Douglas Partners
Geotechnics / Environment / Groundwater

Integrated Practical Solutions

Report on
Supplementary Contamination Assessment

Pendle Hill High School Development
Cornock Avenue, Toongabbie

Prepared for
TSA Management Pty Ltd

Project 86977.01
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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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1. Introduction

This report presents the results of a Supplementary Contamination Assessment undertaken for the proposed new building works at Pendle Hill High School (PHHS) at Cornock Avenue, Toongabbie (the overall 'PHHS Site', see Drawing 1, Appendix A). The investigation was only undertaken for the proposed building works identified as a Stage Significant Development within the area herein referred to as the 'Site' (see Drawing 1, Appendix A). The investigation was commissioned by School Infrastructure NSW c/o TSA Management Pty Ltd and was undertaken in accordance with Douglas Partners' proposal SYD201350 dated 7 December 2020.

Douglas Partners Pty Ltd (DP) has previously undertaken an investigation at the site *'Report on Updated Preliminary Site Investigation with Limited Soil Sampling, Pendle Hill High School, Cornock Avenue, Toongabbie'* (prepared for School Infrastructure NSW, Reference 86977.00.R.004.Rev1, March 2020 (DP, 2020)). DP (2020) identified a fragment of asbestos cement sheet in borehole BH109 between 0.5-1.0 m below ground level (bgl).

The objective of this supplementary contamination assessment is to better define the extent of asbestos previously identified within the Site. As requested by the client, this assessment included additional testing in the vicinity of BH109 to better define the extent of contamination previously identified in this location.

The supplementary assessment included the drilling of four test bores (BH109 N, E, S, W). An additional 9 boreholes (BH201-209) were also drilled within the remainder of the Site for the purposes of a concurrent salinity investigation. The details of the field work and testing are presented in this report, together with comments and recommendations on the issues listed above. The investigation and report have been carried out as with reference made to relevant EPA Guidelines and or other regulatory instruments and as required by general requirement 19 of the Planning Secretary's Environmental Assessment Requirements (SEARS), as listed below:

- *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM]* (NEPC 2013);
- *Contaminated Sites, Sampling Design Guidelines (*NSW EPA 1995);
- *Guidelines for Consultants Reporting on Contaminated Land. Contaminated Land Guidelines* (NSW EPA 2020); and
- *Managing Land Contamination: Planning Guidelines – SEPP 55 Remediation of Land*, (DUAP & EPA 1998).

2. Scope of Works

Based on the site conditions and access constraints DP recommended and undertook the following scope of work:

- Review of previous investigation reports undertaken on the site and made available to DP by the client;
- Drilling of four test bores to a maximum depth of 3 m below ground level (bgl) to collect soil samples;
- Collection of soil samples from the boreholes at regular intervals and where signs of contamination are observed;
- Screening of all soil samples by an environmental scientist for volatile organic compounds (VOC) using a photo-ionisation detection (PID) instrument;
- Dispatch of selected soil samples (plus 10% QA / QC samples for analysis by a NATA accredited laboratory for a range of common contaminants and parameters as listed below:
  - Heavy metals (As, Cd, Cr, Cu, Fe, Pb, Mn, Hg, Ni, Zn) (HM);
  - TRH (a screening test for total petroleum hydrocarbons);
  - Monocyclic aromatic hydrocarbons (benzene, toluene, ethylbenzene and xylene - BTEX);
  - Polycyclic aromatic hydrocarbons (PAH);
  - Phenols;
  - Polychlorinated biphenyls (PCB);
  - Organochlorine pesticides (OCP);
  - pH;
  - Asbestos;
  - Toxicity characteristic leachability procedure (TCLP) for heavy metals and PAH; and
  - QA / QC analysis including one replicate sample, a trip spike and trip blank.
- Collection and sieving of bulk soil samples for asbestos investigation purposes; and
- Provision of this supplementary contamination assessment report describing the methodology and results of the assessment.

A salinity assessment was undertaken concurrently to this assessment. This boreholes for the salinity assessment (BH201 to BH209) are referenced in this report and additional samples were taken from selected boreholes. The methodology and results of the salinity assessment will be reported in a separate report.

3. Site Information and Description

3.1 PHHS and Site Identification

The PHHS and Site information is presented in Table 1, below and a drawing of the PHHS site and the approximate boundary of the Site is included as Drawing 1 in Appendix B. The Site is the subject of this report.

Table 1: PHHS Site Identification Details

Address	Cornock Avenue, Toongabbie
Lot Identification	Lot 101, Deposited Plan 1141329
Approximate PHHS Site Area	6.6 ha
Local Government Area	City of Parramatta Council
Approximate Site Area	4600 m^2

3.2 Geology, Topography and Hydrogeology

Reference to published regional maps indicates that the PHHS site is:

- Underlain by the residual Blacktown soil landscape (based on the 1:100 000 Soil Landscape Series mapping). These soils are from Wianamatta Group shales and Hawkesbury shales and typically consist of medium and high plasticity clays;
- Underlain by Ashfield Shale (based on the 1:100 000 Geological Series mapping), which typically comprises black to dark grey shale and laminite; and
- In an area of moderate salinity potential (based on the Salinity Potential in Western Sydney Mapping of 2002).

There is evidence of fill at the site, however this was not present on the mapping.

Reference to the NSW Water digital bore information indicates that there are no registered groundwater wells in close proximity to the site.

The nearest surface water receptor is the Pendle Creek which is located approximately 600 m west of the site. Based on local topography observed in the regional map information, groundwater is anticipated to flow westwards towards the creek.

3.3 Proposed Development

We understand that the proposed development includes the construction of a new three-storey courtyard building on Binalong Road comprising:

- Two new 3 storey wings under a connected roof which will accommodate a library, staff unit, lecture theatre, multimedia and senior learning, administration unit and student amenities;
- External transport infrastructure upgrade works;
- New covered walkways and upgraded landscape; and
- New hardstand areas for bicycle parking.

An extracted architectural drawing showing the proposed development is included in Appendix B.

4. Review of Previous Report

DP notes that DP (2020) report was compiled for the PHHS Site and was an updated PSI which included a review of the desktop components of a PSI undertaken in 2019[1] by DP and the results of a limited soil sampling investigation undertaken as part of the updated PSI (DP 2020). As such, the updated PSI (DP 2020) has been reviewed and pertinent information is summarised below.

DP (2020) comprised a desktop review to identify potential sources of contamination, any associated contaminants of potential concern (CoPC), human and ecological receptors and potentially affected media such as soil and groundwater, as well as a limited soil investigation, which included the drilling of ten soil boreholes (BH101 to BH110 inclusive).

The desktop investigation component included a review of published geological, topographic, soil, acid sulfate soil and hydrogeological information, a review of relevant publicly available databases, historical aerial photographs, Section 10.7 (2) & (5) Planning Certificates, a SafeWork NSW Records search for hazardous chemicals on the premises and a site walkover.

The report identified that the PHHS Site had previously been used for agricultural purposes prior to being developed for a high school in the late 1960s with the surrounding areas developed into low-density residential dwellings.

The most significant risks associated with contamination at the PHHS Site were considered to be imported fill, previous site uses impacting fill / surficial soils and the risk associated with the demolition / renovation of existing buildings impacting fill / surficial soil. DP noted several sheds adjacent to the northern PHHS Site boundary were used as animal shelters as part of the school's agricultural curriculum.

An initial CSM was developed to provide the framework for identifying how a site could 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.

The soil investigation included the drilling of ten soil boreholes (BH101 to BH110) across the PHHS Site, with collection of environmental samples taken at regular depths throughout the soil profile. Two boreholes (BH105 and BH109) were drilled within the Site area (current investigation). A fragment of fibre cement sheet was identified within BH109 and was sent for laboratory analysis for asbestos. Laboratory analysis was undertaken on selected samples for a range of CoPC. Reported concentrations of contaminants were below the adopted site assessment criteria (SAC) for all samples analysed. The fragment of cement sheet tested positive for chrysotile asbestos.

DP (2020) recommended the following:

- Lateral and vertical delineation of the fill and asbestos contamination identified in BH109 and confirmation of the waste classification of fill around that location;
- Further soil investigations in the case of any demolition of existing PHHS site buildings occurring;
- Preparation of an unexpected finds protocol (UFP) for the PHHS site due to the nature and age of the filling;

[1] DP *Report on Preliminary Site Investigation, Pendle Hill High School, Cornock Avenue, Toongabbie* dated December 2019 (DP reference: 86977.00.R.001.Rev0)

- A pre-demolition HAZMAT survey to identify the location and nature of hazardous building materials;
- Removal and disposal of the identified hazardous materials by an appropriately licensed and qualified contractor, at an appropriately licensed disposal facility;
- Validation / clearance of the PHHS site area by a qualified occupational hygienist upon completion of demolition and removal of the buildings, confirming that there are no residual asbestos-containing materials or other hazardous materials remaining on the PHHS site; and
- Undertake a HAZMAT survey of all buildings remaining on PHHS site to provide an updated asbestos and HAZMAT register.

In regard to the preliminary waste classification the following preliminary classifications were provided:

- Fill at the borehole locations BH101 - BH108 and BH110 were preliminarily classified as general solid waste (non-putrescible, CT1);
- Fill at the borehole location BH109 was preliminarily classified as general solid waste (special waste asbestos, non-putrescible, CT1); and
- Natural soils were preliminarily classified as VENM.

5. Preliminary Conceptual Site Model (Site)

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).

A 'source - pathway - receptor' approach has been used to assess the potential risks of harm being caused to human or environmental receptors from contamination sources on or in the vicinity of the site, via exposure pathways (potential complete pathways). This CSM has been informed by the results of DP (2020). The possible pathways between the above sources (S1 and S2) and receptors (R1 to R3) are provided in Table 2.

Table 2: Summary of Potential Complete Pathways

Potential Source and COPC	Pathway	Receptor
S1 - Uncontrolled Fill Asbestos	P1 - Inhalation of dust and / or vapours	R1 - End users R2 - Construction and maintenance workers R3 - Adjacent site users
S2 - Existing buildings on-site / adjacent	P1 - Ingestion and dermal contact P2 - Inhalation of dust and / or vapours	R1 - End users R2 - Construction and maintenance workers

Potential Source and COPC	Pathway	Receptor
Asbestos, lead based paints, PCB capacitors, and synthetic mineral fibres (SMF)	P2 - Inhalation of dust and / or vapours	R3 - Adjacent site users

6. Field Work Methodology and Analytical Rationale

The field work for this contamination assessment was undertaken on 21 and 22 January 2021. The investigation had been devised broadly in accordance with the seven-step data quality objective (DQO) process which is provided in NEPC (2013) *National Environment Protection (Assessment of Site Contamination) Measure* (as amended 2013). Furthermore, the performance of the investigation in achieving the DQO was assessed through the application of data quality indicators (DQI).

The DQO and DQI adopted for this project are presented in Appendix C.

6.1 Sampling Location and Rationale

Boreholes BH109N, BH109E, BH109S and BH109W were positioned in a radial pattern centred at previous test bore location BH109, approximately 0.5 m from BH5. The purpose of the test bores was primarily to attempt to delineate the extent of asbestos contamination previously identified in BH109.

Boreholes BH201 to BH209 were positioned to provide coverage across the whole Site for the primary purpose of a salinity investigation. These bores were not initially planned for contamination sampling. Following receipt of laboratory results, additional laboratory analysis was conducted on selected samples from BH202, BH203, BH204, BH207 and BH209.

6.2 Sampling Methodology

Drilling for boreholes BH109N, BH109E, BH109S and BH109W was undertaken using a 3.5 tonne excavator with a 300 mm diameter solid flight auger. Drilling for bores BH201 to BH209 was undertaken using a 3.5 tonne excavator with a 100 mm diameter solid flight auger.

Soil samples were collected at regular depth intervals and observations of any staining, odours and anthropogenic inclusions (if present) were made and recorded on the borehole logs.

All sampling data was recorded on DP's borehole logs, provided in Appendix D. The general sampling procedure adopted for the collection of soil samples for environmental analysis comprised:

- Collection of soil samples from auger returns using disposable nitrile gloves;
- Transferring samples into laboratory-prepared glass jars, completely filled to minimise the headspace within the sample jar, and capping immediately to minimise loss of volatiles;

- Collection of replicate samples in zip-lock bags for PID screening;
- Collection of 500 mL soil samples in zip-lock bags for asbestos analysis. Asbestos samples were double bagged to prevent potential release of fibres;
- Collection of 500 mL soil samples in zip-lock bags from boreholes BH201 to BH209 for the salinity assessment;
- Labelling sample containers with individual and unique identification details, including project number, sample location and sample depth;
- Placement of the glass jars, with a Teflon lined lid, into a cooled, insulated and sealed container for transport to the laboratory;
- 10 L bulk sampling from the 300 mm diameter augured boreholes at sample locations BH109N, BH109E, BH109S and BH109W;
- Undertake 10 L asbestos sieve tests for every 1 m of strata (or as required based on changes in strata) to assess for the presence of ACM;
- Use of chain-of-custody (CoC) documentation so that sample tracking and custody could be cross-checked at any point in the transfer of samples from the field to the laboratory;
- Laboratory-prepared trip blanks and spikes were taken in field and subject to the same jar storage and transfer protocols as the field samples; and
- Selected samples were sent to a National Association of Testing Authorities (NATA) accredited laboratory, Envirolab Services Pty Ltd, for analysis.

In addition to the above, a blind replicate sample was collected from the same location and identical depth to the primary sample (at a sampling frequency of a minimum of one replicate sample per 20 primary samples). The sample was split to prevent the loss of volatiles from the soil (i.e., not homogenised in a bowl). The blind replicate sample was labelled with a DP identification number, recorded on DP's borehole logs, so as to conceal their relationship to the primary sample from the primary analytical laboratory.

It should be noted that due to limitations placed on the field work by Schools Infrastructure NSW, the investigation was undertaken using vertical boring. This is not the best means of identifying asbestos in fill due to the limited sample size, and the limited area of observation when compared to test pitting.

6.3 Analytical Rationale

A total of 20 soil samples were selected for analysis. Four samples from each of BH109N, BH109E, BH109S and BH109W were analysed. At least one soil sample from each borehole was selected for analysis, with more samples selected where deeper fill was encountered. Samples were analysed for the primary CoPC outlined in the CSM above (namely metals / metalloids, TPH, BTEX, PAH, OCP, OPP, PCB, phenols and asbestos)

A total of 12 soil samples were selected for asbestos fines and friable asbestos (FA/AF). These samples included two each from boreholes BH109E, BH109S and BH109W and one from BH109N which located radially around the previous test bore BH109. These initial seven samples were collected fines which had passed through a 7 mm sieve during on-site bulk sieving. An additional five samples from BH202, BH203, BH204, BH207 and BH209 were analysed for FA/AF following receipt of initial laboratory results

which indicated the presence of asbestos fines in the vicinity of BH019. These samples were analysed to determine the potential lateral extent of potential asbestos contamination.

7. Site Assessment Criteria

The Site Assessment Criteria (SAC) applied in the current investigation were informed by the CSM which identified human and environmental receptors to potential contamination on the Site (refer to Section 5).

Analytical results were assessed (as a Tier 1 assessment) against the SAC comprising primarily the human health and ecological investigation and screening levels of Schedule B1, *National Environment Protection (Assessment of Site Contamination) Measure* 1999, as amended 2013 (NEPC, 2013).

The investigation and screening levels applied in the current investigation comprised levels adopted for a generic residential with garden / accessible soil land use scenario which in NEPC (2013), includes the land use as a primary school.

7.1 Asbestos

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

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

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

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

NEPC (2013) defines the various asbestos types referred to above as follows:

Bonded ACM: Asbestos containing material which is in sound condition, bound in a matrix of cement or resin, and cannot pass a 7 mm x 7 mm sieve.

FA: Fibrous asbestos material including severely weathered cement sheet, insulation products and woven asbestos material. This material is typically unbonded or was previously bonded and is now significantly degraded and crumbling.

AF: Asbestos fines including free fibres, small fibre bundles and also small fragments of bonded ACM that pass through a 7 mm x 7 mm sieve.

Health Screening Levels (HSL) for asbestos in soil, which are based on likely exposure levels for different scenarios, have been adopted in NEPC (2013) from the Western Australian Department of Health (WA DoH) publication *Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia 2009* (WA DoH 2009).

Asbestos has been identified within the Site in the form of chrysotile and crocidolite in a bonded cement sheet and as FA/AF. On the basis of the proposed land use, and in accordance with Table 7, Schedule B1, NEPC (2013) the following asbestos HSL is to be adopted for the asbestos assessment are shown in Table 3 below.

Table 3: Health Screening Levels for Asbestos Contamination in Soil (% w/w)

Form of Asbestos	HSL
	Residential A
Bonded ACM	0.01%
FA and AF	0.001%
All Forms of Asbestos	No visible asbestos for surface soil

8. Results of Investigation

8.1 Sub-surface Conditions

The borehole logs for this assessment are included in Appendix D and recorded the following general sub-surface profile as shown in Table 4 below. Whilst not relevant to the current investigation, the boreholes logs for boreholes BH201, BH205, BH206 and BH209 have also been included in Appendix D.

Table 4: Summary of Ground Profile

Depth Range (m below ground level [bgl])	Description
From 0 m bgl to depths of between 0.2 m bgl and 2.3 m bgl	TOPSOIL / FILL: • Topsoil encountered generally comprised of dark brown clayey silt with trace rootlets; • Fill encountered beneath the topsoil, generally red-brown brown silty clay with ironstone and shale gravels; • Tile, brick and concrete fragments were identified within BH109N, BH109E, BH109S, BH109W and BH209; • Ash and clinker was observed in BH109N, BH109E, BH109S and BH109W at depths between 1.2 and 1.5 m bgl; and • It is noted that a potential concrete slab was underlying fill in BH109N, BH109E, BH109S, and BH109W at a depth of 1.5 m bgl.
Underlying the above to depths of between 0.2 m bgl and 3.0 m bgl	RESIDUAL SILTY CLAY: Red-brown, red and grey residual silty clay weathered from Ashfield Shale.
1.3 m bgl to 3.0 m bgl	SHALE: Pale grey and yellow-brown shale, highly to moderately weathered.

There was no other apparent evidence of visual or olfactory impacts (e.g., staining or odorous soils) to suggest the presence of contamination within the fill soils observed in the investigation.

During the field work no fragments of potential asbestos-containing material (PACM) were identified.

Free groundwater was not observed during drilling in any borehole.

8.2 Analytical Laboratory Results

The results of laboratory analysis are summarised and compared to the SAC adopted in the following tables in Appendix E, namely:

- Table E1: Summary of Asbestos Results; and
- Table E2: Summary of Laboratory Results - Waste Classification.

Table E1 includes a summary of the field sieve screening undertaken in addition to the results of laboratory analysis.

The soil laboratory certificates together with the chain of custody and sample receipt information are provided in Appendix G. The QA / QC results are discussed in Appendix C.

Results of the salinity assessment will be discussed in a later report.

9. Discussion

9.1 Asbestos

Asbestos as chrysotile and crocidolite was identified by laboratory analysis within three samples, BH109E/0.05-1.0, BH109S/1.0-1.5 and BH109W/1.0-1.5. FA/AF was identified in BH109E/0.05-1.0 at 0.0034% w/w which exceeds the adopted HSL of 0.001% w/w. This indicates that friable asbestos is present within the soil from a depth of 0.05 m bgl to 1.5 m bgl above the adopted SAC.

Based on the fill composition recorded from the bores, it appears likely that the northern portion of the playing field is impacted by asbestos (in fill) to some degree. Asbestos has been previously identified as an ACM fragment, but is disseminated as AF/FA in the fill matrix. The presence of anthropogenic material such as tile, brick, concrete and glass may suggest that demolition wastes were used as fill and have a high likelihood of containing further asbestos.

No asbestos was identified in the other samples analysed.

9.2 Preliminary Waste Classification

The NSW EPA *Waste Classification Guidelines* (NSW EPA, 2014) contains a six-step procedure for determining the type of waste and the waste classification. Part of the procedure, for materials not classified as special waste or pre-classified waste, is a comparison of analytical data initially against contaminant threshold (CT) values specific to a waste category. Alternatively, the data can be assessed against specific contaminant concentration (SCC) thresholds when used in conjunction with toxicity characteristic leaching procedure (TCLP) thresholds.

The CT, SCC, and TCLP values relevant to this preliminary *in situ* waste classification are shown in Table E2, Appendix E.

Table 5 presents the results of the six-step procedure outlined in NSW EPA (2014) for determining the type of waste and the waste classification. This process applies to the fill (including surface soils) at the Site, which do not meet the definition of virgin excavated natural material (VENM).

Table 5: Six-Step Classification Procedure

Step	Comments	Rationale
1. Is the waste special waste?	BH109E, BH109S, BH109W - Yes	Asbestos was detected by the analytical laboratory.
	BH1019N - No	No asbestos-containing materials (ACM), clinical or related waste, or waste tyres were observed in the boreholes; and Asbestos was not detected by the analytical laboratory.
2. Is the waste liquid waste?	No	The fill comprised a soil matrix.
3. Is the waste "pre-classified"?	No	The fill is not pre-classified with reference to EPA (2014); and

Step	Comments	Rationale
		The natural material, if classified as VENM, is pre-classified as General Solid Waste (non-putrescible).
4. Does the waste possess hazardous waste characteristics?	No	The waste was not observed to contain or considered at risk to contain explosives, gases, flammable solids, oxidising agents, organic peroxides, toxic substances, corrosive substances, coal tar, batteries, lead paint or dangerous goods containers.
5. Determining a wastes classification using chemical assessment	Conducted	Refer to Table E2 (Appendix E).
6. Is the waste putrescible or non-putrescible?	No	The fill does not contain materials considered to be putrescible [a].

Note: a wastes that are generally not classified as putrescible include soils, timber, garden trimmings, agricultural, forest and crop materials, and natural fibrous organic and vegetative materials (EPA, 2014).

As shown in the Table E2, Appendix E, all contaminant concentrations for the analysed fill samples were within the contaminant thresholds (CT1s) for General Solid Waste (GSW). Based on the observations at the time of sampling and the reported analytical results the preliminary waste classifications are provided:

- Fill around test location BH109E, BH109S and BH109W to depths of 1.5 m bgl are preliminarily classified *in situ* as general solid waste (special waste asbestos, non-putrescible, CT1); and
- Fill around test locations BH101 - BH108 and BH110 are preliminarily classified *in situ* as general solid waste (non-putrescible, CT1).

DP notes that should asbestos be later identified in fill at the other test locations, the waste classification as special waste asbestos would apply in conjunction with the preliminary waste classification provided above.

10. Conclusion and Recommendation

This supplementary contamination assessment consisted of a review of an earlier PSI prepared by DP (DP 2020) and the undertaking of an additional limited intrusive soil investigation to better define the extent of asbestos previously identified within the Site. This assessment determined that asbestos as FA/AF was present within fill in the northern portion of the Site area, however the lateral and vertical extent of this impact is not yet known.

Based on the results presented herein, it is considered that the northern portion of the playing field has a moderate to high potential to be impacted with asbestos contamination in soil and the following are recommended:

- Undertake an additional investigation to confirm the presence / absence of FA/AF in the topsoil as an additional safety measure for the existing site users (school);
- Preparation of a site-specific asbestos management plan/temporary asbestos management plan;
- Lateral and vertical delineation investigation of the fill and contamination (asbestos) identified in the vicinity of the BH109 location prior to commencement of works, ideally utilising test pit methodology. Additionally, further investigation is required in the vicinity of boreholes BH203 and BH209 which indicated the presence of anthropogenic materials in the fill;
- The detailed asbestos assessment could be undertaken during early works once the Site has been secured, appropriate asbestos monitoring controls in place and test pits / trenches can be easily excavated to delineate the asbestos impacted area; and
- Prepare a remediation action plan which would include and outline both requirements of the detailed asbestos assessment (as discussed above) and potential remediation strategies with a preferred approach dependent on the proposed works plan.

In regard to the preliminary waste classification the following preliminary classifications have been provided:

- Fill described herein at the borehole location BH109N have been preliminarily classified as general solid waste (non-putrescible, CT1); and
- Fill described herein at the borehole location BH109E, BH109S and BH109W has been preliminarily classified as general solid waste (special waste asbestos, non-putrescible, CT1).

It is recommended that the waste classification be confirmed by a qualified environmental consultant *ex situ* during bulk excavation. Additional visual / analytical testing of the natural or suspected natural materials should be conducted to confirm a waste classification.

11. Limitations

Douglas Partners (DP) has prepared this report for this project at Pendle Hill High School in accordance with DP's proposal SYD201350 dated 7 December 2020 and acceptance received from SINSW c/o TSA Management Pty Ltd (TSA). The work was carried out under variation DP_V01 of contract SINSW00145-19. This report is provided for the exclusive use of SINSW C/O TSA Management this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of DP, does so entirely at its own risk and without recourse to DP for any loss or damage. In preparing this report DP has necessarily relied upon information provided by the client and / or their agents.

The results provided in the report are indicative of the sub-surface conditions on the site only at the specific sampling and / or testing locations, and then only to the depths investigated and at the time the work was carried out. Sub-surface conditions can change abruptly due to variable geological processes

and also as a result of human influences. Such changes may occur after DP's field testing has been completed.

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

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

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

Asbestos has been detected by observation and by laboratory analysis, in filling materials at three test locations sampled and analysed. Although asbestos was not identified at the other test locations, the presence of asbestos at one test location is indicative of the possible presence of hazardous building materials (HBM) in fill across the site, 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, or to vegetation preventing visual inspection 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.

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

Douglas Partners Pty Ltd

Appendix A

Notes 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

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

Borehole and Test Pit Logs

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

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

Groundwater

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

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

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

Reports

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

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

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

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

About this Report

Site Anomalies

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

Information for Contractual Purposes

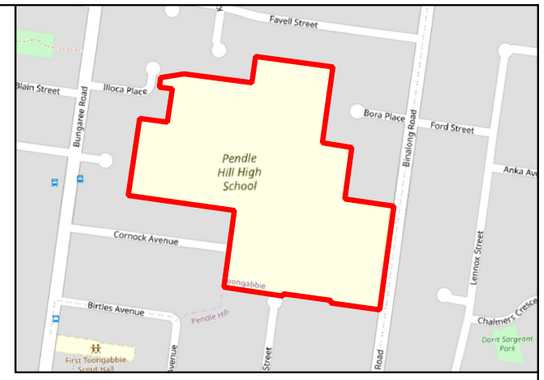
Where information obtained from this report is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate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

Site Inspection

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

Appendix B

Drawings



LOCALITY MAP

Notes:
1. Basemap from metromap.com.au (dated 07/12/2020).
2. Boundaries shown are approximate only.

Legend

- Approximate School Boundary
- Approximate Stage 2 Site Boundary

0 25 50 75 100 m

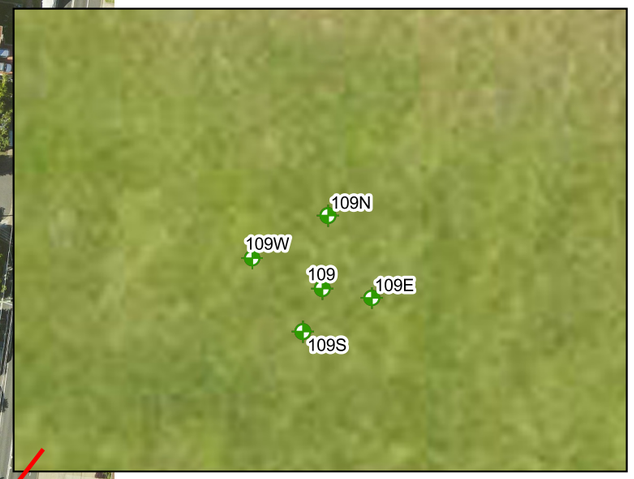
Douglas Partners
Geotechnics / Environment / Groundwater

CLIENT:	TSA Management Pty Ltd		
OFFICE:	Sydney	DRAWN BY:	NW
SCALE:	1:1500 @ A3	DATE:	16.03.2021

TITLE: **Site Location Plan**
Supplementary Contamination Services
Cornock Avenue, Toongabbie

N

PROJECT No:	86977.01
DRAWING No:	1
REVISION:	0



Inset: Sample Locations around 109

Legend

- Approximate School Boundary
- Approximate Stage 2 Site Boundary
- Current Investigation Borehole Location
- DP (2020) Environmental Borehole Location
- DP (2020) Geotechnical and Environmental Borehole Location

0 25 50 75 m

Notes:
1. Basemap from metromap.com.au (dated 07/12/2020).
2. Boundaries and test locations shown are approximate only.

Douglas Partners
Geotechnics / Environment / Groundwater

CLIENT:	TSA Management Pty Ltd		
OFFICE:	Sydney	DRAWN BY:	NW
SCALE:	1:1200 @ A3	DATE:	17.03.2021

TITLE: **Borehole Location Plan**
Supplementary Contamination Services
Cornock Avenue, Toongabbie

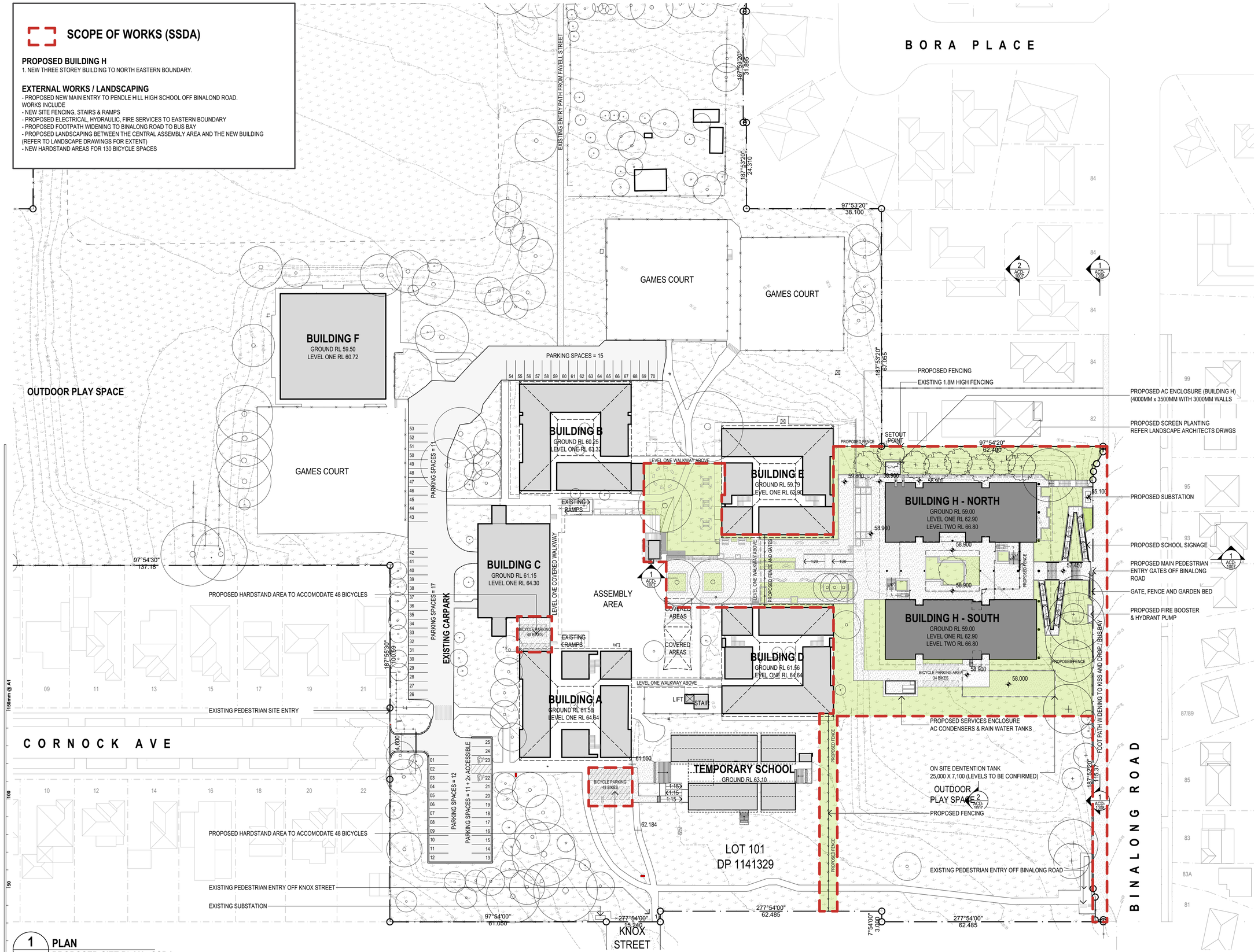
N

PROJECT No:	86977.01
DRAWING No:	2
REVISION:	0

SCOPE OF WORKS (SSDA)

PROPOSED BUILDING H
1. NEW THREE STOREY BUILDING TO NORTH EASTERN BOUNDARY.

EXTERNAL WORKS / LANDSCAPING
- PROPOSED NEW MAIN ENTRY TO PENDLE HILL HIGH SCHOOL OFF BINALOND ROAD.
WORKS INCLUDE
- NEW SITE FENCING, STAIRS & RAMPS
- PROPOSED ELECTRICAL, HYDRAULIC, FIRE SERVICES TO EASTERN BOUNDARY
- PROPOSED FOOTPATH WIDENING TO BINALONG ROAD TO BUS BAY
- PROPOSED LANDSCAPING BETWEEN THE CENTRAL ASSEMBLY AREA AND THE NEW BUILDING
(REFER TO LANDSCAPE DRAWINGS FOR EXTENT)
- NEW HARDSTAND AREAS FOR 130 BICYCLE SPACES



SITE PLAN LEGEND

- EXISTING BUILDINGS
- PROPOSED BUILDINGS (SSDA)
- PROPOSED REFURBISHED AREAS (CDC)
- EXISTING PAVING
- PROPOSED PAVING
- EXISTING ASPHALT
- PROPOSED ASPHALT
- EXISTING LANDSCAPING
- PROPOSED LANDSCAPING
- EXISTING FENCING
- PROPOSED FENCING
- EXISTING TREES
- TREES TO BE REMOVED
- PROPOSED TREES
- PROPOSED SPOT LEVEL (0.000)
- EXISTING SPOT LEVEL (0.000)

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REV.	DESCRIPTION	DATE	INIT.
P1	PRELIMINARY ISSUE	14/01/2021	AP
P2	CONSULTANT ISSUE	29/01/2021	AP
P3	TSG REVIEW ISSUE	10/02/2021	AP
P4	REVISED TSG ISSUE	17/02/2021	AP
	ISSUED TO PENDLE HILL HIGH SCHOOL		AP
P5	SDRP ISSUE	23/02/2021	AP
P6	CONSULTANT ISSUE	01/03/2021	AP
P7	PRELIMINARY SSD ISSUE	10/03/2021	AP

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Paul Trotter fraia		NSW 7177	QLD 2646
Ryan Loveday raia			QLD 4500

www.fultontrotter.com.au

PHASE **SCHEMATIC DESIGN**

CLIENT SCHOOL INFRASTRUCTURE NSW

PROJECT PENDLE HILL HIGH SCHOOL

ADDRESS 19-21 CORNOCK AVENUE
PENDLE HILL, NSW, 2146

DRAWING **PROPOSED SITE PLAN**

Figured dimensions take precedence over scale dimensions. Contractors must verify all dimensions on site before commencing any work or making shop drawings.

PROJECT NUMBER	DIRECTOR	CHECKED
7068TO01	JW	

DRAWING NUMBER **ACD-1002** REVISION **P7**

1 PLAN
PROPOSED SITE PLAN - SSDA
SCALE: 1:500

150mm @ A1 — 50 — 100 — 150mm @ A1

plot date: Wednesday, 10 March 2021, 4:53 PM
file location: BIMcloud: SYDBIMSYD - BIMcloud Basic for ARCHICAD 23/7068TO01 - PHHS - SITE FILE

Appendix C

Data Quality Objectives and Data Quality Indicators

Appendix C
Data Quality Objectives and Data Quality Indicators
Pendle Hill High School Cornock Avenue, Toongabbie

C1.0 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 C1. 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 filed QC samples are included in Table C3 at the end of this appendix.

Table C1: Field and Laboratory Quality Control

Item	Evaluation / Acceptance Criteria	Compliance
Analytical laboratories used	NATA accreditation	C
Holding times	Various based on type of analysis	PC
Intra-laboratory replicates	5% of primary samples; <30% RPD	C
Trip Spikes	1 per sampling event; 60-140% recovery	C
Trip Blanks	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

Partial compliance for holding times was related to pH sampling, which does not affect the current investigation.

The RPD results were all within the acceptable range, with the exception of those indicated in bold in the summary results tables. The exceedances are not, however, considered to be of concern given that:

- The typically low actual differences in the concentrations of the replicate pairs where some RPD exceedances occurred;
- The replicate pair being collected from fill soils which by its nature is heterogeneous;
- Replicate, rather than homogenised duplicate, was used to minimise risk of volatile loss, hence greater variability can be expected;
- Most of the recorded concentrations being relatively close to the PQL;
- The majority of RPDs within the replicate pair being within the acceptable limits; and
- All other QA / QC parameters met the DQIs.

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

C2.0 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 C2: 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.
	Preparation of field groundwater sampling sheets.
	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 generally complied with.

C3.0 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.

C4.0 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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Table C3: Relative Percentage Difference Results – Intra-laboratory Replicates

			Metals								TRH					
			Arsenic	Cadmium	Total Chromium	Copper	Lead	Mercury (inorganic)	Nickel	Zinc	TRH C6 - C10	TRH >C10-C16	F1 ((C6-C10)-BTEX)	F2 (>C10-C16 less Naphthalene)	F3 (>C16-C34)	F4 (>C34-C40)
Sample ID	Depth	Sampled Date	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
BH109N/0.5-1.0	0 m	21/01/2021	<4	<0.4	3	5	5	<0.1	<1	7	<25	<50	<25	<50	<100	<100
BD1/20210121	0 m	-	5	<0.4	4	6	7	<0.1	<1	**11**	<25	<50	<25	<50	<100	<100
		Difference	1	0	1	1	2	0	0	4	0	0	0	0	0	0
		RPD	22%	0%	29%	18%	33%	0%	0%	44%	0%	0%	0%	0%	0%	0%

			BTEX				PAH			
			Benzene	Toluene	Ethylbenzene	Total Xylenes	Naphthalene	Benzo(a)pyrene (BaP)	Benzo(a)pyrene TEQ	Total PAHs
Sample ID	Depth	Sampled Date	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
BH109N/0.5-1.0	0m	21/01/2020	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05
BD1/20210121	0m	21/01/2020	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05
		Difference	0	0	0	0	0	0	0	0
		RPD	0%	0%	0%	0%	0%	0%	0%	0%

Appendix D

Borehole Logs

BOREHOLE LOG

CLIENT: SINSW c/o TSA Management
PROJECT: Pendle Hill High School, Proposed Development
LOCATION: Cornock Avenue, Toongabbie

SURFACE LEVEL: 58.7 AHD
EASTING: 6258786
NORTHING: 311479.5
DIP/AZIMUTH: 90°/--

BORE No: BH109E
PROJECT No: 86977.01
DATE: 21-1-2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
58	0.05	FILL/TOPSOIL: Clayey SILT ML, low plasticity, brown, trace rootlets, w<PL, generally in a firm condition			0.05				
		FILL/Silty CLAY: medium to high plasticity, red-brown and grey with ironstone and shale gravel, tile, brick and concrete fragments, generally in a firm to stiff condition		A			PID<3ppm Sieve sample taken at 0.05-1.0		
					0.5				
				A			PID<3ppm		
	1				1.0				1
		Between 1.2-1.5m depth: with ash and clinker fragments		A			PID<3ppm		
57	1.5	Bore discontinued at 1.5m Refusal on concrete			1.5				
	2								2
56									
	3								3
55									
	4								4
54									

RIG: IHI 3.5 tonne excavator **DRILLER:** A&A **LOGGED:** TG **CASING:** Nil
TYPE OF BORING: 300mm Solid Flight Auger
WATER OBSERVATIONS: No Free Groundwater Observed
REMARKS: Location coordinates are in MGA94 Zone 56.

SAMPLING & IN SITU TESTING LEGEND

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

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: SINSW c/o TSA Management
PROJECT: Pendle Hill High School, Proposed Development
LOCATION: Cornock Avenue, Toongabbie

SURFACE LEVEL: 58.7 AHD
EASTING: 6258787
NORTHING: 311478.9
DIP/AZIMUTH: 90°/--

BORE No: BH109N
PROJECT No: 86977.01
DATE: 21-1-2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
58	0.05	FILL/TOPSOIL: Clayey SILT ML, low plasticity, brown, trace rootlets, w<PL, generally in a firm condition			0.05				
		FILL/Silty CLAY: medium to high plasticity, red-brown and grey with ironstone and shale gravel, tile and concrete fragments, generally in a firm to stiff condition		A			PID<3 ppm Sieve samples taken at 0.05-1.0 and 1.0-1.5		
					0.5				
				A*			PID<3 ppm		
	1				1.0				1
		Between 1.3-1.5m depth: with ash and clinker fragments		A			PID<3 ppm		
	1.5	Bore discontinued at 1.5m Refusal on concrete			1.5				
57	2								2
56	3								3
55	4								4
54									

RIG: IHI 3.5 tonne excavator **DRILLER:** A&A **LOGGED:** TG **CASING:** Nil

TYPE OF BORING: 300mm Solid Flight Auger

WATER OBSERVATIONS: No Free Groundwater Observed

REMARKS: Location coordinates are in MGA94 Zone 56.
* Replicate sample BD1/20210121 taken at 0.5-1.0m

SAMPLING & IN SITU TESTING LEGEND

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

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Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: SINSW c/o TSA Management
PROJECT: Pendle Hill High School, Proposed Development
LOCATION: Cornock Avenue, Toongabbie

SURFACE LEVEL: 58.7 AHD
EASTING: 6258785.5
NORTHING: 311478.5
DIP/AZIMUTH: 90°/--

BORE No: BH109S
PROJECT No: 86977.01
DATE: 21-1-2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.05	FILL/TOPSOIL: Clayey SILT ML, low plasticity, brown, trace rootlets, w<PL, generally in a firm condition			0.05				
		FILL/Silty CLAY: medium to high plasticity, red-brown and grey with ironstone and shale gravel, tile, brick and concrete fragments, generally in a firm to stiff condition		A			PID<3ppm Sieve samples taken at 0.05-1.0 and 1.0-1.5		
					0.5				
58				A			PID<3ppm		
	1				1.0				1
		Between 1.2-1.5m depth: with ash and clinker fragments		A			PID<3ppm		
	1.5	Bore discontinued at 1.5m Refusal on concrete			1.5				
57									
	2								2
56									
	3								3
55									
	4								4
54									

RIG: IHI 3.5 tonne excavator **DRILLER:** A&A **LOGGED:** TG **CASING:** Nil
TYPE OF BORING: 300mm Solid Flight Auger
WATER OBSERVATIONS: No Free Groundwater Observed
REMARKS: Location coordinates are in MGA94 Zone 56.

SAMPLING & IN SITU TESTING LEGEND

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

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: SINSW c/o TSA Management
PROJECT: Pendle Hill High School, Proposed Development
LOCATION: Cornock Avenue, Toongabbie

SURFACE LEVEL: 58.6 AHD
EASTING: 6258786.5
NORTHING: 311477.9
DIP/AZIMUTH: 90°/--

BORE No: BH109W
PROJECT No: 86977.01
DATE: 21-1-2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
58	0.05	FILL/TOPSOIL: Clayey SILT ML, low plasticity, brown, trace rootlets, w<PL, generally in a firm condition			0.05				
		FILL/Silty CLAY: medium to high plasticity, red-brown and grey with ironstone and shale gravel, tile, brick and concrete fragments, generally in a firm to stiff condition		A			PID<3 ppm Sieve samples taken at 0.05-1.0 and 1.0-1.5		
					0.5				
				A			PID<3 ppm		
	1				1.0				1
		Between 1.3-1.5m depth: with ash and clinker fragments		A			PID<3 ppm		
57	1.5	Bore discontinued at 1.5m Refusal on concrete			1.5				
	2								2
56									
	3								3
55									
	4								4
54									

RIG: IHI 3.5 tonne excavator **DRILLER:** A&A **LOGGED:** TG **CASING:** Nil
TYPE OF BORING: 300mm Solid Flight Auger
WATER OBSERVATIONS: No Free Groundwater Observed
REMARKS: Location coordinates are in MGA94 Zone 56.

SAMPLING & IN SITU TESTING LEGEND

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

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: SINSW c/o TSA Management
PROJECT: Pendle Hill High School, Proposed Development
LOCATION: Cornock Avenue, Toongabbie

SURFACE LEVEL: 58.0 AHD
EASTING: 6258802
NORTHING: 311458.1
DIP/AZIMUTH: 90°/--

BORE No: BH201
PROJECT No: 86977.01
DATE: 22-1-2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
58	0.25	FILL/Silty CLAY: low plasticity, trace rootlets, shale and ironstone gravel, w<PL, generally in a firm condition		A	0.1 0.2				
		FILL/Silty CLAY: medium plasticity, red-brown and grey, with ironstone and shale gravel, trace rootlets, w<PL, generally in a firm to stiff condition		A	0.5 0.6				
57	1			A	1.0 1.1				1
	1.3	SHALE: grey and yellow-brown, with ironstone bands and hard clay seams, inferred low strength, highly weathered, dry.		A	1.4				
	1.5	Bore discontinued at 1.5m Refusal on shale			1.5				
56	2								2
55	3								3
54	4								4

RIG: IHI 3.5 tonne excavator **DRILLER:** A&A **LOGGED:** TG **CASING:** Nil
TYPE OF BORING: 100mm Solid Flight Auger
WATER OBSERVATIONS: No Free Groundwater Observed
REMARKS: Location coordinates are in MGA94 Zone 56.

SAMPLING & IN SITU TESTING LEGEND

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

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Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: SINSW c/o TSA Management
PROJECT: Pendle Hill High School, Proposed Development
LOCATION: Cornock Avenue, Toongabbie

SURFACE LEVEL: 59.1 AHD
EASTING: 6258788.5
NORTHING: 311447.1
DIP/AZIMUTH: 90°/--

BORE No: BH202
PROJECT No: 86977.01
DATE: 21-1-2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
59	0.15	FILL/TOPSOIL: Clayey SILT ML, low plasticity, dark red and brown, trace rootlets, w<PL		A	0.1				
		FILL/ Silty CLAY: medium to high plasticity, red-brown and grey with ironstone and shale gravels, w<PL, generally in a firm to stiff condition			0.15				
				A	0.5				
					0.6				
58	1			A	1.0				1
					1.1				
	1.3	Silty CLAY: grey and red-brown mottled, very stiff, relict rock texture, residual							
				A	1.5				
					1.6				
57	2			A	2.0				2
					2.1				
	2.2	SHALE: grey and yellow-brown, with ironstone bands and hard clay seams, inferred low strength, highly weathered, dry.							
				A	2.5				
	2.6	Bore discontinued at 2.6m Refusal on shale			2.6				
56	3								3
55	4								4

RIG: IHI 3.5 tonne excavator **DRILLER:** A&A **LOGGED:** TG **CASING:** Nil
TYPE OF BORING: 100mm Solid Flight Auger
WATER OBSERVATIONS: No Free Groundwater Observed
REMARKS: Location coordinates are in MGA94 Zone 56.

SAMPLING & IN SITU TESTING LEGEND

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

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BOREHOLE LOG

CLIENT: SINSW c/o TSA Management
PROJECT: Pendle Hill High School, Proposed Development
LOCATION: Cornock Avenue, Toongabbie

SURFACE LEVEL: 58.3 AHD
EASTING: 6258781.6
NORTHING: 311498
DIP/AZIMUTH: 90°/--

BORE No: BH203
PROJECT No: 86977.01
DATE: 22-1-2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
58	0.15	FILL/TOPSOIL: Clayey SILT ML, low plasticity, brown, trace rootlets, w<PL, generally in a firm condition		A	0.1				
		FILL/Silty CLAY: medium to high plasticity, red-brown and grey with ironstone and shale gravel, tile and concrete fragments, generally in a firm to stiff condition			0.15				
				A	0.5				
					0.6				
57	1			A	1.0				1
					1.1				
				A	1.5				
					1.6				
56	2			A	2.0				2
					2.1				
	2.3	Silty CLAY: grey and red-brown mottled, very stiff, relict rock texture, residual		A	2.5				
					2.6				
				A	2.9				
55	3								3
	3.0	Bore discontinued at 3.0m Target Depth Achieved			3.0				
54	4								4

RIG: IHI 3.5 tonne excavator **DRILLER:** A&A **LOGGED:** TG **CASING:** Nil

TYPE OF BORING: 100mm Solid Flight Auger

WATER OBSERVATIONS: No Free Groundwater Observed

REMARKS: Location coordinates are in MGA94 Zone 56.

SAMPLING & IN SITU TESTING LEGEND

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

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BOREHOLE LOG

CLIENT: SINSW c/o TSA Management
PROJECT: Pendle Hill High School, Proposed Development
LOCATION: Cornock Avenue, Toongabbie

SURFACE LEVEL: 59.2 AHD
EASTING: 6258768.3
NORTHING: 311458.1
DIP/AZIMUTH: 90°/--

BORE No: BH204
PROJECT No: 86977.01
DATE: 21-1-2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
59	0.15	FILL/TOPSOIL: Clayey SILT ML, low plasticity, dark red and brown, trace rootlets, w<PL, generally in a firm condition		A	0.1 0.15				
		FILL/ Silty CLAY: medium to high plasticity, red-brown and grey with ironstone and shale gravels, w<PL, generally in a firm to stiff condition		A	0.5 0.6				
	0.8	Silty CLAY: grey and red-brown mottled, very stiff, relict rock texture, residual		A	1.0 1.1				
58	1			A	1.5 1.6				1
	1.7	SHALE: grey and yellow-brown, with ironstone bands and hard clay seams, inferred low strength, highly weathered, dry		A	2.0 2.1				
57	2								2
	2.2	Bore discontinued at 2.2m Refusal on shale							
56	3								3
55	4								4

RIG: IHI 3.5 tonne excavator **DRILLER:** A&A **LOGGED:** TG **CASING:** Nil
TYPE OF BORING: 100mm Solid Flight Auger
WATER OBSERVATIONS: No Free Groundwater Observed
REMARKS: Location coordinates are in MGA94 Zone 56.

SAMPLING & IN SITU TESTING LEGEND

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

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BOREHOLE LOG

CLIENT: SINSW c/o TSA Management
PROJECT: Pendle Hill High School, Proposed Development
LOCATION: Cornock Avenue, Toongabbie

SURFACE LEVEL: 59.6 AHD
EASTING: 6258756.1
NORTHING: 311442.9
DIP/AZIMUTH: 90°/--

BORE No: BH205
PROJECT No: 86977.01
DATE: 21-1-2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
59	0.2	FILL/TOPSOIL: Clayey SILT ML, low plasticity, dark red and brown, trace rootlets, w<PL, generally in a firm condition		A	0.1				
					0.2				
		Silty CLAY: grey and red-brown mottled, very stiff, relict rock texture, residual		A	0.5				
					0.6				
	1			A	1.0				1
					1.1				
				A	1.5				
58	1.6	SHALE: grey and yellow-brown, with ironstone bands and hard clay seams, inferred low strength, highly weathered, dry			1.6				
	2			A	2.0				2
	2.1	Bore discontinued at 2.1m Refusal on shale			2.1				
57									
	3								3
56									
	4								4
55									

RIG: IHI 3.5 tonne excavator **DRILLER:** A&A **LOGGED:** TG **CASING:** Nil
TYPE OF BORING: 100mm Solid Flight Auger
WATER OBSERVATIONS: No Free Groundwater Observed
REMARKS: Location coordinates are in MGA94 Zone 56.

SAMPLING & IN SITU TESTING LEGEND

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

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BOREHOLE LOG

CLIENT: SINSW c/o TSA Management
PROJECT: Pendle Hill High School, Proposed Development
LOCATION: Cornock Avenue, Toongabbie

SURFACE LEVEL: 58.9 AHD
EASTING: 6258759.1
NORTHING: 311482.6
DIP/AZIMUTH: 90°/--

BORE No: BH206
PROJECT No: 86977.01
DATE: 22-1-2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
58	0.2	FILL/TOPSOIL: Clayey SILT ML, low plasticity, dark red and brown, trace rootlets, w<PL, generally in a firm condition		A	0.1 0.2				
		FILL/ Silty CLAY: medium to high plasticity, red-brown and grey with ironstone and shale gravels, w<PL, generally in a firm to stiff condition		A	0.5 0.6				
	1			A	1.0 1.1				1
	1.3	Silty CLAY: grey and red-brown mottled, very stiff, relict rock texture, residual		A	1.5 1.6				
57	1.8	SHALE: grey and yellow-brown, with ironstone bands and hard clay seams, inferred low strength, highly weathered, dry		A	2.0 2.1				
	2								2
	2.3	Bore discontinued at 2.3m Refusal on shale							
56	3								3
55	4								4
54									

RIG: IHI 3.5 tonne excavator **DRILLER:** A&A **LOGGED:** TG **CASING:** Nil
TYPE OF BORING: 100mm Solid Flight Auger
WATER OBSERVATIONS: No Free Groundwater Observed
REMARKS: Location coordinates are in MGA94 Zone 56.

SAMPLING & IN SITU TESTING LEGEND

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

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BOREHOLE LOG

CLIENT: SINSW c/o TSA Management
PROJECT: Pendle Hill High School, Proposed Development
LOCATION: Cornock Avenue, Toongabbie

SURFACE LEVEL: 58.4 AHD
EASTING: 6258750.1
NORTHING: 311496.9
DIP/AZIMUTH: 90°/--

BORE No: BH207
PROJECT No: 86977.01
DATE: 22-1-2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
58	0.05	FILL/TOPSOIL: Clayey SILT ML, low plasticity, dark red and brown, trace rootlets, w<PL, generally in a firm condition		A	0.1				
					0.2				
		FILL/ Silty CLAY: medium to high plasticity, red-brown and grey with ironstone and shale gravels, w<PL, generally in a firm to stiff condition		A	0.5				
					0.6				
	1			A	1.0				1
					1.1				
57	1.2	Silty CLAY: grey and red-brown mottled, very stiff, relict rock texture, residual		A	1.5				
					1.6				
	1.7	SHALE: grey and yellow-brown, with ironstone bands and hard clay seams, inferred low strength, highly weathered, dry							
	2			A	2.0				2
					2.1				
56	2.2	Bore discontinued at 2.2m Refusal on shale							
	3								3
55									
	4								4
54									

RIG: IHI 3.5 tonne excavator **DRILLER:** A&A **LOGGED:** TG **CASING:** Nil
TYPE OF BORING: 100mm Solid Flight Auger
WATER OBSERVATIONS: No Free Groundwater Observed
REMARKS: Location coordinates are in MGA94 Zone 56.

SAMPLING & IN SITU TESTING LEGEND

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

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BOREHOLE LOG

CLIENT: SINSW c/o TSA Management
PROJECT: Pendle Hill High School, Proposed Development
LOCATION: Cornock Avenue, Toongabbie

SURFACE LEVEL: 59.5 AHD
EASTING: 6258743.7
NORTHING: 311454.3
DIP/AZIMUTH: 90°/--

BORE No: BH208
PROJECT No: 86977.01
DATE: 21-1-2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
59	0.25	FILL/TOPSOIL: Clayey SILT ML, low plasticity, dark red and brown, trace rootlets, w<PL, generally in a firm condition		A	0.1 0.2				
		Silty CLAY: grey and red-brown mottled, very stiff, relict rock texture, residual		A	0.6 0.7				
	1			A	1.0 1.1				1
58	1.6			A	1.5 1.6				
		SHALE: grey and yellow-brown, with ironstone bands and hard clay seams, inferred low strength, highly weathered, dry		A	2.0 2.1				
	2								2
57				A	2.5 2.6				
	3	3.0		A	2.9 3.0				3
		Bore discontinued at 3.0m Target Depth Achieved							
56	4								4
55									

RIG: IHI 3.5 tonne excavator **DRILLER:** A&A **LOGGED:** TG **CASING:** Nil
TYPE OF BORING: 100mm Solid Flight Auger
WATER OBSERVATIONS: No Free Groundwater Observed
REMARKS: Location coordinates are in MGA94 Zone 56.

SAMPLING & IN SITU TESTING LEGEND

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

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BOREHOLE LOG

CLIENT: SINSW c/o TSA Management
PROJECT: Pendle Hill High School, Proposed Development
LOCATION: Cornock Avenue, Toongabbie

SURFACE LEVEL: 58.4 AHD
EASTING: 6258767.7
NORTHING: 311496.6
DIP/AZIMUTH: 90°/--

BORE No: BH209
PROJECT No: 86977.01
DATE: 22-1-2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		FILL/TOPSOIL: Clayey SILT ML, low plasticity, brown, trace rootlets, w<PL, generally in a firm condition		A	0.1				
	0.2	FILL/Silty CLAY: medium to high plasticity, red-brown and grey with ironstone and shale gravel, tile and concrete fragments, generally in a firm to stiff condition		A	0.2 0.5 0.6				
58	1			A	1.0 1.1				1
57				A	1.5 1.6				
	1.8	Silty CLAY: grey and red-brown mottled, very stiff, relict rock texture, residual		A	2.0 2.1				
	2								2
	2.3	SHALE: grey and yellow-brown, with ironstone bands and hard clay seams, inferred low strength, highly weathered, dry.		A	2.5				
56	2.6	Bore discontinued at 2.6m Refusal on shale			2.6				
	3								3
55									
	4								4
54									

RIG: IHI 3.5 tonne excavator **DRILLER:** A&A **LOGGED:** TG **CASING:** Nil

TYPE OF BORING: 100mm Solid Flight Auger

WATER OBSERVATIONS: No Free Groundwater Observed

REMARKS: Location coordinates are in MGA94 Zone 56.

SAMPLING & IN SITU TESTING LEGEND

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

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Sampling Methods

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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).

Rock Strength

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

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

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

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

Degree of Weathering

The degree of weathering of rock is classified as follows:

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

Rock Descriptions

Degree of Fracturing

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

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

Rock Quality Designation

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

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

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

Stratification Spacing

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

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

Symbols & Abbreviations

Douglas Partners

Introduction

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

Drilling or Excavation Methods

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

Water

▷	Water seep
▽	Water level

Sampling and Testing

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

Description of Defects in Rock

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

Defect Type

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

Orientation

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

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

Coating or Infilling Term

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

Coating Descriptor

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

Shape

cu	curved
ir	irregular
pl	planar
st	stepped
un	undulating

Roughness

po	polished
ro	rough
sl	slickensided
sm	smooth
vr	very rough

Other

fg	fragmented
bnd	band
qtz	quartz

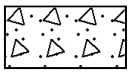
Symbols & Abbreviations

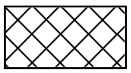
Graphic Symbols for Soil and Rock

General

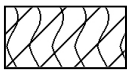

Asphalt

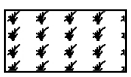

Road base

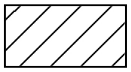

Concrete

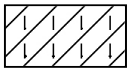

Filling

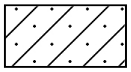
Soils


Topsoil

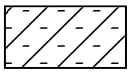

Peat

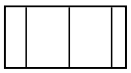

Clay

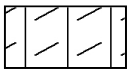

Silty clay

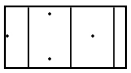

Sandy clay

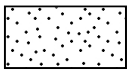

Gravelly clay

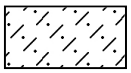

Shaly clay

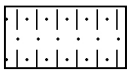

Silt


Clayey silt


Sandy silt

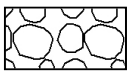

Sand

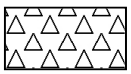

Clayey sand


Silty sand


Gravel

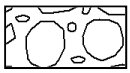

Sandy gravel


Cobbles, boulders

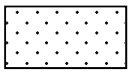

Talus

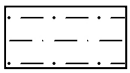
Sedimentary Rocks

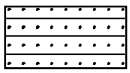

Boulder conglomerate

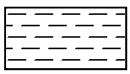

Conglomerate


Conglomeratic sandstone

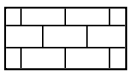

Sandstone


Siltstone

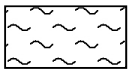

Laminite

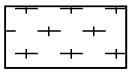

Mudstone, claystone, shale

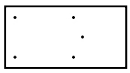

Coal


Limestone

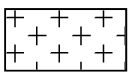
Metamorphic Rocks

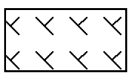

Slate, phyllite, schist

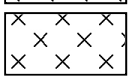

Gneiss

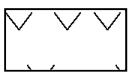

Quartzite

Igneous Rocks


Granite


Dolerite, basalt, andesite


Dacite, epidote


Tuff, breccia


Porphyry

Appendix E

Summary Tables

Table E1: Summary of Asbestos Results

Asbestos Content (assumed)	15%

Health Screening Levels	0.01	**% w/w**	Bonded ACM (Residential A)
	0.001	**% w/w**	AF/FA

Test Pit	Sample Depth (m)	Sample Depth (m RL)	Date	Field Screening						Laboratory Analysis							
				Sample Volume	Weight of Sample (g)	Number of Fragments	Size Range of Fragments (mm)	Weight of Retained ACM (g)	Bonded ACM in Soil (% w/w)	Sample Volume (g)	Weight of Sample (g)	Asbestos ID in soil >0.1g/kg	Trace Analysis	Asbestos ID in soil <0.1g/kg	ACM >7mm Estimation (g)	FA and AF Estimation (g)	FA and AF Estimation (% w/w)
BH109N/0.5-1.0	0.5-1.0	58.2	21/01/21	NT	NT	NT	NT	NT	NT	~ 40 mL	~ 40	NAD	NAD	NT	NT	NT	NT
BH109N/1.0-1.5	1.0-1.5	57.7	21/01/21	~10 L	15,347	0	0	0	0.000	~500mL	1043.5	NAD	NAD	NAD	–	_	<0.001
BH109N/0.05-1.0	0.05-1.0	58.6	21/01/21	~10 L	16,433	0	0	0	0.000	~500mL	1099.2	NAD	NAD	NAD	–	_	<0.001
BH109E/0.5-1.0	0.5-1.0	58.1	21/01/21	NT	NT	NT	NT	NT	NT	~ 40 mL	~50	NAD	NAD	NT	NT	NT	NT
BH109E/1.0-1.5	1.0-1.5	57.6	21/01/21	~10 L	17,908	0	0	0	0.000	~500mL	969.3	NAD	NAD	NAD	–	-	<0.001
BH109E/0.05-1.0	0.05-1.0	58.5	21/01/21	~10 L	15,245	0	0	0	0.000	~500mL	1042.0	NAD	NAD	**Chrysotile Crocidolite**	–	0.0358	0.0034
BH109S/0.5-1.0	0.5-1.0	58.1	21/01/21	NT	NT	NT	NT	NT	NT	~ 40 mL	~50	NAD	NAD	NT	NT	NT	NT
BH109S/1.0-1.5	1.0-1.5	57.6	21/01/21	~10 L	13,677	0	0	0	0.000	~500mL	940.1	NAD	NAD	**Chrysotile**	–	0.0036	<0.001
BH109S/0.05-1.0	0.05-1.0	58.5	21/01/21	~10 L	16,029	0	0	0	0.000	~500mL	1049.6	NAD	NAD	NAD	–	-	<0.001
BH109W/0.5-1.0	0.5-1.0	58.1	21/01/21	NT	NT	NT	NT	NT	NT	~ 40 mL	~45	NAD	NAD	NT	NT	NT	NT
BH109W/1.0-1.5	1.0-1.5	57.6	21/01/21	~10 L	14,795	0	0	0	0.000	~500mL	1132.8	NAD	NAD	**Chrysotile**	–	0.0001	<0.001
BH109W/0.05-1.0	0.5-1.0	58.5	21/01/21	~10 L	16,371	0	0	0	0.000	~500mL	995.2	NAD	NAD	NAD	–	-	<0.001
BH202/0.5	0.5	58.6	21/01/21	NT	NT	NT	NT	NT	NT	~ 40 mL	~60	NAD	NAD	NT	NT	NT	NT
BH203/0.5	0.5	57.8	22/01/21	NT	NT	NT	NT	NT	NT	~500mL	661.4	NAD	NAD	NAD	–	–	<0.001
BH204/0.5	0.5	58.7	21/01/21	NT	NT	NT	NT	NT	NT	~ 40 mL	~ 40	NAD	NAD	NT	NT	NT	NT
BH207/0.5	0.5	59.1	22/01/21	NT	NT	NT	NT	NT	NT	~ 40 mL	~ 40	NAD	NAD	NT	NT	NT	NT
BH209/0.5	0.5	58.4	22/01/21	NT	NT	NT	NT	NT	NT	~ 40 mL	~45	NAD	NAD	NT	NT	NT	NT

NOTES: NT = Not Tested
NAD = No Asbestos Detected
Exceeds the Screening Crietira for AF/FA

Douglas Partners
Geotechnics / Environment / Groundwater

Table E2: Summary of Laboratory Results – Waste Classification

		Metals								TRH		BTEX						PAH		Phenol	OCP		OPP	PCB	Asbestos	
		Arsenic	Cadmium	Total Chromium	Copper	Lead	Mercury (inorganic)	Nickel	Zinc	TRH C6 - C9	C10-C36 recoverable hydrocarbons	Benzene	Toluene	Ethylbenzene	m+p-Xylene	o-Xylene	Xylenes (total)	Benzo(a)pyrene (BaP)	Total PAHs	Phenol	Total Endosulfan	Total Analysed OCP	Total Analysed OPP	Total PCB	Asbestos ID in soil >0.1g/kg	Asbestos ID in soil <0.1g/kg
	PQL	4	0.4	1	1	1	0.1	1	1	25	50	0.2	0.5	1	2	1	3	0.05	0.05	5	0.1	0.1	0.1	0.1		
Sample ID	Sample Date	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	-	-
BH109N/0.5-1.0	21/01/2021	<4	<0.4	3	5	5	<0.1	<1	7	<25	<50	<0.2	<0.5	<1	<2	<1	<3	<0.05	<0.05	<5	<0.1	<0.1	<0.1	<0.1	NAD	-
BH109N/1.0-1.5	21/01/2021	6	<0.4	7	8	14	<0.1	2	39	<25	<50	<0.2	<0.5	<1	<2	<1	<3	<0.05	<0.05	-	-	-	-	-	NAD	NAD
BH109N/0.05-1.0	21/01/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NAD	NAD
BH109E/0.05-0.5	21/01/2021	6	<0.4	6	8	11	<0.1	3	26	<25	<50	<0.2	<0.5	<1	<2	<1	<3	<0.05	<0.05	-	-	-	-	-	NAD	-
BH109E/0.5-1.0	21/01/2021	9	<0.4	8	16	13	<0.1	2	23	<25	<50	<0.2	<0.5	<1	<2	<1	<3	<0.05	<0.05	<5	<0.1	<0.1	<0.1	<0.1	NAD	-
BH109E/1.0-1.5	21/01/2021	4	<0.4	4	6	9	<0.1	<1	12	<25	<50	<0.2	<0.5	<1	<2	<1	<3	<0.05	<0.05	-	-	-	-	-	NAD	NAD
BH109E/0.05-1.0	21/01/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NAD	AD
BH109S/0.05-0.5	21/01/2021	4	<0.4	5	6	7	<0.1	1	13	<25	<50	<0.2	<0.5	<1	<2	<1	<3	<0.05	<0.05	-	-	-	-	-	NAD	-
BH109S/0.5-1.0	21/01/2021	7	<0.4	4	8	8	<0.1	<1	12	<25	<50	<0.2	<0.5	<1	<2	<1	<3	<0.05	<0.05	<5	<0.1	<0.1	<0.1	<0.1	NAD	-
BH109S/1.0-1.5	21/01/2021	4	<0.4	5	5	6	<0.1	1	19	<25	<50	<0.2	<0.5	<1	<2	<1	<3	<0.05	<0.05	-	-	-	-	-	NAD	AD
BH109S/0.05-1.0	21/01/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NAD	NAD
BH109W/0.05-0.5	21/01/2021	5	<0.4	6	8	9	<0.1	2	19	<25	<50	<0.2	<0.5	<1	<2	<1	<3	<0.05	<0.05	-	-	-	-	-	NAD	-
BH109W/0.5-1.0	21/01/2021	<4	<0.4	3	5	9	<0.1	<1	9	<25	<50	<0.2	<0.5	<1	<2	<1	<3	<0.05	<0.05	<5	<0.1	<0.1	<0.1	<0.1	NAD	-
BH109W/1.0-1.5	21/01/2021	<4	<0.4	3	6	12	<0.1	1	34	<25	<50	<0.2	<0.5	<1	<2	<1	<3	<0.05	<0.05	-	-	-	-	-	NAD	AD
BH109W/0.05-1.0	21/01/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NAD	NAD
BH202/0.5	21/01/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NAD	-
BH203/0.5	22/01/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NAD	NAD
BH204/0.5	21/01/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NAD	-
BH207/0.5	22/01/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NAD	-
BH209/0.5	22/01/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NAD	-
Waste Classification Criteria [f]																										
CT1		100	20	100	NC	100	4	40	NC	650	10000	10	288	600	NC	NC	1000	0.8	200	288	60	<50	4	<50	NC	NC
SCC1		500	100	1900	NC	1500	50	1050	NC	650	10000	18	518	1080	NC	NC	1800	10	200	518	108	<50	7.5	<50	NC	NC
TCLP1		N/A	N/A	N/A	NC	N/A	N/A	N/A	NC	N/A	N/A	N/A	N/A	N/A	NC	NC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	NC	NC
CT2		400	80	400	NC	400	16	160	NC	2600	40000	40	1152	2400	NC	NC	4000	3.2	800	1152	240	<50	16	<50	NC	NC
SCC2		2000	400	7600	NC	6000	200	4200	NC	2600	40000	72	2073	4320	NC	NC	7200	23	800	2073	432	<50	30	<50	NC	NC
TCLP2		N/A	N/A	N/A	NC	N/A	N/A	N/A	NC	N/A	N/A	N/A	N/A	N/A	NC	NC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	NC	NC

CT1 exceedance TCLP1 and/or SCC1 exceedance CT2 exceedance TCLP2 and/or SCC2 exceedance Asbestos detection

NT = Not tested NL = Non limiting NC = No criteria NA = Not applicable

Notes:

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

b Total chromium used as initial screen for chromium(VI).

c Total recoverable hydrocarbons (TRH) used as an initial screen for total petroleum hydrocarbons (TPH)

d Criteria for scheduled chemicals used as an initial screen

e Criteria for Chlorpyrifos used as initial screen

f All criteria are in the same units as the reported results

PQL Practical quantitation limit

CT1 NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values of specific contaminant concentration (SCC) for classification without TCLP: General solid waste

SCC1 NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values for leachable concentration (TCLP) and specific contaminant concentration (SCC) when used together: General solid waste

TCLP1 NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values for leachable concentration (TCLP) and specific contaminant concentration (SCC) when used together: General solid waste

CT2 NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values of specific contaminant concentration (SCC) for classification without TCLP: Restricted solid waste

SCC2 NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values for leachable concentration (TCLP) and specific contaminant concentration (SCC) when used together: Restricted solid waste

TCLP2 NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values for leachable concentration (TCLP) and specific contaminant concentration (SCC) when used together: Restricted solid waste

Appendix F

Chain of Custody Documentation, Sample Receipt Advice

and Laboratory Certificates of Analysis

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ANALYSIS REPORT SOIL

PROJECT NO: EW210283		**Date of Issue:**	**03/02/2021**
Customer:	ENVIROLAB SERVICES	Report No:	1
Address:	12 ASHLEY STREET CHATSWOOD NSW 2067	Date Received:	29/01/2021
		Matrix:	Soil
Attention:	Aileen Hie	Location:	260350
Phone:	02 9910 6200	Sampler ID:	Client
Fax:	02 9910 6201	Date of Sampling:	21/01/2021
Email:	ahie@envirolabservices.com.au	Sample Condition:	Acceptable

Results apply to the samples as submitted. All pages of this report have been checked and approved for release.

Signed: Lisa Nies

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East West is certified by the Australian-Asian Soil & Plant Analysis Council to perform various soil and plant tissue analysis. The tests reported herein have been performed in accordance with our terms of accreditation.

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This analysis relates to the sample submitted and it is the client's responsibility to make certain the sample is representative of the matrix to be tested.

Samples will be discarded one month after the date of this report. Please advise if you wish to have your sample/s returned.

ANALYSIS REPORT

PROJECT NO: EW210283 Location: 260350

				CLIENT SAMPLE ID	260350-23	260350-26	260350-33	260350-44
				DEPTH				
Test Parameter	**Method Description**	**Method Reference**	**Units**	**LOR**	**210283-1**	**210283-2**	**210283-3**	**210283-4**
Dispersibility (H2O)	Classification	AS 4419	Category	na	4	4	4	4
Dispersibility (CaCl2)	Classification	AS 4419	Category	na	2	2	2	2

ANALYSIS REPORT

PROJECT NO: EW210283 **Location: 260350**

				CLIENT SAMPLE ID	260350-46	260350-55	260350-66	
				DEPTH				
Test Parameter	**Method Description**	**Method Reference**	**Units**	**LOR**	**210283-5**	**210283-6**	**210283-7**	
Dispersibility (H2O)	Classification	AS 4419	Category	na	4	4	4	
Dispersibility (CaCl2)	Classification	AS 4419	Category	na	2	2	2	

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Soils are air dried at 40^{0}C and ground <2mm.

NB: LOR is the Lowest Obtainable Reading.

DOCUMENT END

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CERTIFICATE OF ANALYSIS 260350

Client Details

Client	Douglas Partners Pty Ltd
Attention	Lisa Teng
Address	96 Hermitage Rd, West Ryde, NSW, 2114

Sample Details

Your Reference	**86977.01**
Number of Samples	69 Soil
Date samples received	27/01/2021
Date completed instructions received	27/01/2021

Analysis Details

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

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

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

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

Report Details

Date results requested by	03/02/2021
Date of Issue	03/02/2021

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Lucy Zhu, Asbestos Supervisor
Manju Dewendrage, Chemist
Nick Sarlamis, Inorganics Supervisor

Authorised By

Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		260350-2	260350-3	260350-5	260350-6	260350-7
Your Reference	UNITS	BH109N/0.5-1.0	BH109N/1.0-1.5	BH109E/0.05-0.5	BH109E/0.5-1.0	BH109E/1.0-1.5
Date Sampled		21/01/2021	21/01/2021	21/01/2021	21/01/2021	21/01/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
Date analysed	-	01/02/2021	01/02/2021	01/02/2021	01/02/2021	01/02/2021
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<3	<3	<3	<3	<3
Surrogate aaa-Trifluorotoluene	%	81	71	98	98	89

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		260350-9	260350-10	260350-11	260350-13	260350-14
Your Reference	UNITS	BH109S/0.05-0.5	BH109S/0.5-1.0	BH109S/1.0-1.5	BH109W/0.05-0.5	BH109W/0.5-1.0
Date Sampled		21/01/2021	21/01/2021	21/01/2021	21/01/2021	21/01/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
Date analysed	-	01/02/2021	01/02/2021	01/02/2021	01/02/2021	01/02/2021
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	%	101	103	91	94	105

vTRH(C6-C10)/BTEXN in Soil					
Our Reference		260350-15	260350-67	260350-68	260350-69
Your Reference	UNITS	BH109W/1.0-1.5	BD1/20210121	Trip Spike	Trip Blank
Date Sampled		21/01/2021	-	-	-
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021
Date analysed	-	01/02/2021	01/02/2021	02/02/2021	01/02/2021
TRH C_6 - C_9	mg/kg	<25	<25	[NA]	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	[NA]	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	[NA]	<25
Benzene	mg/kg	<0.2	<0.2	105%	<0.2
Toluene	mg/kg	<0.5	<0.5	84%	<0.5
Ethylbenzene	mg/kg	<1	<1	90%	<1
m+p-xylene	mg/kg	<2	<2	87%	<2
o-Xylene	mg/kg	<1	<1	89%	<1
naphthalene	mg/kg	<1	<1	[NA]	<1
Total +ve Xylenes	mg/kg	<3	<3	[NT]	<3
Surrogate aaa-Trifluorotoluene	%	93	79	94	93

svTRH (C10-C40) in Soil						
Our Reference		260350-2	260350-3	260350-5	260350-6	260350-7
Your Reference	UNITS	BH109N/0.5-1.0	BH109N/1.0-1.5	BH109E/0.05-0.5	BH109E/0.5-1.0	BH109E/1.0-1.5
Date Sampled		21/01/2021	21/01/2021	21/01/2021	21/01/2021	21/01/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
Date analysed	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	93	106	94	107	93

svTRH (C10-C40) in Soil						
Our Reference		260350-9	260350-10	260350-11	260350-13	260350-14
Your Reference	UNITS	BH109S/0.05-0.5	BH109S/0.5-1.0	BH109S/1.0-1.5	BH109W/0.05-0.5	BH109W/0.5-1.0
Date Sampled		21/01/2021	21/01/2021	21/01/2021	21/01/2021	21/01/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
Date analysed	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	94	103	93	105	107

svTRH (C10-C40) in Soil			
Our Reference		260350-15	260350-67
Your Reference	UNITS	BH109W/1.0-1.5	BD1/20210121
Date Sampled		21/01/2021	-
Type of sample		Soil	Soil
Date extracted	-	29/01/2021	29/01/2021
Date analysed	-	29/01/2021	29/01/2021
TRH C_{10} - C_{14}	mg/kg	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100
TRH >C_{10} -C_{16}	mg/kg	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50
Surrogate o-Terphenyl	%	93	105

PAHs in Soil						
Our Reference		260350-2	260350-3	260350-5	260350-6	260350-7
Your Reference	UNITS	BH109N/0.5-1.0	BH109N/1.0-1.5	BH109E/0.05-0.5	BH109E/0.5-1.0	BH109E/1.0-1.5
Date Sampled		21/01/2021	21/01/2021	21/01/2021	21/01/2021	21/01/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
Date analysed	-	01/02/2021	02/02/2021	02/02/2021	02/02/2021	02/02/2021
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	%	90	97	97	95	96

PAHs in Soil						
Our Reference		260350-9	260350-10	260350-11	260350-13	260350-14
Your Reference	UNITS	BH109S/0.05-0.5	BH109S/0.5-1.0	BH109S/1.0-1.5	BH109W/0.05-0.5	BH109W/0.5-1.0
Date Sampled		21/01/2021	21/01/2021	21/01/2021	21/01/2021	21/01/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
Date analysed	-	02/02/2021	02/02/2021	02/02/2021	02/02/2021	02/02/2021
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	%	98	97	97	93	95

PAHs in Soil			
Our Reference		260350-15	260350-67
Your Reference	UNITS	BH109W/1.0-1.5	BD1/20210121
Date Sampled		21/01/2021	-
Type of sample		Soil	Soil
Date extracted	-	29/01/2021	29/01/2021
Date analysed	-	02/02/2021	02/02/2021
Naphthalene	mg/kg	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	97	97

Organochlorine Pesticides in soil					
Our Reference		260350-2	260350-6	260350-10	260350-14
Your Reference	UNITS	BH109N/0.5-1.0	BH109E/0.5-1.0	BH109S/0.5-1.0	BH109W/0.5-1.0
Date Sampled		21/01/2021	21/01/2021	21/01/2021	21/01/2021
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021
Date analysed	-	01/02/2021	02/02/2021	02/02/2021	02/02/2021
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	%	103	97	100	101

Organophosphorus Pesticides in Soil					
Our Reference		260350-2	260350-6	260350-10	260350-14
Your Reference	UNITS	BH109N/0.5-1.0	BH109E/0.5-1.0	BH109S/0.5-1.0	BH109W/0.5-1.0
Date Sampled		21/01/2021	21/01/2021	21/01/2021	21/01/2021
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021
Date analysed	-	01/02/2021	02/02/2021	02/02/2021	02/02/2021
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	103	97	100	101

PCBs in Soil					
Our Reference		260350-2	260350-6	260350-10	260350-14
Your Reference	UNITS	BH109N/0.5-1.0	BH109E/0.5-1.0	BH109S/0.5-1.0	BH109W/0.5-1.0
Date Sampled		21/01/2021	21/01/2021	21/01/2021	21/01/2021
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021
Date analysed	-	01/02/2021	02/02/2021	02/02/2021	02/02/2021
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	103	97	100	101

Acid Extractable metals in soil						
Our Reference		260350-2	260350-3	260350-5	260350-6	260350-7
Your Reference	UNITS	BH109N/0.5-1.0	BH109N/1.0-1.5	BH109E/0.05-0.5	BH109E/0.5-1.0	BH109E/1.0-1.5
Date Sampled		21/01/2021	21/01/2021	21/01/2021	21/01/2021	21/01/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	29/01/2021	29/01/2021	29/01/2021	02/02/2021	29/01/2021
Date analysed	-	31/01/2021	31/01/2021	31/01/2021	02/02/2021	31/01/2021
Arsenic	mg/kg	<4	6	6	9	4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	3	7	6	8	4
Copper	mg/kg	5	8	8	16	6
Lead	mg/kg	5	14	11	13	9
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	<1	2	3	2	<1
Zinc	mg/kg	7	39	26	23	12

Acid Extractable metals in soil						
Our Reference		260350-9	260350-10	260350-11	260350-13	260350-14
Your Reference	UNITS	BH109S/0.05-0.5	BH109S/0.5-1.0	BH109S/1.0-1.5	BH109W/0.05-0.5	BH109W/0.5-1.0
Date Sampled		21/01/2021	21/01/2021	21/01/2021	21/01/2021	21/01/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
Date analysed	-	31/01/2021	31/01/2021	31/01/2021	31/01/2021	31/01/2021
Arsenic	mg/kg	4	7	4	5	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	5	4	5	6	3
Copper	mg/kg	6	8	5	8	5
Lead	mg/kg	7	8	6	9	9
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	1	<1	1	2	<1
Zinc	mg/kg	13	12	19	19	9

Acid Extractable metals in soil			
Our Reference		260350-15	260350-67
Your Reference	UNITS	BH109W/1.0-1.5	BD1/20210121
Date Sampled		21/01/2021	-
Type of sample		Soil	Soil
Date prepared	-	29/01/2021	29/01/2021
Date analysed	-	31/01/2021	31/01/2021
Arsenic	mg/kg	<4	5
Cadmium	mg/kg	<0.4	<0.4
Chromium	mg/kg	3	4
Copper	mg/kg	6	6
Lead	mg/kg	12	7
Mercury	mg/kg	<0.1	<0.1
Nickel	mg/kg	1	<1
Zinc	mg/kg	34	11

Misc Soil - Inorg					
Our Reference		260350-2	260350-6	260350-10	260350-14
Your Reference	UNITS	BH109N/0.5-1.0	BH109E/0.5-1.0	BH109S/0.5-1.0	BH109W/0.5-1.0
Date Sampled		21/01/2021	21/01/2021	21/01/2021	21/01/2021
Type of sample		Soil	Soil	Soil	Soil
Date prepared	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021
Date analysed	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021
Total Phenolics (as Phenol)	mg/kg	<5	<5	<5	<5

Moisture						
Our Reference		260350-2	260350-3	260350-5	260350-6	260350-7
Your Reference	UNITS	BH109N/0.5-1.0	BH109N/1.0-1.5	BH109E/0.05-0.5	BH109E/0.5-1.0	BH109E/1.0-1.5
Date Sampled		21/01/2021	21/01/2021	21/01/2021	21/01/2021	21/01/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
Date analysed	-	01/02/2021	01/02/2021	01/02/2021	01/02/2021	01/02/2021
Moisture	%	13	16	15	15	17

Moisture						
Our Reference		260350-9	260350-10	260350-11	260350-13	260350-14
Your Reference	UNITS	BH109S/0.05-0.5	BH109S/0.5-1.0	BH109S/1.0-1.5	BH109W/0.05-0.5	BH109W/0.5-1.0
Date Sampled		21/01/2021	21/01/2021	21/01/2021	21/01/2021	21/01/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
Date analysed	-	01/02/2021	01/02/2021	01/02/2021	01/02/2021	01/02/2021
Moisture	%	16	15	19	21	16

Moisture			
Our Reference		260350-15	260350-67
Your Reference	UNITS	BH109W/1.0-1.5	BD1/20210121
Date Sampled		21/01/2021	-
Type of sample		Soil	Soil
Date prepared	-	29/01/2021	29/01/2021
Date analysed	-	01/02/2021	01/02/2021
Moisture	%	15	3.8

Asbestos ID - soils					
Our Reference		260350-2	260350-6	260350-10	260350-14
Your Reference	UNITS	BH109N/0.5-1.0	BH109E/0.5-1.0	BH109S/0.5-1.0	BH109W/0.5-1.0
Date Sampled		21/01/2021	21/01/2021	21/01/2021	21/01/2021
Type of sample		Soil	Soil	Soil	Soil
Date analysed	-	02/02/2021	02/02/2021	02/02/2021	02/02/2021
Sample mass tested	g	Approx. 40g	Approx. 50g	Approx. 50g	Approx. 45g
Sample Description	-	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Asbestos comments	-	NO	NO	NO	NO
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected

Asbestos ID - soils NEPM						
Our Reference		260350-3	260350-4	260350-7	260350-8	260350-11
Your Reference	UNITS	BH109N/1.0-1.5	BH109N/0.05-1.0	BH109E/1.0-1.5	BH109E/0.05-1.0	BH109S/1.0-1.5
Date Sampled		21/01/2021	21/01/2021	21/01/2021	21/01/2021	21/01/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	02/02/2021	02/02/2021	02/02/2021	02/02/2021	02/02/2021
Sample mass tested	g	1,043.49	1,099.19	969.32	1,042.02	940.08
Sample Description	-	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected
Total Asbestos[#1]	g/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	Chrysotile Crocidolite	Chrysotile
ACM >7mm Estimation*	g	–	–	–	–	–
FA and AF Estimation*	g	–	–	–	0.0358	0.0036
FA and AF Estimation*#2	%(w/w)	<0.001	<0.001	<0.001	0.0034	<0.001

Asbestos ID - soils NEPM				
Our Reference		260350-12	260350-15	260350-16
Your Reference	UNITS	BH109S/0.05-1.0	BH109W/1.0-1.5	BH109W/0.05-1.0
Date Sampled		21/01/2021	21/01/2021	21/01/2021
Type of sample		Soil	Soil	Soil
Date analysed	-	02/02/2021	02/02/2021	02/02/2021
Sample mass tested	g	1,049.55	1,132.77	995.24
Sample Description	-	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected
Total Asbestos[#1]	g/kg	<0.1	<0.1	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected	Chrysotile	No visible asbestos detected
ACM >7mm Estimation*	g	–	–	–
FA and AF Estimation*	g	–	0.0001	–
FA and AF Estimation*#2	%(w/w)	<0.001	<0.001	<0.001

Misc Inorg - Soil						
Our Reference		260350-1	260350-2	260350-3	260350-5	260350-6
Your Reference	UNITS	BH109N/0.05-0.5	BH109N/0.5-1.0	BH109N/1.0-1.5	BH109E/0.05-0.5	BH109E/0.5-1.0
Date Sampled		21/01/2021	21/01/2021	21/01/2021	21/01/2021	21/01/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Date analysed	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
pH 1:5 soil:water	pH Units	5.4	4.9	6.5	5.3	5.2
Chloride, Cl 1:5 soil:water	mg/kg	[NA]	<10	[NA]	[NA]	<10
Sulphate, SO4 1:5 soil:water	mg/kg	[NA]	10	[NA]	[NA]	10

Misc Inorg - Soil						
Our Reference		260350-7	260350-9	260350-10	260350-11	260350-13
Your Reference	UNITS	BH109E/1.0-1.5	BH109S/0.05-0.5	BH109S/0.5-1.0	BH109S/1.0-1.5	BH109W/0.05-0.5
Date Sampled		21/01/2021	21/01/2021	21/01/2021	21/01/2021	21/01/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Date analysed	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
pH 1:5 soil:water	pH Units	4.8	5.4	4.9	5.5	5.6
Chloride, Cl 1:5 soil:water	mg/kg	[NA]	[NA]	10	[NA]	[NA]
Sulphate, SO4 1:5 soil:water	mg/kg	[NA]	[NA]	36	[NA]	[NA]

Misc Inorg - Soil						
Our Reference		260350-14	260350-15	260350-17	260350-18	260350-19
Your Reference	UNITS	BH109W/0.5-1.0	BH109W/1.0-1.5	BH201/0.1	BH201/0.5	BH201/1.0
Date Sampled		21/01/2021	21/01/2021	22/01/2021	22/01/2021	22/01/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Date analysed	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
pH 1:5 soil:water	pH Units	5.0	5.5	5.5	5.5	5.7
Chloride, Cl 1:5 soil:water	mg/kg	<10	[NA]	[NA]	<10	[NA]
Sulphate, SO4 1:5 soil:water	mg/kg	20	[NA]	[NA]	<10	[NA]

Misc Inorg - Soil						
Our Reference		260350-20	260350-21	260350-22	260350-23	260350-24
Your Reference	UNITS	BH201/1.5	BH202/0.1	BH202/0.5	BH202/1.0	BH202/1.5
Date Sampled		22/01/2021	21/01/2021	21/01/2021	21/01/2021	21/01/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Date analysed	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
pH 1:5 soil:water	pH Units	5.3	5.5	6.2	5.9	5.2
Chloride, Cl 1:5 soil:water	mg/kg	[NA]	[NA]	[NA]	<10	[NA]
Sulphate, SO4 1:5 soil:water	mg/kg	[NA]	[NA]	[NA]	10	[NA]
Dispersibility	-	[NA]	[NA]	[NA]	#	[NA]

Misc Inorg - Soil						
Our Reference		260350-25	260350-26	260350-27	260350-28	260350-29
Your Reference	UNITS	BH202/2.0	BH202/2.5	BH203/0.1	BH203/0.5	BH203/1.0
Date Sampled		21/01/2021	21/01/2021	22/01/2021	22/01/2021	22/01/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Date analysed	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
pH 1:5 soil:water	pH Units	5.1	5.3	5.4	5.2	5.0
Chloride, Cl 1:5 soil:water	mg/kg	[NA]	<10	[NA]	[NA]	[NA]
Sulphate, SO4 1:5 soil:water	mg/kg	[NA]	110	[NA]	[NA]	[NA]
Dispersibility	-	[NA]	#	[NA]	[NA]	[NA]

Misc Inorg - Soil						
Our Reference		260350-30	260350-31	260350-32	260350-33	260350-34
Your Reference	UNITS	BH203/1.5	BH203/2.0	BH203/2.5	BH203/3.0	BH204/0.1
Date Sampled		22/01/2021	22/01/2021	22/01/2021	22/01/2021	21/01/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Date analysed	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
pH 1:5 soil:water	pH Units	5.2	5.3	5.3	5.1	5.5
Chloride, Cl 1:5 soil:water	mg/kg	<10	[NA]	[NA]	<10	[NA]
Sulphate, SO4 1:5 soil:water	mg/kg	10	[NA]	[NA]	32	[NA]
Dispersibility	-	[NA]	[NA]	[NA]	#	[NA]

Misc Inorg - Soil						
Our Reference		260350-35	260350-36	260350-37	260350-38	260350-39
Your Reference	UNITS	BH204/0.5	BH204/1.0	BH204/1.5	BH204/2.0	BH205/0.1
Date Sampled		21/01/2021	21/01/2021	21/01/2021	21/01/2021	21/01/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Date analysed	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
pH 1:5 soil:water	pH Units	5.5	4.7	4.7	4.9	4.2
Chloride, Cl 1:5 soil:water	mg/kg	[NA]	[NA]	[NA]	20	[NA]
Sulphate, SO4 1:5 soil:water	mg/kg	[NA]	[NA]	[NA]	43	[NA]

Misc Inorg - Soil						
Our Reference		260350-40	260350-41	260350-42	260350-43	260350-44
Your Reference	UNITS	BH205/0.5	BH205/1.0	BH205/1.5	BH205/2.0	BH206/0.1
Date Sampled		21/01/2021	21/01/2021	21/01/2021	21/01/2021	22/01/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Date analysed	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
pH 1:5 soil:water	pH Units	4.5	5.1	4.5	4.8	5.3
Chloride, Cl 1:5 soil:water	mg/kg	10	[NA]	[NA]	[NA]	10
Sulphate, SO4 1:5 soil:water	mg/kg	30	[NA]	[NA]	[NA]	<10
Dispersibility	-	[NA]	[NA]	[NA]	[NA]	#

Misc Inorg - Soil						
Our Reference		260350-45	260350-46	260350-47	260350-48	260350-49
Your Reference	UNITS	BH206/0.5	BH206/1.0	BH206/1.5	BH206/2.0	BH207/0.1
Date Sampled		22/01/2021	22/01/2021	22/01/2021	22/01/2021	22/01/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Date analysed	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
pH 1:5 soil:water	pH Units	5.8	5.9	4.8	5.0	6.0
Chloride, Cl 1:5 soil:water	mg/kg	[NA]	<10	[NA]	10	[NA]
Sulphate, SO4 1:5 soil:water	mg/kg	[NA]	<10	[NA]	59	[NA]
Dispersibility	-	[NA]	#	[NA]	[NA]	[NA]

Misc Inorg - Soil						
Our Reference		260350-50	260350-51	260350-52	260350-53	260350-54
Your Reference	UNITS	BH207/0.5	BH207/1.0	BH207/1.5	BH207/2.0	BH208/0.1
Date Sampled		22/01/2021	22/01/2021	22/01/2021	22/01/2021	21/01/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Date analysed	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
pH 1:5 soil:water	pH Units	5.8	4.8	4.5	4.7	5.7
Chloride, Cl 1:5 soil:water	mg/kg	[NA]	[NA]	32	[NA]	[NA]
Sulphate, SO4 1:5 soil:water	mg/kg	[NA]	[NA]	84	[NA]	[NA]

Misc Inorg - Soil						
Our Reference		260350-55	260350-56	260350-57	260350-58	260350-59
Your Reference	UNITS	BH208/0.6	BH208/1.0	BH208/1.5	BH208/2.0	BH208/2.5
Date Sampled		21/01/2021	21/01/2021	21/01/2021	21/01/2021	21/01/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Date analysed	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
pH 1:5 soil:water	pH Units	6.6	5.2	5.3	5.3	5.4
Chloride, Cl 1:5 soil:water	mg/kg	<10	[NA]	[NA]	100	[NA]
Sulphate, SO4 1:5 soil:water	mg/kg	20	[NA]	[NA]	39	[NA]
Dispersibility	-	#	[NA]	[NA]	[NA]	[NA]

Misc Inorg - Soil						
Our Reference		260350-60	260350-61	260350-62	260350-63	260350-64
Your Reference	UNITS	BH208/3.0	BH209/0.1	BH209/0.5	BH209/1.0	BH209/1.5
Date Sampled		21/01/2021	22/01/2021	22/01/2021	22/01/2021	22/01/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Date analysed	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
pH 1:5 soil:water	pH Units	5.5	5.5	5.4	5.3	5.1
Chloride, Cl 1:5 soil:water	mg/kg	[NA]	[NA]	[NA]	<10	[NA]
Sulphate, SO4 1:5 soil:water	mg/kg	[NA]	[NA]	[NA]	10	[NA]

Misc Inorg - Soil			
Our Reference		260350-65	260350-66
Your Reference	UNITS	BH209/2.0	BH209/2.5
Date Sampled		22/01/2021	22/01/2021
Type of sample		Soil	Soil
Date prepared	-	28/01/2021	28/01/2021
Date analysed	-	29/01/2021	29/01/2021
pH 1:5 soil:water	pH Units	4.8	5.2
Chloride, Cl 1:5 soil:water	mg/kg	[NA]	<10
Sulphate, SO4 1:5 soil:water	mg/kg	[NA]	42
Dispersibility	-	[NA]	#

Texture and Salinity*						
Our Reference		260350-1	260350-2	260350-3	260350-5	260350-6
Your Reference	UNITS	BH109N/0.05-0.5	BH109N/0.5-1.0	BH109N/1.0-1.5	BH109E/0.05-0.5	BH109E/0.5-1.0
Date Sampled		21/01/2021	21/01/2021	21/01/2021	21/01/2021	21/01/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Date analysed	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
Electrical Conductivity 1:5 soil:water	µS/cm	57	33	43	43	37
Texture Value	-	9.0	7.0	9.0	9.0	7.0
Texture	-	CLAY LOAM	MEDIUM CLAY	CLAY LOAM	CLAY LOAM	MEDIUM CLAY
ECe	dS/m	<2	<2	<2	<2	<2
Class	-	NON SALINE	NON SALINE	NON SALINE	NON SALINE	NON SALINE

Texture and Salinity*						
Our Reference		260350-7	260350-9	260350-10	260350-11	260350-13
Your Reference	UNITS	BH109E/1.0-1.5	BH109S/0.05-0.5	BH109S/0.5-1.0	BH109S/1.0-1.5	BH109W/0.05-0.5
Date Sampled		21/01/2021	21/01/2021	21/01/2021	21/01/2021	21/01/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Date analysed	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
Electrical Conductivity 1:5 soil:water	µS/cm	50	37	43	95	34
Texture Value	-	7.0	9.0	7.0	9.0	9.0
Texture	-	MEDIUM CLAY	CLAY LOAM	MEDIUM CLAY	CLAY LOAM	CLAY LOAM
ECe	dS/m	<2	<2	<2	<2	<2
Class	-	NON SALINE	NON SALINE	NON SALINE	NON SALINE	NON SALINE

Texture and Salinity*						
Our Reference		260350-14	260350-15	260350-17	260350-18	260350-19
Your Reference	UNITS	BH109W/0.5-1.0	BH109W/1.0-1.5	BH201/0.1	BH201/0.5	BH201/1.0
Date Sampled		21/01/2021	21/01/2021	22/01/2021	22/01/2021	22/01/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Date analysed	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
Electrical Conductivity 1:5 soil:water	µS/cm	34	35	33	29	27
Texture Value	-	7.0	9.0	7.0	7.0	8.0
Texture	-	MEDIUM CLAY	CLAY LOAM	MEDIUM CLAY	MEDIUM CLAY	LIGHT MEDIUM CLAY
ECe	dS/m	<2	<2	<2	<2	<2
Class	-	NON SALINE	NON SALINE	NON SALINE	NON SALINE	NON SALINE

Texture and Salinity*						
Our Reference		260350-20	260350-21	260350-22	260350-23	260350-24
Your Reference	UNITS	BH201/1.5	BH202/0.1	BH202/0.5	BH202/1.0	BH202/1.5
Date Sampled		22/01/2021	21/01/2021	21/01/2021	21/01/2021	21/01/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Date analysed	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
Electrical Conductivity 1:5 soil:water	µS/cm	63	150	36	33	88
Texture Value	-	7.0	9.0	7.0	8.0	8.0
Texture	-	MEDIUM CLAY	CLAY LOAM	MEDIUM CLAY	LIGHT MEDIUM CLAY	LIGHT MEDIUM CLAY
ECe	dS/m	<2	<2	<2	<2	<2
Class	-	NON SALINE	NON SALINE	NON SALINE	NON SALINE	NON SALINE

Texture and Salinity*						
Our Reference		260350-25	260350-26	260350-27	260350-28	260350-29
Your Reference	UNITS	BH202/2.0	BH202/2.5	BH203/0.1	BH203/0.5	BH203/1.0
Date Sampled		21/01/2021	21/01/2021	22/01/2021	22/01/2021	22/01/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Date analysed	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
Electrical Conductivity 1:5 soil:water	µS/cm	100	85	64	27	35
Texture Value	-	7.0	7.0	9.0	7.0	7.0
Texture	-	MEDIUM CLAY	MEDIUM CLAY	CLAY LOAM	MEDIUM CLAY	MEDIUM CLAY
ECe	dS/m	<2	<2	<2	<2	<2
Class	-	NON SALINE	NON SALINE	NON SALINE	NON SALINE	NON SALINE

Texture and Salinity*						
Our Reference		260350-30	260350-31	260350-32	260350-33	260350-34
Your Reference	UNITS	BH203/1.5	BH203/2.0	BH203/2.5	BH203/3.0	BH204/0.1
Date Sampled		22/01/2021	22/01/2021	22/01/2021	22/01/2021	21/01/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Date analysed	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
Electrical Conductivity 1:5 soil:water	µS/cm	29	33	31	50	28
Texture Value	-	9.0	9.0	9.0	9.0	9.0
Texture	-	CLAY LOAM	CLAY LOAM	CLAY LOAM	CLAY LOAM	CLAY LOAM
ECe	dS/m	<2	<2	<2	<2	<2
Class	-	NON SALINE	NON SALINE	NON SALINE	NON SALINE	NON SALINE

Texture and Salinity*						
Our Reference		260350-35	260350-36	260350-37	260350-38	260350-39
Your Reference	UNITS	BH204/0.5	BH204/1.0	BH204/1.5	BH204/2.0	BH205/0.1
Date Sampled		21/01/2021	21/01/2021	21/01/2021	21/01/2021	21/01/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Date analysed	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
Electrical Conductivity 1:5 soil:water	µS/cm	27	49	88	54	58
Texture Value	-	9.0	7.0	7.0	7.0	7.0
Texture	-	CLAY LOAM	MEDIUM CLAY	MEDIUM CLAY	MEDIUM CLAY	MEDIUM CLAY
ECe	dS/m	<2	<2	<2	<2	<2
Class	-	NON SALINE	NON SALINE	NON SALINE	NON SALINE	NON SALINE

Texture and Salinity*						
Our Reference		260350-40	260350-41	260350-42	260350-43	260350-44
Your Reference	UNITS	BH205/0.5	BH205/1.0	BH205/1.5	BH205/2.0	BH206/0.1
Date Sampled		21/01/2021	21/01/2021	21/01/2021	21/01/2021	22/01/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Date analysed	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
Electrical Conductivity 1:5 soil:water	µS/cm	42	38	65	73	65
Texture Value	-	7.0	7.0	7.0	7.0	9.0
Texture	-	MEDIUM CLAY	MEDIUM CLAY	MEDIUM CLAY	MEDIUM CLAY	CLAY LOAM
ECe	dS/m	<2	<2	<2	<2	<2
Class	-	NON SALINE	NON SALINE	NON SALINE	NON SALINE	NON SALINE

Texture and Salinity*						
Our Reference		260350-45	260350-46	260350-47	260350-48	260350-49
Your Reference	UNITS	BH206/0.5	BH206/1.0	BH206/1.5	BH206/2.0	BH207/0.1
Date Sampled		22/01/2021	22/01/2021	22/01/2021	22/01/2021	22/01/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Date analysed	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
Electrical Conductivity 1:5 soil:water	µS/cm	60	27	79	61	94
Texture Value	-	9.0	9.0	7.0	7.0	7.0
Texture	-	CLAY LOAM	CLAY LOAM	MEDIUM CLAY	MEDIUM CLAY	MEDIUM CLAY
ECe	dS/m	<2	<2	<2	<2	<2
Class	-	NON SALINE	NON SALINE	NON SALINE	NON SALINE	NON SALINE

Texture and Salinity*						
Our Reference		260350-50	260350-51	260350-52	260350-53	260350-54
Your Reference	UNITS	BH207/0.5	BH207/1.0	BH207/1.5	BH207/2.0	BH208/0.1
Date Sampled		22/01/2021	22/01/2021	22/01/2021	22/01/2021	21/01/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Date analysed	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
Electrical Conductivity 1:5 soil:water	µS/cm	58	87	94	76	46
Texture Value	-	7.0	7.0	7.0	7.0	9.0
Texture	-	MEDIUM CLAY	MEDIUM CLAY	MEDIUM CLAY	MEDIUM CLAY	CLAY LOAM
ECe	dS/m	<2	<2	<2	<2	<2
Class	-	NON SALINE	NON SALINE	NON SALINE	NON SALINE	NON SALINE

Texture and Salinity*						
Our Reference		260350-55	260350-56	260350-57	260350-58	260350-59
Your Reference	UNITS	BH208/0.6	BH208/1.0	BH208/1.5	BH208/2.0	BH208/2.5
Date Sampled		21/01/2021	21/01/2021	21/01/2021	21/01/2021	21/01/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Date analysed	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
Electrical Conductivity 1:5 soil:water	µS/cm	44	69	81	120	120
Texture Value	-	7.0	7.0	7.0	7.0	7.0
Texture	-	MEDIUM CLAY	MEDIUM CLAY	MEDIUM CLAY	MEDIUM CLAY	MEDIUM CLAY
ECe	dS/m	<2	<2	<2	<2	<2
Class	-	NON SALINE	NON SALINE	NON SALINE	NON SALINE	NON SALINE

Texture and Salinity*						
Our Reference		260350-60	260350-61	260350-62	260350-63	260350-64
Your Reference	UNITS	BH208/3.0	BH209/0.1	BH209/0.5	BH209/1.0	BH209/1.5
Date Sampled		21/01/2021	22/01/2021	22/01/2021	22/01/2021	22/01/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Date analysed	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
Electrical Conductivity 1:5 soil:water	µS/cm	98	49	43	32	59
Texture Value	-	9.0	9.0	9.0	9.0	7.0
Texture	-	CLAY LOAM	CLAY LOAM	CLAY LOAM	CLAY LOAM	MEDIUM CLAY
ECe	dS/m	<2	<2	<2	<2	<2
Class	-	NON SALINE	NON SALINE	NON SALINE	NON SALINE	NON SALINE

Texture and Salinity*			
Our Reference		260350-65	260350-66
Your Reference	UNITS	BH209/2.0	BH209/2.5
Date Sampled		22/01/2021	22/01/2021
Type of sample		Soil	Soil
Date prepared	-	28/01/2021	28/01/2021
Date analysed	-	29/01/2021	29/01/2021
Electrical Conductivity 1:5 soil:water	µS/cm	77	57
Texture Value	-	7.0	7.0
Texture	-	MEDIUM CLAY	MEDIUM CLAY
ECe	dS/m	<2	<2
Class	-	NON SALINE	NON SALINE

ESP/CEC						
Our Reference		260350-23	260350-26	260350-33	260350-44	260350-46
Your Reference	UNITS	BH202/1.0	BH202/2.5	BH203/3.0	BH206/0.1	BH206/1.0
Date Sampled		21/01/2021	21/01/2021	22/01/2021	22/01/2021	22/01/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	01/02/2021	01/02/2021	01/02/2021	01/02/2021	01/02/2021
Date analysed	-	01/02/2021	01/02/2021	01/02/2021	01/02/2021	01/02/2021
Exchangeable Ca	meq/100g	7.9	1.1	4.9	7.2	8.4
Exchangeable K	meq/100g	0.3	0.4	0.6	1.3	0.3
Exchangeable Mg	meq/100g	2.1	2.9	3.6	3.8	2.7
Exchangeable Na	meq/100g	0.21	0.70	0.21	<0.1	0.23
Cation Exchange Capacity	meq/100g	10	5.1	9.4	12	12
ESP	%	2	14	2	<1	2

ESP/CEC			
Our Reference		260350-55	260350-66
Your Reference	UNITS	BH208/0.6	BH209/2.5
Date Sampled		21/01/2021	22/01/2021
Type of sample		Soil	Soil
Date prepared	-	01/02/2021	01/02/2021
Date analysed	-	01/02/2021	01/02/2021
Exchangeable Ca	meq/100g	9.4	1.0
Exchangeable K	meq/100g	0.2	0.4
Exchangeable Mg	meq/100g	5.3	3.8
Exchangeable Na	meq/100g	0.26	0.53
Cation Exchange Capacity	meq/100g	15	5.7
ESP	%	2	9

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.
Ext-037	Analysed by Sydney Environmental & Soil Laboratory
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA latest edition, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Inorg-002	Conductivity and Salinity - measured using a conductivity cell at 25°C in accordance with APHA latest edition 2510 and Rayment & Lyons.
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Inorg-031	Total Phenolics by segmented flow analyser (in line distillation with colourimetric finish). Solids are extracted in a caustic media prior to analysis.
Inorg-081	Anions - a range of Anions are determined by Ion Chromatography, in accordance with APHA latest edition, 4110-B. Waters samples are filtered on receipt prior to analysis. Alternatively determined by colourimetry/turbidity using Discrete Analyser.
INORG-123	Determined using a "Texture by Feel" method.
Metals-020	Determination of various metals by ICP-AES.
Metals-020	Determination of exchangeable cations and cation exchange capacity in soils using 1M Ammonium Chloride exchange and ICP-AES analytical finish.
Metals-021	Determination of Mercury by Cold Vapour AAS.

Method ID	Methodology Summary
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-021	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Org-021	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD. Note, the Total +ve PCBs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PCBs" is simply a sum of the positive individual PCBs.
Org-022	Determination of VOCs sampled onto coconut shell charcoal sorbent tubes, that can be desorbed using carbon disulphide, and analysed by GC-MS.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS.
Org-022/025	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-MS/GC-MSMS. Note, the Total +ve reported DDD+DDE+DDT PQL is reflective of the lowest individual PQL and is therefore simply a sum of the positive individually report DDD+DDE+DDT.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS and/or GC-MS/MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'EQ PQL'values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'EQ zero'values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'EQ half PQL'values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.

Method ID	Methodology Summary
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	260350-6
Date extracted	-			29/01/2021	2	29/01/2021	29/01/2021		29/01/2021	29/01/2021
Date analysed	-			01/02/2021	2	01/02/2021	01/02/2021		01/02/2021	01/02/2021
TRH C_6 - C_9	mg/kg	25	Org-023	<25	2	<25	<25	0	113	104
TRH C_6 - C_{10}	mg/kg	25	Org-023	<25	2	<25	<25	0	113	104
Benzene	mg/kg	0.2	Org-023	<0.2	2	<0.2	<0.2	0	103	96
Toluene	mg/kg	0.5	Org-023	<0.5	2	<0.5	<0.5	0	113	100
Ethylbenzene	mg/kg	1	Org-023	<1	2	<1	<1	0	124	115
m+p-xylene	mg/kg	2	Org-023	<2	2	<2	<2	0	113	104
o-Xylene	mg/kg	1	Org-023	<1	2	<1	<1	0	116	106
naphthalene	mg/kg	1	Org-023	<1	2	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	111	2	81	82	1	108	93

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]	14	29/01/2021	29/01/2021		[NT]	[NT]
Date analysed	-			[NT]	14	01/02/2021	01/02/2021		[NT]	[NT]
TRH C_6 - C_9	mg/kg	25	Org-023	[NT]	14	<25	<25	0	[NT]	[NT]
TRH C_6 - C_{10}	mg/kg	25	Org-023	[NT]	14	<25	<25	0	[NT]	[NT]
Benzene	mg/kg	0.2	Org-023	[NT]	14	<0.2	<0.2	0	[NT]	[NT]
Toluene	mg/kg	0.5	Org-023	[NT]	14	<0.5	<0.5	0	[NT]	[NT]
Ethylbenzene	mg/kg	1	Org-023	[NT]	14	<1	<1	0	[NT]	[NT]
m+p-xylene	mg/kg	2	Org-023	[NT]	14	<2	<2	0	[NT]	[NT]
o-Xylene	mg/kg	1	Org-023	[NT]	14	<1	<1	0	[NT]	[NT]
naphthalene	mg/kg	1	Org-023	[NT]	14	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	[NT]	14	105	89	16	[NT]	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	260350-6
Date extracted	-			29/01/2021	2	29/01/2021	29/01/2021		29/01/2021	29/01/2021
Date analysed	-			29/01/2021	2	29/01/2021	29/01/2021		29/01/2021	29/01/2021
TRH C_{10} - C_{14}	mg/kg	50	Org-020	<50	2	<50	<50	0	97	93
TRH C_{15} - C_{28}	mg/kg	100	Org-020	<100	2	<100	<100	0	96	91
TRH C_{29} - C_{36}	mg/kg	100	Org-020	<100	2	<100	<100	0	108	112
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	<50	2	<50	<50	0	97	93
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	<100	2	<100	<100	0	96	91
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	<100	2	<100	<100	0	108	112
Surrogate o-Terphenyl	%		Org-020	109	2	93	107	14	113	112

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	14	29/01/2021	29/01/2021		[NT]	[NT]
Date analysed	-			[NT]	14	29/01/2021	29/01/2021		[NT]	[NT]
TRH C_{10} - C_{14}	mg/kg	50	Org-020	[NT]	14	<50	<50	0	[NT]	[NT]
TRH C_{15} - C_{28}	mg/kg	100	Org-020	[NT]	14	<100	<100	0	[NT]	[NT]
TRH C_{29} - C_{36}	mg/kg	100	Org-020	[NT]	14	<100	<100	0	[NT]	[NT]
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	[NT]	14	<50	<50	0	[NT]	[NT]
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	[NT]	14	<100	<100	0	[NT]	[NT]
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	[NT]	14	<100	<100	0	[NT]	[NT]
Surrogate o-Terphenyl	%		Org-020	[NT]	14	107	106	1	[NT]	[NT]

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	260350-6
Date extracted	-			29/01/2021	2	29/01/2021	29/01/2021		29/01/2021	29/01/2021
Date analysed	-			02/02/2021	2	01/02/2021	01/02/2021		02/02/2021	02/02/2021
Naphthalene	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	103	105
Acenaphthylene	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	108	109
Fluorene	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	114	109
Phenanthrene	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	115	111
Anthracene	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	116	111
Pyrene	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	114	113
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	139	135
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	<0.2	2	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	<0.05	2	<0.05	<0.05	0	108	110
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	93	2	90	90	0	86	92

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	14	29/01/2021	29/01/2021		[NT]	[NT]
Date analysed	-			[NT]	14	02/02/2021	02/02/2021		[NT]	[NT]
Naphthalene	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Acenaphthylene	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Phenanthrene	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Anthracene	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Pyrene	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	[NT]	14	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	[NT]	14	<0.05	<0.05	0	[NT]	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	[NT]	14	95	95	0	[NT]	[NT]

QUALITY CONTROL: Organochlorine Pesticides in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	260350-6
Date extracted	-			29/01/2021	2	29/01/2021	29/01/2021		29/01/2021	29/01/2021
Date analysed	-			02/02/2021	2	01/02/2021	01/02/2021		02/02/2021	02/02/2021
alpha-BHC	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	117	111
HCB	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	115	113
gamma-BHC	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	111	125
delta-BHC	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	115	114
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	110	109
gamma-Chlordane	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	109	106
Dieldrin	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	117	115
Endrin	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	114	95
Endosulfan II	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	108	106
Endrin Aldehyde	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	114	116
Methoxychlor	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	98	2	103	101	2	93	97

QUALITY CONTROL: Organochlorine Pesticides in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	14	29/01/2021	29/01/2021		[NT]	[NT]
Date analysed	-			[NT]	14	02/02/2021	02/02/2021		[NT]	[NT]
alpha-BHC	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
HCB	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
gamma-BHC	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
delta-BHC	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
gamma-Chlordane	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Dieldrin	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Endrin	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Endosulfan II	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Methoxychlor	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	[NT]	14	101	98	3	[NT]	[NT]

QUALITY CONTROL: Organophosphorus Pesticides in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	260350-6
Date extracted	-			29/01/2021	2	29/01/2021	29/01/2021		29/01/2021	29/01/2021
Date analysed	-			02/02/2021	2	01/02/2021	01/02/2021		02/02/2021	02/02/2021
Dichlorvos	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	98	92
Dimethoate	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos-methyl	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	111	114
Fenitrothion	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	95	97
Malathion	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	137	137
Chlorpyriphos	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	122	118
Parathion	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	98	76
Bromophos-ethyl	mg/kg	0.1	Org-022	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	125	129
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	98	2	103	101	2	93	97

QUALITY CONTROL: Organophosphorus Pesticides in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	14	29/01/2021	29/01/2021		[NT]	[NT]
Date analysed	-			[NT]	14	02/02/2021	02/02/2021		[NT]	[NT]
Dichlorvos	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Dimethoate	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos-methyl	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Fenitrothion	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Malathion	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Parathion	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Bromophos-ethyl	mg/kg	0.1	Org-022	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	[NT]	14	101	98	3	[NT]	[NT]

QUALITY CONTROL: PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	260350-6
Date extracted	-			29/01/2021	2	29/01/2021	29/01/2021		29/01/2021	29/01/2021
Date analysed	-			02/02/2021	2	01/02/2021	01/02/2021		02/02/2021	02/02/2021
Aroclor 1016	mg/kg	0.1	Org-021	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021	<0.1	2	<0.1	<0.1	0	100	100
Aroclor 1260	mg/kg	0.1	Org-021	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-021	98	2	103	101	2	93	97

QUALITY CONTROL: PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	14	29/01/2021	29/01/2021		[NT]	[NT]
Date analysed	-			[NT]	14	02/02/2021	02/02/2021		[NT]	[NT]
Aroclor 1016	mg/kg	0.1	Org-021	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1260	mg/kg	0.1	Org-021	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-021	[NT]	14	101	98	3	[NT]	[NT]

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-6	260350-6
Date prepared	-			29/01/2021	2	29/01/2021	29/01/2021		29/01/2021	02/02/2021
Date analysed	-			31/01/2021	2	31/01/2021	31/01/2021		31/01/2021	02/02/2021
Arsenic	mg/kg	4	Metals-020	<4	2	<4	<4	0	98	74
Cadmium	mg/kg	0.4	Metals-020	<0.4	2	<0.4	<0.4	0	93	71
Chromium	mg/kg	1	Metals-020	<1	2	3	3	0	95	72
Copper	mg/kg	1	Metals-020	<1	2	5	5	0	96	74
Lead	mg/kg	1	Metals-020	<1	2	5	6	18	95	85
Mercury	mg/kg	0.1	Metals-021	<0.1	2	<0.1	<0.1	0	110	91
Nickel	mg/kg	1	Metals-020	<1	2	<1	<1	0	98	71
Zinc	mg/kg	1	Metals-020	<1	2	7	7	0	110	#

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	14	29/01/2021	29/01/2021		[NT]	[NT]
Date analysed	-			[NT]	14	31/01/2021	31/01/2021		[NT]	[NT]
Arsenic	mg/kg	4	Metals-020	[NT]	14	<4	4	0	[NT]	[NT]
Cadmium	mg/kg	0.4	Metals-020	[NT]	14	<0.4	<0.4	0	[NT]	[NT]
Chromium	mg/kg	1	Metals-020	[NT]	14	3	4	29	[NT]	[NT]
Copper	mg/kg	1	Metals-020	[NT]	14	5	6	18	[NT]	[NT]
Lead	mg/kg	1	Metals-020	[NT]	14	9	7	25	[NT]	[NT]
Mercury	mg/kg	0.1	Metals-021	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Nickel	mg/kg	1	Metals-020	[NT]	14	<1	<1	0	[NT]	[NT]
Zinc	mg/kg	1	Metals-020	[NT]	14	9	10	11	[NT]	[NT]

QUALITY CONTROL: Misc Soil - Inorg						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	260350-6
Date prepared	-			29/01/2021	2	29/01/2021	29/01/2021		29/01/2021	29/01/2021
Date analysed	-			29/01/2021	2	29/01/2021	29/01/2021		29/01/2021	29/01/2021
Total Phenolics (as Phenol)	mg/kg	5	Inorg-031	<5	2	<5	<5	0	99	99

QUALITY CONTROL: Misc Inorg - Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	260350-2
Date prepared	-			28/01/2021	1	28/01/2021	28/01/2021		28/01/2021	28/01/2021
Date analysed	-			29/01/2021	1	29/01/2021	29/01/2021		29/01/2021	29/01/2021
pH 1:5 soil:water	pH Units		Inorg-001	[NT]	1	5.4	5.4	0	101	[NT]
Chloride, Cl 1:5 soil:water	mg/kg	10	Inorg-081	<10	14	<10	<10	0	94	[NT]
Sulphate, SO4 1:5 soil:water	mg/kg	10	Inorg-081	<10	14	20	25	22	88	[NT]
Dispersibility	-	0	Ext-037	[NT]	66	#	[NT]		[NT]	[NT]

QUALITY CONTROL: Misc Inorg - Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	260350-26
Date prepared	-			[NT]	14	28/01/2021	28/01/2021		28/01/2021	28/01/2021
Date analysed	-			[NT]	14	29/01/2021	29/01/2021		29/01/2021	29/01/2021
pH 1:5 soil:water	pH Units		Inorg-001	[NT]	14	5.0	5.0	0	98	[NT]
Chloride, Cl 1:5 soil:water	mg/kg	10	Inorg-081	[NT]	52	32	33	3	[NT]	[NT]
Sulphate, SO4 1:5 soil:water	mg/kg	10	Inorg-081	[NT]	52	84	85	1	[NT]	[NT]

QUALITY CONTROL: Misc Inorg - Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	260350-46
Date prepared	-			[NT]	25	28/01/2021	28/01/2021		28/01/2021	28/01/2021
Date analysed	-			[NT]	25	29/01/2021	29/01/2021		29/01/2021	29/01/2021
pH 1:5 soil:water	pH Units		Inorg-001	[NT]	25	5.1	5.1	0	101	[NT]
Chloride, Cl 1:5 soil:water	mg/kg	10	Inorg-081	[NT]	66	<10	<10	0	[NT]	[NT]
Sulphate, SO4 1:5 soil:water	mg/kg	10	Inorg-081	[NT]	66	42	43	2	[NT]	[NT]

QUALITY CONTROL: Misc Inorg - Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	[NT]
Date prepared	-			[NT]	35	28/01/2021	28/01/2021		28/01/2021	[NT]
Date analysed	-			[NT]	35	29/01/2021	29/01/2021		29/01/2021	[NT]
pH 1:5 soil:water	pH Units		Inorg-001	[NT]	35	5.5	5.4	2	101	[NT]

QUALITY CONTROL: Misc Inorg - Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	45	28/01/2021	28/01/2021		[NT]	[NT]
Date analysed	-			[NT]	45	29/01/2021	29/01/2021		[NT]	[NT]
pH 1:5 soil:water	pH Units		Inorg-001	[NT]	45	5.8	5.8	0	[NT]	[NT]

QUALITY CONTROL: Misc Inorg - Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	52	28/01/2021	28/01/2021		[NT]	[NT]
Date analysed	-			[NT]	52	29/01/2021	29/01/2021		[NT]	[NT]
pH 1:5 soil:water	pH Units		Inorg-001	[NT]	52	4.5	4.5	0	[NT]	[NT]

QUALITY CONTROL: Misc Inorg - Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	66	28/01/2021	28/01/2021		[NT]	[NT]
Date analysed	-			[NT]	66	29/01/2021	29/01/2021		[NT]	[NT]
pH 1:5 soil:water	pH Units		Inorg-001	[NT]	66	5.2	5.2	0	[NT]	[NT]

QUALITY CONTROL: Texture and Salinity*						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			28/01/2021	1	28/01/2021	28/01/2021		28/01/2021	[NT]
Date analysed	-			29/01/2021	1	29/01/2021	29/01/2021		29/01/2021	[NT]
Electrical Conductivity 1:5 soil:water	µS/cm	1	Inorg-002	<1	1	57	59	3	104	[NT]
Texture Value	-		INORG-123	[NT]	1	9.0	9.0	0	[NT]	[NT]

QUALITY CONTROL: Texture and Salinity*						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	[NT]
Date prepared	-			[NT]	14	28/01/2021	28/01/2021		28/01/2021	[NT]
Date analysed	-			[NT]	14	29/01/2021	29/01/2021		29/01/2021	[NT]
Electrical Conductivity 1:5 soil:water	µS/cm	1	Inorg-002	[NT]	14	34	35	3	100	[NT]
Texture Value	-		INORG-123	[NT]	14	7.0	7.0	0	[NT]	[NT]

QUALITY CONTROL: Texture and Salinity*						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	[NT]
Date prepared	-			[NT]	25	28/01/2021	28/01/2021		28/01/2021	[NT]
Date analysed	-			[NT]	25	29/01/2021	29/01/2021		29/01/2021	[NT]
Electrical Conductivity 1:5 soil:water	µS/cm	1	Inorg-002	[NT]	25	100	100	0	101	[NT]
Texture Value	-		INORG-123	[NT]	25	7.0	7.0	0	[NT]	[NT]

QUALITY CONTROL: Texture and Salinity*						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	[NT]
Date prepared	-			[NT]	35	28/01/2021	28/01/2021		28/01/2021	[NT]
Date analysed	-			[NT]	35	29/01/2021	29/01/2021		29/01/2021	[NT]
Electrical Conductivity 1:5 soil:water	µS/cm	1	Inorg-002	[NT]	35	27	28	4	102	[NT]
Texture Value	-		INORG-123	[NT]	35	9.0	9.0	0	[NT]	[NT]

QUALITY CONTROL: Texture and Salinity*						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	45	28/01/2021	28/01/2021		[NT]	[NT]
Date analysed	-			[NT]	45	29/01/2021	29/01/2021		[NT]	[NT]
Electrical Conductivity 1:5 soil:water	µS/cm	1	Inorg-002	[NT]	45	60	58	3	[NT]	[NT]
Texture Value	-		INORG-123	[NT]	45	9.0	9.0	0	[NT]	[NT]

QUALITY CONTROL: Texture and Salinity*						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	52	28/01/2021	28/01/2021		[NT]	[NT]
Date analysed	-			[NT]	52	29/01/2021	29/01/2021		[NT]	[NT]
Electrical Conductivity 1:5 soil:water	µS/cm	1	Inorg-002	[NT]	52	94	99	5	[NT]	[NT]
Texture Value	-		INORG-123	[NT]	52	7.0	7.0	0	[NT]	[NT]

QUALITY CONTROL: Texture and Salinity*					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	66	28/01/2021	28/01/2021		[NT]	[NT]
Date analysed	-			[NT]	66	29/01/2021	29/01/2021		[NT]	[NT]
Electrical Conductivity 1:5 soil:water	µS/cm	1	Inorg-002	[NT]	66	57	56	2	[NT]	[NT]
Texture Value	-		INORG-123	[NT]	66	7.0	7.0	0	[NT]	[NT]

QUALITY CONTROL: ESP/CEC						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			01/02/2021	55	01/02/2021	01/02/2021		01/02/2021	[NT]
Date analysed	-			01/02/2021	55	01/02/2021	01/02/2021		01/02/2021	[NT]
Exchangeable Ca	meq/100g	0.1	Metals-020	<0.1	55	9.4	8.4	11	111	[NT]
Exchangeable K	meq/100g	0.1	Metals-020	<0.1	55	0.2	0.2	0	122	[NT]
Exchangeable Mg	meq/100g	0.1	Metals-020	<0.1	55	5.3	4.9	8	112	[NT]
Exchangeable Na	meq/100g	0.1	Metals-020	<0.1	55	0.26	0.24	8	126	[NT]
ESP	%	1	Metals-020	[NT]	55	2	2	0	[NT]	[NT]

Result Definitions

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

Quality Control Definitions

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

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

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 260350-8; Chrysotile and Crocidolite asbestos identified in 0.0421g of fibrous matted material

Sample 260350-11; Chrysotile asbestos identified in 0.0239g of fibre cement material <7mm

Sample 260350-15; Chrysotile asbestos identified in 0.0006g of fibre cement material <7mm

Samples were out of the recommended holding time for this analysis pH in soil.

Dispersibility was analysed by East West Geo Ag Enviro. Repor No. EW210283
view attached report

8 metals in soil - # Low spike recovery was obtained for this sample. The sample was re-digested and re-spiked and the low recovery was confirmed. This is due to matrix interferences. However, an acceptable recovery was obtained for the LCS.

Douglas Partners
Geotechnics | Environment | Groundwater

CHAIN OF CUSTODY DESPATCH SHEET

Project No:	86977.01	**Suburb:**	Toongabbie	**To:**	Envirolab Services
Project Name:	Pendle Hill High School Development	**Order Number**			12 Ashley Street, Chatswood
Project Manager:	Lisa Teng	**Sampler:**	Tom Graham	**Attn:**	Aileen Hie
Emails:	Lisa.Teng@douglaspartners.com.au	Tom.Graham@douglaspartners.com.au		**Phone:**	9910 6200
Date Required:	Same day ☐ 24 hours ☐ 48 hours ☐ 72 hours ☐ Standard ☑			**Email:**	ahie@envirolab.com.au
Prior Storage:	☐ Esky ☒ Fridge ☑ Shelved	Do samples contain 'potential' HBM?	Yes ☐ No ☑ (If YES, then handle, transport and store in accordance with FPM HAZID)		

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

Sample ID	Lab ID	Date Sampled	Sample Type (S - soil, W - water)	Container Type (G - glass, P - plastic)	Analytes: Combo 8a	Combo 3	Asbestos 500mL	BTEX	Texture / Salinity	pH	Chloride	Sulphate	Sodicity / Dispersibility v	Notes/preservation
BH109N/0.05-0.5	1	21/01/21	S	G+P					X	X				
BH109N/0.5-1.0	2	21/01/21	S	G+P	X				X	X	X	X		
BH109N/1.0-1.5	3	21/01/21	S	G+P		X	X		X	X				Use Abs/ove Sample for 500mL
BH109N/0.05-1.0	4	21/01/21	S	P			X							
BH109E/0.05-0.5	5	21/01/21	S	G+P		X			X	X				
BH109E/0.5-1.0	6	21/01/21	S	G+P	X				X	X	X	X		
BH109E/1.0-1.5	7	21/01/21	S	G+P		X	X		X	X				Use Above Sample for 500mL
BH109E/0.05-1.0	8	21/01/21	S	P			X							
BH109S/0.05-0.5	9	21/01/21	S	G+P		X			X	X				
BH109S/0.5-1.0	10	21/01/21	S	G+P	X				X	X	X	X		
BH109S/1.0-1.5	11	21/01/21	S	G+P		X	X		X	X				Use Above Sample for 500mL
BH109S/0.05-1.0	12	21/01/21	S	P			X							
BH109W/0.05-0.5	13	21/01/21	S	G+P		X			X	X				
BH109W/0.5-1.0	14	21/01/21	S	G+P	X				X	X	X	X		
BH109W/1.0-1.5	15	21/01/21	S	G+P		X	X		X	X				Use Above Sample for 500mL
PQL (S) mg/kg														**ANZECC PQLs req'd for all water analytes** ☐

Job No: 260350
Date Received: 27/1/21
Time Received: 1425
Received By: JD
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit

Metals to Analyse: 8HM unless specified here:

Lab Report/Reference No: 260350

Total number of samples in container: **Relinquished by:** TG **Transported to laboratory by:** Bonded Courier

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

Signed: **Received by:** Jason Day **Date & Time:** 27/1/21 1425

7.4°C

Douglas Partners
Geotechnics | Environment | Groundwater

CHAIN OF CUSTODY DESPATCH SHEET

Project No:	86977.01	**Suburb:**	Toongabbie	**To:**	Envirolab Services
Project Name:	Pendle Hill High School Development	**Order Number**			12 Ashley Street, Chatswood
Project Manager:	Lisa Teng	**Sampler:**	Tom Graham	**Attn:**	Aileen Hie
Emails:	Lisa.Teng@douglaspartners.com.au	Tom.Graham@douglaspartners.com.au		**Phone:**	9910 6200
Date Required:	Same day ☐ 24 hours ☐ 48 hours ☐ 72 hours ☐ Standard ☑			**Email:**	ahie@envirolab.com.au
Prior Storage:	☐ Esky ☑ Fridge ☑ Shelved	Do samples contain 'potential' HBM? Yes ☐ No ☑ (If YES, then handle, transport and store in accordance with FPM HAZID)			

Sample ID	Lab ID	Sampling Date	Sample Type (S - soil, W - water)	Container Type (G - glass, P - plastic)	Analytes: Combo 8a	Combo 3	Asbestos 500mL	BTEX	Texture / Salinity	pH	Chloride	Sulphate	Sodicity / Dispersibility v	Notes/preservation
BH109W/0.05-1.0	16	21/01/21	S	P			X							
BH201/0.1	17	22/01/21	S	P					X	X				
BH201/0.5	18	22/01/21	S	P					X	X	X	X		
BH201/1.0	19	22/01/21	S	P					X	X				
BH201/1.5	20	22/01/21	S	P					X	X				
BH202/0.1	21	21/01/21	S	P					X	X				
BH202/0.5	22	21/01/21	S	P					X	X				
BH202/1.0	23	21/01/21	S	P					X	X	X	X	X	
BH202/1.5	24	21/01/21	S	P					X	X				
BH202/2.0	25	21/01/21	S	P					X	X				
BH202/2.5	26	21/01/21	S	P					X	X	X	X	X	
BH203/0.1	27	22/01/21	S	P					X	X				
BH203/0.5	28	22/01/21	S	P					X	X				
BH203/1.0	29	22/01/21	S	P					X	X				
BH203/1.5	30	22/01/21	S	P					X	X	X	X		
PQL (S) mg/kg														**ANZECC PQLs req'd for all water analytes** ☐

PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit

Metals to Analyse: 8HM unless specified here:

Lab Report/Reference No: 260350

Total number of samples in container:	**Relinquished by:** TG	**Transported to laboratory by:**	Bonded Courier
Send Results to: Douglas Partners Pty Ltd	**Address**	**Phone:**	**Fax:**
Signed:	**Received by:** Jason Day GLS SYD	**Date & Time:** 27/1/21 1425	7.4°C

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CHAIN OF CUSTODY DESPATCH SHEET

Project No:	86977.01	**Suburb:**	Toongabbie	**To:**	Envirolab Services
Project Name:	Pendle Hill High School Development	**Order Number**			12 Ashley Street, Chatswood
Project Manager:	Lisa Teng	**Sampler:**	Tom Graham	**Attn:**	Aileen Hie
Emails:	Lisa.Teng@douglaspartners.com.au	Tom.Graham@douglaspartners.com.au		**Phone:**	9910 6200
Date Required:	Same day ☐ 24 hours ☐ 48 hours ☐ 72 hours ☐ Standard ☑			**Email:**	ahie@envirolab.com.au
Prior Storage:	☐ Esky ☑ Fridge ☑ Shelved	Do samples contain 'potential' HBM?	Yes ☐ No ☒ (If YES, then handle, transport and store in accordance with FPM HAZID)		

Sample ID	Lab ID	Sampling Date	Sample Type (S - soil, W - water)	Container Type (G - glass, P - plastic)	Analytes: Combo 8a	Combo 3	Asbestos 500mL	BTEX	Texture / Salinity	pH	Chloride	Sulphate	Sodicity / Dispersibility v	Notes/preservation
BH203/2.0	31	22/01/21	S	P					X	X				
BH203/2.5	32	22/01/21	S	P					X	X				
BH203/3.0	33	22/01/21	S	P					X	X	X	X	X	
BH204/0.1	34	21/01/21	S	P					X	X				
BH204/0.5	35	21/01/21	S	P					X	X				
BH204/1.0	36	21/01/21	S	P					X	X				
BH204/1.5	37	21/01/21	S	P					X	X				
BH204/2.0	38	21/01/21	S	P					X	X	X	X		
BH205/0.1	39	21/01/21	S	P					X	X				
BH205/0.5	40	21/01/21	S	P					X	X	X	X		
BH205/1.0	41	21/01/21	S	P					X	X				
BH205/1.5	42	21/01/21	S	P					X	X				
BH205/2.0	43	21/01/21	S	P					X	X				
BH206/0.1	44	22/01/21	S	P					X	X	X	X	X	
BH206/0.5	45	22/01/21	S	P					X	X				
PQL (S) mg/kg														**ANZECC PQLs req'd for all water analytes** ☐

PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit

Lab Report/Reference No: 260350

Metals to Analyse: 8HM unless specified here:

Total number of samples in container: **Relinquished by:** TG **Transported to laboratory by:** Bonded Courier

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

Signed: **Received by:** Soon Day JBH GUS SHO **Date & Time:** 27/1/21 1425

Douglas Partners
Geotechnics | Environment | Groundwater

CHAIN OF CUSTODY DESPATCH SHEET

Project No:	86977.01	**Suburb:**	Toongabbie	**To:**	Envirolab Services
Project Name:	Pendle Hill High School Development	**Order Number**			12 Ashley Street, Chatswood
Project Manager:	Lisa Teng	**Sampler:**	Tom Graham	**Attn:**	Aileen Hie
Emails:	Lisa.Teng@douglaspartners.com.au	Tom.Graham@douglaspartners.com.au		**Phone:**	9910 6200
Date Required:	Same day ☐ 24 hours ☐ 48 hours ☐ 72 hours ☐ Standard ☒			**Email:**	ahie@envirolab.com.au
Prior Storage:	☐ Esky ☒ Fridge ☒ Shelved	Do samples contain 'potential' HBM?	Yes ☐ No ☒ (If YES, then handle, transport and store in accordance with FPM HAZID)		

Sample ID	Lab ID	Sampling Date	Sample Type (S - soil W - water)	Container Type (G - glass P - plastic)	Analytes: Combo 8a	Combo 3	Asbestos 500mL	BTEX	Texture / Salinity	pH	Chloride	Sulphate	Sodicity / Dispersibility	Notes/preservation
BH206/1.0	46	22/01/21	S	P					X	X	X	X	X	
BH206/1.5	47	22/01/21	S	P					X	X				
BH206/2.0	48	22/01/21	S	P					X	X	X	X		
BH207/0.1	49	22/01/21	S	P					X	X				
BH207/0.5	50	22/01/21	S	P					X	X				
BH207/1.0	51	22/01/21	S	P					X	X				
BH207/1.5	52	22/01/21	S	P					X	X	X	X		
BH207/2.0	53	22/01/21	S	P					X	X				
BH208/0.1	54	21/01/21	S	P					X	X				
BH208/0.6	55	21/01/21	S	P					X	X	X	X	X	
BH208/1.0	56	21/01/21	S	P					X	X				
BH208/1.5	57	21/01/21	S	P					X	X				
BH208/2.0	58	21/01/21	S	P					X	X	X	X		
BH208/2.5	59	21/01/21	S	P					X	X				
BH208/3.0	60	21/01/21	S	P					X	X				
PQL (S) mg/kg													**ANZECC PQLs req'd for all water analytes** ☐	

PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit

Metals to Analyse: 8HM unless specified here:

Lab Report/Reference No: 260350

Total number of samples in container:	**Relinquished by:** TG	**Transported to laboratory by:**	Bonded Courier
Send Results to: Douglas Partners Pty Ltd	**Address**	**Phone:**	**Fax:**
Signed:	**Received by:** Jessy Dy	**Date & Time:** 27/1/21	1425

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CHAIN OF CUSTODY DESPATCH SHEET

Project No:	86977.01	**Suburb:**	Toongabbie	**To:**	Envirolab Services
Project Name:	Pendle Hill High School Development	**Order Number**			12 Ashley Street, Chatswood
Project Manager:	Lisa Teng	**Sampler:**	Tom Graham	**Attn:**	Aileen Hie
Emails:	Lisa.Teng@douglaspartners.com.au	Tom.Graham@douglaspartners.com.au		**Phone:**	9910 6200
Date Required:	Same day ☐ 24 hours ☐ 48 hours ☐ 72 hours ☐ Standard ☒			**Email:**	ahie@envirolab.com.au
Prior Storage:	☐ Esky ☒ Fridge ☒ Shelved	Do samples contain 'potential' HBM? Yes ☐ No ☒ (If YES, then handle, transport and store in accordance with FPM HAZID)			

Sample ID	Lab ID	Sampling Date	Sample Type (S - soil, W - water)	Container Type (G - glass, P - plastic)	Analytes: Combo 8a	Combo 3	Asbestos 500mL	BTEX	Texture / Salinity	pH	Chloride	Sulphate	Sodicity / Dispersibility	Notes/preservation
BH209/0.1	61	22/01/21	S	P					X	X				
BH209/0.5	62	22/01/21	S	P					X	X				
BH209/1.0	63	22/01/21	S	P					X	X	X	X		
BH209/1.5	64	22/01/21	S	P					X	X				
BH209/2.0	65	22/01/21	S	P					X	X				
BH209/2.5	66	22/01/21	S	P					X	X	X	X	X	
BD1/20210121	67		S	G		X								
Trip Spike	68		S	G				X						
Trip Blank	69		S	G				X						
PQL (S) mg/kg														**ANZECC PQLs req'd for all water analytes** ☐

PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit

Metals to Analyse: 8HM unless specified here:

Lab Report/Reference No: 260350

Total number of samples in container: **Relinquished by:** TG **Transported to laboratory by:** Bonded Courier

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

Signed: **Received by:** Jason Day SMF EOS SMO **Date & Time:** 27/1/21 1425

7.4°C

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 Pty Ltd
Attention	Lisa Teng

Sample Login Details

Your reference	86977.01
Envirolab Reference	260350
Date Sample Received	27/01/2021
Date Instructions Received	27/01/2021
Date Results Expected to be Reported	03/02/2021

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	69 Soil
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	7.4
Cooling Method	Ice Pack
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
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customerservice@envirolab.com.au
www.envirolab.com.au

Sample ID	vTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Organochlorine Pesticides in soil	Organophosphorus Pesticides in Soil	PCBsin Soil	Acid Extractable metalsin soil	Misc Soil - Inorg	Asbestos ID - soils	Asbestos ID - soils NEPM	Misc Inorg - Soil	Texture and Salinity*	ESP/CEC
BH109N/0.05-0.5											✓	✓	
BH109N/0.5-1.0	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	
BH109N/1.0-1.5	✓	✓	✓				✓			✓	✓	✓	
BH109N/0.05-1.0										✓			
BH109E/0.05-0.5	✓	✓	✓				✓				✓	✓	
BH109E/0.5-1.0	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	
BH109E/1.0-1.5	✓	✓	✓				✓			✓	✓	✓	
BH109E/0.05-1.0										✓			
BH109S/0.05-0.5	✓	✓	✓				✓				✓	✓	
BH109S/0.5-1.0	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	
BH109S/1.0-1.5	✓	✓	✓				✓			✓	✓	✓	
BH109S/0.05-1.0										✓			
BH109W/0.05-0.5	✓	✓	✓				✓				✓	✓	
BH109W/0.5-1.0	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	
BH109W/1.0-1.5	✓	✓	✓				✓			✓	✓	✓	
BH109W/0.05-1.0										✓			
BH201/0.1											✓	✓	
BH201/0.5											✓	✓	
BH201/1.0											✓	✓	
BH201/1.5											✓	✓	
BH202/0.1											✓	✓	
BH202/0.5											✓	✓	
BH202/1.0											✓	✓	✓
BH202/1.5											✓	✓	
BH202/2.0											✓	✓	
BH202/2.5											✓	✓	✓
BH203/0.1											✓	✓	
BH203/0.5											✓	✓	
BH203/1.0											✓	✓	
BH203/1.5											✓	✓	
BH203/2.0											✓	✓	
BH203/2.5											✓	✓	

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customerservice@envirolab.com.au
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Sample ID	vTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Organochlorine Pesticides in soil	Organophosphorus Pesticides in Soil	PCBsin Soil	Acid Extractable metalsin soil	Misc Soil - Inorg	Asbestos ID - soils	Asbestos ID - soils NEPM	Misc Inorg - Soil	Texture and Salinity*	ESP/CEC
BH203/3.0											✓	✓	✓
BH204/0.1											✓	✓	
BH204/0.5											✓	✓	
BH204/1.0											✓	✓	
BH204/1.5											✓	✓	
BH204/2.0											✓	✓	
BH205/0.1											✓	✓	
BH205/0.5											✓	✓	
BH205/1.0											✓	✓	
BH205/1.5											✓	✓	
BH205/2.0											✓	✓	
BH206/0.1											✓	✓	✓
BH206/0.5											✓	✓	
BH206/1.0											✓	✓	✓
BH206/1.5											✓	✓	
BH206/2.0											✓	✓	
BH207/0.1											✓	✓	
BH207/0.5											✓	✓	
BH207/1.0											✓	✓	
BH207/1.5											✓	✓	
BH207/2.0											✓	✓	
BH208/0.1											✓	✓	
BH208/0.6											✓	✓	✓
BH208/1.0											✓	✓	
BH208/1.5											✓	✓	
BH208/2.0											✓	✓	
BH208/2.5											✓	✓	
BH208/3.0											✓	✓	
BH209/0.1											✓	✓	
BH209/0.5											✓	✓	
BH209/1.0											✓	✓	
BH209/1.5											✓	✓	

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Sample ID	vTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Organochlorine Pesticides in soil	Organophosphorus Pesticides in Soil	PCBsin Soil	Acid Extractable metalsin soil	Misc Soil - Inorg	Asbestos ID - soils	Asbestos ID - soils NEPM	Misc Inorg - Soil	Texture and Salinity*	ESP/CEC
BH209/2.0											✓	✓	
BH209/2.5											✓	✓	✓
BD1/20210121	✓	✓	✓				✓						
Trip Spike	✓												
Trip Blank	✓												

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.

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CERTIFICATE OF ANALYSIS 260350-A

Client Details

Client	Douglas Partners Pty Ltd
Attention	Lisa Teng
Address	96 Hermitage Rd, West Ryde, NSW, 2114

Sample Details

Your Reference	**86977.01**
Number of Samples	69 Soil
Date samples received	27/01/2021
Date completed instructions received	17/02/2021

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	24/02/2021
Date of Issue	22/02/2021

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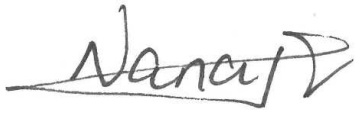
Asbestos Approved By
Analysed by Asbestos Approved Identifier: Panika Wongchanda
Authorised by Asbestos Approved Signatory: Lucy Zhu
Results Approved By
Lucy Zhu, Asbestos Supervisor

Authorised By



Nancy Zhang, Laboratory Manager

Asbestos ID - soils					
Our Reference		260350-A-22	260350-A-35	260350-A-50	260350-A-62
Your Reference	UNITS	BH202/0.5	BH204/0.5	BH207/0.5	BH209/0.5
Type of sample		Soil	Soil	Soil	Soil
Date analysed	-	22/02/2021	22/02/2021	22/02/2021	22/02/2021
Sample mass tested	g	Approx. 60g	Approx. 40g	Approx. 40g	Approx. 45g
Sample Description	-	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Asbestos comments	-	NO	NO	NO	NO
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected

Asbestos ID - soils NEPM		
Our Reference		260350-A-28
Your Reference	UNITS	BH203/0.5
Type of sample		Soil
Date analysed	-	22/02/2021
Sample mass tested	g	661.43
Sample Description	-	Brown clayey soil & rocks
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected
Total Asbestos#1	g/kg	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected
ACM >7mm Estimation*	g	–
FA and AF Estimation*	g	–
FA and AF Estimation*#2	%(w/w)	<0.001

Method ID	Methodology Summary
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.
ASB-001	Asbestos ID - Identification of asbestos in soil samples using Polarised Light Microscopy and Dispersion Staining Techniques. Minimum 500mL soil sample was analysed as recommended by "National Environment Protection (Assessment of site contamination) Measure, Schedule B1 and "The Guidelines from the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia - May 2009" with a reporting limit of 0.1g/kg (0.01% w/w) as per Australian Standard AS4964-2004. Results reported denoted with * are outside our scope of NATA accreditation. **NOTE** #1 Total Asbestos g/kg was analysed and reported as per Australian Standard AS4964 (This is the sum of ACM >7mm, <7mm and FA/AF) **NOTE** #2 The screening level of 0.001% w/w asbestos in soil for FA and AF only applies where the FA and AF are able to be quantified by gravimetric procedures. This screening level is not applicable to free fibres. Estimation = Estimated asbestos weight Results reported with "--" is equivalent to no visible asbestos identified using Polarised Light microscopy and Dispersion Staining Techniques.

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

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.

Asbestos: Excessive sample volumes were provided for asbestos analysis.
A portion of the supplied samples were sub-sampled according to Envirolab procedures.
We cannot guarantee that these sub-samples are indicative of the entire sample.
Envirolab recommends supplying 40-50g (50mL) of sample in its own container as per AS4964-2004.
Note: Samples 260350-A-22,35,50,62 were sub-sampled from bags provided by the client.

Jessica Hie

From: Simon Song
Sent: Wednesday, 17 February 2021 11:42 AM
To: Lisa Teng
Cc: Jessica Hie
Subject: RE: Additional tests

No problem

260350-A
Due 24/2/21
Std TAT

Kind Regards,

Simon Song | Senior Customer Service | Envirolab Services

Great Science. Great Service.

12 Ashley Street Chatswood NSW 2067
T 612 9910 6200
E SSong@envirolab.com.au | **W** www.envirolab.com.au

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JAS-ANZ ISO 9001 ISO 45001 ISO 14001

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Please consider the environment before printing this email.

Samples will be analysed per our T&C's.

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This e-mail message has been scanned for Viruses

From: Lisa Teng <Lisa.Teng@douglaspartners.com.au>
Sent: Wednesday, 17 February 2021 11:41 AM
To: Simon Song <SSong@envirolab.com.au>
Subject: Additional tests

CAUTION: This email originated from outside of the organisation. Do not act on instructions, click links or open attachments unless you recognise the sender and know the content is authentic and safe.

Hi Simon,

Could we please have additional testing on these samples:
Asbestos ID on the following

ELS260350

22- 202/0.5
28- 203/0.5 (500 ml asbestos test instead if there is enough sample)
35- 204/0.5
50- 207/0.5
62- 209/0.5

Thank you,

Lisa Teng | Environmental Engineer
Douglas Partners Pty Ltd | ABN 75 053 980 117 | www.douglaspartners.com.au
96 Hermitage Road West Ryde NSW 2114 | PO Box 472 West Ryde NSW 1685
P: 02 9809 0666 | M: 0437 976 196 | E: Lisa.Teng@douglaspartners.com.au

To find information on our COVID-19 measures, please visit douglaspartners.com.au/news/covid-19

CLIENT
2020 M

This email is confidential. If you are not the intended recipient, please notify us immediately and be aware that any disclosure, copying, distribution or use of the contents of this information is prohibited. Please note that the company does not make any commitment through emails not confirmed by fax or letter.

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 Pty Ltd
Attention	Lisa Teng

Sample Login Details

Your reference	86977.01
Envirolab Reference	260350-A
Date Sample Received	27/01/2021
Date Instructions Received	17/02/2021
Date Results Expected to be Reported	24/02/2021

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	69 Soil
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	7.4
Cooling Method	Ice Pack
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
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Sample ID	Asbestos ID - soils	Asbestos ID - soils NEPM	On Hold
BH109N/0.05-0.5			✓
BH109N/0.5-1.0			✓
BH109N/1.0-1.5			✓
BH109N/0.05-1.0			✓
BH109E/0.05-0.5			✓
BH109E/0.5-1.0			✓
BH109E/1.0-1.5			✓
BH109E/0.05-1.0			✓
BH109S/0.05-0.5			✓
BH109S/0.5-1.0			✓
BH109S/1.0-1.5			✓
BH109S/0.05-1.0			✓
BH109W/0.05-0.5			✓
BH109W/0.5-1.0			✓
BH109W/1.0-1.5			✓
BH109W/0.05-1.0			✓
BH201/0.1			✓
BH201/0.5			✓
BH201/1.0			✓
BH201/1.5			✓
BH202/0.1			✓
BH202/0.5	✓		
BH202/1.0			✓
BH202/1.5			✓
BH202/2.0			✓
BH202/2.5			✓
BH203/0.1			✓
BH203/0.5		✓	
BH203/1.0			✓
BH203/1.5			✓
BH203/2.0			✓
BH203/2.5			✓

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Sample ID	Asbestos ID - soils	Asbestos ID - soils NEPM	On Hold
BH203/3.0			✓
BH204/0.1			✓
BH204/0.5	✓		
BH204/1.0			✓
BH204/1.5			✓
BH204/2.0			✓
BH205/0.1			✓
BH205/0.5			✓
BH205/1.0			✓
BH205/1.5			✓
BH205/2.0			✓
BH206/0.1			✓
BH206/0.5			✓
BH206/1.0			✓
BH206/1.5			✓
BH206/2.0			✓
BH207/0.1			✓
BH207/0.5	✓		
BH207/1.0			✓
BH207/1.5			✓
BH207/2.0			✓
BH208/0.1			✓
BH208/0.6			✓
BH208/1.0			✓
BH208/1.5			✓
BH208/2.0			✓
BH208/2.5			✓
BH208/3.0			✓
BH209/0.1			✓
BH209/0.5	✓		
BH209/1.0			✓
BH209/1.5			✓

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Sample ID	Asbestos ID - soils	Asbestos ID - soils NEPM	On Hold
BH209/2.0			✓
BH209/2.5			✓
BD1/20210121			✓
Trip Spike			✓
Trip Blank			✓

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.