kg	0.1	Org-022/025	[NT]	18	0.9	1.3	36	[NT]	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	[NT]	18	0.6	0.8	29	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	[NT]	18	0.6	0.7	15	[NT]	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	[NT]	18	1	2	67	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	[NT]	18	0.79	1.1	33	[NT]	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	[NT]	18	0.4	0.6	40	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	[NT]	18	0.1	0.2	67	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	[NT]	18	0.6	0.8	29	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	[NT]	18	104	104	0	[NT]	[NT]

Client Reference: 99931.00, Taronga Zoo Wildlife Hospital

QUALITY CONTROL: Organochlorine Pesticides in soil				Duplicate				Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-13	260047-4
Date extracted	-			27/01/2021	2	27/01/2021	27/01/2021		27/01/2021	27/01/2021
Date analysed	-			28/01/2021	2	29/01/2021	29/01/2021		28/01/2021	28/01/2021
alpha-BHC	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	83	106
HCB	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	79	108
gamma-BHC	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	79	95
delta-BHC	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	85	115
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	80	114
gamma-Chlordane	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	82	103
Dieldrin	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	83	115
Endrin	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	82	109
Endosulfan II	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	70	115
Endrin Aldehyde	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	82	97
Methoxychlor	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	109	2	112	114	2	104	106

Client Reference: 99931.00, Taronga Zoo Wildlife Hospital

QUALITY CONTROL: Organochlorine Pesticides in soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-14	260047-20
Date extracted	-			[NT]	11	27/01/2021	27/01/2021		27/01/2021	27/01/2021
Date analysed	-			[NT]	11	29/01/2021	29/01/2021		28/01/2021	28/01/2021
alpha-BHC	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	100	85
HCB	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	88	85
gamma-BHC	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	72	77
delta-BHC	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	98	85
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	92	84
gamma-Chlordane	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	100	84
Dieldrin	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	84	83
Endrin	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	88	86
Endosulfan II	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	96	83
Endrin Aldehyde	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	88	109
Methoxychlor	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	[NT]	11	113	113	0	110	99

Client Reference: 99931.00, Taronga Zoo Wildlife Hospital

QUALITY CONTROL: Organochlorine Pesticides in soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	18	27/01/2021	27/01/2021		[NT]	[NT]
Date analysed	-			[NT]	18	29/01/2021	29/01/2021		[NT]	[NT]
alpha-BHC	mg/kg	0.1	Org-022/025	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
HCB	mg/kg	0.1	Org-022/025	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022/025	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
gamma-BHC	mg/kg	0.1	Org-022/025	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022/025	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
delta-BHC	mg/kg	0.1	Org-022/025	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-022/025	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
gamma-Chlordane	mg/kg	0.1	Org-022/025	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-022/025	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-022/025	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-022/025	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Dieldrin	mg/kg	0.1	Org-022/025	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Endrin	mg/kg	0.1	Org-022/025	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Endosulfan II	mg/kg	0.1	Org-022/025	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-022/025	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-022/025	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022/025	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022/025	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Methoxychlor	mg/kg	0.1	Org-022/025	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	[NT]	18	112	112	0	[NT]	[NT]

Client Reference: 99931.00, Taronga Zoo Wildlife Hospital

QUALITY CONTROL: Organophosphorus Pesticides in Soil				Duplicate				Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-13	260047-4
Date extracted	-			27/01/2021	2	27/01/2021	27/01/2021		27/01/2021	27/01/2021
Date analysed	-			28/01/2021	2	29/01/2021	29/01/2021		28/01/2021	28/01/2021
Dichlorvos	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	69	108
Dimethoate	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Chlorpyrifos-methyl	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	79	112
Fenitrothion	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	107	105
Malathion	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	84	98
Chlorpyrifos	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	83	117
Parathion	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	75	108
Bromophos-ethyl	mg/kg	0.1	Org-022	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	79	127
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	109	2	112	114	2	104	106

QUALITY CONTROL: Organophosphorus Pesticides in Soil				Duplicate				Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-14	260047-20
Date extracted	-			[NT]	11	27/01/2021	27/01/2021		27/01/2021	27/01/2021
Date analysed	-			[NT]	11	29/01/2021	29/01/2021		28/01/2021	28/01/2021
Dichlorvos	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	86	75
Dimethoate	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Chlorpyrifos-methyl	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	98	74
Fenitrothion	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	106	101
Malathion	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	83	118
Chlorpyrifos	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	92	83
Parathion	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	90	84
Bromophos-ethyl	mg/kg	0.1	Org-022	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	96	91
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	[NT]	11	113	113	0	110	99

Client Reference: 99931.00, Taronga Zoo Wildlife Hospital

QUALITY CONTROL: Organophosphorus Pesticides in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	18	27/01/2021	27/01/2021		[NT]	[NT]
Date analysed	-			[NT]	18	29/01/2021	29/01/2021		[NT]	[NT]
Dichlorvos	mg/kg	0.1	Org-022/025	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Dimethoate	mg/kg	0.1	Org-022/025	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-022/025	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Chlorpyrifos-methyl	mg/kg	0.1	Org-022/025	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-022/025	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Fenitrothion	mg/kg	0.1	Org-022/025	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Malathion	mg/kg	0.1	Org-022/025	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Chlorpyrifos	mg/kg	0.1	Org-022/025	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Parathion	mg/kg	0.1	Org-022/025	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Bromophos-ethyl	mg/kg	0.1	Org-022	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-022/025	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-022/025	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	[NT]	18	112	112	0	[NT]	[NT]

Client Reference: 99931.00, Taronga Zoo Wildlife Hospital

QUALITY CONTROL: PCBs in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-13	260047-4
Date extracted	-			27/01/2021	2	27/01/2021	27/01/2021		27/01/2021	27/01/2021
Date analysed	-			28/01/2021	2	29/01/2021	29/01/2021		28/01/2021	28/01/2021
Aroclor 1016	mg/kg	0.1	Org-021	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021	<0.1	2	<0.1	<0.1	0	100	100
Aroclor 1260	mg/kg	0.1	Org-021	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-021	109	2	112	114	2	104	106

QUALITY CONTROL: PCBs in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-14	260047-20
Date extracted	-			[NT]	11	27/01/2021	27/01/2021		27/01/2021	27/01/2021
Date analysed	-			[NT]	11	29/01/2021	29/01/2021		28/01/2021	28/01/2021
Aroclor 1016	mg/kg	0.1	Org-021	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021	[NT]	11	<0.1	<0.1	0	100	100
Aroclor 1260	mg/kg	0.1	Org-021	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-021	[NT]	11	113	113	0	110	99

QUALITY CONTROL: PCBs in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	18	27/01/2021	27/01/2021		[NT]	[NT]
Date analysed	-			[NT]	18	29/01/2021	29/01/2021		[NT]	[NT]
Aroclor 1016	mg/kg	0.1	Org-021	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1260	mg/kg	0.1	Org-021	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-021	[NT]	18	112	112	0	[NT]	[NT]

Client Reference: 99931.00, Taronga Zoo Wildlife Hospital

QUALITY CONTROL: Acid Extractable metals in soil				Duplicate				Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-14	260047-4
Date prepared	-			28/01/2021	2	28/01/2021	28/01/2021		28/01/2021	28/01/2021
Date analysed	-			28/01/2021	2	28/01/2021	28/01/2021		28/01/2021	28/01/2021
Arsenic	mg/kg	4	Metals-020	<4	2	<4	<4	0	105	105
Cadmium	mg/kg	0.4	Metals-020	<0.4	2	<0.4	<0.4	0	103	92
Chromium	mg/kg	1	Metals-020	<1	2	10	9	11	103	102
Copper	mg/kg	1	Metals-020	<1	2	40	35	13	99	108
Lead	mg/kg	1	Metals-020	<1	2	12	10	18	102	96
Mercury	mg/kg	0.1	Metals-021	<0.1	2	<0.1	<0.1	0	107	125
Nickel	mg/kg	1	Metals-020	<1	2	51	44	15	103	84
Zinc	mg/kg	1	Metals-020	<1	2	34	29	16	107	98
Iron	mg/kg	10	Metals-020	<10	[NT]	[NT]	[NT]	[NT]	114	#

QUALITY CONTROL: Acid Extractable metals in soil				Duplicate				Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-13	260047-20
Date prepared	-			[NT]	11	28/01/2021	28/01/2021		28/01/2021	28/01/2021
Date analysed	-			[NT]	11	28/01/2021	28/01/2021		28/01/2021	28/01/2021
Arsenic	mg/kg	4	Metals-020	[NT]	11	<4	<4	0	102	101
Cadmium	mg/kg	0.4	Metals-020	[NT]	11	<0.4	<0.4	0	99	91
Chromium	mg/kg	1	Metals-020	[NT]	11	35	33	6	100	96
Copper	mg/kg	1	Metals-020	[NT]	11	8	8	0	97	114
Lead	mg/kg	1	Metals-020	[NT]	11	4	3	29	99	91
Mercury	mg/kg	0.1	Metals-021	[NT]	11	<0.1	<0.1	0	113	106
Nickel	mg/kg	1	Metals-020	[NT]	11	30	28	7	100	93
Zinc	mg/kg	1	Metals-020	[NT]	11	25	17	38	122	87
Iron	mg/kg	10	Metals-020	[NT]	[NT]	[NT]	[NT]	[NT]	126	#

QUALITY CONTROL: Acid Extractable metals in soil				Duplicate				Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	18	28/01/2021	28/01/2021		[NT]	[NT]
Date analysed	-			[NT]	18	28/01/2021	28/01/2021		[NT]	[NT]
Arsenic	mg/kg	4	Metals-020	[NT]	18	<4	<4	0	[NT]	[NT]
Cadmium	mg/kg	0.4	Metals-020	[NT]	18	<0.4	<0.4	0	[NT]	[NT]
Chromium	mg/kg	1	Metals-020	[NT]	18	16	16	0	[NT]	[NT]
Copper	mg/kg	1	Metals-020	[NT]	18	44	40	10	[NT]	[NT]
Lead	mg/kg	1	Metals-020	[NT]	18	23	26	12	[NT]	[NT]
Mercury	mg/kg	0.1	Metals-021	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Nickel	mg/kg	1	Metals-020	[NT]	18	71	68	4	[NT]	[NT]
Zinc	mg/kg	1	Metals-020	[NT]	18	58	56	4	[NT]	[NT]

Client Reference: 99931.00, Taronga Zoo Wildlife Hospital

QUALITY CONTROL: Misc Soil - Inorg							Duplicate		Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	260047-4
Date prepared	-			27/01/2021	2	27/01/2021	27/01/2021		27/01/2021	27/01/2021
Date analysed	-			27/01/2021	2	27/01/2021	27/01/2021		27/01/2021	27/01/2021
Total Phenolics (as Phenol)	mg/kg	5	Inorg-031	<5	2	<5	<5	0	99	101

QUALITY CONTROL: Misc Soil - Inorg							Duplicate		Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	11	27/01/2021	27/01/2021		[NT]	[NT]
Date analysed	-			[NT]	11	27/01/2021	27/01/2021		[NT]	[NT]
Total Phenolics (as Phenol)	mg/kg	5	Inorg-031	[NT]	11	<5	<5	0	[NT]	[NT]

Client Reference: 99931.00, Taronga Zoo Wildlife Hospital

QUALITY CONTROL: Misc Inorg - Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			21/01/2021	[NT]	[NT]	[NT]	[NT]	21/01/2021	[NT]
Date analysed	-			21/01/2021	[NT]	[NT]	[NT]	[NT]	21/01/2021	[NT]
pH 1:5 soil:water	pH Units		Inorg-001	[NT]	[NT]	[NT]	[NT]	[NT]	101	[NT]
Total Organic Carbon (Walkley Black)	mg/kg	1000	Inorg-036	<1000	[NT]	[NT]	[NT]	[NT]	94	[NT]
Electrical Conductivity 1:5 soil:water	µS/cm	1	Inorg-002	<1	[NT]	[NT]	[NT]	[NT]	100	[NT]
Chloride, Cl 1:5 soil:water	mg/kg	10	Inorg-081	<10	[NT]	[NT]	[NT]	[NT]	96	[NT]
Sulphate, SO4 1:5 soil:water	mg/kg	10	Inorg-081	<10	[NT]	[NT]	[NT]	[NT]	96	[NT]

Client Reference: 99931.00, Taronga Zoo Wildlife Hospital

QUALITY CONTROL: CEC				Duplicate				Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			29/01/2021	[NT]	[NT]	[NT]	[NT]	29/01/2021	[NT]
Date analysed	-			29/01/2021	[NT]	[NT]	[NT]	[NT]	29/01/2021	[NT]
Exchangeable Ca	meq/100g	0.1	Metals-020	<0.1	[NT]	[NT]	[NT]	[NT]	105	[NT]
Exchangeable K	meq/100g	0.1	Metals-020	<0.1	[NT]	[NT]	[NT]	[NT]	105	[NT]
Exchangeable Mg	meq/100g	0.1	Metals-020	<0.1	[NT]	[NT]	[NT]	[NT]	107	[NT]
Exchangeable Na	meq/100g	0.1	Metals-020	<0.1	[NT]	[NT]	[NT]	[NT]	111	[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.	
The recommended maximums for analytes in urine are taken from "2018 TLVs and BEIs", as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.	
Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2	

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: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-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.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Report Comments

8 metals in soil - # Percent recovery is not possible to report due to the high concentration of the element/s in the sample/s. However an acceptable recovery was obtained for the LCS.

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.

Note: All samples analysed as received. However, samples 260047-6 & 16 are below the minimum 500mL sample volume as per National Environment Protection (Assessment of Site Contamination) Measure, Schedule B1, May 2013.

Asbestos: A portion of the supplied samples were sub-sampled for asbestos analysis according to Envirolab procedures.

We cannot guarantee that these sub-samples are indicative of the entire sample.

Envirolab recommends supplying 40-50g of sample in its own container.

Note: Samples 260047-5,8,9,15,17,19 were sub-sampled from jars provided by the client.

Asbestos: Excessive sample volumes were provided for asbestos analysis.

A portion of the supplied samples were sub-sampled according to Envirolab procedures.

We cannot guarantee that these sub-samples are indicative of the entire sample.

Envirolab recommends supplying 40-50g (50mL) of sample in its own container as per AS4964-2004.

Note: Samples 260047-3,10,12 were sub-sampled from bags provided by the client.

PAHs in Soil - The RPD for duplicate results is accepted due to the non homogenous nature of sample 260047-18.

PAHs in Soil - The PQL for sample 260047-7 has been raised due to the high concentration of analytes in the sample, resulting in the sample requiring a dilution.

OC's in Soil - The PQL for sample 260047-7 has been raised due to the high concentration of analytes in the sample, resulting in the sample requiring a dilution.

OP's in Soil - The PQL for sample 260047-7 has been raised due to the high concentration of analytes in the sample, resulting in the sample requiring a dilution.

PCBs in Soil - The PQL for sample 260047-7 has been raised due to the high concentration of analytes in the sample, resulting in the sample requiring a dilution.

TRH_S_NEPM:# Percent recovery for the surrogate/matrix spike is not possible to report as the high concentration of analytes in sample/s 260047-7,20ms have caused interference.

CERTIFICATE OF ANALYSIS

Work Order : ES2102349 Client : DOUGLAS PARTNERS PTY LTD Contact : SAM BALIAN Address : PO BOX 472 WEST RYDE 1685 Telephone : ---- Project : 99931.00 Taronga Zoo, Wildlife Hospital Order number : 99931.00 C-O-C number : ---- Sampler : KR Site : ---- Quote number : EN/222 No. of samples received : 1 No. of samples analysed : 1	Page : 1 of 5 Laboratory : Environmental Division Sydney Contact : Sepan Mahamad Address : 277-289 Woodpark Road Smithfield NSW Australia 2164 Telephone : +61 2 8784 8555 Date Samples Received : 22-Jan-2021 17:15 Date Analysis Commenced : 25-Jan-2021 Issue Date : 01-Feb-2021 10:26
--	---



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Edwandy Fadjjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW



General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

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

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

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

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

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

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

- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) per the NEPM (2013) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a,h)anthracene (1.0), Benzo(g,h,i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.
- EP075(SIM): Where reported, Total Cresol is the sum of the reported concentrations of 2-Methylphenol and 3- & 4-Methylphenol at or above the LOR.



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)		Sample ID		BD3/20210114	----	----	----	----
		Sampling date / time		14-Jan-2021 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	ES2102349-001	-----	-----	-----	-----
				Result	----	----	----	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	9.0	----	----	----	----
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	----	----	----	----
Cadmium	7440-43-9	1	mg/kg	<1	----	----	----	----
Chromium	7440-47-3	2	mg/kg	11	----	----	----	----
Copper	7440-50-8	5	mg/kg	<5	----	----	----	----
Lead	7439-92-1	5	mg/kg	<5	----	----	----	----
Nickel	7440-02-0	2	mg/kg	4	----	----	----	----
Zinc	7440-66-6	5	mg/kg	<5	----	----	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	----	----	----	----
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	----	----	----	----
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	----	----	----	----
Fluorene	86-73-7	0.5	mg/kg	<0.5	----	----	----	----
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	----	----	----	----
Anthracene	120-12-7	0.5	mg/kg	<0.5	----	----	----	----
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	----	----	----	----
Pyrene	129-00-0	0.5	mg/kg	<0.5	----	----	----	----
Benzo(a)anthracene	56-55-3	0.5	mg/kg	<0.5	----	----	----	----
Chrysene	218-01-9	0.5	mg/kg	<0.5	----	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	----	----	----	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	----	----	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	----	----	----	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	----	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	----	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	----	----	----	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	0.6	----	----	----	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	1.2	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.5	%	85.4	----	----	----	----



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID				
				BD3/20210114	----	----	----	----
Sampling date / time				14-Jan-2021 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	ES2102349-001	-----	-----	-----	-----
				Result	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates - Continued								
2-Chlorophenol-D4	93951-73-6	0.5	%	90.5	----	----	----	----
2,4,6-Tribromophenol	118-79-6	0.5	%	60.5	----	----	----	----
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	97.3	----	----	----	----
Anthracene-d10	1719-06-8	0.5	%	99.6	----	----	----	----
4-Terphenyl-d14	1718-51-0	0.5	%	96.6	----	----	----	----



Surrogate Control Limits

Sub-Matrix: SOIL		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	63	123
2-Chlorophenol-D4	93951-73-6	66	122
2,4,6-Tribromophenol	118-79-6	40	138
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	70	122
Anthracene-d10	1719-06-8	66	128
4-Terphenyl-d14	1718-51-0	65	129



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 260047-A

Client Details

Client	Douglas Partners Pty Ltd
Attention	Sam Balian
Address	96 Hermitage Rd, West Ryde, NSW, 2114

Sample Details

Your Reference	99931.00, Taronga Zoo Wildlife Hospital
Number of Samples	24 SOIL
Date samples received	21/01/2021
Date completed instructions received	02/03/2021

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 09/03/2021

Date of Issue 09/03/2021

NATA Accreditation Number 2901. This document shall not be reproduced except in full.

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

Results Approved By

Dragana Tomas, Senior Chemist

Hannah Nguyen, Senior Chemist

Authorised By

Nancy Zhang, Laboratory Manager

TCLP Preparation - Acid						
Our Reference		260047-A-6	260047-A-7	260047-A-8	260047-A-12	260047-A-19
Your Reference	UNITS	WH3	WH4	WH4	WH6	WH9
Depth		0.15-0.25	0.4-0.5	0.9-1.0	0.3-0.5	0.6-0.7
Date Sampled		14/01/2021	14/01/2021	14/01/2021	14/01/2021	14/01/2021
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
pH of soil for fluid# determ.	pH units	9.9	9.6	9.1	9.4	9.2
pH of soil TCLP (after HCl)	pH units	1.9	1.9	1.8	1.8	1.8
Extraction fluid used	-	1	1	1	1	1
pH of final Leachate	pH units	5.2	5.2	5.1	5.1	5.1

PAHs in TCLP (USEPA 1311)					
Our Reference		260047-A-6	260047-A-7	260047-A-8	260047-A-12
Your Reference	UNITS	WH3	WH4	WH4	WH6
Depth		0.15-0.25	0.4-0.5	0.9-1.0	0.3-0.5
Date Sampled		14/01/2021	14/01/2021	14/01/2021	14/01/2021
Type of sample		SOIL	SOIL	SOIL	SOIL
Date extracted	-	05/03/2021	05/03/2021	05/03/2021	05/03/2021
Date analysed	-	08/03/2021	08/03/2021	08/03/2021	08/03/2021
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(b)k)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	%	69	72	72	70

Metals in TCLP USEPA1311		
Our Reference		260047-A-19
Your Reference	UNITS	WH9
Depth		0.6-0.7
Date Sampled		14/01/2021
Type of sample		SOIL
Date extracted	-	08/03/2021
Date analysed	-	08/03/2021
Lead in TCLP	mg/L	0.05

CERTIFICATE OF ANALYSIS 260047-B

Client Details

Client	Douglas Partners Pty Ltd
Attention	Sam Balian
Address	96 Hermitage Rd, West Ryde, NSW, 2114

Sample Details

Your Reference	99931.00, Taronga Zoo Wildlife Hospital
Number of Samples	24 SOIL
Date samples received	21/01/2021
Date completed instructions received	10/03/2021

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	11/03/2021
Date of Issue	11/03/2021
NATA Accreditation Number 2901. This document shall not be reproduced except in full.	
Accredited for compliance with ISO/IEC 17025 - Testing. Tests not covered by NATA are denoted with *	

Results Approved By

Dragana Tomas, Senior Chemist
 Hannah Nguyen, Senior Chemist

Authorised By



Nancy Zhang, Laboratory Manager

TCLP Preparation - Acid					
Our Reference		260047-B-1	260047-B-2	260047-B-10	260047-B-18
Your Reference	UNITS	WH1	WH1	WH5	WH9
Depth		0.1-0.2	0.4-0.5	0.1-0.2	0.1-0.2
Date Sampled		14/01/2021	14/01/2021	14/01/2021	14/01/2021
Type of sample		SOIL	SOIL	SOIL	SOIL
pH of soil for fluid# determ.	pH units	9.7	9.3	9.8	9.3
pH of soil TCLP (after HCl)	pH units	1.9	1.8	2.3	1.8
Extraction fluid used	-	1	1	1	1
pH of final Leachate	pH units	5.2	5.1	5.7	5.1

Metals in TCLP USEPA1311					
Our Reference		260047-B-1	260047-B-2	260047-B-10	260047-B-18
Your Reference	UNITS	WH1	WH1	WH5	WH9
Depth		0.1-0.2	0.4-0.5	0.1-0.2	0.1-0.2
Date Sampled		14/01/2021	14/01/2021	14/01/2021	14/01/2021
Type of sample		SOIL	SOIL	SOIL	SOIL
Date extracted	-	11/03/2021	11/03/2021	11/03/2021	11/03/2021
Date analysed	-	11/03/2021	11/03/2021	11/03/2021	11/03/2021
Nickel in TCLP	mg/L	0.1	0.05	0.02	0.04

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. Please note that the mass used may be scaled down from the default based on sample mass available.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.

Client Reference: 99931.00, Taronga Zoo Wildlife Hospital

QUALITY CONTROL: Metals in TCLP USEPA1311				Duplicate				Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			11/03/2021	[NT]	[NT]	[NT]	[NT]	11/03/2021	[NT]
Date analysed	-			11/03/2021	[NT]	[NT]	[NT]	[NT]	11/03/2021	[NT]
Nickel in TCLP	mg/L	0.02	Metals-020 ICP-AES	<0.02	[NT]	[NT]	[NT]	[NT]	96	[NT]

Result Definitions

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

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.
Australian Drinking 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.	
The recommended maximums for analytes in urine are taken from "2018 TLVs and BEIs", as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.	
Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2	

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: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-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.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.