Douglas Partners
Geotechnics / Environment / Groundwater

Integrated Practical Solutions

Report on
Detailed Site Investigation (Contamination)

Proposed Gosford Regional Library
123A Donnison Street, Gosford

Prepared for
Central Coast Council

Project 83343.03
April 2021

Douglas Partners
Geotechnics / Environment / Groundwater

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

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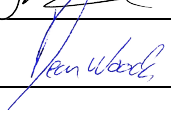
Author		7 April 2021
Reviewer		7 April 2021

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1. Introduction

Douglas Partners Pty Ltd (DP) has been engaged by Central Coast Council to complete this detailed site investigation (contamination) (DSI) for the proposed Gosford Regional Library at 123A Donnison Street, Gosford (the site). The site is shown on Drawing 1, Appendix A.

It is understood that the proposed Gosford Regional Library Building will have a similar floor level to the existing building and that no basement levels are proposed. DP was advised that minimal excavation is proposed at this stage.

DP previously prepared a *Preliminary Site Investigation for Contamination* (PSI) for 123A-125B Donnison Street, Gosford (DP, 2018), which incorporates the current site. The investigation comprised a review of site history information and a walkover; however, no intrusive investigations were completed within the current site (i.e. 123A Donnison Street, Gosford) due to access restrictions. DP (2018) considered that the site could be made compatible with the proposed commercial premises from a contamination standpoint, subject to completion of a DSI, the implementation of a suitable Remediation Action Plan (RAP), followed by remediation and then validation of the requisite works which would be considered appropriate where contamination is identified.

The objective of the DSI is to assess the suitability of the site for the proposed development and whether further investigation and / or management is required.

Relevant sections of the previous PSI (DP, 2018), were reproduced in this report.

This report must be read in conjunction with all appendices including the notes provided in Appendix B.

The following key guidelines were consulted in the preparation of this report:

- NEPC *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013)* (NEPC, 2013); and
- NSW EPA *Guidelines for Consultants Reporting on Contaminated Land* (NSW EPA, 2020).

2. Proposed Development

It is understood that the proposed building would be four-storeys, with the ground floor level at approximately 8 m AHD. It is further understood that the proposed building will have a similar floor level to the existing building and that no basement levels are proposed. DP was advised that minimal excavation is proposed at this stage.

A commercial building currently occupies the entire site; and would be largely demolished to make way for the library building. Some elements of the existing structure may be retained.

3. Scope of Work

The scope of work comprised:

- Review of the previous PSI report issued by (DP, 2018);
- Review of the conceptual site model (CSM) for contamination;
- Set-out seven boreholes targeting the identified potential contamination sources and also providing systematic site coverage. The boreholes were located within the existing building;
- Scan each test location for services using an accredited locator. Off-sets of borehole locations were measured from relevant site features to allow accurate location;
- Concrete coring at all seven locations;
- Seven boreholes were drilled to depths of between 0.33 m and 2.8 m using hand tools;
- Subsurface conditions found in each borehole were logged by an environmental geologist;
- Samples were collected from the boreholes at approximately 0.5 – 1.0 m depth intervals, changes in strata or if signs of potential contamination are identified;
- All samples were screened with a photo-ionisation detector (PID) to assess the likely presence or absence of volatile organic compounds;
- Laboratory analysis of selected soil samples for potential contaminants of concern including, metals, polycyclic aromatic hydrocarbons (PAH), total recoverable hydrocarbons (TRH), benzene, toluene, ethyl-benzene and xylenes (BTEX), phenols, organochlorine pesticides (OCP), polychlorinated biphenyls (PCB), volatile chlorinated/halogenated hydrocarbons (VHC) and asbestos;
- Field sampling and laboratory analysis with respect to standard environmental protocols, including a Quality Assurance / Quality Control (QA/QC) plan including field replicates, trip blank, equipment rinsate blank, appropriate Chain of Custody procedures and in-house laboratory QA/QC testing; and
- Preparation of this report.

4. Site Information

4.1 Site Identification

A summary of the site identification details are presented in Table 1. The site and test location plan is presented in Appendix A.

Table 1: Site Identification Details

Identification	Description
Current Land Title	Lot 100 in Deposited Plan 711850 (123A Donnison Street)
Site Area	Approximately 0.2 ha
Zoning	Current zoning as B3 – Commercial Core
Parish / County / Local Council Area	Gosford / Northumberland / Central Coast Council

5. Physical Setting

DP conducted a desktop review as part of the previous PSI (DP, 2018). The results of that review are summarised in the following sections.

5.1 Topography and Hydrology

Review of the local topographic mapping and site observations indicated that the site surface was relatively flat and level at approximately 8 m AHD. The surrounding area slopes down towards the north-west.

The entire site was covered by the existing building, however, surface water (or roof runoff) would generally be expected to drain into the local stormwater system then then flow west and then south to eventually discharge into Brisbane Water (Broad Water) located approximately 600 m to the south of the site.

5.2 Adjacent Site Uses

Surrounding land uses include the following:

- North (down slope) – Gosford Library and Kibble Park;
- East (across and up slope) – Commercial building and car parking;
- South (up slope) – Commercial property (car parking) and Henry Parry Drive; and
- West (down slope) – Commercial property (car parking).

The potential for contamination from existing off-site land uses or activities to have impacted the site is considered to be relatively low. Some impacted fill material was identified in the car park area located to the south of the current site. However, these previously identified impacted fill materials appeared to be limited to the fill and similar fill materials which were not identified within the current site.

A walkover of the adjacent sites was not undertaken as part of the previous PSI (DP, 2018).

5.3 Regional Geology and Soil Landscape

The local geological mapping indicates that the site is underlain by the Terrigal Formation belonging to the Gosford Subgroup of the Triassic Aged Narrabeen Group. The Terrigal Formation typically comprises interbedded laminite, shale, fine to coarse grained sandstone, and claystone with residual soils derived from the weathering of these rocks. Quaternary Alluvium is mapped approximately 20 m north-west of the site and typically comprises silts, sands, gravels and clays.

Reference to the local soil landscape mapping indicates that the site is generally underlain by Erina erosional soil landscape. Notwithstanding, the northern portion of the site is mapped as being underlain by disturbed terrain.

Local knowledge and the site walkover observations indicated that subsurface conditions would more likely be consistent with Erina soil landscape with residual clayey soils underlain by Terrigal Formation sandstone or siltstone.

5.4 Acid Sulfate Soils

The local acid sulfate risk mapping indicates that the site is located in an area mapped as having no known occurrence of acid sulfate soils. It was noted, however, that the soil landscape mapping identified disturbed terrain in the northern portion of the site. Disturbed terrain in the local area is known to have a risk of being affected by acid sulfate soils.

An acid sulfate soil assessment was completed as part of the previous geotechnical investigation (DP, 2018a) with the assessment concluding that acid sulfate soils are not present within the depth of investigation. Therefore, excavations for the proposed development could be undertaken without reference to an acid sulfate soil management plan.

5.5 Groundwater

Given the site's topography and geology, it is considered unlikely that a permanent groundwater table is present at relatively shallow depth (i.e. less than 2 m depth). Intermittent seepage may however be encountered at localised permeability boundaries such as at the interface of fill and natural soils, sand and clay soils or at the weathered rock interface following periods of wet-weather. It should be noted that groundwater levels are potentially transient and can be affected by factors such as soil permeability and recent weather conditions.

6. Site History

6.1 Regulatory Notices Search

The NSW EPA Register of Contaminated Land was searched for any Regulatory Notices that may be current on the site issued under the *Contaminated Land Management (CLM) Act* 1997 and Section 308 of the *Protection of the Environment Operations (POEO) Act* 1997. The information obtained at the time

of preparing the previous PSI (DP, 2018) indicated that no current or previous Licences, Notices or Orders were applicable for the site.

6.2 Information from Council Enquiries

As part of the previous PSI (DP, 2018), an enquiry was made through Central Coast Council's (CCC) web site. The information obtained relates to applications/approvals dating back to 1981 for Lot 100. The results of the enquiry indicate that several applications have been submitted for the site, generally indicating several stages of commercial development (initially possibly shops then offices); however, the site had a past use listed as a furniture and building material shop in 1981.

The information obtained from Council's Geocortex database (dated 21 May 2018) indicated that the site is not identified as contaminated land.

6.3 WorkCover Dangerous Goods Licences

As part of the previous PSI (DP, 2018), DP completed a search of the Stored Chemical Information Database (SCID) held by SafeWork NSW (formerly WorkCover NSW). SafeWork NSW reported that they did not locate any records pertaining to the site.

6.4 Historical Title Deed Information

As part of the previous PSI (DP, 2018), a historical title deeds search was carried out by InfoTrack Pty Ltd. Numerous ownership records were received; however, the significant ownership records (from a site contamination standpoint) are summarised below:

- Part of the lot was owned by Thomas Robert Hill (Orchardist) from 1920 to 1943;
- Part of the lot was owned by Robert William Boddenberg (Tyre Retreader and Garage Proprietor) from 1946 to 1965;
- Part of the lot was owned by Advanx (Gosford) Motor Service Pty Ltd (Motor Vehicle Servicing) from 1956 to 1965;
- The whole lot was owned by Westfield Development Corporation and then other companies and collective group of individuals (no details of usage available) from circa 1965 to 2000; and
- The whole lot was then acquired by Council in 2000 (current owners).

Several leases or easements were identified by the search; however, none were considered to be significant to the contamination status of the site.

Overall, the search indicated that the site may have originally had an orchard use, prior to being at least in-part developed for a mechanics workshop (circa 1946), then possibly redeveloped for commercial uses (circa 1965). The site is currently occupied by commercial (office) use.

6.5 Historical Aerial Photographs

Historical aerial photographs were reviewed as part of the previous PSI (DP, 2018) dating back to the earliest available record (1954) and approximately every 10 to 20 years thereafter to assess any major changes to the site and surrounding areas during this period. The following historical aerial photographs were reviewed:

- Photograph – Gosford Run 11G, dated 17.05.54;
- Photograph – Gosford – Lake Macquarie NSW Run 10, dated 08.03.66;
- Photograph – Gosford NSW Run 7, dated 28.05.75;
- Photograph – Gosford NSW Run 12, dated 12.09.94;
- Photograph – Gosford NSW Run 12, dated 16.03.02;
- Photograph – Google Earth Image, dated 02.12.2010; and
- Photograph – Google Earth Image, dated 11.08.2016.

Table 2 summarises the observations made during the aerial photograph review.

Table 2: Aerial Photograph Review

Year	Site	Surrounding Land Use
1954	The site appeared to be occupied by two or three buildings.	The local area appeared to comprise possibly a mix of commercial properties (east and north), residential properties (west) and warehouses (south). No intensive agricultural uses were identified on adjacent properties.
1966	The site appeared to be occupied by one large building. The photograph quality was poor.	This photograph was of poor quality which limited the comments that could be made. Surrounding areas appear to be in-part developed for primarily commercial uses (based on building sizes).
1975	The site appeared to be occupied by one large building.	No significant changes were observed, other than an overall increase in development in the local area.
1994	The site appeared to be occupied by one large building, although the dimensions may have slightly changed in association with the construction of a new building in the site to the east.	Surrounding areas appeared to have mixed commercial and community uses consistent with that observed during the walkover.
2002	No significant changes were observed.	No significant changes were observed.
2010	No significant changes were observed.	No significant changes were observed.
2016	No significant changes were observed.	No significant changes were observed.

6.6 Other Historical Information

As part of the previous PSI (DP, 2018), a search of the National Library of Australia (www.trove.nla.gov.au) was completed. A single photograph of the site was retrieved dated 1967. The photograph identifies a Coles New World Supermarket on the site and a construction site (possibly a commercial (retail) building) on the neighbouring site to the east. Figure 1 is a copy of the photograph.

Figure 1: Photograph of the site (dated 3 September 1967), taken from the northern side of Donnison Street facing south-east. The existing Uniting Church is visible in the background (left). (Source: www.trove.nla.gov.au)

7. Site Condition / Description

7.1 Previous (2018)

The following is a summary of site features observed during the previous site walkover undertaken as part of the previous PSI (DP, 2018). The walkover was undertaken on 21 March 2018. At the time of the walkover, the site comprised an existing commercial building. The following tenants were identified to be occupying the commercial (office) building at the time of the walkover:

- ET Australia Training College;
- Apprenticeship Centre;
- Regional Youth Support Services;
- Step Towards Employment Program;

- After Care Resource Centre;
- Options Disability Support; and
- Coastal Accommodation Service Supporting Youth.

In summary, the existing tenants appeared to utilise the site for commercial (office, educational and community services) purposes, and these existing uses are considered not to have any direct significant impact on the site's contamination status. The walkover identified that the site was almost entirely covered with the building footprint. Furthermore, based on ground levels in surrounding areas and existing development on the site; the existing ground surface levels are suspected to have been altered by cut and fill processes.

7.2 Current

At the time of the current investigation, the site condition was consistent with that noted previously, however, the building had been vacated.

8. Preliminary Conceptual Site Model

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

8.1 Previous (2018)

8.1.1 Potential Contamination Sources and Contaminants of Concern

Table 3 summarises the potential sources of contamination and associated contaminants of concern that have been identified at the site.

Table 3: Potential Contamination Sources and Contaminants of Concern

Potential Contamination Source / Activity	Description of Potential Contaminating Activity	Primary Potential Contaminants of Concern
Importation and / or placement of contaminated fill	Importation of fill is possible based on site observations and past site development.	Various - Common contaminants associated with imported fill are metals (As, Cd, Cr, Cu, Pb, Hg, Ni and Zn), TRH, BTEX, PAH, PCB, OCP and asbestos
Construction and demolition of buildings and structures	Historical review has identified the presence of buildings and structures at the site. The review has also identified possible past reconstruction / renovation / demolition of structures.	Metals, OCP and asbestos
Use / storage of oils / chemicals	Historical review has identified the possible past uses / activities including orchards, timber dealer, tyre retreader, garage proprietor and motor vehicle servicing.	Metals, TRH, BTEX, PAH, phenols, VOC and OCP

Notes:
As = arsenic, Cd = cadmium, Cr = chromium, Cu = copper, Pb = lead, Hg = mercury, Ni = nickel and Zn = Zinc
TRH = total recoverable hydrocarbons, BTEX = benzene, toluene, ethylbenzene and xylene, PAH = polycyclic aromatic hydrocarbons, PCB = polychlorinated biphenyls, VOC = volatile organic compounds, OCP = organochlorine pesticides

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

- S1 – Contaminated fill;
- S2 – Construction and demolition of buildings and structures; and
- S3 – Use and storage of oil / chemicals.

8.1.2 Potential Receptors of Concern

The potential receptors of contamination sourced from the site are considered to be:

- R1 – Site users (current and future commercial use);
- R2 – Land users in adjacent areas (generally commercial and recreational uses);
- R3 – Terrestrial ecology;
- R4 – Surface water (Brisbane Water);
- R5 – Groundwater; and
- R6 – Property.

8.1.3 Potential Pathways

The pathways by which the potential sources of contamination could reach potential receptors are described below:

- P1 – Ingestion and dermal contact;
- P2 – Inhalation of dust and / or vapours;
- P3 – Leaching of contaminants into groundwater and lateral migration of groundwater;
- P4 – Surface water runoff; and
- P5 – Direct contact with terrestrial ecology / property.

8.1.4 Conceptual Site Model

A 'source–pathway–receptor' approach has been used to assess the potential risks of harm being caused to human, water or environmental receptors from contamination sources on or in the vicinity of the site, via exposure pathways. The possible pathways between the above sources and receptors are described in Table 4.

Table 4: Conceptual Site Model

Source	Pathway	Receptor
S1 - Contaminated fill. S2 - Construction and demolition of buildings and structures. S3 - Use and storage of oil / chemicals.	P1 - Ingestion and dermal contact	R1 - Site users (future)
	P2 - Inhalation of dust and/or vapours	R1 - Site users R2 - Adjacent site users
	P3 - Leaching of contaminants into groundwater and lateral migration of groundwater	R4 - Surface water (Brisbane Water) R5 - Groundwater
	P4 - Surface water runoff	R4 - Surface water (Brisbane Water)
	P5 – Contact with terrestrial ecology / property	R3 - Terrestrial ecology R6 - Property

8.2 Current

It is considered that the CSM would remain largely unchanged, with the exception being that the commercial building, which occupies the site, was vacant.

9. Sampling and Analysis Quality Plan

9.1 Data Quality Objectives

This DSI was devised with reference to the seven-step data quality objective process which is provided in Appendix B Schedule B2 (NEPC, 2013). The DQO process is outlined in Appendix F.

9.2 Soil Sampling Rationale

Based on the CSM and DQO the following sampling rationale was adopted.

A systematic sampling strategy based on a NSW EPA *Contaminated Sites, Sampling Design Guidelines* (NSW EPA, 1995) which was adapted based on accessible areas. Borehole locations are shown on Drawing 1, in Appendix A.

Table A of NSW EPA (1995) recommends a minimum of seven sampling points for a site of 0.2 ha for site characterisation based on the detection of circular hot spots using a systemic grid sampling pattern. A total of seven test locations were therefore positioned across accessible areas of the site.

Soil samples were collected from each borehole at depths of approximately 0.5 m intervals, and changes in lithology or signs of contamination.

The general sampling methods are described in the field work methodology, included in Appendix C.

10. Site Assessment Criteria

The site assessment criteria (SAC) applied in the current investigation are informed by the CSM (Section 8) which identified human and environmental receptors to potential contamination on the site. Analytical results are assessed (as a Tier 1 assessment) against the SAC comprising primarily the investigation and screening levels of Schedule B1 of NEPC (NEPC, 2013).

The investigation and screening levels applied in the current investigation comprise levels adopted for a generic commercial / industrial land use scenario. The derivation of the SAC is included in Appendix D and the adopted SAC are listed on the summary analytical results tables in Appendix E.

11. Results

11.1 Field Work Results

The borehole logs for this assessment are included in Appendix C. Subsurface conditions comprised:

Concrete:	In all boreholes to depths of between 0.19 m and 0.25 m below bgl.
Fill / Clayey Sand	Grey and mottled yellow brown in Borehole 101 at between depths of 1.0 m and 1.6 m bgl
Fill / Sand	Grey in Boreholes 102 to 107 to depths of between 0.25 m and 0.35 m bgl. A layer of pale grey sand fill in Bore 101 between depths of 1.6 m and 1.7 m.
Fill / Sandy Clay:	Red brown and yellow brown sandy clay fill, trace roadbase gravel in Borehole 102 between 0.35 m and 0.75 m (refusal depth). Brick fragment was encountered at the refusal depth (0.75 m bgl).
Fill / Cobble:	Red brown cobbles and bricks, possible concrete fragments in Borehole 107 between 0.32 m and 0.52 m bgl (refusal depth).
Natural Clayey Sand:	Yellow brown and red brown in Borehole 101 between 1.7 m and 2.8 m bgl (target depth).
Natural Clay:	Red brown and grey brown in Boreholes 104, 105 and 106 to refusal depths of between 0.8 m and 1.1 m bgl.

There were no other apparent records of visual or olfactory evidence (eg: staining, odours, free phase product) to suggest the presence of contamination within the soils observed in the investigation.

The PID screening indicated that the sub-surface conditions were generally absent of VOC with all recorded values of less than 1 ppm.

No free groundwater was observed during drilling of boreholes. It should be noted that groundwater levels are affected by climatic conditions and soil permeability and will therefore vary with time.

11.2 Laboratory Analytical Results

The results of laboratory analysis are summarised in Table E1 in Appendix E:

The laboratory certificate(s) of analysis together with the chain of custody and sample receipt information are provided in Appendix E.

12. Discussion

The analytical results for all contaminants tested were below the SAC with the exception of asbestos which was detected in Sample 101 / 1.2. Laboratory results indicated that Chrysotile asbestos was detected in the form of ACM (>7 mm) at a depth of 1.2 m within the grey and mottled yellow clayey sand fill which was encountered between depths of 1.0 m and 1.6 m in Bore 101. The asbestos fragment would be considered non-friable, given its size. It is noted that this stratum of fill was only encountered in Borehole 101. Differing fill layers (including some brick and concrete inclusions) were noted in the other six boreholes.

The data quality assurance and quality control (QA/QC) results are included in Appendix F. Based on the results of the field QA and field and laboratory QC, and evaluation against the data quality indicators (DQI) it is concluded that the field and laboratory test data obtained are reliable and useable for this assessment.

13. Revised Conceptual Site Model

The data collected for this DSI has generally confirmed that certain potential contaminant sources outlined in the CSM outlined in Section 8 pose a potentially complete pathway to the identified receptor(s) whilst others do not. No other sources of contamination have been identified as a result of the testing results.

Based on the investigation results, some fill materials appear to be impacted by asbestos (in the form of ACM fragments). The potential future exposure pathway (i.e. inhalation of dust and/or asbestos fibres) needs to be appropriately managed during site demolition and redevelopment activities to ensure that site users (i.e. construction workers) and adjacent site users are not inadvertently exposed to the identified asbestos contamination.

14. Conclusions and Recommendations

Based on the results of the investigation, the site is considered to be generally compatible with the proposed Gosford Regional Library (from a site contamination standpoint), except for:

- The presence of asbestos (currently identified as an ACM fragment in fill) will need to be appropriately managed during demolition and construction works to ensure that site users (i.e. construction workers) and adjacent site users are not inadvertently exposed to asbestos contamination. It is recommended that following removal of the existing building slab, any disturbance of site soils should be completed in accordance with a construction environmental management plan; and
- A long-term environmental management plan will need to be prepared for the site that identifies the presence of ACM impacted soils and then establishes the necessary protocols to manage future potential exposure scenarios (i.e. penetration of the proposed new ground floor level slab). A notation on the property title (including Council's database) identifying the presence of asbestos impacted fill materials will also be required.

It is understood that the proposed building will have a similar floor level to the existing building, and therefore, it is assumed that minimal excavation would be required for the construction of footings and floor slabs. Any soils requiring removal from the site will need to be waste classified prior to its removal.

Given that asbestos was found in the fill, it is recommended that DP inspect the site following removal of the existing building to review the site condition and the proposed development plans (including the excavation plan). Following this review, additional assessment and possibly remediation options may be recommended by DP.

15. References

CRC CARE. (2017). *Risk-based Management and Remediation Guidance for Benzo(a)pyrene.* Technical Report no. 39: Cooperative Research Centre for Contamination Assessment and Remediation of the Environment.

DP. (2018a). *Report on Geotechnical Investigtaion, 123A-125B Donnison Street, Gosford.* Douglas Partners Pty Ltd.

DP. (2018). *Report on Prelimnary Site Investigation for Contamination, 123A-125B Donnison Street, Gosfrord.* Douglas Partners Pty Ltd.

NEPC. (2013). *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM].* Australian Government Publishing Services Canberra: National Environment Protection Council.

NSW EPA. (1995). *Contaminated Sites, Sampling Design Guidelines.* NSW Environment Protection Authority.

NSW EPA. (2020). *Guidelines for Consultants Reporting on Contaminated Land.* Contaminated Land Guidelines: NSW Environment Protection Authority.

16. Limitations

Douglas Partners (DP) has prepared this report for the proposed Gosford Regional Library at 123A Donnison Street, Gosford in accordance with DP's proposal 83343.03.P.001 dated 19 February 2021 and acceptance received from Mark Butterfield of Central Coast Council dated 23 February 2021. The work was carried out under DP's Conditions of Engagement. This report is provided for the exclusive use of Central Coast Council 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 assessment of atypical safety hazards arising from this advice is restricted to the environmental 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.

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

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

Asbestos was detected by laboratory analysis in fill materials at one of the test locations sampled and analysed. Building demolition materials, such as concrete and brick were, however, located in fill in other test locations, and these are considered as indicative of the possible presence of hazardous building materials (HBM), including asbestos.

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

Douglas Partners Pty Ltd

Appendix A

Drawing 1

Drawing adapted from Metromap Image, dated 06 April 2020

Douglas Partners
Geotechnics / Environment / Groundwater

CLIENT: Central Coast Council		
OFFICE: Central Coast	DRAWN BY: BJK	
SCALE: 1:250 @ A3	DATE: 01.03.2021	

TITLE: **Test Location Plan**
Proposed Gosford Regional Library
123A Donnison Street, Gosford

N

PROJECT No:	83343.03
DRAWING No:	1
REVISION:	0

Appendix B

About This Report

About this Report

Douglas Partners

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

Borehole and Test Pit Logs

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

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

Groundwater

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

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

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

Reports

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

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

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

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

About this Report

Site Anomalies

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

Information for Contractual Purposes

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

Site Inspection

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

Appendix C

Borehole Logs

Notes on Sampling Methods

Notes on Soil Descriptions

Notes on Symbols and Abbreviations

Field Work Methodology

BOREHOLE LOG

CLIENT: Central Coast Council
PROJECT: Proposed Gosford Regional Library
LOCATION: 123A Donnison St, Gosford

SURFACE LEVEL: 8.731 AHD
COORDINATE **E:**345953.81 **N:** 6300127.26
DATUM/GRID: MGA94 Zone 56 H
DIP/AZIMUTH: 90°/---

LOCATION ID: 101
PROJECT No: 83343.03
DATE: 25/02/21
SHEET: 1 of 1

GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN(#)	CONSIS.(*) / DENSITY.(*)	MOISTURE	REMARKS	SAMPLE TYPE	SAMPLE INTERVAL	DEPTH (m)	TESTING AND REMARKS: TEST TYPE	RESULTS AND REMARKS
25/02/21, No free groundwater observed	8	0.0	CONCRETE; grey; fraction sub-angular; with steel reinforcement										
		0.15	0.14m: cement blinding layer										
		0.22	CONCRETE, with gravel; grey; gravel fraction sub-angular										
			FILL/ SAND; grey; medium; well-graded		FILL		M	ID: QA2	E		0.3	PID	<1
									E		0.8	PID	<1
		1.0	FILL/ Clayey SAND; grey and mottled yellow brown; medium		FILL		M				1		
									E		1.2	PID	<1
		1.6	FILL/ SAND; pale grey; fine		FILL		M		E		1.65	PID	<1
	7	1.7	(SM) Clayey SAND; yellow brown and red brown; fine to medium		RES		M						
	2								E		2.0	PID	<1
									E		2.5	PID	<1
	6	2.8	Borehole discontinued at 2.80m depth - limit of investigation										

NOTES: (#)Soil origin is "probable" unless otherwise stated. (*)Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: Hand Tools
METHOD: 60mm diameter Hand Held Push Tube
REMARKS:

OPERATOR: MJH
CASING:

LOGGED: MJH

EXPORTED 06/04/21 11:15. TEMPLATE ID: DP_101.02.00_SOILLOG

Refer to explanatory notes for symbol and abbreviation definitions

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Central Coast Council
PROJECT: Proposed Gosford Regional Library
LOCATION: 123A Donnison St, Gosford

SURFACE LEVEL: 8.73 AHD
COORDINATE E:345933 **N:** 6300126
DATUM/GRID: MGA94 Zone 56 H
DIP/AZIMUTH: 90°/---

LOCATION ID: 102
PROJECT No: 83343.03
DATE: 25/02/21
SHEET: 1 of 1

CONDITIONS ENCOUNTERED								SAMPLE				TESTING AND REMARKS	
GROUNDWATER	RL (m) / DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN(#)	CONSIS.(*) / DENSITY.(*)	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
25/02/21, No free groundwater observed	0.0	CONCRETE; grey; fraction sub-angular										
	0.16	0.16m: layer of plastic										
	0.25	CONCRETE; grey; fraction sub-angular										
		FILL/ SAND; grey; medium; well-graded		FILL		M		E		0.3	PID	<1
	0.35	FILL/ Sandy CLAY; red brown and yellow brown; low to medium plasticity; trace roadbase gravels (igneous) and ironstone		FILL				E		0.6	PID	<1
	8 0.75	0.75m: brick fragment										
		Borehole discontinued at 0.75m depth - refusal on brick within fill materials										
	1									1		
	7											
	2									2		
	6											

NOTES: (#)Soil origin is "probable" unless otherwise stated. (*)Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: Hand Tools
METHOD: 60mm diameter Hand Held Push Tube
REMARKS:

OPERATOR: MJH
CASING:

LOGGED: MJH

EXPORTED 06/04/21 11:15. TEMPLATE ID: DP_101.02.00_SOILLOG

BOREHOLE LOG

CLIENT: Central Coast Council
PROJECT: Proposed Gosford Regional Library
LOCATION: 123A Donnison St, Gosford

SURFACE LEVEL: 8.73 AHD
COORDINATE E:345917.4 **N:** 6300118.3
DATUM/GRID: MGA94 Zone 56 H
DIP/AZIMUTH: 90°/---

LOCATION ID: 103
PROJECT No: 83343.03
DATE: 25/02/21
SHEET: 1 of 1

CONDITIONS ENCOUNTERED								SAMPLE				TESTING AND REMARKS	
GROUNDWATER	RL (m) / DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN(#)	CONSIS.(*) / DENSITY.(*)	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
25/02/21, No free groundwater observed	0.0	CONCRETE; grey; fraction sub-angular										
	0.15	0.15m: conduit										
	0.23	CONCRETE; grey; fraction sub-angular										
		FILL/ SAND; grey; medium; well graded		FILL		M		E		0.25	PID	<1
	0.33	Borehole discontinued at 0.33m depth - refusal on possible concrete										

NOTES: (#)Soil origin is "probable" unless otherwise stated. (*)Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: Hand Tools
METHOD: 60mm diameter Hand Held Push Tube
REMARKS:

OPERATOR: MJH
CASING:

LOGGED: MJH

EXPORTED 06/04/21 11:15. TEMPLATE ID: DP_101.02.00_SOILLOG

Refer to explanatory notes for symbol and abbreviation definitions

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Central Coast Council
PROJECT: Proposed Gosford Regional Library
LOCATION: 123A Donnison St, Gosford

SURFACE LEVEL: 8.73 AHD
COORDINATE E:345925.2 **N:** 6300105.7
DATUM/GRID: MGA94 Zone 56 H
DIP/AZIMUTH: 90°/---

LOCATION ID: 104
PROJECT No: 83343.03
DATE: 25/02/21
SHEET: 1 of 1

CONDITIONS ENCOUNTERED								SAMPLE				TESTING AND REMARKS	
GROUNDWATER	RL (m) / DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN(#)	CONSIS.(*) / DENSITY.(*)	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
25/02/21, No free groundwater observed	0.0	CONCRETE; grey; fraction sub-angular; with steel reinforcement										
	0.13	0.07m: (70mm)										
	0.19	0.14m: layer of plastic										
	0.25	CONCRETE; grey; fraction sub-angular		FILL		M		E		0.21	PID	<1
		FILL/ SAND; grey; medium; well graded										
		(CL) CLAY, trace sand, trace silt; red brown and slightly grey brown; low plasticity		RES		<PL		E		0.5	PID	<1
	1.0	Borehole discontinued at 1.00m depth - refusal on apparently hard clay						E		1.0	PID	<1

NOTES: (#)Soil origin is "probable" unless otherwise stated. (*)Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: Hand Tools
METHOD: 60mm diameter Hand Held Push Tube
REMARKS:

OPERATOR: MJH
CASING:

LOGGED: MJH

EXPORTED 06/04/21 11:15. TEMPLATE ID: DP_101.02.00_SOILLOG

BOREHOLE LOG

CLIENT: Central Coast Council
PROJECT: Proposed Gosford Regional Library
LOCATION: 123A Donnison St, Gosford

SURFACE LEVEL: 8.73 AHD
COORDINATE E:345925.9 **N:** 6300091.6
DATUM/GRID: MGA94 Zone 56 H
DIP/AZIMUTH: 90°/---

LOCATION ID: 105
PROJECT No: 83343.03
DATE: 25/02/21
SHEET: 1 of 1

CONDITIONS ENCOUNTERED								SAMPLE				TESTING AND REMARKS	
GROUNDWATER	RL (m) / DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN(#)	CONSIS.(*) / DENSITY.(*)	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
25/02/21, No free groundwater observed	0.0	CONCRETE; grey; fraction sub-angular; with steel reinforcement										
	0.15	CONCRETE; grey; fraction sub-angular										
	0.2	FILL/ SAND; grey; medium; well-graded		FILL		M		E		0.23	PID	<1
	0.25	(CL) CLAY, trace sand, trace silt; red brown and slightly grey brown; low plasticity		RES		<PL		E		0.35	PID	<1
	8											
	0.8	Borehole discontinued at 0.80m depth - refusal on apparently hard clay										
	1									1		
	7											
	2									2		
	6											

NOTES: (#)Soil origin is "probable" unless otherwise stated. (*)Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: Hand Tools
METHOD: 60mm diameter Hand Held Push Tube
REMARKS:

OPERATOR: MJH
CASING:

LOGGED: MJH

EXPORTED 06/04/21 11:15. TEMPLATE ID: DP_101.02.00_SOILLOG

BOREHOLE LOG

CLIENT: Central Coast Council
PROJECT: Proposed Gosford Regional Library
LOCATION: 123A Donnison St, Gosford

SURFACE LEVEL: 8.73 AHD
COORDINATE E:345901.3 **N:** 6300094.7
DATUM/GRID: MGA94 Zone 56 H
DIP/AZIMUTH: 90°/---

LOCATION ID: 106
PROJECT No: 83343.03
DATE: 25/02/21
SHEET: 1 of 1

CONDITIONS ENCOUNTERED								SAMPLE				TESTING AND REMARKS	
GROUNDWATER	RL (m) / DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN(#)	CONSIS.(*) / DENSITY.(*)	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
25/02/21, No free groundwater observed	0.02	TILE: terracotta tile										
		CONCRETE; grey; fraction sub-angular										
	0.19	0.19m: layer of plastic										
	0.24	CONCRETE; grey; fraction sub-angular		FILL		M		E		0.25	PID	<1
	0.31	FILL/ SAND; grey; medium; well-graded										
		(CL) CLAY, trace sand, trace silt; red brown and slightly grey brown; low plasticity		RES		<PL		E		0.5	PID	<1
	1.1	Borehole discontinued at 1.10m depth - refusal on apparently hard clay						E		1.0	PID	<1

NOTES: (#)Soil origin is "probable" unless otherwise stated. (*)Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: Hand Tools
METHOD: 60mm diameter Hand Held Push Tube
REMARKS:

OPERATOR: MJH
CASING:

LOGGED: MJH

EXPORTED 06/04/21 11:15. TEMPLATE ID: DP_101.02.00_SOILLOG

BOREHOLE LOG

CLIENT: Central Coast Council
PROJECT: Proposed Gosford Regional Library
LOCATION: 123A Donnison St, Gosford

SURFACE LEVEL: 8.73 AHD
COORDINATE E:345906.2 **N:** 6300109.9
DATUM/GRID: MGA94 Zone 56 H
DIP/AZIMUTH: 90°/---

LOCATION ID: 107
PROJECT No: 83343.03
DATE: 25/02/21
SHEET: 1 of 1

CONDITIONS ENCOUNTERED								SAMPLE				TESTING AND REMARKS	
GROUNDWATER	RL (m) / DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN(#)	CONSIS.(*) / DENSITY.(*)	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
	0.0	CONCRETE; grey; fraction sub-angular; with steel reinforcement										
	0.15	0.15m: plastic										
	0.22	CONCRETE; grey; fraction sub-angular										
		FILL/ SAND; grey; medium; well-graded		FILL		M		E		0.3	PID	<1
	0.32	FILL/ COBBLE; red brown; poorly-graded, cobbles consists of bricks (approx. 20mm to 40mm)		FILL				E		0.4	PID	<1
	0.5	FILL/ CONCRETE;; possible concrete		FILL				E		0.51	PID	<1
	0.52	Borehole discontinued at 0.52m depth - refusal on possible concrete										
	8											
	1									1		
	7											
	2									2		
	6											

NOTES: (#)Soil origin is "probable" unless otherwise stated. (*)Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: Hand Tools
METHOD: 60mm diameter Hand Held Push Tube
REMARKS:

OPERATOR: MJH
CASING:

LOGGED: MJH

EXPORTED 06/04/21 11:15. TEMPLATE ID: DP_101.02.00_SOILLOG

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

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).

Symbols & Abbreviations

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

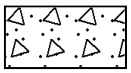
Symbols & Abbreviations

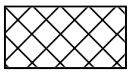
Graphic Symbols for Soil and Rock

General

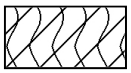

Asphalt

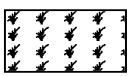

Road base

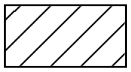

Concrete

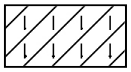

Filling

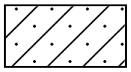
Soils


Topsoil

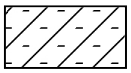

Peat

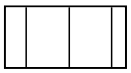

Clay

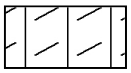

Silty clay

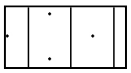

Sandy clay


Gravelly clay


Shaly clay


Silt


Clayey silt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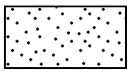
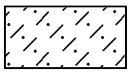
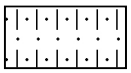
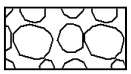

Sand

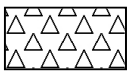

Clayey sand


Silty sand


Gravel

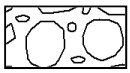

Sandy gravel


Cobbles, boulders

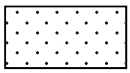

Talus

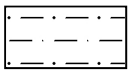
Sedimentary Rocks

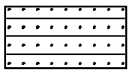

Boulder conglomerate

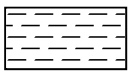

Conglomerate


Conglomeratic sandstone

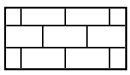

Sandstone


Siltstone

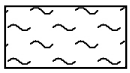

Laminite

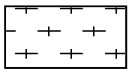

Mudstone, claystone, shale

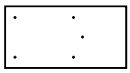

Coal


Limestone

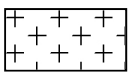
Metamorphic Rocks

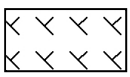

Slate, phyllite, schist

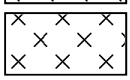

Gneiss

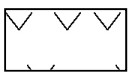

Quartzite

Igneous Rocks


Granite


Dolerite, basalt, andesite


Dacite, epidote


Tuff, breccia


Porphyry

Appendix C
Field Work Methodology
123A Donnison Street, Gosford

C1.0 Guidelines

The following key guideline was consulted for the field work methodology:

- NEPC National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM] (NEPC, 2013).

C2.0 Soil Sampling

- Soil sampling is carried out in accordance with DP standard operating procedures. The general sampling and sample management procedures comprise:
- Collect soil samples directly from the hand tools at depths of approximately 0.5 m to 1.0 m intervals, and changes in lithology or signs of contamination;
- Transfer samples in laboratory-prepared glass jars with Teflon lined lids by hand, capping immediately and minimising headspace within the sample jar;
- Collect replicate samples in zip-lock bags for PID screening;
- Collect ~500 ml samples for FA and AF analysis;
- Wear a new disposable nitrile glove for each sample point thereby minimising potential for cross-contamination;
- Collect 10% replicate samples for QC purposes;
- Label sample containers with individual and unique identification details, including project number, sample location and sample depth (where applicable);
- Place samples into a cooled, insulated and sealed container for transport to the laboratory; and
- Use chain of custody documentation.

C3.0 PID Field Test

- Calibrate the PID with isobutylene gas at 100 ppm and with fresh air prior to commencement of each successive day's field work;
- Allow the headspace in the PID zip-lock bag samples to equilibrate; and
- Screen using the PID.

C4.0 References

HEPA. (2020). *PFAS National Environmental Management Plan (NEMP).* Version 2.0: Heads of EPAs Australia and New Zealand and Australian Government Department of the Environment.

NEPC. (2013). *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM].* Australian Government Publishing Services Canberra: National Environment Protection Council.

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Appendix D

Site Assessment Criteria

Appendix D
Site Assessment Criteria
123A Donnison Street, Gosford

D1.0 Introduction

D1.1 Guidelines

The following key guidelines were consulted for deriving the site assessment criteria (SAC):

- NEPC National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM] (NEPC, 2013).
- CRC CARE Health screening levels for petroleum hydrocarbons in soil and groundwater (CRC CARE, 2011).
- HEPA PFAS National Environmental Management Plan (NEMP) (HEPA, 2020).
- ANZG Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG, 2018).
- NHMRC Guidelines for Managing Risks In Recreational Water (NHMRC, 2008).
- NHMRC, NRMMC *Australian Drinking Water Guidelines 6 2011, Version 3.2* (NHMRC, NRMMC, 2016).
- ANZECC Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC, 2000).

D1.2 General

The SAC applied in the current investigation are informed by the CSM which identified human and environmental receptors to potential contamination at the site. Analytical results are assessed (as a Tier 1 assessment) against the SAC comprising primarily the investigation and screening levels of Schedule B1 of NEPC (2013).

The following inputs are relevant to the selection and/or derivation of the SAC:

- Land use: Commercial / Industrial, Corresponding to land use category 'D', commercial / industrial such as shops, offices, factories and industrial sites; and
- Soil type which is sand

D2.0 Soils

D2.1 Health Investigation and Screening Levels

The generic health investigation levels (HIL) and health screening levels (HSL) are considered to be appropriate for the assessment of human health risk via all relevant pathways of exposure associated

with contamination at the site. The adopted soil HIL and HSL for the contaminants of concern are in Table 1 and Table 2.

Table 1: Health Investigation Levels (mg/kg)

Contaminant	HIL-D
Metals	
Arsenic	3000
Cadmium	900
Chromium (VI)	3600
Copper	240 000
Lead	1500
Mercury (inorganic)	730
Nickel	6000
Zinc	400 000
PAH	
B(a)P TEQ	40
Total PAH	4000
OCP	
DDT+DDE+DDD	3600
Aldrin and dieldrin	45
Chlordane	530
Endosulfan	2000
Endrin	100
Heptachlor	50
HCB	80
Methoxychlor	2500
PCB	
PCB	7

Table 2: Health Screening Levels (mg/kg)

Contaminant	HSL-D	HSL-D	HSL-D	HSL-D
SAND	**0 m to <1 m**	**1 m to <2 m**	**2 m to <4 m**	**4 m+**
Benzene	3	3	3	3
Toluene	NL	NL	NL	NL
Ethylbenzene	NL	NL	NL	NL
Xylenes	230	NL	NL	NL
Naphthalene	NL	NL	NL	NL
TRH F1	260	370	630	NL
TRH F2	NL	NL	NL	NL

Notes: TRH F1 is TRH C_6-C_{10} minus BTEX

TRH F2 is TRH >C_{10}-C_{16} minus naphthalene

The soil saturation concentration (Csat) is defined as the soil concentration at which the porewater phase cannot dissolve any more of an individual chemical. The soil vapour that is in equilibrium with the porewater will be at its maximum. If the derived soil HSL exceeds Csat, a soil vapour source concentration for a petroleum mixture could not exceed a level that would results in the maximum allowable vapour risk for the given scenario. For these scenarios, no HSL is presented for these chemicals and the HSL is shown as 'not limiting' or 'NL'

The HSL for direct contact derived from CRC CARE (2011) are in Table 3.

Table 3: Health Screening Levels for Direct Contact (mg/kg)

Contaminant	DC HSL-D	DC HSL-IMW
Benzene	430	1100
Toluene	99 000	120 000
Ethylbenzene	27 000	85 000
Xylenes	81 000	130 000
Naphthalene	11 000	29 000
TRH F1	26 000	82 000
TRH F2	20 000	62 000
TRH F3	27 000	85 000
TRH F4	38 000	12 000

Notes: TRH F1 is TRH C_6-C_{10} minus BTEX

TRH F2 is TRH >C_{10}-C_{16} minus naphthalene

IMW intrusive maintenance worker

D2.2 Asbestos in Soil

Based on the CSM and / or current site access limitations, a detailed asbestos assessment was not considered to be warranted at this stage. However, due to the history of widespread use of ACM products across Australia, ACM can be encountered unexpectedly and sporadically at a site. Therefore, the presence or absence of asbestos at a limit of reporting of 0.1 g/kg (AS:4964) has been adopted for this investigation as an initial screen.

The HSL for asbestos in soil are based on likely exposure levels for different scenarios published in NEPC (2013) for the following forms of asbestos:

- Bonded asbestos containing material (ACM); and
- Fibrous asbestos and asbestos fines (FA and AF).

The HSL are in Table 4.

Table 4: Health Screening Levels for Asbestos

Form of Asbestos	HSL-D
ACM	0.05%
FA and AF	0.001%
FA and AF and ACM	No visible asbestos for surface soil *

Notes: Surface soils defined as top 10 cm.
* Based on site observations at the sampling points and the analytical results of surface samples.

D2.3 Ecological Investigation Levels

Ecological investigation levels (EIL) and added contaminant limits (ACL), where appropriate, have been derived in NEPC (2013) for arsenic, copper, chromium (III), nickel, lead, zinc, DDT and naphthalene. The adopted EIL, derived using the interactive (excel) calculation spreadsheet on the NEPM toolbox website are shown in Table 6, with inputs into their derivation shown in Table 5.

Table 5: Inputs to the Derivation of the Ecological Investigation Levels

Variable	Input
Age of contaminants	“Aged” (>2 years)
pH	Assumed 4.0
CEC	Assumed 5.00 $cmol_c/kg$
Clay content	Assumed 10%
Traffic volumes	High
State / Territory	NSW

Table 6: Ecological Investigation Levels (mg/kg)

Contaminant	EIL-AES	EIL-D
Metals		
Arsenic	40	160
Copper		
Nickel		
Chromium III		
Lead	470	1800
Zinc		
PAH		
Naphthalene	10	370
OCP		
DDT	3	640

Notes: EIL-AES area of ecological significance

D2.4 Ecological Screening Levels

Ecological screening levels (ESL) are used to assess the risk of selected petroleum hydrocarbon compounds, BTEX and benzo(a)pyrene to terrestrial ecosystems. The adopted ESL are shown in Table 7.

Table 7: Ecological Screening Levels (mg/kg)

Contaminant	Soil Type	EIL-AES	EIL-D
Benzene	Coarse	8	75
Toluene	Coarse	10	135
Ethylbenzene	Coarse	1.5	165
Xylenes	Coarse	10	180
TRH F1	Coarse/ Fine	125*	215*
TRH F2	Coarse/ Fine	25*	170*
TRH F3	Coarse	-	1700
TRH F4	Coarse	-	3300
B(a)P	Coarse	0.7	1.4
Benzene	Fine	10	95
Toluene	Fine	65	135
Ethylbenzene	Fine	40	185

Contaminant	Soil Type	EIL-AES	EIL-D
Xylenes	Fine	1.6	95
TRH F1	Coarse/ Fine	125*	215*
TRH F2	Coarse/ Fine	25*	170*
TRH F3	Fine	-	2500
TRH F4	Fine	-	6600
B(a)P	Fine	0.7	1.4

Notes: ESL are of low reliability except where indicated by * which indicates that the ESL is of moderate reliability
TRH F1 is TRH C_6-C_{10} minus BTEX
TRH F2 is TRH >C_{10}-C_{16} including naphthalene
EIL-AES is area of ecological significance

D2.5 Management Limits

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

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

The adopted management limits are in Table 8.

Table 8: Management Limits (mg/kg)

Contaminant	Soil Type	ML-D
TRH F1	Coarse	700
TRH F2	Coarse	1000
TRH F3	Coarse	3500
TRH F4	Coarse	10 000
TRH F1	Fine	800
TRH F2	Fine	1000
TRH F3	Fine	5000
TRH F4	Fine	10 000

Notes: TRH F1 is TRH C_6-C_{10} including BTEX
TRH F2 is TRH >C_{10}-C_{16} including naphthalene

D3.0 References

ANZECC. (2000). *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*. Australia and New Zealand Environment and Conservation Council.

ANZG. (2018). *Australian and New Zealand Guidelines for Fresh and Marine Water Quality.* Canberra, ACT: Australian and New Zealand Governments and Australian state and territory governments.

CRC CARE. (2011). *Health screening levels for petroleum hydrocarbons in soil and groundwater.* Parts 1 to 3, Technical Report No. 10: Cooperative Research Centre for Contamination Assessment and Remediation of the Environment.

HEPA. (2020). *PFAS National Environmental Management Plan (NEMP).* Version 2.0: Heads of EPAs Australia and New Zealand and Australian Government Department of the Environment.

NEPC. (2013). *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM].* Australian Government Publishing Services Canberra: National Environment Protection Council.

NHMRC. (2008). *Guidelines for Managing Risks In Recreational Water.*

NHMRC, NRMMC. (2016). *Australian Drinking Water Guidelines 6 2011, Version 3.2.* Canberra: National Health and Medical Research Council, National Resource Management Ministerial Council.

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Appendix E

Table E1

Laboratory Reports, Chain of Custody and Sample Receipt

Douglas Partners
Geotechnics / Environment / Groundwater

Table E1: Summary of Laboratory Results – Metals, TRH, BTEX, PAH, Phenol, OCP, PCB, VOC

Sample ID	Depth		Asbestos ID - Soils NEPM		Metals											
			Asbestos ID in soil <0.1g/kg	ACM .7mm Estimation	Arsenic	Arsenic	Cadmium	Cadmium	Total Chromium	Total Chromium	Copper	Copper	Lead	Lead	Mercury (inorganic)	Mercury (inorganic)
		PQL			4	0.05	0.4	0.01	1	0.01	1	0.01	1	0.03	0.1	0.0005
		Sample Date	-	g	mg/kg	mg/l	mg/kg	mg/l	mg/kg	mg/l	mg/kg	mg/l	mg/kg	mg/l	mg/kg	mg/l
101/0.3	0.3 m	25/02/2021	-	-	<4	-	<0.4	-	<1	-	<1	-	<1	-	<0.1	-
					3000 160	3000 160	900 -	900 -	3600 670	3600 670	240000 75	240000 75	1500 1800	1500 1800	730 -	730 -
101/1.2	1.2 m	25/02/2021	**Chrysotile**	**0.0168**	<4	-	<0.4	-	**7**	-	**4**	-	**48**	-	<0.1	-
					3000 160	3000 160	900 -	900 -	3600 670	3600 670	240000 75	240000 75	1500 1800	1500 1800	730 -	730 -
101/1.65	1.65 m	25/02/2021	-	-	<4	-	<0.4	-	**1**	-	<1	-	**2**	-	<0.1	-
					3000 160	3000 160	900 -	900 -	3600 670	3600 670	240000 75	240000 75	1500 1800	1500 1800	730 -	730 -
101/2.0	2 m	25/02/2021	-	-	<4	-	<0.4	-	**8**	-	<1	-	**5**	-	<0.1	-
					3000 160	3000 160	900 -	900 -	3600 670	3600 670	240000 75	240000 75	1500 1800	1500 1800	730 -	730 -
102/0.3	0.3 m	25/02/2021	-	-	<4	-	<0.4	-	**10**	-	**3**	-	**16**	-	<0.1	-
					3000 160	3000 160	900 -	900 -	3600 670	3600 670	240000 75	240000 75	1500 1800	1500 1800	730 -	730 -
102/0.6	0.6 m	25/02/2021	No visible asbestos detected	-	<4	-	<0.4	-	**26**	-	**14**	-	**11**	-	<0.1	-
					3000 160	3000 160	900 -	900 -	3600 670	3600 670	240000 75	240000 75	1500 1800	1500 1800	730 -	730 -
103/0.25	0.25 m	25/02/2021	-	-	<4	-	<0.4	-	**11**	-	**3**	-	**7**	-	<0.1	-
					3000 160	3000 160	900 -	900 -	3600 670	3600 670	240000 75	240000 75	1500 1800	1500 1800	730 -	730 -
104/0.5	0.5 m	25/02/2021	-	-	<4	-	<0.4	-	**10**	-	<1	-	**7**	-	<0.1	-
					3000 160	3000 160	900 -	900 -	3600 670	3600 670	240000 75	240000 75	1500 1800	1500 1800	730 -	730 -
105/0.23	0.23 m	25/02/2021	-	-	<4	-	<0.4	-	**1**	-	**3**	-	**1**	-	<0.1	-
					3000 160	3000 160	900 -	900 -	3600 670	3600 670	240000 75	240000 75	1500 1800	1500 1800	730 -	730 -
105/0.35	0.35 m	25/02/2021	-	-	<4	-	<0.4	-	**12**	-	<1	-	**10**	-	<0.1	-
					3000 160	3000 160	900 -	900 -	3600 670	3600 670	240000 75	240000 75	1500 1800	1500 1800	730 -	730 -
106/0.25	0.25 m	25/02/2021	-	-	<4	-	<0.4	-	**6**	-	**7**	-	**1**	-	<0.1	-
					3000 160	3000 160	900 -	900 -	3600 670	3600 670	240000 75	240000 75	1500 1800	1500 1800	730 -	730 -
106/0.5	0.5 m	25/02/2021	-	-	<4	-	<0.4	-	**9**	-	<1	-	**6**	-	<0.1	-
					3000 160	3000 160	900 -	900 -	3600 670	3600 670	240000 75	240000 75	1500 1800	1500 1800	730 -	730 -
107/0.3	0.3 m	25/02/2021	No visible asbestos detected	-	<4	-	<0.4	-	**4**	-	**4**	-	**11**	-	<0.1	-
					3000 160	3000 160	900 -	900 -	3600 670	3600 670	240000 75	240000 75	1500 1800	1500 1800	730 -	730 -
107/0.4	0.4 m	25/02/2021	No visible asbestos detected	-	<4	-	<0.4	-	**15**	-	**3**	-	**8**	-	<0.1	-
					3000 160	3000 160	900 -	900 -	3600 670	3600 670	240000 75	240000 75	1500 1800	1500 1800	730 -	730 -
QA1	0 m	25/02/2021	-	-	<4	-	<0.4	-	**3**	-	**7**	-	**1**	-	<0.1	-
					3000 160	3000 160	900 -	900 -	3600 670	3600 670	240000 75	240000 75	1500 1800	1500 1800	730 -	730 -
QA2	0 m	25/02/2021	-	-	<5	-	<1	-	<2	-	<5	-	<5	-	<0.1	-
					3000 160	3000 160	900 -	900 -	3600 670	3600 670	240000 75	240000 75	1500 1800	1500 1800	730 -	730 -
RB1	0 m	25/02/2021	-	-	-	<0.05	-	<0.01	-	<0.01	-	<0.01	-	<0.03	-	<0.0005
					3000 160	3000 160	900 -	900 -	3600 670	3600 670	240000 75	240000 75	1500 1800	1500 1800	730 -	730 -

Lab result
HIL/HSL value EIL/ESL value

HIL/HSL exceedance EIL/ESL exceedance HIL/HSL and EIL/ESL exceedance ML exceedance ML and HIL/HSL or EIL/ESL exceedance

Indicates that asbestos has been detected by the lab, refer to the lab report **Blue** = DC exceedance HSL 0-<1 Exceedance

Bold = Lab detections - = Not tested or No HIL/HSL/EIL/ESL (as applicable) or Not applicable NL = Non limiting AD = Asbestos detected NAD = No Asbestos detected

HIL = Health investigation level HSL = Health screening level (excluding DC) EIL = Ecological investigation level ESL = Ecological screening level ML = Management Limit DC = Direct Contact HSL

Notes:

a QA/QC replicate of sample listed directly below the primary sample

b Reported naphthalene laboratory result obtained from BTEXN suite

c Criteria applies to DDT only

Site Assessment Criteria (SAC):

Refer to the SAC section of report for information of SAC sources and rationale. Summary information as follows:

SAC based on generic land use thresholds for Commercial/ industrial D

HIL D Commercial / Industrial (NEPC, 2013)

HSL D Commercial / Industrial (vapour intrusion) (NEPC, 2013)

DC HSL D Direct contact HSL D Commercial/Industrial (direct contact) (CRC CARE, 2011)

EIL/ESL C/I Commercial and Industrial (NEPC, 2013)

ML C/Ind Commercial and Industrial (NEPC, 2013)

				TRH											
Nickel	Nickel	Zinc	Zinc	TRH C6 - C10	TRH C6 - C10	TRH >C10-C16	TRH >C10-C16	F1 ((C6-C10)-BTEX)	F1 ((C6-C10)-BTEX)	F2 (>C10-C16 less Naphthalene)	F2 (>C10-C16 less Naphthalene)	F3 (>C16-C34)	F3 (>C16-C34)	F4 (>C34-C40)	F4 (>C34-C40)
1	0.02	1	0.02	25	10	50	50	25	10	50	50	100	100	100	100
mg/kg	mg/l	mg/kg	mg/l	mg/kg	mg/l	mg/kg	mg/l	mg/kg	mg/l	mg/kg	mg/l	mg/kg	mg/l	mg/kg	mg/l
<1	-	**1**	-	<25	-	<50	-	<25	-	<50	-	<100	-	<100	-
6000 60	6000 60	400000 190	400000 190	- -	- -	- 170	- 170	260 215	260 215	NL -	NL -	- 1700	- 1700	- 3300	- 3300
2	-	**55**	-	<25	-	<50	-	<25	-	<50	-	<100	-	<100	-
6000 60	6000 60	400000 190	400000 190	- -	- -	- 170	- 170	370 215	370 215	NL -	NL -	- 1700	- 1700	- 3300	- 3300
<1	-	**6**	-	-	-	-	-	-	-	-	-	-	-	-	-
6000 60	6000 60	400000 190	400000 190	- -	- -	- 170	- 170	370 215	370 215	NL -	NL -	- 1700	- 1700	- 3300	- 3300
1	-	**2**	-	<25	-	<50	-	<25	-	<50	-	<100	-	<100	-
6000 60	6000 60	400000 190	400000 190	- -	- -	- 170	- 170	630 215	630 215	NL -	NL -	- 1700	- 1700	- 3300	- 3300
5	-	**23**	-	-	-	-	-	-	-	-	-	-	-	-	-
6000 60	6000 60	400000 190	400000 190	- -	- -	- 170	- 170	260 215	260 215	NL -	NL -	- 1700	- 1700	- 3300	- 3300
28	-	**15**	-	<25	-	<50	-	<25	-	<50	-	<100	-	<100	-
6000 60	6000 60	400000 190	400000 190	- -	- -	- 170	- 170	260 215	260 215	NL -	NL -	- 1700	- 1700	- 3300	- 3300
6	-	**8**	-	-	-	-	-	-	-	-	-	-	-	-	-
6000 60	6000 60	400000 190	400000 190	- -	- -	- 170	- 170	260 215	260 215	NL -	NL -	- 1700	- 1700	- 3300	- 3300
1	-	**2**	-	<25	-	<50	-	<25	-	<50	-	<100	-	<100	-
6000 60	6000 60	400000 190	400000 190	- -	- -	- 170	- 170	260 215	260 215	NL -	NL -	- 1700	- 1700	- 3300	- 3300
3	-	**9**	-	-	-	-	-	-	-	-	-	-	-	-	-
6000 60	6000 60	400000 190	400000 190	- -	- -	- 170	- 170	260 215	260 215	NL -	NL -	- 1700	- 1700	- 3300	- 3300
2	-	**3**	-	<25	-	<50	-	<25	-	<50	-	<100	-	<100	-
6000 60	6000 60	400000 190	400000 190	- -	- -	- 170	- 170	260 215	260 215	NL -	NL -	- 1700	- 1700	- 3300	- 3300
5	-	**3**	-	<25	-	<50	-	<25	-	<50	-	<100	-	<100	-
6000 60	6000 60	400000 190	400000 190	- -	- -	- 170	- 170	260 215	260 215	NL -	NL -	- 1700	- 1700	- 3300	- 3300
1	-	**2**	-	<25	-	<50	-	<25	-	<50	-	<100	-	<100	-
6000 60	6000 60	400000 190	400000 190	- -	- -	- 170	- 170	260 215	260 215	NL -	NL -	- 1700	- 1700	- 3300	- 3300
4	-	**9**	-	<25	-	<50	-	<25	-	<50	-	<100	-	<100	-
6000 60	6000 60	400000 190	400000 190	- -	- -	- 170	- 170	260 215	260 215	NL -	NL -	- 1700	- 1700	- 3300	- 3300
8	-	**11**	-	<25	-	<50	-	<25	-	<50	-	<100	-	<100	-
6000 60	6000 60	400000 190	400000 190	- -	- -	- 170	- 170	260 215	260 215	NL -	NL -	- 1700	- 1700	- 3300	- 3300
5	-	**6**	-	<25	-	<50	-	<25	-	<50	-	<100	-	<100	-
6000 60	6000 60	400000 190	400000 190	- -	- -	- 170	- 170	260 215	260 215	NL -	NL -	- 1700	- 1700	- 3300	- 3300
<2	-	<5	-	<10	-	<50	-	<10	-	<50	-	<100	-	<100	-
6000 60	6000 60	400000 190	400000 190	- -	- -	- 170	- 170	260 215	260 215	NL -	NL -	- 1700	- 1700	- 3300	- 3300
-	<0.02	-	<0.02	-	<10	-	<50	-	<10	-	<50	-	<100	-	<100
6000 60	6000 60	400000 190	400000 190	- -	- -	- 170	- 170	260 215	260 215	NL -	NL -	- 1700	- 1700	- 3300	- 3300

BTEX							PAH					Phenol	OCP	PCB	VOC
Benzene	Benzene	Toluene	Toluene	Ethylbenzene	Ethylbenzene	Total Xylenes	Naphthalene [b]	Naphthalene [b]	Benzo(a)pyrene (BaP)	Benzo(a)pyrene TEQ	Total PAHs	Phenol	Total OCP	Total PCB	Total VOC
0.2	1	0.5	1	1	1	1	1	1	0.05	0.5	0.05	5	0.1	0.1	1
mg/kg	mg/l	mg/kg	mg/l	mg/kg	mg/l	mg/kg	mg/kg	mg/l	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
<0.2	-	<0.5	-	<1	-	<1	<1	-	<0.05	<0.5	<0.05	-	<0.1	<0.1	-
3 75	3 75	NL 135	NL 135	NL 165	NL 165	230 180	NL 370	NL 370	- 1.4	40 -	4000 -	660 -	- -	7 -	- -
<0.2	-	<0.5	-	<1	-	<1	<1	-	<0.05	<0.5	<0.05	-	<0.1	<0.1	-
3 75	3 75	NL 135	NL 135	NL 165	NL 165	NL 180	NL 370	NL 370	- 1.4	40 -	4000 -	660 -	- -	7 -	- -
-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	-	-
3 75	3 75	NL 135	NL 135	NL 165	NL 165	NL 180	NL 370	NL 370	- 1.4	40 -	4000 -	660 -	- -	7 -	- -
<0.2	-	<0.5	-	<1	-	<1	<1	-	<0.05	<0.5	<0.05	<5	<0.1	<0.1	<1
3 75	3 75	NL 135	NL 135	NL 165	NL 165	NL 180	NL 370	NL 370	- 1.4	40 -	4000 -	660 -	- -	7 -	- -
-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	-	-
3 75	3 75	NL 135	NL 135	NL 165	NL 165	230 180	NL 370	NL 370	- 1.4	40 -	4000 -	660 -	- -	7 -	- -
<0.2	-	<0.5	-	<1	-	<1	<1	-	<0.05	<0.5	<0.05	-	<0.1	<0.1	-
3 75	3 75	NL 135	NL 135	NL 165	NL 165	230 180	NL 370	NL 370	- 1.4	40 -	4000 -	660 -	- -	7 -	- -
-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	-	-
3 75	3 75	NL 135	NL 135	NL 165	NL 165	230 180	NL 370	NL 370	- 1.4	40 -	4000 -	660 -	- -	7 -	- -
<0.2	-	<0.5	-	<1	-	<1	<1	-	<0.05	<0.5	<0.05	-	<0.1	<0.1	-
3 75	3 75	NL 135	NL 135	NL 165	NL 165	230 180	NL 370	NL 370	- 1.4	40 -	4000 -	660 -	- -	7 -	- -
-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	-	-
3 75	3 75	NL 135	NL 135	NL 165	NL 165	230 180	NL 370	NL 370	- 1.4	40 -	4000 -	660 -	- -	7 -	- -
<0.2	-	<0.5	-	<1	-	<1	<1	-	<0.05	<0.5	<0.05	<5	<0.1	<0.1	<1
3 75	3 75	NL 135	NL 135	NL 165	NL 165	230 180	NL 370	NL 370	- 1.4	40 -	4000 -	660 -	- -	7 -	- -
<0.2	-	<0.5	-	<1	-	<1	<1	-	<0.05	<0.5	<0.05	-	<0.1	<0.1	-
3 75	3 75	NL 135	NL 135	NL 165	NL 165	230 180	NL 370	NL 370	- 1.4	40 -	4000 -	660 -	- -	7 -	- -
<0.2	-	<0.5	-	<1	-	<1	<1	-	<0.05	<0.5	<0.05	<5	<0.1	<0.1	-
3 75	3 75	NL 135	NL 135	NL 165	NL 165	230 180	NL 370	NL 370	- 1.4	40 -	4000 -	660 -	- -	7 -	- -
<0.2	-	<0.5	-	<1	-	<1	<1	-	-	-	-	-	-	-	-
3 75	3 75	NL 135	NL 135	NL 165	NL 165	230 180	NL 370	NL 370	- 1.4	40 -	4000 -	660 -	- -	7 -	- -
<0.2	-	<0.5	-	<0.5	-	<0.5	<1	-	-	-	-	-	-	-	-
3 75	3 75	NL 135	NL 135	NL 165	NL 165	230 180	NL 370	NL 370	- 1.4	40 -	4000 -	660 -	- -	7 -	- -
-	<1	-	<1	-	<1	<1	-	<1	-	-	-	-	-	-	-
3 75	3 75	NL 135	NL 135	NL 165	NL 165	230 180	NL 370	NL 370	- 1.4	40 -	4000 -	660 -	- -	7 -	- -

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CERTIFICATE OF ANALYSIS 263152

Client Details

Client	Douglas Partners Tuggerah
Attention	Brent Kerry
Address	Unit 5, 3 Teamster Close, Tuggerah, NSW, 2259

Sample Details

Your Reference	**83343.03, Gosford DSI**
Number of Samples	15 soil, 1 water
Date samples received	02/03/2021
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.

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

Report Details

Date results requested by	09/03/2021
Date of Issue	09/03/2021

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Asbestos Approved By
Analysed by Asbestos Approved Identifier: Nyovan Moonean
Authorised by Asbestos Approved Signatory: Lucy Zhu

Results Approved By
Diego Bigolin, Team Leader, Inorganics
Dragana Tomas, Senior Chemist
Giovanni Agosti, Group Technical Manager
Hannah Nguyen, Senior Chemist
Lucy Zhu, Asbestos Supervisor
Manju Dewendrage, Chemist
Steven Luong, Organics Supervisor

Authorised By

Nancy Zhang, Laboratory Manager

VHC's in soil				
Our Reference		263152-4	263152-10	263152-12
Your Reference	UNITS	101/2.0	105/0.35	106/0.5
Depth		2.0	0.35	0.5
Date Sampled		25/02/2021	25/02/2021	25/02/2021
Type of sample		soil	soil	soil
Date extracted	-	03/03/2021	03/03/2021	03/03/2021
Date analysed	-	04/03/2021	04/03/2021	04/03/2021
Dichlorodifluoromethane	mg/kg	<1	<1	<1
Chloromethane	mg/kg	<1	<1	<1
Vinyl Chloride	mg/kg	<1	<1	<1
Bromomethane	mg/kg	<1	<1	<1
Chloroethane	mg/kg	<1	<1	<1
Trichlorofluoromethane	mg/kg	<1	<1	<1
1,1-Dichloroethene	mg/kg	<1	<1	<1
trans-1,2-dichloroethene	mg/kg	<1	<1	<1
1,1-dichloroethane	mg/kg	<1	<1	<1
cis-1,2-dichloroethene	mg/kg	<1	<1	<1
bromochloromethane	mg/kg	<1	<1	<1
chloroform	mg/kg	<1	<1	<1
2,2-dichloropropane	mg/kg	<1	<1	<1
1,2-dichloroethane	mg/kg	<1	<1	<1
1,1,1-trichloroethane	mg/kg	<1	<1	<1
1,1-dichloropropene	mg/kg	<1	<1	<1
carbon tetrachloride	mg/kg	<1	<1	<1
dibromomethane	mg/kg	<1	<1	<1
1,2-dichloropropane	mg/kg	<1	<1	<1
trichloroethene	mg/kg	<1	<1	<1
bromodichloromethane	mg/kg	<1	<1	<1
trans-1,3-dichloropropene	mg/kg	<1	<1	<1
cis-1,3-dichloropropene	mg/kg	<1	<1	<1
1,1,2-trichloroethane	mg/kg	<1	<1	<1
1,3-dichloropropane	mg/kg	<1	<1	<1
dibromochloromethane	mg/kg	<1	<1	<1
1,2-dibromoethane	mg/kg	<1	<1	<1
tetrachloroethene	mg/kg	<1	<1	<1
1,1,1,2-tetrachloroethane	mg/kg	<1	<1	<1
chlorobenzene	mg/kg	<1	<1	<1
bromoform	mg/kg	<1	<1	<1
1,1,2,2-tetrachloroethane	mg/kg	<1	<1	<1
1,2,3-trichloropropane	mg/kg	<1	<1	<1

VHC's in soil				
Our Reference		263152-4	263152-10	263152-12
Your Reference	UNITS	101/2.0	105/0.35	106/0.5
Depth		2.0	0.35	0.5
Date Sampled		25/02/2021	25/02/2021	25/02/2021
Type of sample		soil	soil	soil
bromobenzene	mg/kg	<1	<1	<1
2-chlorotoluene	mg/kg	<1	<1	<1
4-chlorotoluene	mg/kg	<1	<1	<1
1,3-dichlorobenzene	mg/kg	<1	<1	<1
1,4-dichlorobenzene	mg/kg	<1	<1	<1
1,2-dichlorobenzene	mg/kg	<1	<1	<1
1,2-dibromo-3-chloropropane	mg/kg	<1	<1	<1
1,2,4-trichlorobenzene	mg/kg	<1	<1	<1
hexachlorobutadiene	mg/kg	<1	<1	<1
1,2,3-trichlorobenzene	mg/kg	<1	<1	<1
Surrogate Dibromofluorometha	%	95	101	100
Surrogate aaa-Trifluorotoluene	%	84	122	118
Surrogate Toluene-d_8	%	98	112	109
Surrogate 4-Bromofluorobenzene	%	103	97	97

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		263152-1	263152-2	263152-4	263152-6	263152-8
Your Reference	UNITS	101/0.3	101/1.2	101/2.0	102/0.6	104/0.5
Depth		0.3	1.2	2.0	0.6	0.5
Date Sampled		25/02/2021	25/02/2021	25/02/2021	25/02/2021	25/02/2021
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	03/03/2021	03/03/2021	03/03/2021	03/03/2021	03/03/2021
Date analysed	-	04/03/2021	04/03/2021	04/03/2021	04/03/2021	04/03/2021
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	%	94	73	84	83	121

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		263152-10	263152-11	263152-12	263152-13	263152-14
Your Reference	UNITS	105/0.35	106/0.25	106/0.5	107/0.3	107/0.4
Depth		0.35	0.25	0.5	0.3	0.4
Date Sampled		25/02/2021	25/02/2021	25/02/2021	25/02/2021	25/02/2021
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	03/03/2021	03/03/2021	03/03/2021	03/03/2021	03/03/2021
Date analysed	-	04/03/2021	04/03/2021	04/03/2021	04/03/2021	04/03/2021
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	%	122	114	118	115	114

vTRH(C6-C10)/BTEXN in Soil		
Our Reference		263152-15
Your Reference	UNITS	QA1
Depth		-
Date Sampled		25/02/2021
Type of sample		soil
Date extracted	-	03/03/2021
Date analysed	-	04/03/2021
TRH C_6 - C_9	mg/kg	<25
TRH C_6 - C_{10}	mg/kg	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25
Benzene	mg/kg	<0.2
Toluene	mg/kg	<0.5
Ethylbenzene	mg/kg	<1
m+p-xylene	mg/kg	<2
o-Xylene	mg/kg	<1
naphthalene	mg/kg	<1
Total +ve Xylenes	mg/kg	<3
Surrogate aaa-Trifluorotoluene	%	125

svTRH (C10-C40) in Soil						
Our Reference		263152-1	263152-2	263152-4	263152-6	263152-8
Your Reference	UNITS	101/0.3	101/1.2	101/2.0	102/0.6	104/0.5
Depth		0.3	1.2	2.0	0.6	0.5
Date Sampled		25/02/2021	25/02/2021	25/02/2021	25/02/2021	25/02/2021
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	03/03/2021	03/03/2021	03/03/2021	03/03/2021	03/03/2021
Date analysed	-	03/03/2021	03/03/2021	03/03/2021	03/03/2021	04/03/2021
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	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	95	89	95	89	88

svTRH (C10-C40) in Soil						
Our Reference		263152-10	263152-11	263152-12	263152-13	263152-14
Your Reference	UNITS	105/0.35	106/0.25	106/0.5	107/0.3	107/0.4
Depth		0.35	0.25	0.5	0.3	0.4
Date Sampled		25/02/2021	25/02/2021	25/02/2021	25/02/2021	25/02/2021
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	03/03/2021	03/03/2021	03/03/2021	03/03/2021	03/03/2021
Date analysed	-	04/03/2021	04/03/2021	04/03/2021	04/03/2021	04/03/2021
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	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	90	85	89	88	95

svTRH (C10-C40) in Soil		
Our Reference		263152-15
Your Reference	UNITS	QA1
Depth		-
Date Sampled		25/02/2021
Type of sample		soil
Date extracted	-	03/03/2021
Date analysed	-	04/03/2021
TRH C_{10} - C_{14}	mg/kg	<50
TRH C_{15} - C_{28}	mg/kg	<100
TRH C_{29} - C_{36}	mg/kg	<100
TRH >C_{10} -C_{16}	mg/kg	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50
TRH >C_{16} -C_{34}	mg/kg	<100
TRH >C_{34} -C_{40}	mg/kg	<100
Total +ve TRH (>C10-C40)	mg/kg	<50
Surrogate o-Terphenyl	%	90

PAHs in Soil						
Our Reference		263152-1	263152-2	263152-4	263152-6	263152-8
Your Reference	UNITS	101/0.3	101/1.2	101/2.0	102/0.6	104/0.5
Depth		0.3	1.2	2.0	0.6	0.5
Date Sampled		25/02/2021	25/02/2021	25/02/2021	25/02/2021	25/02/2021
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	03/03/2021	03/03/2021	03/03/2021	03/03/2021	03/03/2021
Date analysed	-	07/03/2021	07/03/2021	09/03/2021	09/03/2021	09/03/2021
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	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	96	99	92	92	94

PAHs in Soil						
Our Reference		263152-10	263152-11	263152-12	263152-13	263152-14
Your Reference	UNITS	105/0.35	106/0.25	106/0.5	107/0.3	107/0.4
Depth		0.35	0.25	0.5	0.3	0.4
Date Sampled		25/02/2021	25/02/2021	25/02/2021	25/02/2021	25/02/2021
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	03/03/2021	03/03/2021	03/03/2021	03/03/2021	03/03/2021
Date analysed	-	09/03/2021	09/03/2021	09/03/2021	09/03/2021	09/03/2021
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	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	92	92	91	91	91

Organochlorine Pesticides in soil						
Our Reference		263152-1	263152-2	263152-3	263152-4	263152-5
Your Reference	UNITS	101/0.3	101/1.2	101/1.65	101/2.0	102/0.3
Depth		0.3	1.2	1.65	2.0	0.3
Date Sampled		25/02/2021	25/02/2021	25/02/2021	25/02/2021	25/02/2021
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	03/03/2021	03/03/2021	03/03/2021	03/03/2021	03/03/2021
Date analysed	-	07/03/2021	07/03/2021	09/03/2021	09/03/2021	09/03/2021
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	%	98	104	92	98	102

Organochlorine Pesticides in soil						
Our Reference		263152-6	263152-7	263152-8	263152-9	263152-10
Your Reference	UNITS	102/0.6	103/0.25	104/0.5	105/0.23	105/0.35
Depth		0.6	0.25	0.5	0.23	0.35
Date Sampled		25/02/2021	25/02/2021	25/02/2021	25/02/2021	25/02/2021
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	03/03/2021	03/03/2021	03/03/2021	03/03/2021	03/03/2021
Date analysed	-	09/03/2021	09/03/2021	09/03/2021	09/03/2021	09/03/2021
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	%	99	98	99	98	97

Organochlorine Pesticides in soil					
Our Reference		263152-11	263152-12	263152-13	263152-14
Your Reference	UNITS	106/0.25	106/0.5	107/0.3	107/0.4
Depth		0.25	0.5	0.3	0.4
Date Sampled		25/02/2021	25/02/2021	25/02/2021	25/02/2021
Type of sample		soil	soil	soil	soil
Date extracted	-	03/03/2021	03/03/2021	03/03/2021	03/03/2021
Date analysed	-	09/03/2021	09/03/2021	09/03/2021	09/03/2021
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	99	98	99	100

PCBs in Soil						
Our Reference		263152-1	263152-2	263152-4	263152-6	263152-8
Your Reference	UNITS	101/0.3	101/1.2	101/2.0	102/0.6	104/0.5
Depth		0.3	1.2	2.0	0.6	0.5
Date Sampled		25/02/2021	25/02/2021	25/02/2021	25/02/2021	25/02/2021
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	03/03/2021	03/03/2021	03/03/2021	03/03/2021	03/03/2021
Date analysed	-	07/03/2021	07/03/2021	09/03/2021	09/03/2021	09/03/2021
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	%	98	104	98	99	99

PCBs in Soil						
Our Reference		263152-10	263152-11	263152-12	263152-13	263152-14
Your Reference	UNITS	105/0.35	106/0.25	106/0.5	107/0.3	107/0.4
Depth		0.35	0.25	0.5	0.3	0.4
Date Sampled		25/02/2021	25/02/2021	25/02/2021	25/02/2021	25/02/2021
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	03/03/2021	03/03/2021	03/03/2021	03/03/2021	03/03/2021
Date analysed	-	09/03/2021	09/03/2021	09/03/2021	09/03/2021	09/03/2021
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	%	97	99	98	99	100

Misc Soil - Inorg					
Our Reference		263152-4	263152-10	263152-12	263152-14
Your Reference	UNITS	101/2.0	105/0.35	106/0.5	107/0.4
Depth		2.0	0.35	0.5	0.4
Date Sampled		25/02/2021	25/02/2021	25/02/2021	25/02/2021
Type of sample		soil	soil	soil	soil
Date prepared	-	03/03/2021	03/03/2021	03/03/2021	03/03/2021
Date analysed	-	03/03/2021	03/03/2021	03/03/2021	03/03/2021
Total Phenolics (as Phenol)	mg/kg	<5	<5	<5	<5

Acid Extractable metals in soil						
Our Reference		263152-1	263152-2	263152-3	263152-4	263152-5
Your Reference	UNITS	101/0.3	101/1.2	101/1.65	101/2.0	102/0.3
Depth		0.3	1.2	1.65	2.0	0.3
Date Sampled		25/02/2021	25/02/2021	25/02/2021	25/02/2021	25/02/2021
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	03/03/2021	03/03/2021	03/03/2021	03/03/2021	03/03/2021
Date analysed	-	04/03/2021	04/03/2021	04/03/2021	04/03/2021	04/03/2021
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	<1	7	1	8	10
Copper	mg/kg	<1	4	<1	<1	3
Lead	mg/kg	<1	48	2	5	16
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	<1	2	<1	1	5
Zinc	mg/kg	1	55	6	2	23

Acid Extractable metals in soil						
Our Reference		263152-6	263152-7	263152-8	263152-9	263152-10
Your Reference	UNITS	102/0.6	103/0.25	104/0.5	105/0.23	105/0.35
Depth		0.6	0.25	0.5	0.23	0.35
Date Sampled		25/02/2021	25/02/2021	25/02/2021	25/02/2021	25/02/2021
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	03/03/2021	03/03/2021	03/03/2021	03/03/2021	03/03/2021
Date analysed	-	04/03/2021	04/03/2021	04/03/2021	04/03/2021	04/03/2021
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	26	11	10	1	12
Copper	mg/kg	14	3	<1	3	<1
Lead	mg/kg	11	7	7	1	10
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	28	6	1	3	2
Zinc	mg/kg	15	8	2	9	3

Acid Extractable metals in soil						
Our Reference		263152-11	263152-12	263152-13	263152-14	263152-15
Your Reference	UNITS	106/0.25	106/0.5	107/0.3	107/0.4	QA1
Depth		0.25	0.5	0.3	0.4	-
Date Sampled		25/02/2021	25/02/2021	25/02/2021	25/02/2021	25/02/2021
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	03/03/2021	03/03/2021	03/03/2021	03/03/2021	03/03/2021
Date analysed	-	04/03/2021	04/03/2021	04/03/2021	04/03/2021	04/03/2021
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	6	9	4	15	3
Copper	mg/kg	7	<1	4	3	7
Lead	mg/kg	1	6	11	8	1
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	5	1	4	8	5
Zinc	mg/kg	3	2	9	11	6

Moisture						
Our Reference		263152-1	263152-2	263152-3	263152-4	263152-5
Your Reference	UNITS	101/0.3	101/1.2	101/1.65	101/2.0	102/0.3
Depth		0.3	1.2	1.65	2.0	0.3
Date Sampled		25/02/2021	25/02/2021	25/02/2021	25/02/2021	25/02/2021
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	03/03/2021	03/03/2021	03/03/2021	03/03/2021	03/03/2021
Date analysed	-	04/03/2021	04/03/2021	04/03/2021	04/03/2021	04/03/2021
Moisture	%	4.1	11	5.5	9.1	11

Moisture						
Our Reference		263152-6	263152-7	263152-8	263152-9	263152-10
Your Reference	UNITS	102/0.6	103/0.25	104/0.5	105/0.23	105/0.35
Depth		0.6	0.25	0.5	0.23	0.35
Date Sampled		25/02/2021	25/02/2021	25/02/2021	25/02/2021	25/02/2021
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	03/03/2021	03/03/2021	03/03/2021	03/03/2021	03/03/2021
Date analysed	-	04/03/2021	04/03/2021	04/03/2021	04/03/2021	04/03/2021
Moisture	%	7.8	9.7	7.7	15	16

Moisture						
Our Reference		263152-11	263152-12	263152-13	263152-14	263152-15
Your Reference	UNITS	106/0.25	106/0.5	107/0.3	107/0.4	QA1
Depth		0.25	0.5	0.3	0.4	-
Date Sampled		25/02/2021	25/02/2021	25/02/2021	25/02/2021	25/02/2021
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	03/03/2021	03/03/2021	03/03/2021	03/03/2021	03/03/2021
Date analysed	-	04/03/2021	04/03/2021	04/03/2021	04/03/2021	04/03/2021
Moisture	%	6.5	14	9.9	9.2	8.2

Asbestos ID - soils NEPM					
Our Reference		263152-2	263152-6	263152-13	263152-14
Your Reference	UNITS	101/1.2	102/0.6	107/0.3	107/0.4
Depth		1.2	0.6	0.3	0.4
Date Sampled		25/02/2021	25/02/2021	25/02/2021	25/02/2021
Type of sample		soil	soil	soil	soil
Date analysed	-	04/03/2021	04/03/2021	04/03/2021	04/03/2021
Sample mass tested	g	364.62	312	530.64	265.68
Sample Description	-	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Beige sandy soil & rocks	Brown coarse-grained soil & rocks
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected Synthetic mineral 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
Total Asbestos[#1]	g/kg	<0.1	<0.1	<0.1	<0.1
Asbestos ID in soil <0.1g/kg*	-	Chrysotile	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected
ACM >7mm Estimation*	g	0.0168	–	–	–
FA and AF Estimation*	g	–	–	–	–
FA and AF Estimation*#2	%(w/w)	<0.001	<0.001	<0.001	<0.001

vTRH(C6-C10)/BTEXN in Water		
Our Reference		263152-16
Your Reference	UNITS	RB1
Depth		-
Date Sampled		25/02/2021
Type of sample		water
Date extracted	-	03/03/2021
Date analysed	-	04/03/2021
TRH C_6 - C_9	µg/L	<10
TRH C_6 - C_{10}	µg/L	<10
TRH C_6 - C_{10} less BTEX (F1)	µg/L	<10
Benzene	µg/L	<1
Toluene	µg/L	<1
Ethylbenzene	µg/L	<1
m+p-xylene	µg/L	<2
o-xylene	µg/L	<1
Naphthalene	µg/L	<1
Surrogate Dibromofluoromethane	%	102
Surrogate toluene-d8	%	99
Surrogate 4-BFB	%	97

svTRH (C10-C40) in Water		
Our Reference		263152-16
Your Reference	UNITS	RB1
Depth		-
Date Sampled		25/02/2021
Type of sample		water
Date extracted	-	03/03/2021
Date analysed	-	03/03/2021
TRH C_{10} - C_{14}	µg/L	<50
TRH C_{15} - C_{28}	µg/L	<100
TRH C_{29} - C_{36}	µg/L	<100
TRH >C_{10} - C_{16}	µg/L	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	µg/L	<50
TRH >C_{16} - C_{34}	µg/L	<100
TRH >C_{34} - C_{40}	µg/L	<100
Surrogate o-Terphenyl	%	96

Metals in Water - Dissolved		
Our Reference		263152-16
Your Reference	UNITS	RB1
Depth		-
Date Sampled		25/02/2021
Type of sample		water
Date digested	-	03/03/2021
Date analysed	-	03/03/2021
Arsenic - Dissolved	mg/L	<0.05
Cadmium - Dissolved	mg/L	<0.01
Chromium - Dissolved	mg/L	<0.01
Copper - Dissolved	mg/L	<0.01
Lead - Dissolved	mg/L	<0.03
Mercury - Dissolved	mg/L	<0.0005
Nickel - Dissolved	mg/L	<0.02
Zinc - Dissolved	mg/L	<0.02

Method ID	Methodology Summary
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.
ASB-001	Asbestos ID - Identification of asbestos in soil samples using Polarised Light Microscopy and Dispersion Staining Techniques. Minimum 500mL soil sample was analysed as recommended by "National Environment Protection (Assessment of site contamination) Measure, Schedule B1 and "The Guidelines from the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia - May 2009" with a reporting limit of 0.1g/kg (0.01% w/w) as per Australian Standard AS4964-2004. Results reported denoted with * are outside our scope of NATA accreditation. **NOTE** #1 Total Asbestos g/kg was analysed and reported as per Australian Standard AS4964 (This is the sum of ACM >7mm, <7mm and FA/AF) **NOTE** #2 The screening level of 0.001% w/w asbestos in soil for FA and AF only applies where the FA and AF are able to be quantified by gravimetric procedures. This screening level is not applicable to free fibres. Estimation = Estimated asbestos weight Results reported with "--" is equivalent to no visible asbestos identified using Polarised Light microscopy and Dispersion Staining Techniques.
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Inorg-031	Total Phenolics by segmented flow analyser (in line distillation with colourimetric finish). Solids are extracted in a caustic media prior to analysis.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Org-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.

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. 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-022/025	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	Water samples are analysed directly by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
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.

QUALITY CONTROL: VHC's in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-6	263152-4
Date extracted	-			03/03/2021	10	03/03/2021	03/03/2021		03/03/2021	03/03/2021
Date analysed	-			04/03/2021	10	04/03/2021	04/03/2021		04/03/2021	04/03/2021
Dichlorodifluoromethane	mg/kg	1	Org-023	<1	10	<1	<1	0	[NT]	[NT]
Chloromethane	mg/kg	1	Org-023	<1	10	<1	<1	0	[NT]	[NT]
Vinyl Chloride	mg/kg	1	Org-023	<1	10	<1	<1	0	[NT]	[NT]
Bromomethane	mg/kg	1	Org-023	<1	10	<1	<1	0	[NT]	[NT]
Chloroethane	mg/kg	1	Org-023	<1	10	<1	<1	0	[NT]	[NT]
Trichlorofluoromethane	mg/kg	1	Org-023	<1	10	<1	<1	0	[NT]	[NT]
1,1-Dichloroethene	mg/kg	1	Org-023	<1	10	<1	<1	0	[NT]	[NT]
trans-1,2-dichloroethene	mg/kg	1	Org-023	<1	10	<1	<1	0	[NT]	[NT]
1,1-dichloroethane	mg/kg	1	Org-023	<1	10	<1	<1	0	108	86
cis-1,2-dichloroethene	mg/kg	1	Org-023	<1	10	<1	<1	0	[NT]	[NT]
bromochloromethane	mg/kg	1	Org-023	<1	10	<1	<1	0	[NT]	[NT]
chloroform	mg/kg	1	Org-023	<1	10	<1	<1	0	106	90
2,2-dichloropropane	mg/kg	1	Org-023	<1	10	<1	<1	0	[NT]	[NT]
1,2-dichloroethane	mg/kg	1	Org-023	<1	10	<1	<1	0	103	80
1,1,1-trichloroethane	mg/kg	1	Org-023	<1	10	<1	<1	0	93	79
1,1-dichloropropene	mg/kg	1	Org-023	<1	10	<1	<1	0	[NT]	[NT]
carbon tetrachloride	mg/kg	1	Org-023	<1	10	<1	<1	0	[NT]	[NT]
dibromomethane	mg/kg	1	Org-023	<1	10	<1	<1	0	[NT]	[NT]
1,2-dichloropropane	mg/kg	1	Org-023	<1	10	<1	<1	0	[NT]	[NT]
trichloroethene	mg/kg	1	Org-023	<1	10	<1	<1	0	75	82
bromodichloromethane	mg/kg	1	Org-023	<1	10	<1	<1	0	89	86
trans-1,3-dichloropropene	mg/kg	1	Org-023	<1	10	<1	<1	0	[NT]	[NT]
cis-1,3-dichloropropene	mg/kg	1	Org-023	<1	10	<1	<1	0	[NT]	[NT]
1,1,2-trichloroethane	mg/kg	1	Org-023	<1	10	<1	<1	0	[NT]	[NT]
1,3-dichloropropane	mg/kg	1	Org-023	<1	10	<1	<1	0	[NT]	[NT]
dibromochloromethane	mg/kg	1	Org-023	<1	10	<1	<1	0	76	69
1,2-dibromoethane	mg/kg	1	Org-023	<1	10	<1	<1	0	[NT]	[NT]
tetrachloroethene	mg/kg	1	Org-023	<1	10	<1	<1	0	101	81
1,1,1,2-tetrachloroethane	mg/kg	1	Org-023	<1	10	<1	<1	0	[NT]	[NT]
chlorobenzene	mg/kg	1	Org-023	<1	10	<1	<1	0	[NT]	[NT]
bromoform	mg/kg	1	Org-023	<1	10	<1	<1	0	[NT]	[NT]
1,1,2,2-tetrachloroethane	mg/kg	1	Org-023	<1	10	<1	<1	0	[NT]	[NT]
1,2,3-trichloropropane	mg/kg	1	Org-023	<1	10	<1	<1	0	[NT]	[NT]
bromobenzene	mg/kg	1	Org-023	<1	10	<1	<1	0	[NT]	[NT]
2-chlorotoluene	mg/kg	1	Org-023	<1	10	<1	<1	0	[NT]	[NT]
4-chlorotoluene	mg/kg	1	Org-023	<1	10	<1	<1	0	[NT]	[NT]
1,3-dichlorobenzene	mg/kg	1	Org-023	<1	10	<1	<1	0	[NT]	[NT]
1,4-dichlorobenzene	mg/kg	1	Org-023	<1	10	<1	<1	0	[NT]	[NT]

QUALITY CONTROL: VHC's in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-6	263152-4
1,2-dichlorobenzene	mg/kg	1	Org-023	<1	10	<1	<1	0	[NT]	[NT]
1,2-dibromo-3-chloropropane	mg/kg	1	Org-023	<1	10	<1	<1	0	[NT]	[NT]
1,2,4-trichlorobenzene	mg/kg	1	Org-023	<1	10	<1	<1	0	[NT]	[NT]
hexachlorobutadiene	mg/kg	1	Org-023	<1	10	<1	<1	0	[NT]	[NT]
1,2,3-trichlorobenzene	mg/kg	1	Org-023	<1	10	<1	<1	0	[NT]	[NT]
Surrogate Dibromofluorometha	%		Org-023	96	10	101	102	1	99	99
Surrogate aaa-Trifluorotoluene	%		Org-023	75	10	122	121	1	110	80
Surrogate Toluene-d_8	%		Org-023	98	10	112	113	1	106	101
Surrogate 4-Bromofluorobenzene	%		Org-023	103	10	97	98	1	96	103

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-6	263152-4
Date extracted	-			03/03/2021	1	03/03/2021	03/03/2021		03/03/2021	03/03/2021
Date analysed	-			04/03/2021	1	04/03/2021	04/03/2021		04/03/2021	04/03/2021
TRH C_6 - C_9	mg/kg	25	Org-023	<25	1	<25	<25	0	103	83
TRH C_6 - C_{10}	mg/kg	25	Org-023	<25	1	<25	<25	0	103	83
Benzene	mg/kg	0.2	Org-023	<0.2	1	<0.2	<0.2	0	90	86
Toluene	mg/kg	0.5	Org-023	<0.5	1	<0.5	<0.5	0	110	83
Ethylbenzene	mg/kg	1	Org-023	<1	1	<1	<1	0	106	85
m+p-xylene	mg/kg	2	Org-023	<2	1	<2	<2	0	104	81
o-Xylene	mg/kg	1	Org-023	<1	1	<1	<1	0	101	87
naphthalene	mg/kg	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	75	1	94	91	3	110	80

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]	10	03/03/2021	03/03/2021		[NT]	[NT]
Date analysed	-			[NT]	10	04/03/2021	04/03/2021		[NT]	[NT]
TRH C_6 - C_9	mg/kg	25	Org-023	[NT]	10	<25	<25	0	[NT]	[NT]
TRH C_6 - C_{10}	mg/kg	25	Org-023	[NT]	10	<25	<25	0	[NT]	[NT]
Benzene	mg/kg	0.2	Org-023	[NT]	10	<0.2	<0.2	0	[NT]	[NT]
Toluene	mg/kg	0.5	Org-023	[NT]	10	<0.5	<0.5	0	[NT]	[NT]
Ethylbenzene	mg/kg	1	Org-023	[NT]	10	<1	<1	0	[NT]	[NT]
m+p-xylene	mg/kg	2	Org-023	[NT]	10	<2	<2	0	[NT]	[NT]
o-Xylene	mg/kg	1	Org-023	[NT]	10	<1	<1	0	[NT]	[NT]
naphthalene	mg/kg	1	Org-023	[NT]	10	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	[NT]	10	122	121	1	[NT]	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-5	263152-4
Date extracted	-			03/03/2021	1	03/03/2021	03/03/2021		03/03/2021	03/03/2021
Date analysed	-			03/03/2021	1	03/03/2021	03/03/2021		03/03/2021	03/03/2021
TRH C_{10} - C_{14}	mg/kg	50	Org-020	<50	1	<50	<50	0	120	117
TRH C_{15} - C_{28}	mg/kg	100	Org-020	<100	1	<100	<100	0	108	102
TRH C_{29} - C_{36}	mg/kg	100	Org-020	<100	1	<100	<100	0	108	105
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	<50	1	<50	<50	0	120	117
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	<100	1	<100	<100	0	108	102
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	<100	1	<100	<100	0	108	105
Surrogate o-Terphenyl	%		Org-020	93	1	95	93	2	102	95

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-6	[NT]
Date extracted	-			[NT]	10	03/03/2021	03/03/2021		03/03/2021	[NT]
Date analysed	-			[NT]	10	04/03/2021	04/03/2021		03/03/2021	[NT]
TRH C_{10} - C_{14}	mg/kg	50	Org-020	[NT]	10	<50	<50	0	138	[NT]
TRH C_{15} - C_{28}	mg/kg	100	Org-020	[NT]	10	<100	<100	0	105	[NT]
TRH C_{29} - C_{36}	mg/kg	100	Org-020	[NT]	10	<100	<100	0	108	[NT]
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	[NT]	10	<50	<50	0	138	[NT]
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	[NT]	10	<100	<100	0	105	[NT]
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	[NT]	10	<100	<100	0	108	[NT]
Surrogate o-Terphenyl	%		Org-020	[NT]	10	90	89	1	108	[NT]

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-5	263152-4
Date extracted	-			03/03/2021	1	03/03/2021	03/03/2021		03/03/2021	03/03/2021
Date analysed	-			07/03/2021	1	07/03/2021	07/03/2021		07/03/2021	09/03/2021
Naphthalene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	97	101
Acenaphthylene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	92	97
Fluorene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	95	96
Phenanthrene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	103	95
Anthracene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	96	95
Pyrene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	107	95
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	100	104
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	<0.05	1	<0.05	<0.05	0	116	88
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	93	1	96	92	4	93	90

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-6	[NT]
Date extracted	-			[NT]	10	03/03/2021	03/03/2021		03/03/2021	[NT]
Date analysed	-			[NT]	10	09/03/2021	09/03/2021		09/03/2021	[NT]
Naphthalene	mg/kg	0.1	Org-022/025	[NT]	10	<0.1	<0.1	0	94	[NT]
Acenaphthylene	mg/kg	0.1	Org-022/025	[NT]	10	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	[NT]	10	<0.1	<0.1	0	99	[NT]
Fluorene	mg/kg	0.1	Org-022/025	[NT]	10	<0.1	<0.1	0	96	[NT]
Phenanthrene	mg/kg	0.1	Org-022/025	[NT]	10	<0.1	<0.1	0	97	[NT]
Anthracene	mg/kg	0.1	Org-022/025	[NT]	10	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	[NT]	10	<0.1	<0.1	0	98	[NT]
Pyrene	mg/kg	0.1	Org-022/025	[NT]	10	<0.1	<0.1	0	96	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	[NT]	10	<0.1	<0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	[NT]	10	<0.1	<0.1	0	106	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	[NT]	10	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	[NT]	10	<0.05	<0.05	0	93	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	[NT]	10	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	[NT]	10	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	[NT]	10	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	[NT]	10	92	92	0	92	[NT]

QUALITY CONTROL: Organochlorine Pesticides in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-5	263152-4
Date extracted	-			03/03/2021	1	03/03/2021	03/03/2021		03/03/2021	03/03/2021
Date analysed	-			07/03/2021	1	07/03/2021	07/03/2021		07/03/2021	09/03/2021
alpha-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	96	94
HCB	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	96	91
gamma-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	97	95
delta-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	99	105
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	102	99
gamma-Chlordane	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	99	96
Dieldrin	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	95	99
Endrin	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	89	96
Endosulfan II	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	94	81
Endrin Aldehyde	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	93	105
Methoxychlor	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	101	1	98	98	0	98	97

QUALITY CONTROL: Organochlorine Pesticides in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-6	[NT]
Date extracted	-			[NT]	10	03/03/2021	03/03/2021		03/03/2021	[NT]
Date analysed	-			[NT]	10	09/03/2021	09/03/2021		09/03/2021	[NT]
alpha-BHC	mg/kg	0.1	Org-022/025	[NT]	10	<0.1	<0.1	0	96	[NT]
HCB	mg/kg	0.1	Org-022/025	[NT]	10	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022/025	[NT]	10	<0.1	<0.1	0	89	[NT]
gamma-BHC	mg/kg	0.1	Org-022/025	[NT]	10	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022/025	[NT]	10	<0.1	<0.1	0	97	[NT]
delta-BHC	mg/kg	0.1	Org-022/025	[NT]	10	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-022/025	[NT]	10	<0.1	<0.1	0	106	[NT]
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	[NT]	10	<0.1	<0.1	0	101	[NT]
gamma-Chlordane	mg/kg	0.1	Org-022/025	[NT]	10	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-022/025	[NT]	10	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-022/025	[NT]	10	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-022/025	[NT]	10	<0.1	<0.1	0	97	[NT]
Dieldrin	mg/kg	0.1	Org-022/025	[NT]	10	<0.1	<0.1	0	103	[NT]
Endrin	mg/kg	0.1	Org-022/025	[NT]	10	<0.1	<0.1	0	100	[NT]
Endosulfan II	mg/kg	0.1	Org-022/025	[NT]	10	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-022/025	[NT]	10	<0.1	<0.1	0	83	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-022/025	[NT]	10	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022/025	[NT]	10	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022/025	[NT]	10	<0.1	<0.1	0	99	[NT]
Methoxychlor	mg/kg	0.1	Org-022/025	[NT]	10	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	[NT]	10	97	98	1	98	[NT]

QUALITY CONTROL: PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-5	263152-4
Date extracted	-			03/03/2021	1	03/03/2021	03/03/2021		03/03/2021	03/03/2021
Date analysed	-			09/03/2021	1	07/03/2021	07/03/2021		07/03/2021	09/03/2021
Aroclor 1016	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	90	80
Aroclor 1260	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-021	101	1	98	98	0	98	97

QUALITY CONTROL: PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-6	[NT]
Date extracted	-			[NT]	10	03/03/2021	03/03/2021		03/03/2021	[NT]
Date analysed	-			[NT]	10	09/03/2021	09/03/2021		09/03/2021	[NT]
Aroclor 1016	mg/kg	0.1	Org-021	[NT]	10	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021	[NT]	10	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021	[NT]	10	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021	[NT]	10	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021	[NT]	10	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021	[NT]	10	<0.1	<0.1	0	90	[NT]
Aroclor 1260	mg/kg	0.1	Org-021	[NT]	10	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-021	[NT]	10	97	98	1	98	[NT]

QUALITY CONTROL: Misc Soil - Inorg						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-5	263152-4
Date prepared	-			03/03/2021	10	03/03/2021	03/03/2021		03/03/2021	03/03/2021
Date analysed	-			03/03/2021	10	03/03/2021	03/03/2021		03/03/2021	03/03/2021
Total Phenolics (as Phenol)	mg/kg	5	Inorg-031	<5	10	<5	<5	0	102	100

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-6	263152-4
Date prepared	-			03/03/2021	1	03/03/2021	03/03/2021		03/03/2021	03/03/2021
Date analysed	-			04/03/2021	1	04/03/2021	04/03/2021		04/03/2021	04/03/2021
Arsenic	mg/kg	4	Metals-020	<4	1	<4	<4	0	105	96
Cadmium	mg/kg	0.4	Metals-020	<0.4	1	<0.4	<0.4	0	99	94
Chromium	mg/kg	1	Metals-020	<1	1	<1	2	67	103	97
Copper	mg/kg	1	Metals-020	<1	1	<1	<1	0	105	108
Lead	mg/kg	1	Metals-020	<1	1	<1	<1	0	99	96
Mercury	mg/kg	0.1	Metals-021	<0.1	1	<0.1	<0.1	0	106	111
Nickel	mg/kg	1	Metals-020	<1	1	<1	<1	0	103	99
Zinc	mg/kg	1	Metals-020	<1	1	1	1	0	104	93

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	10	03/03/2021	03/03/2021		[NT]	[NT]
Date analysed	-			[NT]	10	04/03/2021	04/03/2021		[NT]	[NT]
Arsenic	mg/kg	4	Metals-020	[NT]	10	<4	<4	0	[NT]	[NT]
Cadmium	mg/kg	0.4	Metals-020	[NT]	10	<0.4	<0.4	0	[NT]	[NT]
Chromium	mg/kg	1	Metals-020	[NT]	10	12	9	29	[NT]	[NT]
Copper	mg/kg	1	Metals-020	[NT]	10	<1	<1	0	[NT]	[NT]
Lead	mg/kg	1	Metals-020	[NT]	10	10	10	0	[NT]	[NT]
Mercury	mg/kg	0.1	Metals-021	[NT]	10	<0.1	<0.1	0	[NT]	[NT]
Nickel	mg/kg	1	Metals-020	[NT]	10	2	1	67	[NT]	[NT]
Zinc	mg/kg	1	Metals-020	[NT]	10	3	3	0	[NT]	[NT]

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Water					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			03/03/2021	[NT]	[NT]	[NT]	[NT]	03/03/2021	[NT]
Date analysed	-			04/03/2021	[NT]	[NT]	[NT]	[NT]	04/03/2021	[NT]
TRH C_6 - C_9	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	99	[NT]
TRH C_6 - C_{10}	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	99	[NT]
Benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	100	[NT]
Toluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	95	[NT]
Ethylbenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	100	[NT]
m+p-xylene	µg/L	2	Org-023	<2	[NT]	[NT]	[NT]	[NT]	100	[NT]
o-xylene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	100	[NT]
Naphthalene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-023	100	[NT]	[NT]	[NT]	[NT]	100	[NT]
Surrogate toluene-d8	%		Org-023	99	[NT]	[NT]	[NT]	[NT]	99	[NT]
Surrogate 4-BFB	%		Org-023	99	[NT]	[NT]	[NT]	[NT]	101	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Water					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			03/03/2021	[NT]	[NT]	[NT]	[NT]	03/03/2021	[NT]
Date analysed	-			03/03/2021	[NT]	[NT]	[NT]	[NT]	03/03/2021	[NT]
TRH C_{10} - C_{14}	µg/L	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	99	[NT]
TRH C_{15} - C_{28}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	85	[NT]
TRH C_{29} - C_{36}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	92	[NT]
TRH >C_{10} - C_{16}	µg/L	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	99	[NT]
TRH >C_{16} - C_{34}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	85	[NT]
TRH >C_{34} - C_{40}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	92	[NT]
Surrogate o-Terphenyl	%		Org-020	89	[NT]	[NT]	[NT]	[NT]	66	[NT]

QUALITY CONTROL: Metals in Water - Dissolved						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date digested	-			03/03/2021	[NT]	[NT]	[NT]	[NT]	03/03/2021	[NT]
Date analysed	-			03/03/2021	[NT]	[NT]	[NT]	[NT]	03/03/2021	[NT]
Arsenic - Dissolved	mg/L	0.05	Metals-020	<0.05	[NT]	[NT]	[NT]	[NT]	105	[NT]
Cadmium - Dissolved	mg/L	0.01	Metals-020	<0.01	[NT]	[NT]	[NT]	[NT]	101	[NT]
Chromium - Dissolved	mg/L	0.01	Metals-020	<0.01	[NT]	[NT]	[NT]	[NT]	98	[NT]
Copper - Dissolved	mg/L	0.01	Metals-020	<0.01	[NT]	[NT]	[NT]	[NT]	98	[NT]
Lead - Dissolved	mg/L	0.03	Metals-020	<0.03	[NT]	[NT]	[NT]	[NT]	98	[NT]
Mercury - Dissolved	mg/L	0.0005	Metals-021	<0.0005	[NT]	[NT]	[NT]	[NT]	108	[NT]
Nickel - Dissolved	mg/L	0.02	Metals-020	<0.02	[NT]	[NT]	[NT]	[NT]	100	[NT]
Zinc - Dissolved	mg/L	0.02	Metals-020	<0.02	[NT]	[NT]	[NT]	[NT]	100	[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

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.

Factual description of asbestos identified in the soil samples: NEPM
Sample 263152-2; Chrysotile asbestos identified in 0.1119g of fibre cement material >7mm

Note: All samples analysed as received. However, samples 263152-2, 6, 13, 14 are below the minimum 500mL sample volume as per National Environment Protection (Assessment of Site Contamination) Measure, Schedule B1, May 2013.

CHAIN OF CUSTODY

SCC0019

Douglas Partners
Geotechnics / Environment / Groundwater

Client: Douglas Partners	**Project Number** 83343.03	**To:**	Envirolab Services
Contact Person: Brent Kerry	**Project Name:** Gosford DSI	**Contact Person:**	Aileen Hie
Project Mgr: Brent Kerry	**PO No.:**	**Address:**	12 Ashley Street
	lab Quote No. : 2018-2019 List		Chatswood NSW 2068
Address: 5/3 Teanster Cl	**Date results required:** Standard TAT	**Phone:**	02 9910 6200
Tuggerah NSW 2259	*Note: Inform lab in advance if urgent turnaround is required - surcharges apply*	**Fax:**	02 9910 6201
		Email:	ahie@envirolab.com.au
Phone: 4351 1422 **Mob:**	**Report format:** Esdat/PDF / Excel	**Laboratory Report No:**	
Email: brent.kerry@douglaspartners.com.au	**Comments:**	**Lab Comments:**	

Sample information						Tests Required											Comments
Lab Sample ID	Field Sample ID	Depth	Date sampled	Container Type	Type of sample	COMBO #5A	COMBO #5	VHC	COMBO #7A	COMBO #7	HM	OCP	COMBO #1m	COMBO #7A	COMBO #7	Asbestos ID	Provide as much information about the sample as you can
1	101/0.3	0.3	25/02/2021	Jar	discrete		X										500ml samples tested for Asbestos (DOH method)
2	101/1.2	1.2	25/02/2021	Jar	discrete	X											
3	101/1.65	1.65	25/02/2021	Jar	discrete						X	X					
4	101/2.0	2.0	25/02/2021	Jar	discrete			X		X							
5	102/0.3	0.3	25/02/2021	Jar	discrete						X	X					
6	102/0.6	0.6	25/02/2021	Jar	discrete	X											
7	103/0.25	0.25	25/02/2021	Jar	discrete						X	X					
8	104/0.5	0.5	25/02/2021	Jar	discrete		X										
9	105/0.23	0.23	25/02/2021	Jar	discrete						X	X					
10	105/0.35	0.35	25/02/2021	Jar	discrete			X		X							
11	106/0.25	0.25	25/02/2021	Jar	discrete		X										
12	106/0.5	0.5	25/02/2021	Jar	discrete			X		X							
13	107/0.3	0.3	25/02/2021	Jar	discrete	X											
14	107/0.4	0.4	25/02/2021	Jar	discrete				X								
15	QA1	-	25/02/2021	Jar	discrete								X				
16	RB1	-	25/02/2021	Jar	discrete								X				

Relinquished by: Douglas Partners	**Sample Receipt**	***Lab use only:***
Courier (by whom) TNT	**Received by (Company):** ELS S/O	**Samples Received:** Cool or Ambient (circle one)
Condition of Sample at dispatch Cool or Ambient (circle) cool	**Print Name:** Sam Day	**Temperature Received at:** 17 (if applicable)
Temperature (if Applicable):	**Date & Time:** 2/3/21 1040	**Transported by:** Hand delivered / courier
Print Name: Brent Kerry	**Signature:**	
Date & Time: 1/3/21		
Signature:		

Page 1 of 1

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

ENVIROLAB

Job No: 263152

Date Received: 2/3/21
Time Received: 1040
Received By: SD
Temp: ~~Cool~~/Ambient
Cooling: ~~Ice~~/Icepack
Security: ~~Intact~~/Broken/None

CHAIN OF CUSTODY

SCC0019

Douglas Partners
Geotechnics / Environment / Groundwater

Client: Douglas Partners	**Project Number** 83343.03	**To:**	Envirolab Services
Contact Person: Brent Kerry	**Project Name:** Gosford DSI	**Contact Person:**	Aileen Hie
Project Mgr: Brent Kerry	**PO No.:**	**Address:**	12 Ashley Street
	lab Quote No. : 2018-2019 List		Chatswood NSW 2068
Address: 5/3 Teanster Cl	**Date results required:** Standard TAT	**Phone:**	02 9910 6200
Tuggerah NSW 2259	*Note: Inform lab in advance if urgent turnaround is required - surcharges apply*	**Fax:**	02 9910 6201
		Email:	ahie@envirolab.com.au
Phone: 4351 1422 **Mob:**	**Report format:** Esdat/PDF / Excel	**Laboratory Report No:**	
Email: brent.kerry@douglaspartners.com.au	**Comments:**	**Lab Comments:**	

Sample information						Tests Required											Comments
Lab Sample ID	Field Sample ID	Depth	Date sampled	Container Type	Type of sample	COMBO #5A	COMBO #5	VHC	COMBO #7A	COMBO #7	HM	OCP	COMBO #1m	COMBO #7A	COMBO #7	Asbestos ID	Provide as much information about the sample as you can
1	101/0.3	0.3	25/02/2021	Jar	discrete		X										500ml samples tested for Asbestos (DOH method)
2	101/1.2	1.2	25/02/2021	Jar	discrete	X											
3	101/1.65	1.65	25/02/2021	Jar	discrete						X	X					
4	101/2.0	2.0	25/02/2021	Jar	discrete			X		X							
5	102/0.3	0.3	25/02/2021	Jar	discrete						X	X					
6	102/0.6	0.6	25/02/2021	Jar	discrete	X											
7	103/0.25	0.25	25/02/2021	Jar	discrete						X	X					
8	104/0.5	0.5	25/02/2021	Jar	discrete		X										
9	105/0.23	0.23	25/02/2021	Jar	discrete						X	X					
10	105/0.35	0.35	25/02/2021	Jar	discrete			X		X							
11	106/0.25	0.25	25/02/2021	Jar	discrete		X										
12	106/0.5	0.5	25/02/2021	Jar	discrete			X		X							
13	107/0.3	0.3	25/02/2021	Jar	discrete	X											
14	107/0.4	0.4	25/02/2021	Jar	discrete				X								
15	QA1	-	25/02/2021	Jar	discrete								X				
16	RB1	-	25/02/2021	Jar	discrete								X				

Relinquished by: Douglas Partners	**Sample Receipt**	***Lab use only:***
Courier (by whom) TNT	**Received by (Company):** ELS S/O	**Samples Received:** Cool or Ambient (circle one)
Condition of Sample at dispatch Cool or Ambient (circle) cool	**Print Name:** Sam Day	**Temperature Received at:** 17 (if applicable)
Temperature (if Applicable):	**Date & Time:** 2/3/21 1040	**Transported by:** Hand delivered / courier
Print Name: Brent Kerry	**Signature:**	
Date & Time: 1/3/21		
Signature:		

Page 1 of 1

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

ENVIROLAB

Job No: 263152

Date Received: 2/3/21
Time Received: 1040
Received By: SD
Temp: ~~Cool~~/Ambient
Cooling: ~~Ice~~/Icepack
Security: ~~Intact~~/Broken/None

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

SAMPLE RECEIPT ADVICE

Client Details

Client	Douglas Partners Tuggerah
Attention	Brent Kerry

Sample Login Details

Your reference	83343.03, Gosford DSI
Envirolab Reference	263152
Date Sample Received	02/03/2021
Date Instructions Received	02/03/2021
Date Results Expected to be Reported	09/03/2021

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	15 soil, 1 water
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	17
Cooling Method	Ice
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	**Phone: 02 9910 6200**
Fax: 02 9910 6201	**Fax: 02 9910 6201**
Email: ahie@envirolab.com.au	**Email: jhurst@envirolab.com.au**

Analysis Underway, details on the following page:

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

Sample ID	VHC's in soil	vTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Organochlorine Pesticides in soil	PCBsin Soil	Misc Soil - Inorg	Acid Extractable metalsin soil	Asbestos ID - soils NEPM	vTRH(C6-C10)/BTEXN in Water	svTRH (C10-C40) in Water	Metals in Water - Dissolved
101/0.3-0.3		✓	✓	✓	✓	✓		✓				
101/1.2-1.2		✓	✓	✓	✓	✓		✓	✓			
101/1.65-1.65					✓			✓				
101/2.0-2.0	✓	✓	✓	✓	✓	✓	✓	✓				
102/0.3-0.3					✓			✓				
102/0.6-0.6		✓	✓	✓	✓	✓		✓	✓			
103/0.25-0.25					✓			✓				
104/0.5-0.5		✓	✓	✓	✓	✓		✓				
105/0.23-0.23					✓			✓				
105/0.35-0.35	✓	✓	✓	✓	✓	✓	✓	✓				
106/0.25-0.25		✓	✓	✓	✓	✓		✓				
106/0.5-0.5	✓	✓	✓	✓	✓	✓	✓	✓				
107/0.3-0.3		✓	✓	✓	✓	✓		✓	✓			
107/0.4-0.4		✓	✓	✓	✓	✓	✓	✓	✓			
QA1		✓	✓					✓				
RB1										✓	✓	✓

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.

Requests for longer term sample storage must be received in writing.

Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.

TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES2107377**	Page	: 1 of 5
Client	: **DOUGLAS PARTNERS PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: BRENT KERRY	Contact	: Sepan Mahamad
Address	: PO BOX 472 WEST RYDE 1685	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61 2 8784 8555
Project	: 83343.03 Gosford DSI	Date Samples Received	: 02-Mar-2021 16:30
Order number	: ----	Date Analysis Commenced	: 03-Mar-2021
C-O-C number	: ----	Issue Date	: 08-Mar-2021 19:15
Sampler	: ----		
Site	: 5/3 Teanster Cl, TUGGERAH NSW 2259		
Quote number	: EN/222		
No. of samples received	: 1		
No. of samples analysed	: 1		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

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.

Signatories	*Position*	*Accreditation Category*
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	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.

- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	QA2	----	----	----	----
				Sampling date / time	25-Feb-2021 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES2107377-001	--------	--------	--------	--------
					Result	----	----	----	----
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	1.0	%		**3.5**	----	----	----	----
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		<2	----	----	----	----
Copper	7440-50-8	5	mg/kg		<5	----	----	----	----
Lead	7439-92-1	5	mg/kg		<5	----	----	----	----
Nickel	7440-02-0	2	mg/kg		<2	----	----	----	----
Zinc	7440-66-6	5	mg/kg		<5	----	----	----	----
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		<0.1	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	----	----	----	----
C10 - C14 Fraction	----	50	mg/kg		<50	----	----	----	----
C15 - C28 Fraction	----	100	mg/kg		<100	----	----	----	----
C29 - C36 Fraction	----	100	mg/kg		<100	----	----	----	----
^ **C10 - C36 Fraction (sum)**	----	50	mg/kg		<50	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	----	----	----	----
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	10	mg/kg		<10	----	----	----	----
>C10 - C16 Fraction	----	50	mg/kg		<50	----	----	----	----
>C16 - C34 Fraction	----	100	mg/kg		<100	----	----	----	----
>C34 - C40 Fraction	----	100	mg/kg		<100	----	----	----	----
^ **>C10 - C40 Fraction (sum)**	----	50	mg/kg		<50	----	----	----	----
^ **>C10 - C16 Fraction minus Naphthalene (F2)**	----	50	mg/kg		<50	----	----	----	----
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	----	----	----	----
Toluene	108-88-3	0.5	mg/kg		<0.5	----	----	----	----
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	----	----	----	----
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	----	----	----	----
^ **Sum of BTEX**	----	0.2	mg/kg		<0.2	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	QA2	----	----	----	----
				Sampling date / time	25-Feb-2021 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES2107377-001	--------	--------	--------	--------
					Result	----	----	----	----
EP080: BTEXN - Continued									
^ **Total Xylenes**	----	0.5	mg/kg		<0.5	----	----	----	----
Naphthalene	91-20-3	1	mg/kg		<1	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**88.1**	----	----	----	----
Toluene-D8	2037-26-5	0.2	%		**96.9**	----	----	----	----
4-Bromofluorobenzene	460-00-4	0.2	%		**93.7**	----	----	----	----

Surrogate Control Limits

Sub-Matrix: **SOIL**

Compound	CAS Number	Recovery Limits (%) Low	High
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	73	133
Toluene-D8	2037-26-5	74	132
4-Bromofluorobenzene	460-00-4	72	130

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **ES2107377**	Page	: 1 of 5
Client	: **DOUGLAS PARTNERS PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: BRENT KERRY	Contact	: Sepan Mahamad
Address	: PO BOX 472 WEST RYDE 1685	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61 2 8784 8555
Project	: 83343.03 Gosford DSI	Date Samples Received	: 02-Mar-2021
Order number	: ----	Date Analysis Commenced	: 03-Mar-2021
C-O-C number	: ----	Issue Date	: 08-Mar-2021
Sampler	: ----		
Site	: 5/3 Teanster Cl, TUGGERAH NSW 2259		
Quote number	: EN/222		
No. of samples received	: 1		
No. of samples analysed	: 1		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

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 Quality Control Report contains the following information:

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

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.

Signatories	*Position*	*Accreditation Category*
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	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

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

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EG005(ED093)T: Total Metals by ICP-AES (QC Lot: 3545834)									
ES2107269-002	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	12	11	10.7	0% - 50%
		EG005T: Chromium	7440-47-3	2	mg/kg	204	198	2.94	0% - 20%
		EG005T: Nickel	7440-02-0	2	mg/kg	38	34	9.60	0% - 50%
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	11	11	0.00	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	918	818	11.5	0% - 20%
		EG005T: Zinc	7440-66-6	5	mg/kg	26900	25200	6.64	0% - 20%
ES2107502-003	Anonymous	EG005T: Copper	7440-50-8	5	mg/kg	346	383	10.3	0% - 20%
ES2107502-003	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	15	16	0.00	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	4	4	0.00	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	7	<5	31.6	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	11	8	27.9	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	2920	3260	11.2	0% - 20%
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 3545838)									
ES2107269-005	Anonymous	EA055: Moisture Content	----	0.1	%	61.1	61.0	0.214	0% - 20%
ES2107502-004	Anonymous	EA055: Moisture Content	----	0.1	%	4.2	3.9	7.44	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 3545830)									
ES2107107-002	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
ES2107126-001	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 3541420)									
ES2106817-001	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
ES2106817-045	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 3541745)									

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 3541745) - continued									
ES2107107-001	Anonymous	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 3541420)									
ES2106817-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
ES2106817-045	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 3541745)									
ES2107107-001	Anonymous	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
EP080: BTEXN (QC Lot: 3541420)									
ES2106817-001	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit
ES2106817-045	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit

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

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

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 3545834)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	121.1 mg/kg	108	88.0	113
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	0.74 mg/kg	93.8	70.0	130
EG005T: Chromium	7440-47-3	2	mg/kg	<2	20.2 mg/kg	110	68.0	132
EG005T: Copper	7440-50-8	5	mg/kg	<5	52.9 mg/kg	103	89.0	111
EG005T: Lead	7439-92-1	5	mg/kg	<5	62.1 mg/kg	89.6	82.0	119
EG005T: Nickel	7440-02-0	2	mg/kg	<2	15.4 mg/kg	99.6	80.0	120
EG005T: Zinc	7440-66-6	5	mg/kg	<5	162 mg/kg	66.5	66.0	133
EG035T: Total Recoverable Mercury by FIMS (QCLot: 3545830)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	0.073 mg/kg	84.2	70.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3541420)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	26 mg/kg	122	68.4	128
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3541745)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	300 mg/kg	96.5	75.0	129
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	450 mg/kg	94.4	77.0	131
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	300 mg/kg	90.9	71.0	129
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3541420)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	31 mg/kg	124	68.4	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3541745)								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	375 mg/kg	96.5	77.0	125
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	525 mg/kg	93.0	74.0	138
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	225 mg/kg	83.0	63.0	131
EP080: BTEXN (QCLot: 3541420)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	108	62.0	116
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	101	67.0	121
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	100	65.0	117
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	2 mg/kg	107	66.0	118
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	105	68.0	120
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	102	63.0	119

Matrix Spike (MS) Report

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

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 3545834)							
ES2107502-003	Anonymous	EG005T: Arsenic	7440-38-2	50 mg/kg	73.4	70.0	130
		EG005T: Cadmium	7440-43-9	50 mg/kg	72.2	70.0	130
		EG005T: Chromium	7440-47-3	50 mg/kg	72.5	68.0	132
		EG005T: Copper	7440-50-8	250 mg/kg	125	70.0	130
		EG005T: Lead	7439-92-1	250 mg/kg	71.5	70.0	130
		EG005T: Nickel	7440-02-0	50 mg/kg	70.6	70.0	130
		EG005T: Zinc	7440-66-6	250 mg/kg	# Not Determined	66.0	133
EG035T: Total Recoverable Mercury by FIMS (QCLot: 3545830)							
ES2107107-002	Anonymous	EG035T: Mercury	7439-97-6	5 mg/kg	74.4	70.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3541420)							
ES2106817-001	Anonymous	EP080: C6 - C9 Fraction	----	32.5 mg/kg	108	70.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3541745)							
ES2107107-001	Anonymous	EP071: C10 - C14 Fraction	----	523 mg/kg	102	73.0	137
		EP071: C15 - C28 Fraction	----	2319 mg/kg	121	53.0	131
		EP071: C29 - C36 Fraction	----	1714 mg/kg	118	52.0	132
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3541420)							
ES2106817-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	108	70.0	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3541745)							
ES2107107-001	Anonymous	EP071: >C10 - C16 Fraction	----	860 mg/kg	107	73.0	137
		EP071: >C16 - C34 Fraction	----	3223 mg/kg	130	53.0	131
		EP071: >C34 - C40 Fraction	----	1058 mg/kg	92.9	52.0	132
EP080: BTEXN (QCLot: 3541420)							
ES2106817-001	Anonymous	EP080: Benzene	71-43-2	2.5 mg/kg	92.2	70.0	130
		EP080: Toluene	108-88-3	2.5 mg/kg	91.8	70.0	130
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	96.3	70.0	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2.5 mg/kg	91.8	70.0	130
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	96.5	70.0	130
		EP080: Naphthalene	91-20-3	2.5 mg/kg	75.3	70.0	130

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES2107377**	Page	: 1 of 4
Client	: **DOUGLAS PARTNERS PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: BRENT KERRY	Telephone	: +61 2 8784 8555
Project	: 83343.03 Gosford DSI	Date Samples Received	: 02-Mar-2021
Site	: 5/3 Teanster Cl, TUGGERAH NSW 2259	Issue Date	: 08-Mar-2021
Sampler	: ----	No. of samples received	: 1
Order number	: ----	No. of samples analysed	: 1

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **Matrix Spike outliers exist - please see following pages for full details.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

- **NO Quality Control Sample Frequency Outliers exist.**

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EG005(ED093)T: Total Metals by ICP-AES	ES2107502--003	Anonymous	**Zinc**	7440-66-6	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

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

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

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

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA055: Moisture Content (Dried @ 105-110°C)							
Soil Glass Jar - Unpreserved (EA055)							
QA2	**25-Feb-2021**	**----**	----	----	**04-Mar-2021**	11-Mar-2021	✓
EG005(ED093)T: Total Metals by ICP-AES							
Soil Glass Jar - Unpreserved (EG005T)							
QA2	**25-Feb-2021**	**04-Mar-2021**	24-Aug-2021	✓	**05-Mar-2021**	24-Aug-2021	✓
EG035T: Total Recoverable Mercury by FIMS							
Soil Glass Jar - Unpreserved (EG035T)							
QA2	**25-Feb-2021**	**04-Mar-2021**	25-Mar-2021	✓	**08-Mar-2021**	25-Mar-2021	✓
EP080/071: Total Petroleum Hydrocarbons							
Soil Glass Jar - Unpreserved (EP080)							
QA2	**25-Feb-2021**	**03-Mar-2021**	11-Mar-2021	✓	**05-Mar-2021**	11-Mar-2021	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Soil Glass Jar - Unpreserved (EP080)							
QA2	**25-Feb-2021**	**03-Mar-2021**	11-Mar-2021	✓	**05-Mar-2021**	11-Mar-2021	✓
EP080: BTEXN							
Soil Glass Jar - Unpreserved (EP080)							
QA2	**25-Feb-2021**	**03-Mar-2021**	11-Mar-2021	✓	**05-Mar-2021**	11-Mar-2021	✓

Quality Control Parameter Frequency Compliance

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

Matrix: **SOIL**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Moisture Content	EA055	2	16	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	3	17	**17.65**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	9	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Total Mercury by FIMS	EG035T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Total Mercury by FIMS	EG035T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Total Mercury by FIMS	EG035T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
Moisture Content	EA055	SOIL	In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 105-110 degrees C. This method is compliant with NEPM Schedule B(3).
Total Metals by ICP-AES	EG005T	SOIL	In house: Referenced to APHA 3120; USEPA SW 846 - 6010. Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM Schedule B(3)
Total Mercury by FIMS	EG035T	SOIL	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2) (Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. Ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3)
TRH - Semivolatile Fraction	EP071	SOIL	In house: Referenced to USEPA SW 846 - 8015 Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C40. Compliant with NEPM Schedule B(3).
TRH Volatiles/BTEX	EP080	SOIL	In house: Referenced to USEPA SW 846 - 8260. Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. Compliant with NEPM Schedule B(3) amended.

Preparation Methods	Method	Matrix	Method Descriptions
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	In house: Referenced to USEPA 200.2. Hot Block Acid Digestion 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge, sediments, and soils. This method is compliant with NEPM Schedule B(3).
Methanolic Extraction of Soils for Purge and Trap	ORG16	SOIL	In house: Referenced to USEPA SW 846 - 5030A. 5g of solid is shaken with surrogate and 10mL methanol prior to analysis by Purge and Trap - GC/MS.
Tumbler Extraction of Solids	ORG17	SOIL	In house: Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 30mL 1:1 DCM/Acetone by end over end tumble. The solvent is decanted, dehydrated and concentrated (by KD) to the desired volume for analysis.

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **ES2107377**

Client	: **DOUGLAS PARTNERS PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: BRENT KERRY	Contact	: Sepan Mahamad
Address	: PO BOX 472 WEST RYDE 1685	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: brent.kerry@douglaspartners.com.au	E-mail	: Sepan.Mahamad@ALSGlobal.com
Telephone	: ----	Telephone	: +61 2 8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: 83343.03 Gosford DSI	Page	: 1 of 2
Order number	: ----	Quote number	: EM2017DOUPAR0002 (EN/222)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: 5/3 Teanster Cl, TUGGERAH NSW 2259		
Sampler	:		

Dates

Date Samples Received	: 02-Mar-2021 16:30	Issue Date	: 02-Mar-2021
Client Requested Due Date	: 08-Mar-2021	Scheduled Reporting Date	: **08-Mar-2021**

Delivery Details

Mode of Delivery	: Carrier	Security Seal	: Intact.
No. of coolers/boxes	: 1	Temperature	: 9.6 - Ice Bricks present
Receipt Detail	:	No. of samples received / analysed	: 1 / 1

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- Please direct any queries you have regarding this work order to the above ALS laboratory contact.
- Analytical work for this work order will be conducted at ALS Sydney.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months ± 1 week) from receipt of samples.
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.

Sample Container(s)/Preservation Non-Compliances

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

- **No sample container / preservation non-compliance exists.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.
If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **SOIL**

Laboratory sample ID	Sampling date / time	Sample ID	SOIL - EA055-103 Moisture Content	SOIL - S-02 8 Metals (incl. Digestion)	SOIL - S-04 TRH/BTEXN
ES2107377-001	25-Feb-2021 00:00	QA2	✓	✓	✓

Proactive Holding Time Report

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

Requested Deliverables

ACCOUNTS PAYABLE INVOICES

- A4 - AU Tax Invoice (INV)	Email	apinvoices@douglaspartners.com.au

BRENT KERRY

- *AU Certificate of Analysis - NATA (COA)	Email	brent.kerry@douglaspartners.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	brent.kerry@douglaspartners.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	brent.kerry@douglaspartners.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	brent.kerry@douglaspartners.com.au
- Chain of Custody (CoC) (COC)	Email	brent.kerry@douglaspartners.com.au
- EDI Format - ESDAT (ESDAT)	Email	brent.kerry@douglaspartners.com.au
- EDI Format - XTab (XTAB)	Email	brent.kerry@douglaspartners.com.au

263152.

CHAIN OF CUSTODY

Douglas Partners
Geotechnics / Environment / Groundwater

Client: Douglas Partners	**Project Number** 83343.03	**To:**	ALS
Contact Person: Brent Kerry	**Project Name:** Gosford DSI	**Contact Person:**	Sample Receipt
Project Mgr: Brent Kerry	**PO No.:**	**Address:**	Sydney
	lab Quote No. : 2018-2019 List		
Address: 5/3 Teanster Cl Tuggerah NSW 2259	**Date results required:** Standard TAT *Note: Inform lab in advance if urgent turnaround is required - surcharges apply*	**Phone:** **Fax:** **Email:**	
Phone: 4351 1422 **Mob:**	**Report format:** Esdat/PDF / Excel	**Laboratory Report No:**	
Email: brent.kerry@douglaspartners.com.au	**Comments:**	**Lab Comments:**	

Sample information						Tests Required											Comments
Lab Sample ID	Field Sample ID	Depth	Date sampled	Container Type	Type of sample	COMBO #5A	COMBO #5	VHC	COMBO #7A	COMBO #7	HM	TRH/BTEX	COMBO #1m	COMBO #7A	COMBO #7	Asbestos ID	Provide as much information about the sample as you can
(1)	QA2	0.3	25/02/2021	Jar	Discrete						X	X					

Environmental Division
Sydney
Work Order Reference
ES2107377

Telephone + 61-2-8784 8555

Relinquished by ES Sydney
CMcLennan
2/3/21 1200
CM

Relinquished by: Douglas Partners	**Sample Receipt**		*Lab use only:*
Courier (by whom) TNT	**Received by (Company):** MADI	2/3/21	**Samples Received: Cool or Ambient (circle one)**
Condition of Sample at dispatch Cool or Ambient (circle) cool	**Print Name:**		**Temperature Received at:** (if applicable)
Temperature (if Applicable):	**Date & Time:**	4:39	**Transported by:** Hand delivered / courier
Print Name: Brent Kerry	**Signature:**		
Date & Time: 1/3/21			
Signature: B Kerry			

263152.

CHAIN OF CUSTODY

Douglas Partners
Geotechnics / Environment / Groundwater

Client: Douglas Partners	**Project Number** 83343.03	**To:**	ALS
Contact Person: Brent Kerry	**Project Name:** Gosford DSI	**Contact Person:**	Sample Receipt
Project Mgr: Brent Kerry	**PO No.:**	**Address:**	Sydney
	lab Quote No. : 2018-2019 List		
Address: 5/3 Teanster Cl Tuggerah NSW 2259	**Date results required:** Standard TAT *Note: Inform lab in advance if urgent turnaround is required - surcharges apply*	**Phone:** **Fax:** **Email:**	
Phone: 4351 1422 **Mob:**	**Report format:** Esdat/PDF / Excel	**Laboratory Report No:**	
Email: brent.kerry@douglaspartners.com.au	**Comments:**	**Lab Comments:**	

Sample information						Tests Required											Comments
Lab Sample ID	Field Sample ID	Depth	Date sampled	Container Type	Type of sample	COMBO #5A	COMBO #5	VHC	COMBO #7A	COMBO #7	HM	TRH/BTEX	COMBO #1m	COMBO #7A	COMBO #7	Asbestos ID	Provide as much information about the sample as you can
(1)	QA2	0.3	25/02/2021	Jar	Discrete						X	X					

Environmental Division
Sydney
Work Order Reference
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Relinquished by ES Sydney
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2/3/21 1200
CM

Relinquished by: Douglas Partners	**Sample Receipt**		*Lab use only:*
Courier (by whom) TNT	**Received by (Company):** MADI	2/3/21	**Samples Received: Cool or Ambient (circle one)**
Condition of Sample at dispatch Cool or Ambient (circle) cool	**Print Name:**		**Temperature Received at:** (if applicable)
Temperature (if Applicable):	**Date & Time:**	4:39	**Transported by:** Hand delivered / courier
Print Name: Brent Kerry	**Signature:**		
Date & Time: 1/3/21			
Signature: B Kerry			

Appendix F

Data Quality Assessment

Appendix F
Data Quality Assurance and Quality Control
123A Donnison Street, Gosford

F1.0 Field and Laboratory Data Quality Assurance and Quality Control

The field and laboratory data quality assurance and quality control (QA/QC) procedures and results are summarised in the following Table 1. Reference should be made to the field work methodology and the laboratory results / certificates of analysis for further details. The relative percentage difference (RPD) results, along with the other field QC samples are included in Table E1 in Appendix E.

Table 1: Field and Laboratory Quality Control

Item	Evaluation / Acceptance Criteria	Compliance
Analytical laboratories used	NATA accreditation	C
Holding times	Various based on type of analysis	C
Intra-laboratory replicates	7% of primary samples; <30% RPD	C
Inter-laboratory replicates	7% of primary samples; <30% RPD	C
Rinsates	1 per sampling event; <PQL	C
Laboratory / Reagent Blanks	1 per batch; <PQL	C
Matrix Spikes	1 per lab batch; 70-130% recovery (inorganics); 60-140% recovery (organics)	C
Surrogate Spikes	All organics analysis; 70-130% recovery (inorganics); 60-140% recovery (organics)	C
Control Samples	1 per lab batch; 70-130% recovery (inorganics); 60-140% recovery (organics)	C
Standard Operating Procedures (SOP)	Adopting SOP for all aspects of the sampling field work	C

Notes:
C = compliance; PC = partial compliance; NC = non-compliance

The RPD results were all within the acceptable range.

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

F2.0 Data Quality Indicators

The reliability of field procedures and analytical results was assessed against the following data quality indicators (DQIs) as outlined in NEPC *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM]* (NEPC, 2013):

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

Table 2: Data Quality Indicators

Data Quality Indicator	Method(s) of Achievement
Completeness	Systematic and selected target locations sampled.
	Preparation of borehole logs, sample location plan and chain of custody records.
	Laboratory sample receipt information received confirming receipt of samples intact and appropriateness of the chain of custody.
	Samples analysed for contaminants of potential concern (COPC) identified in the Conceptual Site Model (CSM).
	Completion of chain of custody (COC) documentation.
	NATA accredited laboratory results certificates provided by the laboratory.
	Satisfactory frequency and results for field and laboratory quality control (QC) samples as discussed in Section 1.
Comparability	Using appropriate techniques for sample recovery, storage and transportation, which were the same for the duration of the project.
	Experienced sampler(s) used.
	Use of NATA registered laboratories, with test methods the same or similar between laboratories.
	Satisfactory results for field and laboratory QC samples.
Representativeness	Target media sampled.
	Sample numbers recovered and analysed are considered to be representative of the target media and complying with DQOs.
	Samples were extracted and analysed within holding times.
	Samples were analysed in accordance with the COC.
Precision	Field staff followed standard operating procedures.
	Acceptable RPD between original samples and replicates.
	Satisfactory results for all other field and laboratory QC samples.
Accuracy	Field staff followed standard operating procedures.
	Satisfactory results for all field and laboratory QC samples.

Based on the above, it is considered that the DQIs have been complied with.

F3.0 Conclusion

Based on the results of the field QA and field and laboratory QC, and evaluation against the DQIs it is concluded that the field and laboratory test data obtained are reliable and useable for this assessment.

F4.0 References

NEPC. (2013). *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM].* Australian Government Publishing Services Canberra: National Environment Protection Council.

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