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Report on
Detailed Site Investigation (Contamination)

Proposed Multi Deck Carpark
Part Lot 245 Farrow Road, Campbelltown NSW

Prepared for
Hill Thalis Architecture & Urban Projects Pty Ltd

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

	Signature	Date
Author		26 May 2022
Reviewer		26 May 2022

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Douglas Partners Pty Ltd
ABN 75 053 980 117
www.douglaspartners.com.au
18 Waler Crescent
Smeaton Grange NSW 2567
Phone (02) 4647 0075

Executive Summary

Douglas Partners Pty Ltd (DP) has been engaged by Hill Thalis Architecture & Urban Projects Pty Ltd (HTUP) to complete this Detailed Site Investigation for contamination (DSI) for a proposed multi deck carpark at Part Lot 245 Farrow Road, Campbelltown NSW (the site).

In September 2021, DP completed a Preliminary Site Investigation for contamination (PSI) report[1] for the wider site (comprised of Lots 2 and 245) which identified the following areas of environmental concern (AEC) that had the potential for contamination of soils and groundwater which required further investigation:

- AEC1: Historical application of fill to the site.
- AEC2: Presence of and potential for recently dumped rubbish likely as the result of fly-tipping; and
- AEC3: Off-site commercial/industrial business with spilling, leaks and mishandling of chemicals.

The objective of the DSI was to further investigate the above AEC to assess the suitability of the site for the proposed development and determine whether further investigation, remediation and/or management is required.

Soil sampling was completed for this DSI at a total of 22 grid-based locations across the site. Selected soil samples were sent to the laboratory for analysis of the contaminants of potential concern (COPC) associated with the identified PAEC. Two soil vapour gas samplers were also installed in the northern and southern portions of the site and vapour samples collected for analysis of volatile COPC related to the offsite storage of chemicals.

COPC were not detected in any soil or soil vapour samples collected from the site at concentrations that present an unacceptable human health or ecological risk for the proposed land use.

From a contamination perspective, based on the findings of this DSI, it is concluded that no further investigations or remediation works are warranted, and the site is considered suitable for the proposed multi deck carpark development.

Notwithstanding the above, it is recommended that an Unexpected Finds Protocol should be prepared and implemented to provide a formal contingency to be followed in the event of an unexpected find with respect to potential site contamination issues encountered during future bulk earthworks.

[1] DP (2021) *Report on Preliminary Site Investigation (Contamination), Proposed Multi-Deck Carpark, Lots 2 and 245 Farrow Road, Campbelltown NSW,* DP ref.204718.01.R.001.Rev0 dated 29 September 2021.

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Report on Detailed Site Investigation (Contamination)
Proposed Multi Deck Carpark
Part Lot 245 Farrow Road, Campbelltown NSW

1. Introduction

Douglas Partners Pty Ltd (DP) has been engaged by Hill Thalis Architecture & Urban Projects Pty Ltd (HTUP) to complete this Detailed Site Investigation for contamination (DSI) for a proposed multi deck carpark at Part Lot 245 Farrow Road, Campbelltown NSW (the site). The site is shown on Drawing 1, Appendix A.

In September 2021, DP completed a Preliminary Site Investigation for contamination (PSI) report[2] for the wider site (comprised of Lots 2 and 245) which identified the following areas of environmental concern (AEC) that had the potential for contamination of soils and groundwater which required further investigation:

- AEC1: Historical application of fill to the site.
- AEC2: Presence of and potential for recently dumped rubbish likely as the result of fly-tipping; and
- AEC3: Off-site commercial/industrial business with spilling, leaks and mishandling of chemicals.

The objective of the DSI was to further investigate the above AEC to assess the suitability of the site for the proposed development and determine whether further investigation, remediation and/or management is required.

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

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

1.1 Proposed Development

A new multistorey carpark and associated landscaping is proposed for the southern portion of Lot 245 and trenching for stormwater services is likely required in either the northern or central eastern portions of the lot. A drawing provided by HTUP showing the proposed carpark area and the likely options for stormwater trenches is provided in Attachment B – It is understood that HTUP will be managing the proposed carpark upgrades on Part Lot 245.

The ‘site’ and lot boundaries are shown on Figure 1 below.

[2] DP (2021) *Report on Preliminary Site Investigation (Contamination), Proposed Multi-Deck Carpark, Lots 2 and 245 Farrow Road, Campbelltown NSW,* DP ref.204718.01.R.001.Rev0 dated 29 September 2021.

Figure 1 – Approximate Site (in red outline) and Lot Boundaries

2. Scope of Work

The scope of the DSI was as follows:

- Review of previous environmental investigations and results relevant to the site including the findings of the PSI;
- A site walkover to identify any additional potential areas of environmental concern (PAEC - beyond those identified from the PSI);
- Grid based soil sampling across the site;
- Laboratory analysis of selected soil samples for the identified contaminants of potential concern (COPC) associated with each of the identified potential sources;
- Interpretation of results in accordance with current NSW EPA endorsed guidelines; and
- Preparation of this report detailing the methodology and results of the investigation including recommendations on the suitability of the site and future remedial/management options for the site.

3. Site Information

Site Address	Part Lot 245 Farrow Road, Campbelltown NSW
Legal Description	Part Lot 245 Deposited Plan 1222763
Area	0.78 ha
Zoning	Zone SP2 Infrastructure
Local Council Area	Campbelltown City Council
Current Use	Car Park
Surrounding Uses	North – Commercial East – Commercial South – Commercial West – Commercial and residential

4. Environmental Setting

Regional Topography	The surrounding regional topography generally slopes gently to the northwest towards Bow Bowing Creek.
Site Topography	Site levels are generally flat with an overall difference in level of approximately 1.3 m from the highest part of the site (RL 61.5 relative to Australian Height Datum [AHD]) to the lowest (RL 60.2).
Geology	Published mapping indicates that the site is underlain by Alluvium of the of Cenozoic age. This formation typically comprises of unconsolidated alluvia clay, silt, sand, and gravel deposits. Reference to 1:100 000 *Wollongong-Port Hacking* Soils Landscape Sheet 9029 indicates the landscape as gently undulating rises on Wianamatta Group Shales and Hawkesbury Shale. Local relief is to 30 m, with slopes typically <5%. The landscape also contains broad rounded crests and ridges with gently inclined slopes. Shallow to moderately deep soils (<100 cm) include red and brown podzolic soils on the crests, upper slopes and in well drained areas. Deeper soils (100 – 300 cm) contain yellow podzolic soils and soloths on lower slopes and in areas of poor drainage (Sydney). Limitations include moderately reactive highly plastic subsoil, low soil fertility and poor soil drainage.

Surface Water and Groundwater	Bow Bowing Creek is located adjacent to the immediate north of the site and runs in an east to west direction. A search of the publicly available registered groundwater bore database indicated that there are 15 registered groundwater bores within 500 m of the site and are summarised in **Table 1**.

Table 1: Summary of Available Information from Nearby Registered Groundwater Bores

Bore ID Authorised Purpose Completion Year Status	Location Relative to Site	Final Depth (m)	Standing Water Level (m bgl)
GW112867 Monitoring bore	184 m north	6.5	4.5
GW112868 Monitoring bore	176 m north	6.5	4.5
GW112869 Monitoring bore	165 m northeast	6.5	4.5
GW112870 Monitoring bore	201 m northeast	6.5	4.5
GW109212 Monitoring bore	325 m east	9.0	ND
GW109213 Monitoring bore	335 m east	5.0	ND
GW109214 Monitoring bore	330 m east	7.0	ND
GW109215 Monitoring bore	330 m east	5.0	ND
GW115416 ND	270 m southeast	ND	ND
GW115417 ND	270 m southeast	ND	ND
GW115418 ND	270 m southeast	ND	ND
GW115419 ND	270 m southeast	ND	ND
GW115420 ND	270 m southeast	ND	ND
GW115421 ND	270 m southeast	ND	ND
GW115422 ND	270 m southeast	ND	ND

ND = No data available for this bore.

Based on the regional topography and the inferred flow direction of nearby water courses, the anticipated flow direction of groundwater beneath the site is to the northeast, towards Bow Bowing creek, the likely receiving surface water body for the groundwater flow path.

Given the local geology (ie: Wiannamatta Shale), the groundwater in the fractured rock beneath the site is anticipated to be saline and very low yield. Accordingly, there would be no significant potential beneficial uses of the groundwater.

5. Previous Reports and Site History

The following previous reports are relevant to the current investigation:

5.1 DP (2021) Report on Geotechnical Investigation

In September 2021, DP completed a Geotechnical Investigation of the wider site, which included both Lots 245 and the adjacent Lot 2, for CCC for the proposed carpark and included the completion of the following scope:

- Drilling of five boreholes across the wider site. Two boreholes were drilled on Lot 245 and three boreholes completed on the adjacent Lot 2;
- Installation of groundwater monitoring wells in two of the bore holes across the wider site and measurement of groundwater levels. One of the wells was installed in the northern portion of the subject site;
- Excavation of six test pits on the adjacent lot 2;
- Logging of soil and geological strata to a maximum depth of 16.6 m
- Collection of rock core samples; and
- Completion of several geotechnical tests including dynamic cone penetration (DCP) and California bearing ratio (CBR) tests.

The results of the investigation included the identification of the following strata:

- Pavement – Asphaltic concrete encountered to 0.1 m depth then base and sub-base pavement layers encountered to depths of 0.8 m (in Bores 1 and 2 completed within Lot 245);
- Topsoil Fill – Silty clay topsoil fill encountered to depths of 0.2 – 0.5 m in Bores 3 – 5 and Pits 6 – 10 (completed on Lot 2). Topsoil fill with charcoal rubble, brick fragments and shale fragments encountered to a depth of 0.8 m in Pit 11;
- Fill – Silty clay fill encountered to depths of 0.6 m in Bore 3 and 1.2 m in Bore 4. Silty clay fill with was encountered to a depth of 0.8 m in Bore 5;
- Clay – Silty clay encountered to depths of 5.0 – 6.8 m in Bores 1 – 5 and continuing to the termination depth of 3 m in all test pits; and
- Bedrock – Shale encountered at depths in the range 5.0 – 6.8 m and continuing to the target investigation depths of 15.5 – 16.6 m in Bores 1 – 5. The bedrock was initially of extremely low to very low strength with the exception of Bore 3 which initially encountered medium strength bedrock on first contact. Strength increased with depth in all boreholes up to high strength.

No free groundwater was encountered at any of the test locations during the field work. The introduction of water as a drilling fluid in the boreholes during rock coring prevented any further monitoring of groundwater ingress. The invert level of the concrete box channel creek is approximately RL 58 – 60.

Monitoring of the standpipes installed in Bores 1 and 4 was undertaken and the results are given in Table 2.

Table 2: Summary of Groundwater Observations

Borehole No.	Groundwater Depth (m bgl)	Groundwater RL (m AHD)	Description
1	3.1	57.9	Standing water level measured in standpipe 2 September 2021
4	2.6	58.6	Standing water level measured in standpipe 2 September 2021

Where bgl = below ground level

5.2 DP (September 2021) Preliminary Site Investigation

In September 2021, DP completed a PSI undertaken for the proposed multi deck carpark for the site which included a desktop review of site history information to identify PAEC and related Contaminants of Potential Concern (COPC) which may arise from previous and current land uses.

The desktop investigation was limited to the following:

- A review of historical aerial photographs;
- NSW EPA data base searches;
- Review of Council Records; and
- Listing of other potential site contamination issues based on DP's experience with sites of a similar nature and scale.

Given that historical aerial photographs identified that the site and surrounds have been used for rural purposes or relatively vacant land since the 1940's, a title search, SafeWork NSW Dangerous goods search and Section 10.7 certificate were not considered to be warranted for this PSI.

The results of the PSI and the review of a previous investigation completed on a portion of the site has identified that the site has historically been used for rural land-use purposes likely for grazing since at least 1947 and remained relatively vacant until sometime between 1975 and 1990 when lot 245 was covered with asphalt for use as a carpark.

The desktop investigation and walkover identified the following areas of environmental concern (AEC) as occurring on the site that have the potential for contamination of the site's soils and groundwater:

- AEC1: Historical application of fill to the site;
- AEC2: Presence of and potential for recently dumped rubbish likely as the result of flytipping; and
- AEC3: Off-site commercial/industrial business with spilling, leaks and mishandling of chemicals .

Whilst the potential for gross contamination associated with the above sources was generally considered to be low, further assessment in the form of intrusive investigations was required to assess the extent of any associated contamination (if any) and to confirm that no other additional potential sources of contamination exist on the site.

6. Preliminary Conceptual Site Model

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

6.1 Potential Sources of Contamination

Based on the current investigation, the following potential sources of contamination and associated contaminants of potential concern (COPC) have been identified.

Areas of Fill (AEC1/Source 1 – S1)

Review of the historical aerial photos, previous investigations and site inspection has identified areas where actual or potential filling has occurred including potential general filling beneath the asphalt carpark and in the vicinity of Bow Bowing creek to flatten the site. It is noted that this AEC would also apply to any incidental spillage of fuels/oils from construction vehicles or parked vehicles. There is therefore potential for contaminated fill on the site that has not been subject to any known contamination testing.

There is potential for soil impact at the site from fill related COPC including:

- Total Recoverable Hydrocarbons (TRH);
- Benzene, toluene, ethylbenzene and xylenes (BTEX);
- Polycyclic aromatic hydrocarbons (PAHs);
- Polychlorinated biphenyls (PCBs);
- Heavy metals (As, Cd, Cr, Cu, Pb, Hg, Ni and Zn);
- Organochlorine pesticides (OCPs);
- Organophosphate pesticides (OPPs); and
- Asbestos.
-

Fly Tipping and Dumping Activities (AEC2/Source 2 – S2)

The site inspection completed in the PSI also identified areas of the site where flytipping/dumping may have occurred particularly on the central eastern portion of adjacent Lot 2. Given the open accessible nature of the site the potential for dumping and impact particularly to surface soils cannot be completely ruled out. The COPC associated with flytipping/dumping are the same as identified above for fill (S1).

Potential Off-Site Sources of Contamination – Nearby Commercial/Industrial Activities (AEC3/Source 3 – S3)

The review of the EPA Notices available under Section 58 of the CLM Act indicated that property located at 62 Blaxland Road beyond Bow Bowing creek to the north of the subject site was subject to revocation and cleanup/remediation notices in 1991 due to spilling, leaks and mishandling of chemicals within drums on-site.

Whilst the EPA notices are not specific with regards to the types of chemicals kept at the property at 62 Blaxland Road, COPC commonly associated with keeping of chemicals include TRH, BTEX, VOCs, PAHs, OCPs, OPPs, PCBs and metals.

6.2 Potential Receptors

The following potential human receptors have been identified:

- R1: Current users [carpark users and maintenance workers];
- R2: Construction and maintenance workers;
- R3: End users [Proposed carpark]; and
- R4: Adjacent site users [commercial/industrial].

The following potential environmental receptors have been identified:

- R5: Surface water [Bow Bowing Creek is located adjacent to the immediate north of the site which is anticipated to be freshwater];
- R6: Groundwater; and
- R7: Terrestrial ecology.

6.3 Potential Pathways

The following potential pathways have been identified:

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

Summary of Potentially Complete Exposure 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). The possible pathways between the above sources (S1 to S3) and receptors (R1 to R7) are provided in Table 4.

Table 4: Summary of Potentially Complete Exposure Pathways

Source and COPC	Transport Pathway	Receptor	Risk Management Action
S1: Fill, Metals, TRH, BTEX, PAH, OCP, OPPs, PCBs and asbestos S2: flytipping/dumped rubbish, Metals, TRH, BTEX, PAH, OCP, OPPs, PCBs and asbestos S3: Off-site properties with likely Chemical and fuel use and storage, Metals, TRH, BTEX, PAH, VOCs, OCP, OPPs, PCBs	P1: Ingestion and dermal contact P2: Inhalation of dust and/or vapours P3: Surface water run-off P4: Lateral migration of groundwater providing base flow to water bodies P5: Leaching of contaminants and vertical migration into groundwater P6: Contact with terrestrial ecology	R1: Current users of the asphalt carpark in the western portion (Lot 245) R2: Construction and maintenance workers R3: End users - proposed carpark R4: Adjacent site users-commercial/industrial R5 – Surface water bodies. R6 – Local groundwater and receiving water bodies. R7 – Local ecology.	An intrusive investigation is recommended to assess possible contamination including testing of the soils and soil vapour.

7. DSI -Fieldwork Sampling and Analysis Quality Plan

DSI fieldwork was completed at the site on 6 and 9 May 2022 to assess the AEC identified in the PSI as requiring further investigation (Discussed in Sections 5 and 6). Photographic plates are presented in Appendix C.

7.1 Data Quality Objectives

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

7.2 Soil Sampling Rationale

Soil sample locations are shown on Drawing 2, Appendix A. Soil sampling was completed at most locations by boring with a hand-held auger fitted with a 150 mm auger. A Geoprobe drilling rig was used initially to core through the overlying asphalt.

To investigate the potential for soil contamination from the identified AEC, the following scope was completed:

- Drilling of 22 boreholes (BH1 to BH22) on an approximate 20 m grid across the proposed carpark area on lot 245 which includes two bore holes (BH17 and BH18) within the option 1 stormwater alignment and four boreholes (BH19 to BH22) within the option 2 stormwater alignment. Boreholes were drilled approximately 0.5 m into natural soil. The number of sample locations satisfies NSW EPA 1995 sampling requirements for the Lot (total area of approximately 7,800 m^2). The grid is sufficient to detect a 23.6 m diameter hotspot with 95% confidence;
- Collection of samples in fill and/or shallow soils at all borehole locations;
- All primary shallow/fill soil samples were analysed for the following COPC associated with the identified AEC including:
    - Total Recoverable Hydrocarbons (TRH);
    - Benzene, toluene, ethylbenzene and xylenes (BTEX);
    - Polycyclic aromatic hydrocarbons (PAHs).
    - Polychlorinated biphenyls (PCBs);
    - Heavy metals (As, Cd, Cr, Cu, Pb, Hg, Ni and Zn);
    - Organochlorine pesticides (OCPs); and
    - Organophosphate pesticides (OPPs); and
    - Asbestos.
- All fill/shallow grid based samples were submitted to the laboratory for two-part (sample) composite analysis of pesticide COPC, including OCPs, OPPs and heavy metals. Two-part compositing of samples was considered warranted for a tier 1 screening of the grid-based samples given the chemicals to be analysed are generally not volatile and the general sandy gravelly nature of the fill;
- Three selected samples were analysed for physico chemical characteristics including pH, and cation exchange capacity (CEC) to determine appropriate ecological investigation levels.

7.2.1 Soil Sampling Procedure and QA/QC

All sampling data was recorded on DP's borehole logs (Appendix E) with samples also recorded on Chain-of-Custody sheets. The general sampling procedure adopted for the collection of environmental samples is summarised below:

- Collection of soil samples was completed using disposable sampling equipment (new nitrile glove for each sample) from the hand-held auger. Samples were collected taking care to not include soil that was directly in contact with either the surface of the auger;
- Screen all soil samples using a calibrated PID and a sub-sample in a resealable plastic zip-lock bags to assess the presence of volatile organic compounds.
- Transfer of samples requiring chemical analysis sampling into laboratory-prepared glass jars, completely filled to minimise the headspace within the sample jar was minimised, and capping immediately to minimise loss of volatiles;
- A 50 g bag sample was collected for samples requiring analysis of asbestos;
- Label sample containers with individual and unique identification, including project number, sample location and sample depth;

- Place the glass jars, with Teflon lined lid, into a cooled, insulated and sealed container for transport to the laboratory;
- Collection of additional replicate samples at a rate of 10% for QA/QC requirements; and
- Samples designated for analysis were dispatched to NATA accredited laboratory Envirolab Services at Chatswood NSW for analysis of primary samples and intra-laboratory replicates.

7.3 Soil Vapour Sampling Rationale

Soil vapour sampling was completed at the site in order to assess current broad scale soil vapour concentrations at the site and to evaluate whether historical/off site land uses may have impacted the site. The soil vapour sampling comprised the installation of Waterloo Membrane Passive Gas Samplers (WMGS) as per the Waterloo Method within two of the boreholes BH101 (gas sampler SV101) and BH122 (gas sampler SV122) which were positioned in the southern and northern portions of the site, respectively, to provide broad scale coverage of the site.

The general soil vapour sampler installation and sampling methodology comprised the following:

- A WMGS was lowered into each borehole using a polythene sleeve to a depth of approximately 0.5 m bgl within the borehole;
- The WMGS were surrounded/covered by a stainless steel wire to protect the membrane from contacting any soil surfaces during deployment and retrieval;
- The boreholes were sealed by placing an expandable sponge in the polythene sleeve at the level and immediately below the level of the surface of the concrete slab to prevent atmospheric breakthrough;
- Each WMGS was left for a period of approximately 24 hours before retrieval. The sampling time was completed with the recommended sampling time of 24 hours provided in CRC Care *Technical Report No.23 Petroleum Hydrocarbon Vapour Intrusion Assessment: Australian Guidance* (2013). The time and date of installation and removal was recorded on the chain of custody (CoC); and
- Upon retrieval, samplers were placed in Teflon sealed plastic tubes and transferred under CoC to Envirolab Services at Chatswood NSW for volatile contaminants including TRH, BTEX, PAHs and VOCs.

8. Site Assessment Criteria

The site assessment criteria (SAC) applied in the current investigation are informed by the CSM (Section 6) which identified human and environmental receptors to potential contamination on the site. Analytical results are assessed (as a Tier 1 assessment) against the SAC comprising primarily the investigation and screening levels of Schedule B1 of NEPC (2013).

Given the proposed public nature of the carpark and the accessible landscaped gardens surrounding the proposed carpark the investigation and screening levels applied in the current investigation comprise levels adopted for a generic parkland open space land use scenario. The derivation of the SAC is included in Appendix D and the adopted SAC are listed on the summary analytical results tables in Appendix F.

9. Results

9.1 Field Work Results

The borehole logs for this assessment are included in Appendix E. The logs recorded the following general sub-surface profile:

- Asphalt Hardstand: In all boreholes to depths of between 0.01 m and 0.1 m below ground level (bgl).
- Fill/Roadbase: Sand and igneous gravel in BH101 to BH104, BH115 to BH119 and BH121 to depths of between 0.05 m and 0.07 m bgl.
- Fill: Generally comprising silty clay or sand with sandstone and shale gravels to depths of between 0.1 m and 0.9 m bgl.
- Silty Clay: Silty clay to a depths of between 1.0 and the maximum depth of the investigation of 1.6 m bgl. Grey weathered shale was encountered at a depth of 0.4 m bgl in borehole BH101.

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

No free groundwater was observed during drilling of boreholes and for the short time that they were left open. Water was encountered within BH101 however the drilling of this borehole was completed during heavy rain and the water observed is likely attributed to surface water ingress.

It is also noted that most of the boreholes were immediately backfilled following drilling which precluded longer term monitoring of groundwater levels. It should be noted that groundwater levels are transient and are affected by factors such as climatic conditions and soil permeability and will therefore vary with time.

9.2 Laboratory Analytical Results

The analytical results for the soil samples collected during this DSI are summarised in Tables F1 to F3 in Appendix F, together with the adopted SAC. The laboratory certificates of analysis for this DSI are provided in Appendix G.

F3 fraction compounds (TRH C_{16}-C_{34}) were the only COPC detected at concentrations exceeding the SAC parkland open space ecological screening level (ESL – 300 mg/kg) in samples collected from the following boreholes/depths:

- BH107/0.0-0.1 (330 mg/kg);
- BH113/0-0.1 (570 mg/kg);
- BH117/0.2-0.3 (500 mg/kg);
- BH119/0.2-0.3 (340 mg/kg);
- BH120/0.04-0.3 (1000 mg/kg); and
- BH122/0.05-0.3 (470 mg/kg).

Remaining COPC were not detected at concentrations exceeding the adopted SAC in all soil and soil vapour samples analysed.

DP notes that if the SAC for OCPs, OPPs and metals were divided by two to account for dilution of one higher result with a lower result in the composite samples, that result would still be below the adjusted SAC.

9.3 Quality Assurance/Quality Control (QA/QC)

A review of the adopted QA/QC procedures and results presented in Appendix H indicates that the data quality indicators (DQIs) have generally been met. On this basis, the sampling and laboratory methods used during the investigation were found to meet the DQO for this project.

10. Discussion

TRH F3 compounds (TRH C_{16}-C_{34}) commonly associated with petroleum related contamination were detected within shallow fill soils at concentrations exceeding parkland open space ESL (300 mg/kg) in six of the 22 boreholes completed. The TRH F3 detections are likely due to historical use of the site as a carpark and resultant from localised oil spills/leaks from parked cars. The identified TRH exceedances of the ESL are not considered to prevent the proposed use of the site for a multi-level carpark given:

- The location of the TRH exceedances are currently covered by asphalt and most of the site is either to be covered with asphalt or concrete slabs in the proposed development therefore limiting ecological access to site's soils; and
- The general commercial/industrial setting of the site. No single sample contained concentrations of F3 TRH at levels exceeding the commercial/industrial ESL of 1700 mg/kg..
- Figure 1 from schedule B1 of the NEPM for Tier 1 human and ecological risk assessment of petroleum hydrocarbon contamination was followed to inform the required response to the ESL exceedance (NEPM 2013). With reference to the flowchart, the F3 concentration is not in exceedance of the HSL, but is in exceedance of the parkland open space ESL. The flowchart then asks the question, "are off-site migration and all ecological exposure pathways absent?". In response to this, the source-pathway-receptor risk approach used in the conceptual site model from Section 6 was considered. The receptor that would be potentially at risk would be flora and fauna at and near to the site. However, due to the commercial/industrial setting of the site and surrounding sites, it is unlikely for any flora or fauna to be impacted.

11. Conclusions and Recommendations

The results of the PSI and the review of a previous investigation completed on a portion of the site has identified that the site has historically been used for rural land-use purposes likely for grazing since at least 1947 and remained relatively vacant until sometime between 1975 and 1990 when lot 245 was covered with asphalt for use as a carpark. The following PAEC were identified from desktop investigations that had the potential for contamination of site soils:

- AEC1: Historical application of fill to the site;
- AEC2: Presence of and potential for recently dumped rubbish likely as the result of flytipping; and
- AEC3: Off-site commercial/industrial business with spilling, leaks and mishandling of chemicals.

Soil sampling was completed for this DSI at a total of 22 grid-based locations across the site. Selected soil samples were sent to the laboratory for analysis of the COPC associated with the identified PAEC. Two soil vapour gas samplers were also installed in the northern and southern portions of the site and vapour samples collected for analysis of volatile COPC related to the offsite storage of chemicals.

COPC were not detected in any soil or soil vapour samples collected from the site at concentrations that present an unacceptable human health or ecological risk for the proposed land use.

From a contamination perspective, based on the findings of this DSI, it is concluded that no further investigations or remediation works are warranted, and the site is considered suitable for the proposed multi deck carpark development.

Notwithstanding the above, it is recommended that an Unexpected Finds Protocol should be prepared and implemented to provide a formal contingency to be followed in the event of an unexpected find with respect to potential site contamination issues encountered during future bulk earthworks.

12. References

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

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

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

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

13. Limitations

Douglas Partners Pty Ltd (DP) has prepared this report for this project at Part Lot 245 Farrow Road, Campbelltown in accordance with DP's proposal 204718.02.P.001.Rev1 dated 29 March 2022 and acceptance received from Brett Sperling on behalf of Hill Thalis Architecture & Urban Projects Pty Ltd dated 8 April 2022. The work was carried out under DP's Conditions of Engagement and Hill Thalis Sub-Consultant Agreement dated 17 September 2021. This report is provided for the exclusive use of Camden Council for this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of DP, does so entirely at its own risk and without recourse to DP for any loss or damage. In preparing this report DP has necessarily relied upon information provided by the client and/or their agents.

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

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

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

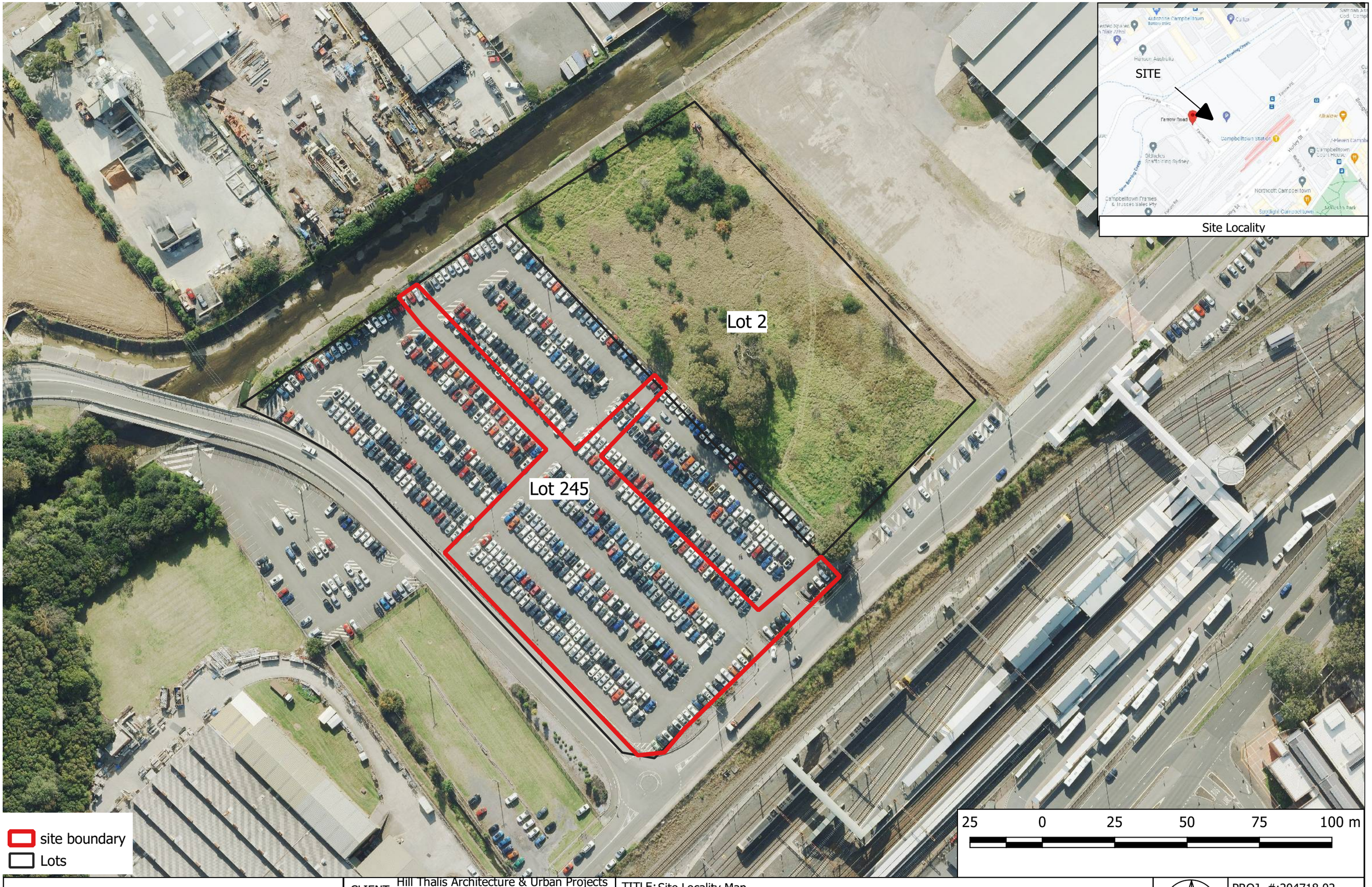
This report must be read in conjunction with all of the attached and should be kept in its entirety without separation of individual pages or sections. DP cannot be held responsible for interpretations or conclusions made by others unless they are supported by an expressed statement, interpretation,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

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

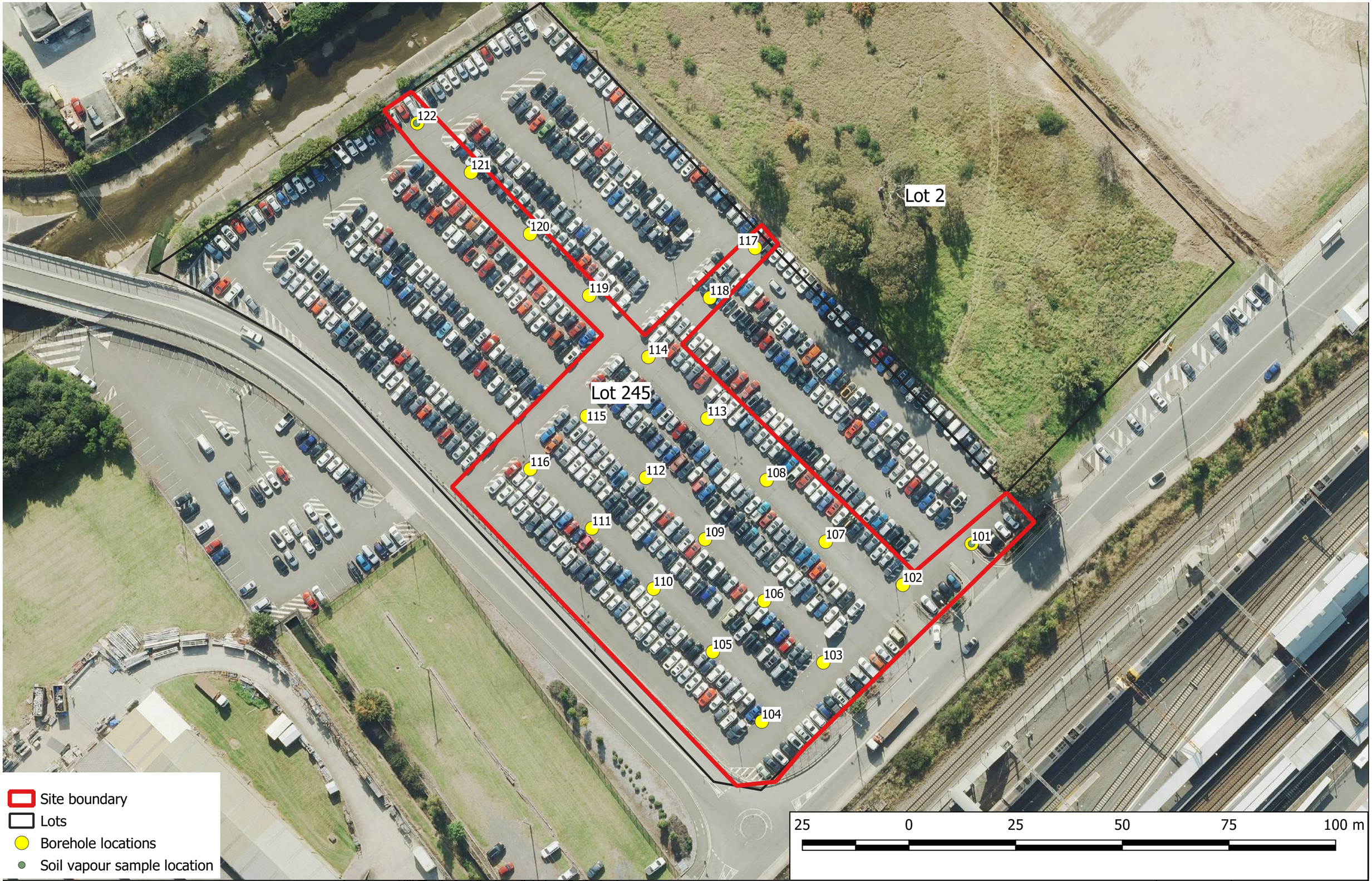
Douglas Partners Pty Ltd

Appendix A

Drawings



Douglas Partners Geotechnics / Environment / Groundwater	CLIENT: Hill Thalis Architecture & Urban Projects Pty Ltd	TITLE: Site Locality Map Detailed Site Investigation Part Lot 245 Farrow Road, Campbelltown NSW	PROJ. #:204718.02
	OFFICE: Macarthur DRAWN BY: GAR		DRAWING No: 1
	SCALE: As shown DATE: 20.05.2022	MGA	REVISION: 0



Douglas Partners
Geotechnics | Environment | Groundwater

CLIENT:	Hill Thalis Architecture & Urban Projects Pty Ltd	
OFFICE:	Macarthur	DRAWN BY: GAR
SCALE:	As shown	DATE: 20.05.2022

TITLE: Borehole Location Map
Detailed Site Investigation
Part Lot 245 Farrow Road,
Campbelltown NSW

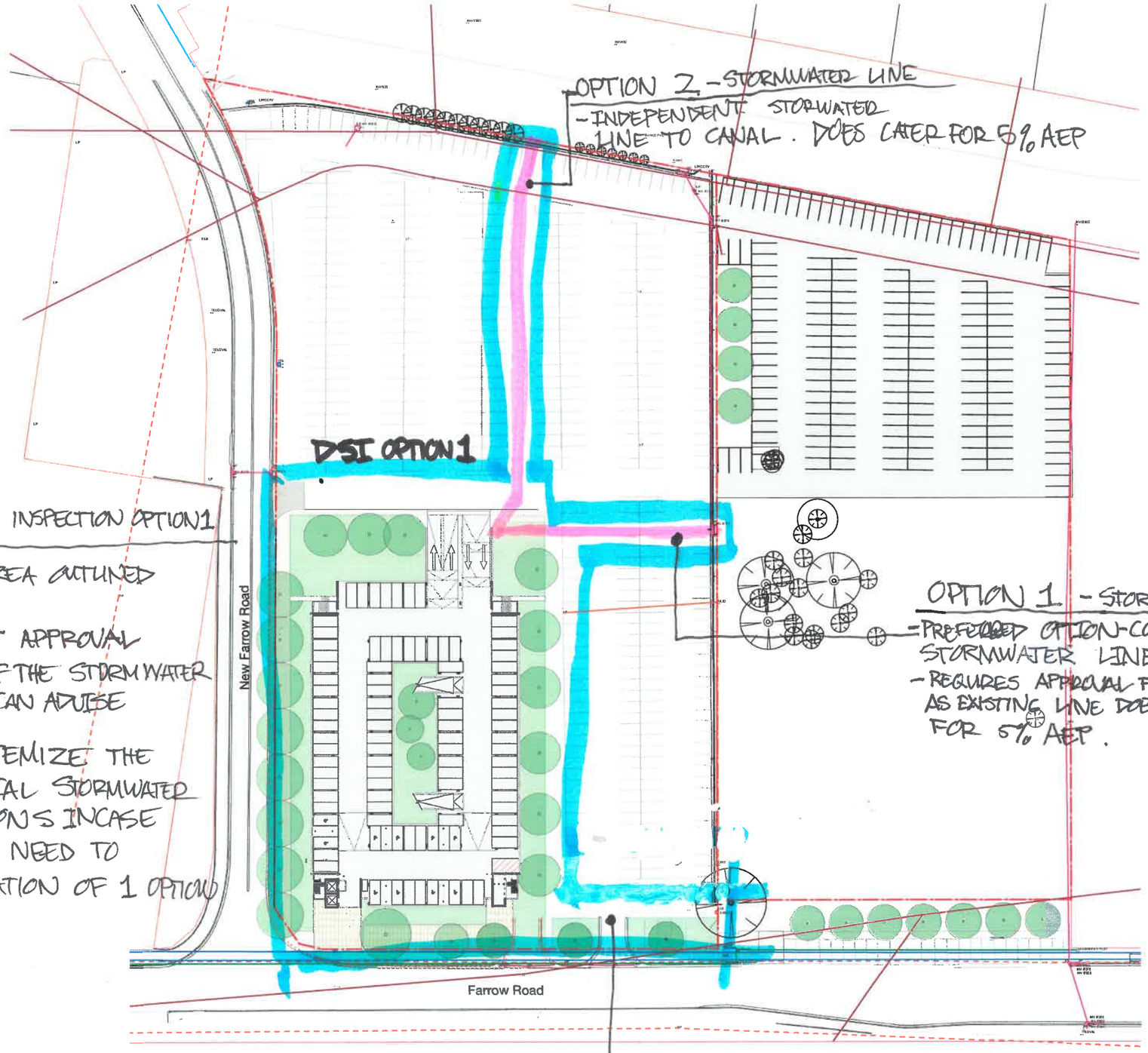
MGA

PROJ. #:	204718.02
DRAWING No:	2
REVISION:	0

Appendix B

HTUP Drawing

HT 21/3/22.



DETAILED SITE INSPECTION OPTION 1

- INCLUDE AREA OUTLINED BY BLUE.
- IF WE GET APPROVAL FOR ONE OF THE STORMWATER LINES WE CAN ADVISE
- CAN YOU ITEMIZE THE 2 POTENTIAL STORMWATER LINE OPTIONS INCASE WE ONLY NEED TO TEST LOCATION OF 1 OPTION ONLY.

OPTION 1 - STORMWATER LINE
- PREFERRED OPTION - CONNECT TO EXISTING STORMWATER LINE
- REQUIRES APPROVAL FROM COUNCIL AS EXISTING LINE DOES NOT CATER FOR 5% AEP.

POTENTIAL SERVICES CONNECTIONS ALONG THIS FRONTAGE

ARCHITECTS:
hill thalis
ARCHITECTURE + URBAN PROJECTS PTY LTD
LEVEL 4, 69-72 Wentworth Ave
Surry Hills NSW 2010 Australia
T 02 9211 4374 F 02 9281 3171
E admin@hillthalis.com.au www.hillthalis.com.au
Nominated Architects: Philip Thalis #6780 Sarah Hill #9283

- Use figured dimensions only
- Do not scale
- Comply with the Building Code of Australia
- Comply with the relevant Australian Standards
- Comply with relevant Authorities' requirements

REV	DATE	AMENDMENT
P1	17/3/22	Preliminary Issue for Information

Preliminary

PROJECT
Farrow Rd Multi-Deck Carpark
27 Farrow Road Campbelltown
(Design Development Stage)

CLIENT
Campbelltown City Council

DRAWING TITLE
Site Plan

JOB NO	DRAWN	SCALE	DRAWING NO.
21.41	BS	1:1000	**A2.02**
DATE	CHECKED	PLOT DATE	REVISION
Jan 2022	PT	21/3/22	**P1**

Appendix C

Photographic Plates

Photograph 1 - Borehole 101 and soil vapour sampling location

Photograph 2 - Fill and natural material augered from borehole 102

Douglas Partners Geotechnics / Environment / Groundwater	Site Photographs	PROJECT:	204718.02
	Detailed Site Investigation (Contamination)	PLATE No:	1
	Part Lot 245 Farrow Road, Campbelltown NSW	REV:	0
	CLIENT: Hill Thalis Architecture & Urban Projects Pty Ltd	DATE:	May-22

Photograph 3 - Visible layers of asphaltic concrete, sand (fill), and silty clay (natural) from borehole 110

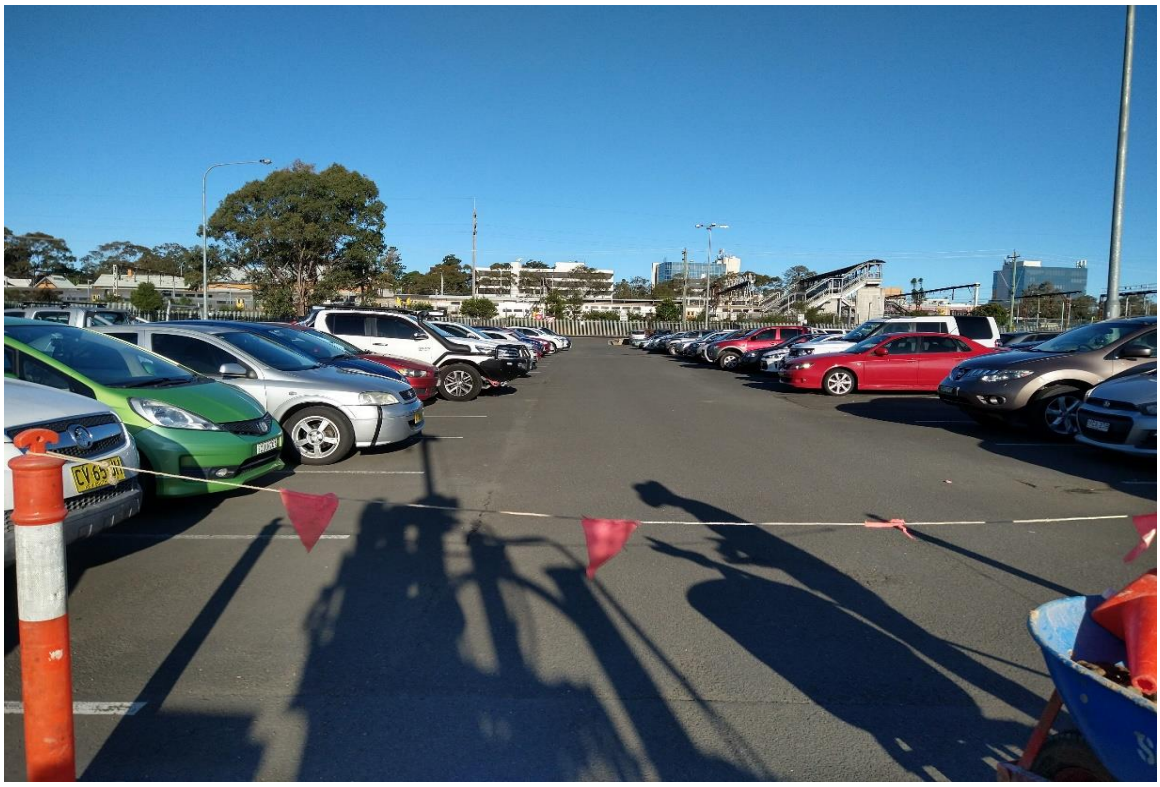
Photograph 4 - Surrounding area of borehole 110

Douglas Partners Geotechnics / Environment / Groundwater	Site Photographs	PROJECT:	204718.02
	Detailed Site Investigation (Contamination)	PLATE No:	2
	Part Lot 245 Farrow Road, Campbelltown NSW	REV:	0
	CLIENT: Hill Thalis Architecture & Urban Projects Pty Ltd	DATE:	May-22

Photograph 5 - Augered materials of borehole 116

Photograph 6 - Natural clay material augered from borehole 118

Douglas Partners Geotechnics / Environment / Groundwater	Site Photographs	PROJECT:	204718.02
	Detailed Site Investigation (Contamination)	PLATE No:	3
	Part Lot 245 Farrow Road, Campbelltown NSW	REV:	0
	CLIENT: Hill Thalis Architecture & Urban Projects Pty Ltd	DATE:	May-22



Photograph 7 - Surrounding area of borehole 118

Photograph 8 - Visible layers of asphaltic concrete, roadbase, silty sandy clay (fill), and silty clay (natural) from borehole 121

Douglas Partners Geotechnics / Environment / Groundwater	Site Photographs	PROJECT:	204718.02
	Detailed Site Investigation (Contamination)	PLATE No:	4
	Part Lot 245 Farrow Road, Campbelltown NSW	REV:	0
	CLIENT: Hill Thalis Architecture & Urban Projects Pty Ltd	DATE:	May-22

Photograph 9 - Excavated materials from borehole 122

Photograph 10 - Borehole 122 and soil vapour sampling location

Douglas Partners Geotechnics / Environment / Groundwater	Site Photographs	PROJECT:	204718.02
	Detailed Site Investigation (Contamination)	PLATE No:	5
	Part Lot 245 Farrow Road, Campbelltown NSW	REV:	0
	CLIENT: Hill Thalis Architecture & Urban Projects Pty Ltd	DATE:	May-22

Appendix D

DQO and SAC

Appendix D - 1 Data Quality Objectives

The DSI has been devised broadly in accordance with the seven step data quality objective (DQO) process which is provided in Appendix B, Schedule B2 of the *National Environment Protection (Assessment of Site Contamination) Measure* 1999 as amended 2013 (NEPC, 2013). The DQO process is outlined as follows:

D1.1 State the Problem

Desktop investigations completed during PSI have identified the following areas of environmental concern (AEC) that present the potential for soil and groundwater contamination at the site:

- AEC1: Historical application of fill to the site.
- AEC2: Presence of and potential for recently dumped rubbish likely as the result of fly-tipping; and
- AEC3: Off-site commercial/industrial business with spilling, leaks and mishandling of chemicals.

The “problem” to be addressed is the extent and nature of potential contamination at the site that may require remediation for the site to be rendered suitable for continued commercial/industrial land use.

The objectives of the investigation are as follows:

- Assess the contamination status of the site and the suitability of the site, from a contamination standpoint, for the continued commercial/industrial land use.

D1.2 Identify the Decision/Goal of the Study

The suitability of the site for the current and assumed future car park development was assessed based on the findings of the site walkover and a comparison of the analytical results for identified contaminants of potential concern (COPC) with the adopted site assessment criteria (SAC). The adopted SAC are provided in Section D2 below.

Based on the identified historical land uses, the main CoPC are expected to be total recoverable hydrocarbons (TRH), benzene, toluene, ethylbenzene and xylenes (BTEX), polycyclic aromatic hydrocarbons (PAH), organochlorine pesticides (OCP), metals and asbestos. Other commonly encountered contaminants which may be present include phenols, organophosphate pesticides (OPP) and polychlorinated biphenyls (PCB).

The following specific decisions were considered as part of the DSI:

- Did field observations and analytical results identify potential contamination sources which were not included in the preliminary conceptual site model (PCSM)?
- Were COPC present in soil at concentrations that pose a potential risk to identified receptors?
- Is the data sufficient to make a decision regarding the abovementioned risks, the suitability of the site for the proposed development?
- Does contamination at the site, if encountered, trigger the Duty to Report requirements under the CLM Act 1997?
- Are there any off-site migration issues that need to be considered?

D1.3 Identify Information Inputs

Inputs into the decisions are as follows:

- Review of regional geology, topography and hydrogeology information;
- Review of site history information;
- Completion of a site inspection;
- Soil samples collected in the immediate vicinity of identified AEC;
- The lithology of the site as described in the bore logs (Appendix E);
- Field and laboratory quality assurance/quality control (QA/QC) data to assess the suitability of the environmental data for the DSI (Appendix H);
- All analyses were undertaken at a National Association of Testing Authorities (NATA) accredited laboratory; and
- Laboratory reported concentrations of COPC were compared with the NEPC (2013) criteria as discussed in Section D2.

D1.4 Define the Study Boundaries

The site covers an approximate total area of 0.78 ha and the land parcel of Part Lot 245 Deposited Plan (DP) 1222763.

The Site location and boundaries are shown on Drawing 1, Appendix A.

The investigation was undertaken to a maximum depth of 1.6 m below ground level (bgl) across the Site.

Field investigations were undertaken on 6 May 2022 by a DP Environmental Scientist.

D1.5 Develop the Analytical Approach (or decision rule)

The information obtained during the assessment was used to characterise the Site in terms of contamination issues and risk to human health and the environment. The decision rules used in characterising the site were as follows:

- The adopted SAC was the NSW Environment Protection Authority (EPA) endorsed criteria; and
- The contaminant concentrations in soil were compared to the adopted SAC to establish whether further investigation or remedial action was required.

Field and laboratory test results were considered useable for the assessment after evaluation against the following data quality indicators (DQIs):

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

The specific limits are outlined in the data QA/QC procedures and results (Appendix H).

D1.6 Specify the Performance or Acceptable Criteria

Decision errors for the respective CoPC for fill and natural soils are:

1. Deciding that fill and natural soil at the Site exceeds the adopted SAC when they truly do not; and
2. Deciding that fill and natural soil at the Site is within the adopted SAC when they truly do not.

Decision errors for the PSI were minimised and measured by the following:

- The sampling regime targeted each stratum identified to account for site variability;
- Sample collection and handling techniques were in accordance with DP's *Field Procedures Manual*;
- Samples were prepared and analysed by a NATA-accredited laboratory with the acceptance limits for laboratory QA/QC parameters based on the laboratory reported acceptance limits and those stated in NEPC (2013);
- The analyte selection is based on the available site history, past site activities and site features. The potential for contaminants other than those proposed to be analysed is considered to be low;
- The SAC were adopted from established and NSW EPA endorsed guidelines. The SAC have risk probabilities already incorporated; and
- A NATA accredited laboratory using NATA endorsed methods are used to perform laboratory analysis. Where NATA endorsed methods are not used, the reasons are stated. The effect of using non-NATA methods on the decision making process are explained.

G1.7 Optimise the design for obtaining data

Sampling design and procedures that were implemented to optimise data collection for achieving the DQOs included the following;

- A NATA accredited laboratory using NATA endorsed methods was used to perform laboratory analysis;
- Additional soil samples were collected but kept 'on hold' pending details of initial analysis so that they could be analysed if further delineation was required; and
- Adequately experienced environmental scientists/engineers were chosen to conduct field work and sample analysis interpretation.

Appendix D – 2 - Site Assessment Criteria

The Site Assessment Criteria (SAC) applied in the current investigation are informed by the preliminary CSM which identified human and environmental receptors to potential contamination on the site (refer to Section 5). Analytical results are assessed (as a Tier 1 assessment) against the SAC comprising investigation and screening levels as per Schedule B1, *National Environment Protection (Assessment of Site Contamination) Measure* 1999, as amended 2013 (NEPC, 2013).

Given the proposed public nature of the carpark and accessible landscaped gardens the investigation and screening levels applied in the current investigation comprise levels adopted for a generic parkland open space land use scenario.

D2.1 Health Investigation and Screening Levels

The generic Health Investigation Levels (HILs) and Health Screening Levels (HSLs) are considered to be appropriate for the assessment of human health risk associated with contamination at the site. The adopted soil HILs and HSLs for the potential contaminants of concern are presented in Table D2, with inputs into their derivation shown in Table D1.

As shown in Table D2 the adopted HSLs are based on a potential vapour intrusion pathway, as identified in the CSM. Although the CSM also identifies a direct contact pathway as well as construction worker receptors, the corresponding HSLs are significantly higher than those for the vapour intrusion pathway and are therefore not drivers for further assessment and/or remediation. As such the direct contact and intrusive maintenance worker HSLs have not been listed.

Table D1: Inputs to the Derivation of HSLs

Variable	Input	Rationale
Potential exposure pathway	Inhalation of vapours	Potential exposure pathways
Soil Type	Sand	Dominant soil type in surface soils (see Bore Logs – Appendix E)
Depth to contamination	0 m to <1 m	Potential contamination sources likely to impact surface soils

Table D2: HIL and HSL in mg/kg Unless Otherwise Indicated

Contaminants		HIL- C	HSL- C
Metals	Arsenic	300	-
	Cadmium	90	-
	Chromium (VI)	300	-
	Copper	17000	-
	Lead	600	-
	Mercury (inorganic)	80	-
	Nickel	1200	-
	Zinc	30000	-
PAH	Benzo(a)pyrene TEQ[1]	3	-
	Total PAH	300	-
	Naphthalene	-	NL[3]
TRH	C6 – C10 (less BTEX) [F1	-	NL
	>C10-C16 (less Naphthalene) [F2	-	NL
	>C16-C34 [F3	-	-
	>C34-C40 [F4	-	-
BTEX	Benzene	-	NL[3]
	Toluene	-	NL[3]
	Ethylbenzene	-	NL[3]
	Xylenes	-	NL[3]

Contaminants		HIL- C	HSL- C
OCP	Aldrin + Dieldrin	10	-
	Chlordane	70	-
	DDT+DDE+DDD	400	-
	Endosulfan	340	-
	Endrin	20	-
	Heptachlor	10	-
	HCB	10	-
	Methoxychlor	400	-
OPP	Chlorpyrifos	250	-
PCB	Total PCBs	1	-

Notes:

1 Sum of carcinogenic PAH

2 Non dioxin-like PCBs only.

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

D2.2 Ecological Investigation Levels

Ecological Investigation Levels (EILs) and Added Contaminant Limits (ACLs), where appropriate, have been derived in NEPC (2013) for only a short list of contaminants comprising As, Cu, Cr (III), DDT, naphthalene, Ni, Pb and Zn. The adopted EILs, derived using the *Interactive (Excel) Calculation Spreadsheet* (Standing Council on Environment and Water (SCEW) website (http://www.scew.gov.au/node/941)) are shown in the following Table C4, with inputs into their derivation shown on Table C3.

Table D3: Inputs to the Derivation of EILs

Variable	Input	Rationale
Age of contaminants	"Aged" (>2 years)	Given the potential sources of soil contamination are from historical land use, the contamination is considered as "aged" (>2 years);
pH	7.5	Three selected samples were tested during the DSI for pH. The average pH value has been used as an initial screening value.
CEC	17.2 cmolc/kg	Three selected samples were tested during the DSI for CEC. The average CEC value has been used as an initial screening value.

Variable	Input	Rationale
Clay content	10 %	Conservative value for initial screen
Traffic volumes	low	The site is considered to be located within a low traffic area
State/Territory	New South Wales	-

Table D4: EIL in mg/kg

Analyte		EIL
Metals	Arsenic	100
	Copper	220
	Nickel	250
	Chromium III	410
	Lead	1,100
	Zinc	690
PAH	Naphthalene	170
OCP	DDT	180

D2.3 Ecological Screening Levels

Ecological Screening Levels (ESLs) are used to assess the risk of selected petroleum hydrocarbon compounds, BTEX and benzo(a)pyrene to terrestrial ecosystems. The adopted ESLs, based on a fine soil type are shown in the following Table D5.

Table D5: ESL in mg/kg

Analyte		ESL[1]	Comments
TRH	C6 – C10 (less BTEX) [F1]	180*	All ESLs are low reliability apart from those marked with * which are moderate reliability
	>C10-C16 (less Naphthalene) [F2]	120*	
	>C16-C34 [F3]	300	
	>C34-C40 [F4]	2800	
BTEX	Benzene	50	
	Toluene	85	
	Ethylbenzene	70	
	Xylenes	105	
PAH	Benzo(a)pyrene	0.7	

D2.4 Management Limits

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

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

The adopted management limits, based on a fine soil type are shown in the following Table D6.

Table D6: Management Limits in mg/kg

Analyte		Management Limit
TRH	F1[#]	700
	F2[#]	1,000
	F3	2,500
	F4	10,000

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

D2.5 Asbestos in Soil

NEPC (2013) defines the various asbestos types 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 (HSLs) 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).

On the basis of the proposed land use, and in accordance with Table 7, Schedule B1, NEPC (2013) the following asbestos HSLs have been adopted:

Table D7: Health Screening Levels for Asbestos Contamination in Soil (% w/w)

Form of Asbestos	HSL
Bonded ACM	0.02%
FA and AF	0.001 %
All Forms of Asbestos	No visible asbestos for surface soil

D.2.7 Soil Vapour Investigation levels

For the purposes of this investigation, soil vapour analytical results were assessed against the interim soil vapour health investigation levels for volatile organic chlorinated compounds and soil vapour health screening levels presented in Schedule B1 (Tables 1A(3) and 1A(5)) of the ASC NEPM (NEPC, 2013).

Parkland open space land use criteria (HIL/HSLs D) within sand were adopted (as required by the ASC NEPM) and the fill encountered across the site, particularly at the target depth of approximately 0.5 m, was generally encountered to be a silty sand. The criteria for depths of 0.0 - <1.0 m were applied given the current levels of the site and site levels are expected to remain similar in the near future.

The adopted Interim HILs and HSLs, are shown in the following Table D8.

Table D8: Interim HIL and HSL in mg/m^3 Unless Otherwise Indicated

Contaminants		Interim HIL- C	HSL- C
Volatile Organic Chlorinated Compounds	Trichloroethylene (TCE)	0.4	-
	1,1,1-trichlorethane (1,1,1 – TCA)	1200	-
	Tetrachlorethylene (PCE)	40	-
	Cis- 1,2 - dichloroethene	2	-
	Vinyl chloride	0.5	-
PAH	Naphthalene	-	410
TRH	C6 – C10 (less BTEX) [F1]	-	8600
	>C10-C16 (less Naphthalene) [F2]	-	NL[3]
BTEX	Benzene	-	360
	Toluene	-	NL[3]
	Ethylbenzene	-	NL[3]
	Xylenes	-	NL[3]

Notes:

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

Appendix E

Borehole Logs

BOREHOLE LOG

CLIENT: Hill Thalis Architecture & Urban Projects Pty Ltd
PROJECT: Proposed Multi Deck Carpark
LOCATION: Lots 2 and 245 Farrow Road, Campbelltown, NSW

SURFACE LEVEL: --
EASTING: 298165
NORTHING: 6228614
DIP/AZIMUTH: 90°/--

BORE No: 101
PROJECT No: 204718.02
DATE: 9/5/2022
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	ASPHALTIC CONCRETE: car park pavement							
	0.08	ROADBASE: brown, sand and igneous gravel			0.08				
		FILL/Silty CLAY CL: low plasticity, brown, with sandstone and shale gravel, cobbles, trace sand, w~PL		E					
	0.4	- becoming orange mottled brown below 0.35m			0.4				
		SHALE: grey, with clay, silt, trace sand, highly to moderately weathered, wet		E	0.5			▼ 09-05-22	
1	1.0	Bore discontinued at 1.0m - limit of investigation							1
	2								2
	3								3

RIG: Hand tools **DRILLER:** Epoca **LOGGED:** AJ **CASING:** N/A

TYPE OF BORING: 150mm diameter auger

WATER OBSERVATIONS: Free groundwater observed whilst augering at 0.75m

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: Hill Thalis Architecture & Urban Projects Pty Ltd
PROJECT: Proposed Multi Deck Carpark
LOCATION: Lots 2 and 245 Farrow Road, Campbelltown, NSW

SURFACE LEVEL: --
EASTING: 298152
NORTHING: 6228608
DIP/AZIMUTH: 90°/--

BORE No: 102
PROJECT No: 204718.02
DATE: 6/5/2022
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
	0.02	ASPHALTIC CONCRETE: car park pavement							
	0.05	ROADBASE: brown, sand and igneous gravel							
		FILL/Silty SAND SL: low plasticity, yellow-brown, trace clay gravel and cobbles, dry		E	0.1 0.2				
	0.4	Silty CLAY CI: medium plasticity, dark brown, w~PL, residual		E	0.5 0.6				
1	1.0	Bore discontinued at 1.0m - limit of investigation							1
2									2
3									3

RIG: Hand tools **DRILLER:** Epoca **LOGGED:** AJ **CASING:** N/A

TYPE OF BORING: 150mm diameter auger

WATER OBSERVATIONS: No free groundwater observed whilst augering

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: Hill Thalis Architecture & Urban Projects Pty Ltd
PROJECT: Proposed Multi Deck Carpark
LOCATION: Lots 2 and 245 Farrow Road, Campbelltown, NSW

SURFACE LEVEL: --
EASTING: 298134
NORTHING: 6228591
DIP/AZIMUTH: 90°/--

BORE No: 103
PROJECT No: 204718.02
DATE: 6/5/2022
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
	0.02	ASPHALTIC CONCRETE: car park pavement							
	0.04	ROADBASE: brown, sand and igneous gravel							
		FILL/Silty SAND SL: low plasticity, yellow-brown, with sandstone gravel and cobbles, trace clay and shale gravel, dry		E	0.2 0.3				
	0.4	Silty CLAY CI: medium plasticity, dark brown, trace shale gravel, w~PL, residual		E	0.5 0.6				
		- becoming dark brown mottled red-orange below 0.8m							
1	1.0	Bore discontinued at 1.0m - limit of investigation							1
2									2
3									3

RIG: Hand tools **DRILLER:** Epoca **LOGGED:** AJ **CASING:** N/A

TYPE OF BORING: 150mm diameter auger

WATER OBSERVATIONS: No free groundwater observed whilst augering

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: Hill Thalis Architecture & Urban Projects Pty Ltd
PROJECT: Proposed Multi Deck Carpark
LOCATION: Lots 2 and 245 Farrow Road, Campbelltown, NSW

SURFACE LEVEL: --
EASTING: 298121
NORTHING: 6228575
DIP/AZIMUTH: 90°/--

BORE No: 104
PROJECT No: 204718.02
DATE: 6/5/2022
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
	0.06	ASPHALTIC CONCRETE: car park pavement							
	0.07	ROADBASE: brown, sand and igneous gravel		E	0.1				
		FILL/Silty SAND SL: low plasticity, yellow-brown, with sandstone gravel and cobbles, trace clay and shale gravel, dry			0.2				
	0.3	Silty CLAY CI: medium plasticity, dark brown, trace shale cobbles and sand, w~PL, very stiff, residual		E	0.5				
		- becoming orange-brown below 0.65m			0.6				
1	1.0	Bore discontinued at 1.0m - limit of investigation							1
2									2
3									3

RIG: Hand tools **DRILLER:** Epoca **LOGGED:** AJ **CASING:** N/A

TYPE OF BORING: 150mm diameter auger

WATER OBSERVATIONS: No free groundwater observed whilst augering

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: Hill Thalis Architecture & Urban Projects Pty Ltd
PROJECT: Proposed Multi Deck Carpark
LOCATION: Lots 2 and 245 Farrow Road, Campbelltown, NSW

SURFACE LEVEL: --
EASTING: 298110
NORTHING: 6228594
DIP/AZIMUTH: 90°/--

BORE No: 105
PROJECT No: 204718.02
DATE: 6/5/2022
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
	0.03	ASPHALTIC CONCRETE: car park pavement			0.03				
		FILL/SAND SL: low plasticity, yellow,with sandstone gravel and cobbles, trace shale gravel, dry		E					
	0.3	FILL/Silty CLAY CL: low plasticity, pale brown to dark brown, trace sand, w<PL		E	0.3 0.34 0.4				
	0.9	Silty CLAY CI: medium plasticity, orange-brown, w~PL, residual		E	0.9 1.0				
	1.4	Bore discontinued at 1.4m - limit of investigation							

RIG: Hand tools **DRILLER:** Epoca **LOGGED:** AJ **CASING:** N/A

TYPE OF BORING: 150mm diameter auger

WATER OBSERVATIONS: No free groundwater observed whilst augering

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: Hill Thalis Architecture & Urban Projects Pty Ltd
PROJECT: Proposed Multi Deck Carpark
LOCATION: Lots 2 and 245 Farrow Road, Campbelltown, NSW

SURFACE LEVEL: --
EASTING: 298124
NORTHING: 6228604
DIP/AZIMUTH: 90°/--

BORE No: 106
PROJECT No: 204718.02
DATE: 9/5/2022
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	ASPHALTIC CONCRETE: car park pavement			0.05				
		FILL/Silty SAND SL: low plasticity, yellow-brown, with sandstone gravel and cobbles, moist		E					
	0.3	Silty CLAY CI: medium plasticity, dark orange-brown, w~PL, residual		E	0.3				
					0.4				
1	1.0	Bore discontinued at 1.0m - limit of investigation							1
2									2
3									3

RIG: Hand tools **DRILLER:** Epoca **LOGGED:** AJ **CASING:** N/A

TYPE OF BORING: 150mm diameter auger

WATER OBSERVATIONS: No free groundwater observed whilst augering

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: Hill Thalis Architecture & Urban Projects Pty Ltd
PROJECT: Proposed Multi Deck Carpark
LOCATION: Lots 2 and 245 Farrow Road, Campbelltown, NSW

SURFACE LEVEL: --
EASTING: 298136
NORTHING: 6228619
DIP/AZIMUTH: 90°/--

BORE No: 107
PROJECT No: 204718.02
DATE: 6/5/2022
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
	0.09	ASPHALTIC CONCRETE: car park pavement							
	0.1	FILL/Silty SAND SL: low plasticity, yellow-brown, with sandstone gravel and cobbles, trace clay and shale gravel, moist		E	0.09 0.1				
		Silty CLAY CL-CI: low to medium plasticity, dark orange-brown, w<PL, residual		E	0.3 0.4				
		- becoming orange below 0.8m							
	0.9	Bore discontinued at 0.9m - limit of investigation							
	1								1
	2								2
	3								3

RIG: Hand tools **DRILLER:** Epoca **LOGGED:** AJ **CASING:** N/A

TYPE OF BORING: 150mm diameter auger

WATER OBSERVATIONS: No free groundwater observed whilst augering

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: Hill Thalis Architecture & Urban Projects Pty Ltd
PROJECT: Proposed Multi Deck Carpark
LOCATION: Lots 2 and 245 Farrow Road, Campbelltown, NSW

SURFACE LEVEL: --
EASTING: 298124
NORTHING: 6228635
DIP/AZIMUTH: 90°/--

BORE No: 108
PROJECT No: 204718.02
DATE: 6/5/2022
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	ASPHALTIC CONCRETE: car park pavement			0.05				
		FILL/Silty SAND SL: low plasticity, yellow-brown, with sandstone gravel and cobbles, trace clay and shale gravel, moist		E					
	0.35	Silty CLAY CL-CI: low to medium plasticity, dark orange-brown, w<PL, residual			0.35				
				E	0.5				
					0.6				
1	1.0	Bore discontinued at 1.0m - limit of investigation							1
2									2
3									3

RIG: Hand tools **DRILLER:** Epoca **LOGGED:** AJ **CASING:** N/A

TYPE OF BORING: 150mm diameter auger

WATER OBSERVATIONS: No free groundwater observed whilst augering

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: Hill Thalis Architecture & Urban Projects Pty Ltd
PROJECT: Proposed Multi Deck Carpark
LOCATION: Lots 2 and 245 Farrow Road, Campbelltown, NSW

SURFACE LEVEL: --
EASTING: 298108
NORTHING: 6228612
DIP/AZIMUTH: 90°/--

BORE No: 109
PROJECT No: 204718.02
DATE: 9/5/2022
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
	0.08	ASPHALTIC CONCRETE: car park pavement			0.08				
		FILL/Silty SAND SL: low plasticity, yellow-brown, with sandstone gravel and cobbles, moist		E*					
	0.3	Silty CLAY CL: low plasticity, orange-brown, w<PL			0.3				
				E	0.4				
	0.8	Bore discontinued at 0.8m - limit of investigation			0.5				
	1								
	2								
	3								

RIG: Hand tools **DRILLER:** Epoca **LOGGED:** AJ **CASING:** N/A

TYPE OF BORING: 150mm diameter auger

WATER OBSERVATIONS: No free groundwater observed whilst augering

REMARKS: Location coordinates are in MGA94 Zone 56. * Replicate sample BD2/090522 collected

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: Hill Thalis Architecture & Urban Projects Pty Ltd
PROJECT: Proposed Multi Deck Carpark
LOCATION: Lots 2 and 245 Farrow Road, Campbelltown, NSW

SURFACE LEVEL: --
EASTING: 298094
NORTHING: 6228606
DIP/AZIMUTH: 90°/--

BORE No: 110
PROJECT No: 204718.02
DATE: 6/5/2022
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
	0.03	ASPHALTIC CONCRETE: car park pavement			0.03				
		FILL/SAND SL: low plasticity, yellow, with sandstone gravel and cobbles, trace shale gravel, dry		E					
	0.3	Silty CLAY CL-CI: low to medium plasticity, dark brown to orange-brown, w<PL, residual			0.3				
				E	0.4				
					0.5				
	0.8	Bore discontinued at 0.8m - limit of investigation							
	1								1
	2								2
	3								3

RIG: Hand tools **DRILLER:** Epoca **LOGGED:** AJ **CASING:** N/A

TYPE OF BORING: 150mm diameter auger

WATER OBSERVATIONS: No free groundwater observed whilst augering

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: Hill Thalis Architecture & Urban Projects Pty Ltd
PROJECT: Proposed Multi Deck Carpark
LOCATION: Lots 2 and 245 Farrow Road, Campbelltown, NSW

SURFACE LEVEL: --
EASTING: 298079
NORTHING: 6228625
DIP/AZIMUTH: 90°/--

BORE No: 111
PROJECT No: 204718.02
DATE: 6/5/2022
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	ASPHALTIC CONCRETE: car park pavement			0.05				
		FILL/SAND SL: low plasticity, yellow-brown, with sandstone gravel and cobbles, trace shale gravel, dry		E					
	0.3	Silty CLAY CL-CI: low to medium plasticity, dark brown to orange-brown, w<PL, residual			0.3				
				E	0.4				
					0.5				
	0.8	Bore discontinued at 0.8m - limit of investigation							
	1								
	2								
	3								

RIG: Hand tools **DRILLER:** Epoca **LOGGED:** AJ **CASING:** N/A

TYPE OF BORING: 150mm diameter auger

WATER OBSERVATIONS: No free groundwater observed whilst augering

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: Hill Thalis Architecture & Urban Projects Pty Ltd
PROJECT: Proposed Multi Deck Carpark
LOCATION: Lots 2 and 245 Farrow Road, Campbelltown, NSW

SURFACE LEVEL: --
EASTING: 298096
NORTHING: 6228630
DIP/AZIMUTH: 90°/--

BORE No: 112
PROJECT No: 204718.02
DATE: 9/5/2022
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	ASPHALTIC CONCRETE: car park pavement		E	0.05				
	0.1	FILL/SAND SL: low plasticity, yellow, trace silt and sandstone gravel, dry			0.1				
		FILL/Silty SAND SL: low plasticity, brown to pale brown, trace sand, dry		E	0.2 0.3				
	0.4	Silty CLAY CL: low plasticity, orange-brown, w<PL		E	0.6 0.7				
1	1.0	Bore discontinued at 1.0m - limit of investigation							1
2									2
3									3

RIG: Hand tools **DRILLER:** Epoca **LOGGED:** AJ **CASING:** N/A

TYPE OF BORING: 150mm diameter auger

WATER OBSERVATIONS: No free groundwater observed whilst augering

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: Hill Thalis Architecture & Urban Projects Pty Ltd
PROJECT: Proposed Multi Deck Carpark
LOCATION: Lots 2 and 245 Farrow Road, Campbelltown, NSW

SURFACE LEVEL: --
EASTING: 298111
NORTHING: 6228647
DIP/AZIMUTH: 90°/--

BORE No: 113
PROJECT No: 204718.02
DATE: 6/5/2022
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
	0.0								
	0.1	ASPHALTIC CONCRETE: car park pavement		E	0.1				
		Silty CLAY CL-CI: low to medium plasticity, dark orange-brown, w<PL, residual			0.2				
				E	0.3				
		- becoming orange mottled grey below 0.8m							
	0.9	Bore discontinued at 0.9m							
	1	- limit of investigation							
	2								
	3								

RIG: Hand tools **DRILLER:** Epoca **LOGGED:** AJ **CASING:** N/A

TYPE OF BORING: 150mm diameter auger

WATER OBSERVATIONS: No free groundwater observed whilst augering

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: Hill Thalis Architecture & Urban Projects Pty Ltd
PROJECT: Proposed Multi Deck Carpark
LOCATION: Lots 2 and 245 Farrow Road, Campbelltown, NSW

SURFACE LEVEL: --
EASTING: 298095
NORTHING: 6228663
DIP/AZIMUTH: 90°/--

BORE No: 114
PROJECT No: 204718.02
DATE: 6/5/2022
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
	0.02	ASPHALTIC CONCRETE: car park pavement			0.02				
		FILL/Silty SAND SL: low plasticity, yellow-brown, with shale and sandstone gravel and cobbles, trace clay, dry		E					
	0.4	Silty CLAY CL-CI: low to medium plasticity, dark orange-brown, w~PL, residual			0.4				
				E	0.5				
					0.6				
	0.9	Bore discontinued at 0.9m - limit of investigation							
	1								1
	2								2
	3								3

RIG: Hand tools **DRILLER:** Epoca **LOGGED:** AJ **CASING:** N/A

TYPE OF BORING: 150mm diameter auger

WATER OBSERVATIONS: No free groundwater observed whilst augering

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: Hill Thalis Architecture & Urban Projects Pty Ltd
PROJECT: Proposed Multi Deck Carpark
LOCATION: Lots 2 and 245 Farrow Road, Campbelltown, NSW

SURFACE LEVEL: --
EASTING: 298085
NORTHING: 6228645
DIP/AZIMUTH: 90°/--

BORE No: 115
PROJECT No: 204718.02
DATE: 9/5/2022
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	ASPHALTIC CONCRETE: car park pavement			0.05				
		ROADBASE: brown, sand and igneous gravel		E					
	0.2	FILL/Silty CLAY CL: low plasticity, yellow-brown, trace sandstone gravel and sand, w<PL			0.2				
				E	0.3				
	0.5	Silty CLAY CL: low plasticity, orange-brown, w<PL			0.4				
				E	0.6				
	1.0	Bore discontinued at 1.0m - limit of investigation			0.7				
1									1
2									2
3									3

RIG: Hand tools **DRILLER:** Epoca **LOGGED:** AJ **CASING:** N/A
TYPE OF BORING: 150mm diameter auger
WATER OBSERVATIONS: No free groundwater observed whilst augering
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: Hill Thalis Architecture & Urban Projects Pty Ltd
PROJECT: Proposed Multi Deck Carpark
LOCATION: Lots 2 and 245 Farrow Road, Campbelltown, NSW

SURFACE LEVEL: --
EASTING: 298068
NORTHING: 6228638
DIP/AZIMUTH: 90°/--

BORE No: 116
PROJECT No: 204718.02
DATE: 6/5/2022
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
	0.02	ASPHALTIC CONCRETE: car park pavement			0.02				
		ROADBASE: brown, sand and igneous gravel		E					
	0.4	FILL/Silty CLAY CL: low plasticity, pale brown, trace sand and shale gravel, w<PL		E	0.4				
	0.5	Silty CLAY CI: medium plasticity, dark brown to orange-brown, w<PL, residual		E	0.5				
					0.6				
1	1.0	Bore discontinued at 1.0m - limit of investigation							1
2									2
3									3

RIG: Hand tools **DRILLER:** Epoca **LOGGED:** AJ **CASING:** N/A

TYPE OF BORING: 150mm diameter auger

WATER OBSERVATIONS: No free groundwater observed whilst augering

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: Hill Thalis Architecture & Urban Projects Pty Ltd
PROJECT: Proposed Multi Deck Carpark
LOCATION: Lots 2 and 245 Farrow Road, Campbelltown, NSW

SURFACE LEVEL: --
EASTING: 298117
NORTHING: 6228687
DIP/AZIMUTH: 90°/--

BORE No: 117
PROJECT No: 204718.02
DATE: 6/5/2022
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
	0.02	ASPHALTIC CONCRETE: car park pavement							
		ROADBASE: brown, sand and igneous gravel							
	0.2	FILL/Silty Sandy CLAY CL: low plasticity, brown, with gravel and cobbles, w<PL		E	0.2				
	0.3	Silty CLAY CI: medium plasticity, yellow-brown, w~PL, residual			0.3				
				E	0.5				
					0.6				
1	1.0	Bore discontinued at 1.0m - limit of investigation							1
2									2
3									3

RIG: Hand tools **DRILLER:** Epoca **LOGGED:** AJ **CASING:** N/A

TYPE OF BORING: 150mm diameter auger

WATER OBSERVATIONS: No free groundwater observed whilst augering

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: Hill Thalis Architecture & Urban Projects Pty Ltd
PROJECT: Proposed Multi Deck Carpark
LOCATION: Lots 2 and 245 Farrow Road, Campbelltown, NSW

SURFACE LEVEL: --
EASTING: 298109
NORTHING: 6228672
DIP/AZIMUTH: 90°/--

BORE No: 118
PROJECT No: 204718.02
DATE: 6/5/2022
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
	0.01	ASPHALTIC CONCRETE: car park pavement							
		ROADBASE: brown, sand and igneous gravel							
	0.25	FILL/Silty SAND SL: low plasticity, yellow-brown, with sandstone cobbles and gravel, trace clay, dry		E	0.25				
	0.35	Silty CLAY CL-CI: low to medium plasticity, dark orange-brown, w<PL, residual			0.35				
				E	0.5				
					0.6				
1	1.0	Bore discontinued at 1.0m - limit of investigation							1
2									2
3									3

RIG: Hand tools **DRILLER:** Epoca **LOGGED:** AJ **CASING:** N/A

TYPE OF BORING: 150mm diameter auger

WATER OBSERVATIONS: No free groundwater observed whilst augering

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: Hill Thalis Architecture & Urban Projects Pty Ltd
PROJECT: Proposed Multi Deck Carpark
LOCATION: Lots 2 and 245 Farrow Road, Campbelltown, NSW

SURFACE LEVEL: --
EASTING: 298081
NORTHING: 6228674
DIP/AZIMUTH: 90°/--

BORE No: 119
PROJECT No: 204718.02
DATE: 6/5/2022
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
	0.03	ASPHALTIC CONCRETE: car park pavement			0.03				
		ROADBASE: brown, sand and igneous gravel		E					
	0.2	FILL/Silty SAND SL: low plasticity, brown-yellow, with shale gravel and cobbles, trace clay, moist		E	0.2 0.3				
	0.4	Silty CLAY CL-CI: low to medium plasticity, dark orange-brown, w<PL, residual		E	0.4 0.5				
	0.9	Bore discontinued at 0.9m - limit of investigation							
	1								1
	2								2
	3								3

RIG: Hand tools **DRILLER:** Epoca **LOGGED:** AJ **CASING:** N/A

TYPE OF BORING: 150mm diameter auger

WATER OBSERVATIONS: No free groundwater observed whilst augering

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: Hill Thalis Architecture & Urban Projects Pty Ltd
PROJECT: Proposed Multi Deck Carpark
LOCATION: Lots 2 and 245 Farrow Road, Campbelltown, NSW

SURFACE LEVEL: --
EASTING: 298066
NORTHING: 6228689
DIP/AZIMUTH: 90°/--

BORE No: 120
PROJECT No: 204718.02
DATE: 6/5/2022
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
	0.04	ASPHALTIC CONCRETE: car park pavement			0.04				
		FILL/Silty SAND SL: low plasticity, brown-yellow, with shale and sandstone gravel and cobbles, trace clay, dry		E*					
	0.3	Silty CLAY CL-CI: low to medium plasticity, dark orange-brown, w<PL, residual			0.3				
				E	0.4				
					0.5				
	0.8	Bore discontinued at 0.8m - limit of investigation							
	1								
	2								
	3								

RIG: Hand tools **DRILLER:** Epoca **LOGGED:** AJ **CASING:** N/A

TYPE OF BORING: 150mm diameter auger

WATER OBSERVATIONS: No free groundwater observed whilst augering

REMARKS: Location coordinates are in MGA94 Zone 56. * Replicate sample BD1/060522 collected

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: Hill Thalis Architecture & Urban Projects Pty Ltd
PROJECT: Proposed Multi Deck Carpark
LOCATION: Lots 2 and 245 Farrow Road, Campbelltown, NSW

SURFACE LEVEL: --
EASTING: 298054
NORTHING: 6228704
DIP/AZIMUTH: 90°/--

BORE No: 121
PROJECT No: 204718.02
DATE: 6/5/2022
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
	0.02	ASPHALTIC CONCRETE: car park pavement							
		ROADBASE: brown, sand and igneous gravel							
	0.3	FILL/Silty Sandy CLAY CL: low plasticity, dark brown, with shale gravel and cobbles, trace sand, w<PL		E	0.3 0.4				
	0.5	Silty CLAY CL-CI: low to medium plasticity, dark orange-brown, w~PL, residual		E	0.5 0.6				
		- becoming orange below 0.7m							
1	1.0	Bore discontinued at 1.0m - limit of investigation							1
2									2
3									3

RIG: Hand tools **DRILLER:** Epoca **LOGGED:** AJ **CASING:** N/A

TYPE OF BORING: 150mm diameter auger

WATER OBSERVATIONS: No free groundwater observed whilst augering

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: Hill Thalis Architecture & Urban Projects Pty Ltd
PROJECT: Proposed Multi Deck Carpark
LOCATION: Lots 2 and 245 Farrow Road, Campbelltown, NSW

SURFACE LEVEL: --
EASTING: 298035
NORTHING: 6228713
DIP/AZIMUTH: 90°/--

BORE No: 122
PROJECT No: 204718.02
DATE: 9/5/2022
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	ASPHALTIC CONCRETE: car park pavement			0.05				
		FILL/Silty SAND SL: low plasticity, brown, with shale and sandstone gravel and cobbles, trace clay, dry		E					
	0.3	Silty CLAY CL-CI: low to medium plasticity, orange-brown, trace ironstone gravel, w~PL, residual			0.3				
				E	0.4				
					0.5				
1									1
	1.1	Bore discontinued at 1.1m - limit of investigation							
2									2
3									3

RIG: Hand tools **DRILLER:** Epoca **LOGGED:** AJ **CASING:** N/A

TYPE OF BORING: 150mm diameter auger

WATER OBSERVATIONS: No free groundwater observed whilst augering

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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Appendix F

Results Summary Tables F1 to F3

Table F1: Summary of Laboratory Results – Metals, TRH, BTEX, PAH

			Metals								TRH						BTEX				PAH			
			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)	Benzene	Toluene	Ethylbenzene	Total Xylenes	Naphthalene [b]	Benzo(a)pyrene (BaP)	Benzo(a)pyrene TEQ	Total PAHs
		PQL	4	0.4	1	1	1	0.1	1	1	25	50	25	50	100	100	0.2	0.5	1	1	0.1	0.05	0.5	0.05
Sample ID	Depth	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
BH101	0.08 - 0.4 m	9/05/2022	-	-	-	-	-	-	-	-	<25	<50	<25	<50	100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
			300 100	90 -	300 410	17000 220	600 1100	80 -	1200 250	30000 690	- -	- 120	NL 180	NL -	- 300	- 2800	NL 50	NL 85	NL 70	NL 105	NL 170	- 0.7	3 -	300 -
BH102	0.1 - 0.2 m	6/05/2022	-	-	-	-	-	-	-	-	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	0.3
			300 100	90 -	300 410	17000 220	600 1100	80 -	1200 250	30000 690	- -	- 120	NL 180	NL -	- 300	- 2800	NL 50	NL 85	NL 70	NL 105	NL 170	- 0.7	3 -	300 -
BH103	0.2 - 0.3 m	6/05/2022	-	-	-	-	-	-	-	-	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	0.1
			300 100	90 -	300 410	17000 220	600 1100	80 -	1200 250	30000 690	- -	- 120	NL 180	NL -	- 300	- 2800	NL 50	NL 85	NL 70	NL 105	NL 170	- 0.7	3 -	300 -
BH104	0.1 - 0.2 m	6/05/2022	-	-	-	-	-	-	-	-	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	0.08	<0.5	0.97
			300 100	90 -	300 410	17000 220	600 1100	80 -	1200 250	30000 690	- -	- 120	NL 180	NL -	- 300	- 2800	NL 50	NL 85	NL 70	NL 105	NL 170	- 0.7	3 -	300 -
BH105	0.03 - 0.3 m	6/05/2022	-	-	-	-	-	-	-	-	<25	<50	<25	<50	220	280	<0.2	<0.5	<1	<1	<0.1	0.4	0.5	5.2
			300 100	90 -	300 410	17000 220	600 1100	80 -	1200 250	30000 690	- -	- 120	NL 180	NL -	- 300	- 2800	NL 50	NL 85	NL 70	NL 105	NL 170	- 0.7	3 -	300 -
BH106	0.05 - 0.3 m	6/05/2022	-	-	-	-	-	-	-	-	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
			300 100	90 -	300 410	17000 220	600 1100	80 -	1200 250	30000 690	- -	- 120	NL 180	NL -	- 300	- 2800	NL 50	NL 85	NL 70	NL 105	NL 170	- 0.7	3 -	300 -
BH107	0.09 - 0.1 m	6/05/2022	-	-	-	-	-	-	-	-	<25	<50	<25	<50	330	620	<0.2	<0.5	<1	<1	<0.1	0.08	<0.5	0.53
			300 100	90 -	300 410	17000 220	600 1100	80 -	1200 250	30000 690	- -	- 120	NL 180	NL -	- 300	- 2800	NL 50	NL 85	NL 70	NL 105	NL 170	- 0.7	3 -	300 -
BH108	0.05 - 0.35 m	6/05/2022	-	-	-	-	-	-	-	-	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
			300 100	90 -	300 410	17000 220	600 1100	80 -	1200 250	30000 690	- -	- 120	NL 180	NL -	- 300	- 2800	NL 50	NL 85	NL 70	NL 105	NL 170	- 0.7	3 -	300 -
BH109	0.08 - 0.3 m	09/05/2022	-	-	-	-	-	-	-	-	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	0.3
			300 100	90 -	300 410	17000 220	600 1100	80 -	1200 250	30000 690	- -	- 120	NL 180	NL -	- 300	- 2800	NL 50	NL 85	NL 70	NL 105	NL 170	- 0.7	3 -	300 -
BH110	0.03 - 0.3 m	6/05/2022	-	-	-	-	-	-	-	-	<25	<50	<25	<50	130	200	<0.2	<0.5	<1	<1	<0.1	0.4	0.7	6.2
			300 100	90 -	300 410	17000 220	600 1100	80 -	1200 250	30000 690	- -	- 120	NL 180	NL -	- 300	- 2800	NL 50	NL 85	NL 70	NL 105	NL 170	- 0.7	3 -	300 -
BH111	0.05 - 0.3 m	6/05/2022	-	-	-	-	-	-	-	-	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	0.2	<0.5	2.6
			300 100	90 -	300 410	17000 220	600 1100	80 -	1200 250	30000 690	- -	- 120	NL 180	NL -	- 300	- 2800	NL 50	NL 85	NL 70	NL 105	NL 170	- 0.7	3 -	300 -
BH112	0.05 - 0.1 m	09/05/2022	-	-	-	-	-	-	-	-	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
			300 100	90 -	300 410	17000 220	600 1100	80 -	1200 250	30000 690	- -	- 120	NL 180	NL -	- 300	- 2800	NL 50	NL 85	NL 70	NL 105	NL 170	- 0.7	3 -	300 -
BH113	0 - 0.1 m	6/05/2022	-	-	-	-	-	-	-	-	<25	<50	<25	<50	570	1100	<0.2	<0.5	<1	<1	<0.1	0.1	<0.5	1.2
			300 100	90 -	300 410	17000 220	600 1100	80 -	1200 250	30000 690	- -	- 120	NL 180	NL -	- 300	- 2800	NL 50	NL 85	NL 70	NL 105	NL 170	- 0.7	3 -	300 -
BH114	0.02 - 0.4 m	6/05/2022	-	-	-	-	-	-	-	-	<25	<50	<25	<50	170	300	<0.2	<0.5	<1	<1	<0.1	0.3	<0.5	2.4
			300 100	90 -	300 410	17000 220	600 1100	80 -	1200 250	30000 690	- -	- 120	NL 180	NL -	- 300	- 2800	NL 50	NL 85	NL 70	NL 105	NL 170	- 0.7	3 -	300 -
BH115	0.3 - 0.4 m	09/05/2022	-	-	-	-	-	-	-	-	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
			300 100	90 -	300 410	17000 220	600 1100	80 -	1200 250	30000 690	- -	- 120	NL 180	NL -	- 300	- 2800	NL 50	NL 85	NL 70	NL 105	NL 170	- 0.7	3 -	300 -
BH116	0.4 - 0.5 m	6/05/2022	-	-	-	-	-	-	-	-	<25	<50	<25	<50	170	230	<0.2	<0.5	<1	<1	<0.1	0.3	<0.5	2.6
			300 100	90 -	300 410	17000 220	600 1100	80 -	1200 250	30000 690	- -	- 120	NL 180	NL -	- 300	- 2800	NL 50	NL 85	NL 70	NL 105	NL 170	- 0.7	3 -	300 -
BH117	0.2 - 0.3 m	6/05/2022	-	-	-	-	-	-	-	-	<25	<50	<25	<50	500	610	<0.2	<0.5	<1	<1	<0.1	0.2	<0.5	1.3
			300 100	90 -	300 410	17000 220	600 1100	80 -	1200 250	30000 690	- -	- 120	NL 180	NL -	- 300	- 2800	NL 50	NL 85	NL 70	NL 105	NL 170	- 0.7	3 -	300 -
BH118	0.25 - 0.35 m	6/05/2022	-	-	-	-	-	-	-	-	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	0.2	<0.5	2
			300 100	90 -	300 410	17000 220	600 1100	80 -	1200 250	30000 690	- -	- 120	NL 180	NL -	- 300	- 2800	NL 50	NL 85	NL 70	NL 105	NL 170	- 0.7	3 -	300 -
BH119	0.2 - 0.3 m	6/05/2022	-	-	-	-	-	-	-	-	<25	<50	<25	<50	340	400	<0.2	<0.5	<1	<1	<0.1	0.64	0.8	6.3
			300 100	90 -	300 410	17000 220	600 1100	80 -	1200 250	30000 690	- -	- 120	NL 180	NL -	- 300	- 2800	NL 50	NL 85	NL 70	NL 105	NL 170	- 0.7	3 -	300 -
BH120	0.04 - 0.3 m	6/05/2022	-	-	-	-	-	-	-	-	<25	<50	<25	<50	1000	900	<0.2	<0.5	<1	<1	<0.1	0.5	0.7	5.1
			300 100	90 -	300 410	17000 220	600 1100	80 -	1200 250	30000 690	- -	- 120	NL 180	NL -	- 300	- 2800	NL 50	NL 85	NL 70	NL 105	NL 170	- 0.7	3 -	300 -

Table F1: Summary of Laboratory Results – Metals, TRH, BTEX, PAH

			Metals								TRH						BTEX				PAH			
			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)	Benzene	Toluene	Ethylbenzene	Total Xylenes	Naphthalene [b]	Benzo(a)pyrene (BaP)	Benzo(a)pyrene TEQ	Total PAHs
BH121	0.3 - 0.4 m	6/05/2022	-	-	-	-	-	-	-	-	<25	<50	<25	<50	290	450	<0.2	<0.5	<1	<1	<0.1	0.3	<0.5	2.7
			300 100	90 -	300 410	17000 220	600 1100	80 -	1200 250	30000 690	- -	- 120	NL 180	NL -	- 300	- 2800	NL 50	NL 85	NL 70	NL 105	NL 170	- 0.7	3 -	300 -
BH122	0.05 - 0.3 m	09/05/2022	-	-	-	-	-	-	-	-	<25	<50	<25	<50	470	570	<0.2	<0.5	<1	<1	<0.1	0.69	1	8.8
			300 100	90 -	300 410	17000 220	600 1100	80 -	1200 250	30000 690	- -	- 120	NL 180	NL -	- 300	- 2800	NL 50	NL 85	NL 70	NL 105	NL 170	- 0.7	3 -	300 -
BD1	0 m	6/05/2022	-	-	-	-	-	-	-	-	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	0.1
			300 100	90 -	300 410	17000 220	600 1100	80 -	1200 250	30000 690	- -	- 120	NL 180	NL -	- 300	- 2800	NL 50	NL 85	NL 70	NL 105	NL 170	- 0.7	3 -	300 -
BD2	0 m	09/05/2022	-	-	-	-	-	-	-	-	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	0.3
			300 100	90 -	300 410	17000 220	600 1100	80 -	1200 250	30000 690	- -	- 120	NL 180	NL -	- 300	- 2800	NL 50	NL 85	NL 70	NL 105	NL 170	- 0.7	3 -	300 -
C1	0 m	6/05/2022	<4	<0.4	7	20	12	<0.1	8	46	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			300 100	90 -	300 410	17000 220	600 1100	80 -	1200 250	30000 690	- -	- 120	NL 180	NL -	- 300	- 2800	NL 50	NL 85	NL 70	NL 105	NL 170	- 0.7	3 -	300 -
C2	0 m	6/05/2022	<4	<0.4	7	77	14	<0.1	5	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			300 100	90 -	300 410	17000 220	600 1100	80 -	1200 250	30000 690	- -	- 120	NL 180	NL -	- 300	- 2800	NL 50	NL 85	NL 70	NL 105	NL 170	- 0.7	3 -	300 -
C3	0 m	6/05/2022	<4	<0.4	7	16	11	<0.1	4	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			300 100	90 -	300 410	17000 220	600 1100	80 -	1200 250	30000 690	- -	- 120	NL 180	NL -	- 300	- 2800	NL 50	NL 85	NL 70	NL 105	NL 170	- 0.7	3 -	300 -
C4	0 m	6/05/2022	<4	<0.4	8	34	10	<0.1	6	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			300 100	90 -	300 410	17000 220	600 1100	80 -	1200 250	30000 690	- -	- 120	NL 180	NL -	- 300	- 2800	NL 50	NL 85	NL 70	NL 105	NL 170	- 0.7	3 -	300 -
C5	0 m	6/05/2022	<4	<0.4	7	20	11	<0.1	6	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			300 100	90 -	300 410	17000 220	600 1100	80 -	1200 250	30000 690	- -	- 120	NL 180	NL -	- 300	- 2800	NL 50	NL 85	NL 70	NL 105	NL 170	- 0.7	3 -	300 -
C6	0 m	6/05/2022	<4	<0.4	10	12	16	<0.1	7	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			300 100	90 -	300 410	17000 220	600 1100	80 -	1200 250	30000 690	- -	- 120	NL 180	NL -	- 300	- 2800	NL 50	NL 85	NL 70	NL 105	NL 170	- 0.7	3 -	300 -
C7	0 m	6/05/2022	<4	<0.4	12	100	11	<0.1	6	39	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			300 100	90 -	300 410	17000 220	600 1100	80 -	1200 250	30000 690	- -	- 120	NL 180	NL -	- 300	- 2800	NL 50	NL 85	NL 70	NL 105	NL 170	- 0.7	3 -	300 -
C8	0 m	6/05/2022	4	<0.4	11	25	19	<0.1	8	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			300 100	90 -	300 410	17000 220	600 1100	80 -	1200 250	30000 690	- -	- 120	NL 180	NL -	- 300	- 2800	NL 50	NL 85	NL 70	NL 105	NL 170	- 0.7	3 -	300 -
C9	0 m	6/05/2022	<4	<0.4	13	45	16	<0.1	10	57	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			300 100	90 -	300 410	17000 220	600 1100	80 -	1200 250	30000 690	- -	- 120	NL 180	NL -	- 300	- 2800	NL 50	NL 85	NL 70	NL 105	NL 170	- 0.7	3 -	300 -
C10	0 m	6/05/2022	<4	<0.4	11	89	17	<0.1	16	39	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			300 100	90 -	300 410	17000 220	600 1100	80 -	1200 250	30000 690	- -	- 120	NL 180	NL -	- 300	- 2800	NL 50	NL 85	NL 70	NL 105	NL 170	- 0.7	3 -	300 -
C11	0 m	6/05/2022	<4	<0.4	18	76	13	<0.1	27	39	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			300 100	90 -	300 410	17000 220	600 1100	80 -	1200 250	30000 690	- -	- 120	NL 180	NL -	- 300	- 2800	NL 50	NL 85	NL 70	NL 105	NL 170	- 0.7	3 -	300 -

Lab result

HIL/HSL value EIL/ESL value

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

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

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

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

Notes:

a	QA/QC replicate of sample listed directly below the primary sample	C1	Composite sample BH101/0.08-0.4 and	C4	Composite sample BH107/0.09-0.1 and BH108 C7
b	Reported naphthalene laboratory result obtained from BTEXN suite	C2	Composite sample BH103/0.2-0.3 and B	C5	Composite sample BH109/0.08-0.35 and BH11 C8
c	Criteria applies to DDT only	C3	Composite sample BH105/0.03-0.3 and	C6	Composite sample BH111/0.05-0.3 and BH112 C9

Composite sample BH113/0-0.1 and BH114/0.(	C10	Composite sample BH119/0.2-0.3 and BH120/0.04-0.3	
Composite sample BH115/0.3-0.4 and BH116/(	C11	Composite sample BH121/0.3-0.4 and BH122/0.05-0.3	
Composite sample BH117/0.2-0.3 and BH118/0.25-0.35			

Site Assessment Criteria (SAC):

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

SAC based on generic land use thresholds for Recreational C including public open space

HIL C	Recreational / Open Space (NEPC, 2013)
HSL C	Recreational / Open Space (vapour intrusion) (NEPC, 2013)
DC HSL C	Direct contact HSL C Recreational /Open space (direct contact) (CRC CARE, 2011)
EIL/ESL UR/POS	Urban Residential and Public Open Space (NEPC, 2013)
ML R/P/POS	Residential, Parkland and Public Open Space (NEPC, 2013)

Douglas Partners
Geotechnics / Environment / Groundwater

Table F2: Summary of Laboratory Results – Phenol, OCP, OPP, PCB, Asbestos

			Phenol	OCP											OPP	PCB								Asbestos		
			Phenol	DDD	DDT+DDE+DDD [c]	DDE	DDT	Aldrin & Dieldrin	Total Chlordane	Endrin	Total Endosulfan	Heptachlor	Hexachlorobenzene	Methoxychlor	Chlorpyriphos	Arochlor 1016	Total PCB	Arochlor 1221	Arochlor 1232	Arochlor 1242	Arochlor 1248	Arochlor 1254	Aroclor 1260	Asbestos ID in soil >0.1g/kg	Trace Analysis	Asbestos (50 g)
		PQL	5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1			
Sample ID	Depth	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	-	-	-
BH101	0.08 - 0.4 m	9/05/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NAD	NAD	NAD
			120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	250 -	- -	1 -	- -	- -	- -	- -	- -	- -			
BH102	0.1 - 0.2 m	6/05/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NAD	NAD	NAD
			120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	250 -	- -	1 -	- -	- -	- -	- -	- -	- -			
BH103	0.2 - 0.3 m	6/05/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NAD	NAD	NAD
			120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	250 -	- -	1 -	- -	- -	- -	- -	- -	- -			
BH104	0.1 - 0.2 m	6/05/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NAD	NAD	NAD
			120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	250 -	- -	1 -	- -	- -	- -	- -	- -	- -			
BH105	0.03 - 0.3 m	6/05/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NAD	NAD	NAD
			120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	250 -	- -	1 -	- -	- -	- -	- -	- -	- -			
BH106	0.05 - 0.3 m	6/05/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NAD	NAD	NAD
			120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	250 -	- -	1 -	- -	- -	- -	- -	- -	- -			
BH107	0.09 - 0.1 m	6/05/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NAD	NAD	NAD
			120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	250 -	- -	1 -	- -	- -	- -	- -	- -	- -			
BH108	0.05 - 0.35 m	6/05/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NAD	NAD	NAD
			120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	250 -	- -	1 -	- -	- -	- -	- -	- -	- -			
BH109	0.08 - 0.3 m	09/05/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NAD	NAD	NAD
			120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	250 -	- -	1 -	- -	- -	- -	- -	- -	- -			
BH110	0.03 - 0.3 m	6/05/2022	<5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NAD	NAD	NAD
			120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	250 -	- -	1 -	- -	- -	- -	- -	- -	- -			
BH111	0.05 - 0.3 m	6/05/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NAD	NAD	NAD
			120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	250 -	- -	1 -	- -	- -	- -	- -	- -	- -			
BH112	0.05 - 0.1 m	09/05/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NAD	NAD	NAD
			120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	250 -	- -	1 -	- -	- -	- -	- -	- -	- -			
BH113	0 - 0.1 m	6/05/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NAD	NAD	NAD
			120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	250 -	- -	1 -	- -	- -	- -	- -	- -	- -			
BH114	0.02 - 0.4 m	6/05/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NAD	NAD	NAD
			120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	250 -	- -	1 -	- -	- -	- -	- -	- -	- -			
BH115	0.3 - 0.4 m	09/05/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NAD	NAD	NAD
			120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	250 -	- -	1 -	- -	- -	- -	- -	- -	- -			
BH116	0.4 - 0.5 m	6/05/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NAD	NAD	NAD
			120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	250 -	- -	1 -	- -	- -	- -	- -	- -	- -			
BH117	0.2 - 0.3 m	6/05/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NAD	NAD	NAD
			120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	250 -	- -	1 -	- -	- -	- -	- -	- -	- -			
BH118	0.25 - 0.35 m	6/05/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NAD	NAD	NAD
			120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	250 -	- -	1 -	- -	- -	- -	- -	- -	- -			
BH119	0.2 - 0.3 m	6/05/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NAD	NAD	NAD
			120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	250 -	- -	1 -	- -	- -	- -	- -	- -	- -			
BH120	0.04 - 0.3 m	6/05/2022	<5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NAD	NAD	NAD
			120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	250 -	- -	1 -	- -	- -	- -	- -	- -	- -			
BH121	0.3 - 0.4 m	6/05/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NAD	NAD	NAD
			120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	250 -	- -	1 -	- -	- -	- -	- -	- -	- -			

BH122	0.05 - 0.3 m	09/05/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NAD	NAD	NAD
			120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	250 -	- -	1 -	- -	- -	- -	- -	- -			
TS	0 m	6/05/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	250 -	- -	1 -	- -	- -	- -	- -	- -			
TB	0 m	6/05/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	250 -	- -	1 -	- -	- -	- -	- -	- -			
BD1	0 m	6/05/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	250 -	- -	1 -	- -	- -	- -	- -	- -			
BD2	0 m	09/05/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	250 -	- -	1 -	- -	- -	- -	- -	- -			
C1	0 m	6/05/2022	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-
			120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	250 -	- -	1 -	- -	- -	- -	- -	- -			
C2	0 m	6/05/2022	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-
			120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	250 -	- -	1 -	- -	- -	- -	- -	- -			
C3	0 m	6/05/2022	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-
			120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	250 -	- -	1 -	- -	- -	- -	- -	- -			
C4	0 m	6/05/2022	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-
			120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	250 -	- -	1 -	- -	- -	- -	- -	- -			
C5	0 m	6/05/2022	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-
			120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	250 -	- -	1 -	- -	- -	- -	- -	- -			
C6	0 m	6/05/2022	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-
			120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	250 -	- -	1 -	- -	- -	- -	- -	- -			
C7	0 m	6/05/2022	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-
			120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	250 -	- -	1 -	- -	- -	- -	- -	- -			
C8	0 m	6/05/2022	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-
			120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	250 -	- -	1 -	- -	- -	- -	- -	- -			
C9	0 m	6/05/2022	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-
			120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	250 -	- -	1 -	- -	- -	- -	- -	- -			
C10	0 m	6/05/2022	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-
			120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	250 -	- -	1 -	- -	- -	- -	- -	- -			
C11	0 m	6/05/2022	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-
			120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	250 -	- -	1 -	- -	- -	- -	- -	- -			

Lab result

HIL/HSL value EIL/ESL value

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

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

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

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

Notes:

a	QA/QC replicate of sample listed directly below the primary sample	C1	Composite sample BH101/0.08-0.4 and BH102/0.1-0.2	C4	Composite sample BH107/0.09-0.1 and BH108/0.05-035	C7	Composite sample BH113/0-0.1 and BH114/0.02-0.4	C10	Composite sample BH119/0.2-0.3 and BH120/0.04-0.3
b	Reported naphthalene laboratory result obtained from BTEXN suite	C2	Composite sample BH103/0.2-0.3 and BH104/0.1-0.2	C5	Composite sample BH109/0.08-0.35 and BH110/0.03-0.3	C8	Composite sample BH115/0.3-0.4 and BH116/0.4-0.5	C11	Composite sample BH121/0.3-0.4 and BH122/0.05-0.3
c	Criteria applies to DDT only	C3	Composite sample BH105/0.03-0.3 and BH106/0.05-0.3	C6	Composite sample BH111/0.05-0.3 and BH112/0.05-0.1	C9	Composite sample BH117/0.2-0.3 and BH118/0.25-0.35		

Site Assessment Criteria (SAC):

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

SAC based on generic land use thresholds for Recreational C including public open space

HIL C	Recreational / Open Space (NEPC, 2013)
HSL C	Recreational / Open Space (vapour intrusion) (NEPC, 2013)
DC HSL C	Direct contact HSL C Recreational /Open space (direct contact) (CRC CARE, 2011)
EIL/ESL UR/POS	Urban Residential and Public Open Space (NEPC, 2013)
ML R/P/POS	Residential, Parkland and Public Open Space (NEPC, 2013)

Table F3 - Summary of Soil Vapour Sampling and Chemical Analysis Results (Results in mg/m^3 - unless specified)

Sample Location	Sample Depth (m)	Sampling Date	VOCs					PAH	TRH		BTEX			
			Trichloroethylene (TCE)	1,1,1-trichlorethane (1,1,1 – TCA)	Tetrachlorethylene (PCE)	Cis-1,2 - dichloroethene	Vinyl chloride	Naphthalene	C6 – C10 (less BTEX) [F1]	>C10-C16 (less Naphthalene) [F2]	Benzene	Toluene	Ethylbenzene	Xylenes
Soil Vapour Assessment Criteria														
NEPC (2013) Interim HIL			**0.4**	**1200**	**40**	**2**	**0.5**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**
NEPC (2013) HSL C			**NC**	**NC**	**NC**	**NC**	**NC**	**410**	**8600**	**NL**	**360**	**NL**	**NL**	**NL**
Analytical Results of Soil Vapour Samples														
SV101	0.5	09/05/22	<0.035	<0.061	<0.024	<0.048	<0.748	<0.02	<43	<20	<0.042	<0.031	<0.022	<0.064
SV122	0.5	09/05/22	<0.034	<0.061	<0.023	<0.047	<0.739	<0.02	49	26	<0.042	0.21	0.88	5.7

Notes:

All results in mg/m^3 unless specified

BOLD - HSL Exceeded

ND - Not detected

Interim HIL - Interim Health Investigation Level

HSL - Health Screening Level

CRC Care (2013) Technical Report No.23 Petroleum Hydrocarbon Vapour Intrusion Assessment: Australian Guidance (2013) Table C1 Summary of Key PHC to be considered in the PVI Assessment and Relative Acute and Chronic Air Guidelines

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

Appendix G

Lab Certificates of Analysis and Chain-of-Custody documentation

Envirolab Services (WA) Pty Ltd trading as MPL Laboratories
ABN 53 140 099 207
16-18 Hayden Court Myaree WA 6154
ph 08 9317 2505 fax 08 9317 4163
lab@mpl.com.au
www.mpl.com.au

CERTIFICATE OF ANALYSIS 281618

Client Details

Client	Envirolab Services - Sydney
Attention	Aileen Hie
Address	12 Ashley St, CHATSWOOD, NSW, 2057

Sample Details

Your Reference	**295300**
Number of Samples	2 Waterloo LU
Date samples received	13/05/2022
Date completed instructions received	13/05/2022
Sampler Name	Not applicable for this job

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.

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

Report Details

Date results requested by	18/05/2022
Date of Issue	18/05/2022

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

Results Approved By
Travis Carey, Organics - Team Leader

Authorised By

Michael Kubiak, Laboratory Manager

Low Level Vapour Suite-WMS				
Our Reference			281618-1	281618-2
Sample ID	UNITS	PQL	295300-27	295300-28
Your Reference			SV101	SV122
Date Sampled			10/05/2022	10/05/2022
Type of sample			Vapour	Vapour
Date extracted	-		16/05/2022	16/05/2022
Date analysed	-		18/05/2022	18/05/2022
Benzene	µg/sampler	0.05	<0.05	<0.05
Toluene	µg/sampler	0.05	<0.05	0.3
Ethylbenzene	µg/sampler	0.05	<0.05	2.0
m+p Xylene	µg/sampler	0.1	<0.1	11
o Xylene	µg/sampler	0.05	<0.05	2.8
Total Xylene	µg/sampler	0.15	<0.15	13
Styrene	µg/sampler	0.05	<0.05	0.08
n-propylbenzene	µg/sampler	0.05	<0.05	<0.05
1,3,5-Trimethylbenzene	µg/sampler	0.05	<0.05	<0.05
1,2,4-Trimethylbenzene	µg/sampler	0.05	<0.05	<0.05
Naphthalene	µg/sampler	0.05	<0.05	<0.05
1,1-Dichloroethene	µg/sampler	0.05	<0.05	<0.05
Trans-1,2-dichloroethene	µg/sampler	0.05	<0.05	<0.05
1,1-Dichloroethane	µg/sampler	0.05	<0.05	<0.05
Cis-1,2-dichloroethene	µg/sampler	0.05	<0.05	<0.05
Trichloromethane (Chloroform)	µg/sampler	0.05	<0.05	<0.05
1,1,1,-Trichloroethane	µg/sampler	0.05	<0.05	<0.05
1,2-Dichloroethane	µg/sampler	0.05	<0.05	<0.05
Carbon Tetrachloride	µg/sampler	0.05	<0.05	<0.05
Trichloroethene (TCE)	µg/sampler	0.05	<0.05	<0.05
1,1,2,-Trichloroethane	µg/sampler	0.05	<0.05	<0.05
Tetrachloroethene (PCE)	µg/sampler	0.05	<0.05	<0.05
Chlorobenzene	µg/sampler	0.05	<0.05	<0.05
1,1,2,2-Tetrachloroethane	µg/sampler	0.05	<0.05	<0.05
1,3-Dichlorobenzene	µg/sampler	0.05	<0.05	<0.05
1,4-Dichlorobenzene	µg/sampler	0.05	<0.05	<0.05
1,2-Dichlorobenzene	µg/sampler	0.05	<0.05	<0.05
Methyl Ethyl Ketone (MEK)	µg/sampler	5	<5	<5
4-Methyl-2-Pentanone (MIBK)	µg/sampler	5	<5	<5
Cyclohexane	µg/sampler	0.05	<0.05	<0.05
Heptane	µg/sampler	5	<5	<5
Hexane	µg/sampler	5	<5	<5
Acetone	µg/sampler	20	<20	<20

Low Level Vapour Suite-WMS				
Our Reference	UNITS	PQL	281618-1	281618-2
Sample ID			295300-27	295300-28
Your Reference			SV101	SV122
Date Sampled			10/05/2022	10/05/2022
Type of sample			Vapour	Vapour
MtBE	µg/sampler	10	<10	<10
TRH C_6 - C_{10} as C_7	µg/sampler	50	<50	56
TRH C_6-C_{10} less BTEX (F1)	µg/sampler	50	<50	<50
TRH >C_{10} - C_{16} as Nap*	µg/sampler	50	<50	64
TRH >C_{10}-C_{16} less N (F2) *	µg/sampler	50	<50	64
Vinyl Chloride*	µg/sampler	0.5	<0.5	<0.5
Surrogate Toluene-d_8	%		98	93

VOC/TRH Vapour Suite-Waterloo				
Our Reference			281618-1	281618-2
Sample ID	UNITS	PQL	295300-27	295300-28
Your Reference			SV101	SV122
Date Sampled			10/05/2022	10/05/2022
Type of sample			Vapour	Vapour
Date extracted	-		16/05/2022	16/05/2022
Date analysed	-		18/05/2022	18/05/2022
Sampling Time	minutes		1,630	1,650
Benzene	µg/m3		<42	<42
Toluene	µg/m3		<31	210
Ethylbenzene	µg/m3		<22	880
m+p Xylene	µg/m3		<44	4,600
o Xylene	µg/m3		<20	1,100
Total Xylene	µg/m3		<64	5,700
Styrene	µg/m3		<20	<33
n-propylbenzene	µg/m3		<16	<16
1,3,5-Trimethylbenzene	µg/m3		<15	<14
Naphthalene	µg/m3		<20	<20
1,1-Dichloroethene	µg/m3		<67	<66
Trans-1,2-dichloroethene	µg/m3		<57	<56
1,1-Dichloroethane	µg/m3		<59	<58
Cis-1,2-dichloroethene	µg/m3		<48	<47
Trichloromethane (Chloroform)	µg/m3		<47	<47
1,1,1,-Trichloroethane	µg/m3		<61	<61
1,2-Dichloroethane	µg/m3		<41	<40
Carbon Tetrachloride	µg/m3		<52	<51
Trichloroethene (TCE)	µg/m3		<35	<34
1,1,2,-Trichloroethane	µg/m3		<35	<35
Tetrachloroethene (PCE)	µg/m3		<24	<23
Chlorobenzene	µg/m3		<26	<25
1,1,2,2-Tetrachloroethane	µg/m3		<20	<20
1,3-Dichlorobenzene	µg/m3		<13	<13
1,4-Dichlorobenzene	µg/m3		<12	<12
1,2-Dichlorobenzene	µg/m3		<11	<11
Methyl Ethyl Ketone (MEK)	µg/m3		<6260	<6184
4-Methyl-2-Pentanone (MIBK)	µg/m3		<3652	<3608
Cyclohexane	µg/m3		<46	<46
Heptane	µg/m3		<4382	<4329
Hexane	µg/m3		<6135	<6061
Acetone	µg/m3		<28535	<28189

VOC/TRH Vapour Suite-Waterloo				
Our Reference			281618-1	281618-2
Sample ID	UNITS	PQL	295300-27	295300-28
Your Reference			SV101	SV122
Date Sampled			10/05/2022	10/05/2022
Type of sample			Vapour	Vapour
MtBE	µg/m3		<11575	<11435
TRH C_6 - C_{10} as C_7	mg/m3		<43.821	49
TRH >C_{10} - C_{16} as Nap*	mg/m3		<20.450	26
TRH >C_{10}-C_{16} less N (F2) *	mg/m3		<20.450	26
Vinyl Chloride*	µg/m3		<748	<739
Surrogate Toluene-d_8	%		98	93

Method ID	Methodology Summary
Org-020/022/025	Organic Vapours using GC-FID/GC-MS/GC-MSMS analysis in accordance with NIOSH methodology. Desorption efficiencies are not applied to results in µg/tube. Note where µg/m3 results are supplied for SKC badges, the factors used are for 575-001, if 575-001 data is unavailable for an analyte then use 575-002 then 575-003 (exposure time must be supplied). Note - air volume measurements are not covered by Envirolab's NATA accreditation.
Org-020/022/025	Organic Vapours using GC-FID/GC-MS/GC-MSMS analysis after chemical desorption of Waterloo Membrane Samplers (WMS). Where concentration results are provided, uptake rates have been sourced from SiREM (the WMS supplier). Note, not all analytes have a currently available uptake rate and therefore conversion to concentration may not be feasible (an alternative compound with an uptake rate may be used but this will decrease the accuracy of the data - such instances are indicated by 'as C7' or 'as Nap' for example - see below). Where TRH fractions are reported as a concentration, the uptake rate for Heptane (C7) is used for >C6-C10 and Naphthalene (Nap) for >C10-C16, note that these uptake rates may not accurately represent many of the broad range of compounds that elute within these fractions. Therefore the data is indicative only.

QUALITY CONTROL: Low Level Vapour Suite-WMS						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			16/05/2022	[NT]	[NT]	[NT]	[NT]	16/05/2022	[NT]
Date analysed	-			18/05/2022	[NT]	[NT]	[NT]	[NT]	18/05/2022	[NT]
Benzene	µg/sampler	0.05	Org-020/022/025	<0.05	[NT]	[NT]	[NT]	[NT]	91	[NT]
Toluene	µg/sampler	0.05	Org-020/022/025	<0.05	[NT]	[NT]	[NT]	[NT]	91	[NT]
Ethylbenzene	µg/sampler	0.05	Org-020/022/025	<0.05	[NT]	[NT]	[NT]	[NT]	91	[NT]
m+p Xylene	µg/sampler	0.1	Org-020/022/025	<0.1	[NT]	[NT]	[NT]	[NT]	91	[NT]
o Xylene	µg/sampler	0.05	Org-020/022/025	<0.05	[NT]	[NT]	[NT]	[NT]	92	[NT]
Total Xylene	µg/sampler	0.15	Org-020/022/025	<0.15	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Styrene	µg/sampler	0.05	Org-020/022/025	<0.05	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
n-propylbenzene	µg/sampler	0.05	Org-020/022/025	<0.05	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,3,5-Trimethylbenzene	µg/sampler	0.05	Org-020/022/025	<0.05	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2,4-Trimethylbenzene	µg/sampler	0.05	Org-020/022/025	<0.05	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Naphthalene	µg/sampler	0.05	Org-020/022/025	<0.05	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,1-Dichloroethene	µg/sampler	0.05	Org-020/022/025	<0.05	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Trans-1,2-dichloroethene	µg/sampler	0.05	Org-020/022/025	<0.05	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,1-Dichloroethane	µg/sampler	0.05	Org-020/022/025	<0.05	[NT]	[NT]	[NT]	[NT]	89	[NT]
Cis-1,2-dichloroethene	µg/sampler	0.05	Org-020/022/025	<0.05	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Trichloromethane (Chloroform)	µg/sampler	0.05	Org-020/022/025	<0.05	[NT]	[NT]	[NT]	[NT]	87	[NT]
1,1,1,-Trichloroethane	µg/sampler	0.05	Org-020/022/025	<0.05	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2-Dichloroethane	µg/sampler	0.05	Org-020/022/025	<0.05	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Carbon Tetrachloride	µg/sampler	0.05	Org-020/022/025	<0.05	[NT]	[NT]	[NT]	[NT]	89	[NT]
Trichloroethene (TCE)	µg/sampler	0.05	Org-020/022/025	<0.05	[NT]	[NT]	[NT]	[NT]	89	[NT]
1,1,2,-Trichloroethane	µg/sampler	0.05	Org-020/022/025	<0.05	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Tetrachloroethene (PCE)	µg/sampler	0.05	Org-020/022/025	<0.05	[NT]	[NT]	[NT]	[NT]	91	[NT]
Chlorobenzene	µg/sampler	0.05	Org-020/022/025	<0.05	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,1,2,2-Tetrachloroethane	µg/sampler	0.05	Org-020/022/025	<0.05	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,3-Dichlorobenzene	µg/sampler	0.05	Org-020/022/025	<0.05	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,4-Dichlorobenzene	µg/sampler	0.05	Org-020/022/025	<0.05	[NT]	[NT]	[NT]	[NT]	88	[NT]
1,2-Dichlorobenzene	µg/sampler	0.05	Org-020/022/025	<0.05	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Methyl Ethyl Ketone (MEK)	µg/sampler	5	Org-020/022/025	<5	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
4-Methyl-2-Pentanone (MIBK)	µg/sampler	5	Org-020/022/025	<5	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Cyclohexane	µg/sampler	0.05	Org-020/022/025	<0.05	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Heptane	µg/sampler	5	Org-020/022/025	<5	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Hexane	µg/sampler	5	Org-020/022/025	<5	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Acetone	µg/sampler	20	Org-020/022/025	<20	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
MtBE	µg/sampler	10	Org-020/022/025	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
TRH C_6 - C_{10} as C_7	µg/sampler	50	Org-020/022/025	<50	[NT]	[NT]	[NT]	[NT]	116	[NT]
TRH C_6-C_{10} less BTEX (F1)	µg/sampler	50	Org-020/022/025	<50	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
TRH >C_{10} - C_{16} as Nap*	µg/sampler	50	Org-020/022/025	<50	[NT]	[NT]	[NT]	[NT]	110	[NT]
TRH >C_{10}-C_{16} less N (F2) *	µg/sampler	50	Org-020/022/025	<50	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]

QUALITY CONTROL: Low Level Vapour Suite-WMS					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Vinyl Chloride*	µg/sampler	0.5	Org-020/022/025	<0.5	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate Toluene-d_8	%			102	[NT]	[NT]	[NT]	[NT]	127	[NT]

QUALITY CONTROL: VOC/TRH Vapour Suite-Waterloo						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			16/05/2022	[NT]	[NT]	[NT]	[NT]	16/05/2022	[NT]
Date analysed	-			18/05/2022	[NT]	[NT]	[NT]	[NT]	18/05/2022	[NT]
Surrogate Toluene-d_8	%			102	[NT]	[NT]	[NT]	[NT]	127	[NT]

Result Definitions

DOL	Samples rejected due to particulate overload
RPF	Sample rejected due to pump failure
RFD	Sample rejected due to filter damage
RUD	Sample rejected due to uneven deposition
PQL	Practical quantitation limit

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.

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

#2 - VOC/TRH Vapour Suite-Waterloo - # Percent recovery is not possible to report as the analytes in the sample/s have caused interference.

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

CERTIFICATE OF ANALYSIS 295300

Client Details

Client	Douglas Partners Pty Ltd Smeaton Grange
Attention	Ashika Jagdish, Grant Russell
Address	18 Waler Crescent, Smeaton Grange, NSW, 2567

Sample Details

Your Reference	**204718.02, Lot 245 Farrow Rd DSI Campbelltown**
Number of Samples	64 Soil, 2 Vapour
Date samples received	11/05/2022
Date completed instructions received	11/05/2022

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	19/05/2022
Date of Issue	19/05/2022

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Asbestos Approved By
Analysed by Asbestos Approved Analyst: Panika Wongchanda
Authorised by Asbestos Approved Signatory: Lucy Zhu

Results Approved By
Dragana Tomas, Senior Chemist
Kyle Gavrily, Chemist
Liam Timmins, Organic Instruments Team Leader
Lucy Zhu, Asbestos Supervisor
Nancy Zhang, Laboratory Manager, Sydney
Steven Luong, Senior Chemist
Thomas Lovatt, Chemist

Authorised By

Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		295300-1	295300-2	295300-3	295300-4	295300-5
Your Reference	UNITS	BH101	BH102	BH103	BH104	BH105
Depth		0.08-0.4	0.1-0.2	0.2-0.3	0.1-0.2	0.03-0.3
Composite Reference		-	-	-	-	-
Date Sampled		9/05/2022	6/05/2022	6/05/2022	6/05/2022	6/05/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	13/05/2022	13/05/2022	13/05/2022	13/05/2022	13/05/2022
Date analysed	-	16/05/2022	16/05/2022	16/05/2022	16/05/2022	16/05/2022
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	107	106	107	98	92

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		295300-6	295300-7	295300-8	295300-9	295300-10
Your Reference	UNITS	BH106	BH107	BH108	BH109	BH110
Depth		0.05-0.3	0.09-0.1	0.05-0.35	0.08-0.3	0.03-0.3
Composite Reference		-	-	-	-	-
Date Sampled		6/05/2022	6/05/2022	6/05/2022	09/05/2022	6/05/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	13/05/2022	13/05/2022	13/05/2022	13/05/2022	13/05/2022
Date analysed	-	16/05/2022	16/05/2022	16/05/2022	16/05/2022	16/05/2022
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	108	97	106	106	105

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		295300-11	295300-12	295300-13	295300-14	295300-15
Your Reference	UNITS	BH111	BH112	BH113	BH114	BH115
Depth		0.05-0.3	0.05-0.1	0-0.1	0.02-0.4	0.3-0.4
Composite Reference		-	-	-	-	-
Date Sampled		6/05/2022	09/05/2022	6/05/2022	6/05/2022	09/05/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	13/05/2022	13/05/2022	13/05/2022	13/05/2022	13/05/2022
Date analysed	-	16/05/2022	16/05/2022	16/05/2022	16/05/2022	16/05/2022
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	109	108	88	106	106

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		295300-16	295300-17	295300-18	295300-19	295300-20
Your Reference	UNITS	BH116	BH117	BH118	BH119	BH120
Depth		0.4-0.5	0.2-0.3	0.25-0.35	0.2-0.3	0.04-0.3
Composite Reference		-	-	-	-	-
Date Sampled		6/05/2022	6/05/2022	6/05/2022	6/05/2022	6/05/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	13/05/2022	13/05/2022	13/05/2022	13/05/2022	13/05/2022
Date analysed	-	16/05/2022	16/05/2022	16/05/2022	16/05/2022	16/05/2022
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	108	111	106	105	107

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		295300-21	295300-22	295300-23	295300-24	295300-25
Your Reference	UNITS	BH121	BH122	TS	TB	BD1
Depth		0.3-0.4	0.05-0.3	-	-	-
Composite Reference		-	-	-	-	-
Date Sampled		6/05/2022	09/05/2022	6/05/2022	6/05/2022	6/05/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	13/05/2022	13/05/2022	13/05/2022	13/05/2022	13/05/2022
Date analysed	-	16/05/2022	16/05/2022	16/05/2022	16/05/2022	16/05/2022
TRH C_6 - C_9	mg/kg	<25	<25	[NA]	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	[NA]	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	[NA]	<25	<25
Benzene	mg/kg	<0.2	<0.2	99%	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	97%	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	96%	<1	<1
m+p-xylene	mg/kg	<2	<2	95%	<2	<2
o-Xylene	mg/kg	<1	<1	96%	<1	<1
Naphthalene	mg/kg	<1	<1	[NA]	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	[NA]	<1	<1
Surrogate aaa-Trifluorotoluene	%	104	107	96	112	110

vTRH(C6-C10)/BTEXN in Soil		
Our Reference		295300-26
Your Reference	UNITS	BD2
Depth		-
Composite Reference		-
Date Sampled		09/05/2022
Type of sample		Soil
Date extracted	-	13/05/2022
Date analysed	-	16/05/2022
TRH C_6 - C_9	mg/kg	<25
TRH C_6 - C_{10}	mg/kg	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25
Benzene	mg/kg	<0.2
Toluene	mg/kg	<0.5
Ethylbenzene	mg/kg	<1
m+p-xylene	mg/kg	<2
o-Xylene	mg/kg	<1
Naphthalene	mg/kg	<1
Total +ve Xylenes	mg/kg	<1
Surrogate aaa-Trifluorotoluene	%	104

svTRH (C10-C40) in Soil						
Our Reference		295300-1	295300-2	295300-3	295300-4	295300-5
Your Reference	UNITS	BH101	BH102	BH103	BH104	BH105
Depth		0.08-0.4	0.1-0.2	0.2-0.3	0.1-0.2	0.03-0.3
Composite Reference		-	-	-	-	-
Date Sampled		9/05/2022	6/05/2022	6/05/2022	6/05/2022	6/05/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	13/05/2022	13/05/2022	13/05/2022	13/05/2022	13/05/2022
Date analysed	-	14/05/2022	14/05/2022	14/05/2022	14/05/2022	14/05/2022
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	200
Total +ve TRH (C10-C36)	mg/kg	<50	<50	<50	<50	200
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	220
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100	280
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	500
Surrogate o-Terphenyl	%	95	94	93	94	104

svTRH (C10-C40) in Soil						
Our Reference		295300-6	295300-7	295300-8	295300-9	295300-10
Your Reference	UNITS	BH106	BH107	BH108	BH109	BH110
Depth		0.05-0.3	0.09-0.1	0.05-0.35	0.08-0.3	0.03-0.3
Composite Reference		-	-	-	-	-
Date Sampled		6/05/2022	6/05/2022	6/05/2022	09/05/2022	6/05/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	13/05/2022	13/05/2022	13/05/2022	13/05/2022	13/05/2022
Date analysed	-	14/05/2022	14/05/2022	14/05/2022	14/05/2022	14/05/2022
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	360	<100	<100	150
Total +ve TRH (C10-C36)	mg/kg	<50	460	<50	<50	150
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	330	<100	<100	130
TRH >C_{34} -C_{40}	mg/kg	<100	620	<100	<100	200
Total +ve TRH (>C10-C40)	mg/kg	<50	950	<50	<50	330
Surrogate o-Terphenyl	%	91	102	93	91	89

svTRH (C10-C40) in Soil						
Our Reference		295300-11	295300-12	295300-13	295300-14	295300-15
Your Reference	UNITS	BH111	BH112	BH113	BH114	BH115
Depth		0.05-0.3	0.05-0.1	0-0.1	0.02-0.4	0.3-0.4
Composite Reference		-	-	-	-	-
Date Sampled		6/05/2022	09/05/2022	6/05/2022	6/05/2022	09/05/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	13/05/2022	13/05/2022	13/05/2022	13/05/2022	13/05/2022
Date analysed	-	14/05/2022	14/05/2022	14/05/2022	14/05/2022	14/05/2022
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	160	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	650	180	<100
Total +ve TRH (C10-C36)	mg/kg	<50	<50	810	180	<50
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	570	170	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	1,100	300	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	1,600	470	<50
Surrogate o-Terphenyl	%	84	91	98	94	92

svTRH (C10-C40) in Soil						
Our Reference		295300-16	295300-17	295300-18	295300-19	295300-20
Your Reference	UNITS	BH116	BH117	BH118	BH119	BH120
Depth		0.4-0.5	0.2-0.3	0.25-0.35	0.2-0.3	0.04-0.3
Composite Reference		-	-	-	-	-
Date Sampled		6/05/2022	6/05/2022	6/05/2022	6/05/2022	6/05/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	13/05/2022	13/05/2022	13/05/2022	13/05/2022	13/05/2022
Date analysed	-	14/05/2022	14/05/2022	14/05/2022	14/05/2022	14/05/2022
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	53	<50
TRH C_{15} - C_{28}	mg/kg	<100	190	<100	140	440
TRH C_{29} - C_{36}	mg/kg	160	480	<100	310	840
Total +ve TRH (C10-C36)	mg/kg	160	670	<50	510	1,300
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	170	500	<100	340	1,000
TRH >C_{34} -C_{40}	mg/kg	230	610	<100	400	900
Total +ve TRH (>C10-C40)	mg/kg	400	1,100	<50	740	1,900
Surrogate o-Terphenyl	%	96	103	87	102	105

svTRH (C10-C40) in Soil					
Our Reference		295300-21	295300-22	295300-25	295300-26
Your Reference	UNITS	BH121	BH122	BD1	BD2
Depth		0.3-0.4	0.05-0.3	-	-
Composite Reference		-	-	-	-
Date Sampled		6/05/2022	09/05/2022	6/05/2022	09/05/2022
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	13/05/2022	13/05/2022	13/05/2022	13/05/2022
Date analysed	-	14/05/2022	14/05/2022	14/05/2022	14/05/2022
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	100	160	<100	<100
TRH C_{29} - C_{36}	mg/kg	310	470	<100	<100
Total +ve TRH (C10-C36)	mg/kg	410	630	<50	<50
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	290	470	<100	<100
TRH >C_{34} -C_{40}	mg/kg	450	570	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	740	1,000	<50	<50
Surrogate o-Terphenyl	%	99	77	88	83

PAHs in Soil						
Our Reference		295300-1	295300-2	295300-3	295300-4	295300-5
Your Reference	UNITS	BH101	BH102	BH103	BH104	BH105
Depth		0.08-0.4	0.1-0.2	0.2-0.3	0.1-0.2	0.03-0.3
Composite Reference		-	-	-	-	-
Date Sampled		9/05/2022	6/05/2022	6/05/2022	6/05/2022	6/05/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	13/05/2022	13/05/2022	13/05/2022	13/05/2022	13/05/2022
Date analysed	-	13/05/2022	13/05/2022	13/05/2022	13/05/2022	13/05/2022
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	0.4
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	0.2	0.1	0.3	1.3
Pyrene	mg/kg	<0.1	0.1	<0.1	0.2	1.0
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	0.1	0.5
Chrysene	mg/kg	<0.1	<0.1	<0.1	0.1	0.4
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	0.8
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	0.08	0.4
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	0.2
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	0.3
Total +ve PAH's	mg/kg	<0.05	0.3	0.1	0.97	5.2
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	0.6
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	0.6
Surrogate p-Terphenyl-d14	%	87	93	93	96	86

PAHs in Soil						
Our Reference		295300-6	295300-7	295300-8	295300-9	295300-10
Your Reference	UNITS	BH106	BH107	BH108	BH109	BH110
Depth		0.05-0.3	0.09-0.1	0.05-0.35	0.08-0.3	0.03-0.3
Composite Reference		-	-	-	-	-
Date Sampled		6/05/2022	6/05/2022	6/05/2022	09/05/2022	6/05/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	13/05/2022	13/05/2022	13/05/2022	13/05/2022	13/05/2022
Date analysed	-	13/05/2022	13/05/2022	13/05/2022	13/05/2022	13/05/2022
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	0.4
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	0.2	1.6
Pyrene	mg/kg	<0.1	0.1	<0.1	0.1	1.2
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	0.5
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	0.4
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	0.9
Benzo(a)pyrene	mg/kg	<0.05	0.08	<0.05	<0.05	0.4
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	0.2
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	0.3	<0.1	<0.1	0.3
Total +ve PAH's	mg/kg	<0.05	0.53	<0.05	0.3	6.2
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	0.7
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	0.7
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	0.7
Surrogate p-Terphenyl-d14	%	92	99	94	92	98

PAHs in Soil						
Our Reference		295300-11	295300-12	295300-13	295300-14	295300-15
Your Reference	UNITS	BH111	BH112	BH113	BH114	BH115
Depth		0.05-0.3	0.05-0.1	0-0.1	0.02-0.4	0.3-0.4
Composite Reference		-	-	-	-	-
Date Sampled		6/05/2022	09/05/2022	6/05/2022	6/05/2022	09/05/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	13/05/2022	13/05/2022	13/05/2022	13/05/2022	13/05/2022
Date analysed	-	13/05/2022	13/05/2022	13/05/2022	13/05/2022	13/05/2022
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	0.2	<0.1	<0.1	0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.7	<0.1	0.1	0.4	<0.1
Pyrene	mg/kg	0.6	<0.1	0.2	0.4	<0.1
Benzo(a)anthracene	mg/kg	0.2	<0.1	0.1	0.3	<0.1
Chrysene	mg/kg	0.2	<0.1	0.1	0.2	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	0.4	<0.2	<0.2	0.4	<0.2
Benzo(a)pyrene	mg/kg	0.2	<0.05	0.1	0.3	<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	0.5	0.2	<0.1
Total +ve PAH's	mg/kg	2.6	<0.05	1.2	2.4	<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	%	93	96	95	92	96

PAHs in Soil						
Our Reference		295300-16	295300-17	295300-18	295300-19	295300-20
Your Reference	UNITS	BH116	BH117	BH118	BH119	BH120
Depth		0.4-0.5	0.2-0.3	0.25-0.35	0.2-0.3	0.04-0.3
Composite Reference		-	-	-	-	-
Date Sampled		6/05/2022	6/05/2022	6/05/2022	6/05/2022	6/05/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	13/05/2022	13/05/2022	13/05/2022	13/05/2022	13/05/2022
Date analysed	-	13/05/2022	13/05/2022	13/05/2022	13/05/2022	13/05/2022
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	0.2	<0.1	<0.1	0.6	0.2
Anthracene	mg/kg	<0.1	<0.1	<0.1	0.2	0.1
Fluoranthene	mg/kg	0.4	0.1	0.4	1.0	0.6
Pyrene	mg/kg	0.4	0.2	0.4	1.1	1.1
Benzo(a)anthracene	mg/kg	0.3	0.1	0.2	0.7	0.5
Chrysene	mg/kg	0.2	0.1	0.2	0.5	0.5
Benzo(b,j+k)fluoranthene	mg/kg	0.5	0.3	0.4	1	1
Benzo(a)pyrene	mg/kg	0.3	0.2	0.2	0.64	0.5
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	0.1	0.1	0.2	0.2
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	0.2	0.2	0.1	0.3	0.3
Total +ve PAH's	mg/kg	2.6	1.3	2.0	6.3	5.1
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	0.8	0.7
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	0.9	0.7
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	0.9	0.8
Surrogate p-Terphenyl-d14	%	92	93	95	89	93

PAHs in Soil					
Our Reference		295300-21	295300-22	295300-25	295300-26
Your Reference	UNITS	BH121	BH122	BD1	BD2
Depth		0.3-0.4	0.05-0.3	-	-
Composite Reference		-	-	-	-
Date Sampled		6/05/2022	09/05/2022	6/05/2022	09/05/2022
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	13/05/2022	13/05/2022	13/05/2022	13/05/2022
Date analysed	-	13/05/2022	13/05/2022	13/05/2022	13/05/2022
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	0.2	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.1	1.2	<0.1	<0.1
Anthracene	mg/kg	<0.1	0.4	<0.1	<0.1
Fluoranthene	mg/kg	0.4	1.5	0.1	0.2
Pyrene	mg/kg	0.4	1.6	<0.1	0.1
Benzo(a)anthracene	mg/kg	0.3	0.9	<0.1	<0.1
Chrysene	mg/kg	0.2	0.5	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	0.5	1	<0.2	<0.2
Benzo(a)pyrene	mg/kg	0.3	0.69	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	0.2	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	0.2	0.3	<0.1	<0.1
Total +ve PAH's	mg/kg	2.7	8.8	0.1	0.3
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	1.0	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	1.0	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	0.5	1.0	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	85	87	96	96

Organochlorine Pesticides in soil						
Our Reference		295300-56	295300-57	295300-58	295300-59	295300-60
Your Reference	UNITS	C1	C2	C3	C4	C5
Depth		-	-	-	-	-
Composite Reference		1 +2	3+4	5+6	7+8	9+10
Date Sampled		6/05/2022	6/05/2022	6/05/2022	6/05/2022	6/05/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	13/05/2022	13/05/2022	13/05/2022	13/05/2022	13/05/2022
Date analysed	-	13/05/2022	13/05/2022	13/05/2022	13/05/2022	13/05/2022
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	92	92	92	90	94

Organochlorine Pesticides in soil						
Our Reference		295300-61	295300-62	295300-63	295300-64	295300-65
Your Reference	UNITS	C6	C7	C8	C9	C10
Depth		-	-	-	-	-
Composite Reference		11+12	13+14	15+15	17+18	19+20
Date Sampled		6/05/2022	6/05/2022	6/05/2022	6/05/2022	6/05/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	13/05/2022	13/05/2022	13/05/2022	13/05/2022	13/05/2022
Date analysed	-	13/05/2022	13/05/2022	13/05/2022	13/05/2022	13/05/2022
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	88	89	89	89	83

Organochlorine Pesticides in soil		
Our Reference		295300-66
Your Reference	UNITS	C11
Depth		-
Composite Reference		21+22
Date Sampled		6/05/2022
Type of sample		Soil
Date extracted	-	13/05/2022
Date analysed	-	13/05/2022
alpha-BHC	mg/kg	<0.1
HCB	mg/kg	<0.1
beta-BHC	mg/kg	<0.1
gamma-BHC	mg/kg	<0.1
Heptachlor	mg/kg	<0.1
delta-BHC	mg/kg	<0.1
Aldrin	mg/kg	<0.1
Heptachlor Epoxide	mg/kg	<0.1
gamma-Chlordane	mg/kg	<0.1
alpha-chlordane	mg/kg	<0.1
Endosulfan I	mg/kg	<0.1
pp-DDE	mg/kg	<0.1
Dieldrin	mg/kg	<0.1
Endrin	mg/kg	<0.1
Endosulfan II	mg/kg	<0.1
pp-DDD	mg/kg	<0.1
Endrin Aldehyde	mg/kg	<0.1
pp-DDT	mg/kg	<0.1
Endosulfan Sulphate	mg/kg	<0.1
Methoxychlor	mg/kg	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1
Surrogate TCMX	%	86

Organophosphorus Pesticides in Soil						
Our Reference		295300-56	295300-57	295300-58	295300-59	295300-60
Your Reference	UNITS	C1	C2	C3	C4	C5
Depth		-	-	-	-	-
Composite Reference		1 +2	3+4	5+6	7+8	9+10
Date Sampled		6/05/2022	6/05/2022	6/05/2022	6/05/2022	6/05/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	13/05/2022	13/05/2022	13/05/2022	13/05/2022	13/05/2022
Date analysed	-	13/05/2022	13/05/2022	13/05/2022	13/05/2022	13/05/2022
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	92	92	92	90	94

Organophosphorus Pesticides in Soil						
Our Reference		295300-61	295300-62	295300-63	295300-64	295300-65
Your Reference	UNITS	C6	C7	C8	C9	C10
Depth		-	-	-	-	-
Composite Reference		11+12	13+14	15+15	17+18	19+20
Date Sampled		6/05/2022	6/05/2022	6/05/2022	6/05/2022	6/05/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	13/05/2022	13/05/2022	13/05/2022	13/05/2022	13/05/2022
Date analysed	-	13/05/2022	13/05/2022	13/05/2022	13/05/2022	13/05/2022
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	88	89	89	89	83

Organophosphorus Pesticides in Soil		
Our Reference		295300-66
Your Reference	UNITS	C11
Depth		-
Composite Reference		21+22
Date Sampled		6/05/2022
Type of sample		Soil
Date extracted	-	13/05/2022
Date analysed	-	13/05/2022
Dichlorvos	mg/kg	<0.1
Dimethoate	mg/kg	<0.1
Diazinon	mg/kg	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1
Ronnel	mg/kg	<0.1
Fenitrothion	mg/kg	<0.1
Malathion	mg/kg	<0.1
Chlorpyriphos	mg/kg	<0.1
Parathion	mg/kg	<0.1
Bromophos-ethyl	mg/kg	<0.1
Ethion	mg/kg	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1
Surrogate TCMX	%	86

PCBs in Soil						
Our Reference		295300-56	295300-57	295300-58	295300-59	295300-60
Your Reference	UNITS	C1	C2	C3	C4	C5
Depth		-	-	-	-	-
Composite Reference		1 +2	3+4	5+6	7+8	9+10
Date Sampled		6/05/2022	6/05/2022	6/05/2022	6/05/2022	6/05/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	13/05/2022	13/05/2022	13/05/2022	13/05/2022	13/05/2022
Date analysed	-	13/05/2022	13/05/2022	13/05/2022	13/05/2022	13/05/2022
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	92	92	92	90	94

PCBs in Soil						
Our Reference		295300-61	295300-62	295300-63	295300-64	295300-65
Your Reference	UNITS	C6	C7	C8	C9	C10
Depth		-	-	-	-	-
Composite Reference		11+12	13+14	15+15	17+18	19+20
Date Sampled		6/05/2022	6/05/2022	6/05/2022	6/05/2022	6/05/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	13/05/2022	13/05/2022	13/05/2022	13/05/2022	13/05/2022
Date analysed	-	13/05/2022	13/05/2022	13/05/2022	13/05/2022	13/05/2022
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	88	89	89	89	83

PCBs in Soil		
Our Reference		295300-66
Your Reference	UNITS	C11
Depth		-
Composite Reference		21+22
Date Sampled		6/05/2022
Type of sample		Soil
Date extracted	-	13/05/2022
Date analysed	-	13/05/2022
Aroclor 1016	mg/kg	<0.1
Aroclor 1221	mg/kg	<0.1
Aroclor 1232	mg/kg	<0.1
Aroclor 1242	mg/kg	<0.1
Aroclor 1248	mg/kg	<0.1
Aroclor 1254	mg/kg	<0.1
Aroclor 1260	mg/kg	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1
Surrogate TCMX	%	86

Acid Extractable metals in soil						
Our Reference		295300-56	295300-57	295300-58	295300-59	295300-60
Your Reference	UNITS	C1	C2	C3	C4	C5
Depth		-	-	-	-	-
Composite Reference		1 +2	3+4	5+6	7+8	9+10
Date Sampled		6/05/2022	6/05/2022	6/05/2022	6/05/2022	6/05/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	16/05/2022	16/05/2022	16/05/2022	16/05/2022	16/05/2022
Date analysed	-	16/05/2022	16/05/2022	16/05/2022	16/05/2022	16/05/2022
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	7	7	7	8	7
Copper	mg/kg	20	77	16	34	20
Lead	mg/kg	12	14	11	10	11
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	8	5	4	6	6
Zinc	mg/kg	46	27	23	32	26

Acid Extractable metals in soil						
Our Reference		295300-61	295300-62	295300-63	295300-64	295300-65
Your Reference	UNITS	C6	C7	C8	C9	C10
Depth		-	-	-	-	-
Composite Reference		11+12	13+14	15+15	17+18	19+20
Date Sampled		6/05/2022	6/05/2022	6/05/2022	6/05/2022	6/05/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	16/05/2022	16/05/2022	16/05/2022	16/05/2022	16/05/2022
Date analysed	-	16/05/2022	16/05/2022	16/05/2022	16/05/2022	16/05/2022
Arsenic	mg/kg	<4	<4	4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	10	12	11	13	11
Copper	mg/kg	12	100	25	45	89
Lead	mg/kg	16	11	19	16	17
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	7	6	8	10	16
Zinc	mg/kg	35	39	32	57	39

Acid Extractable metals in soil		
Our Reference		295300-66
Your Reference	UNITS	C11
Depth		-
Composite Reference		21+22
Date Sampled		6/05/2022
Type of sample		Soil
Date prepared	-	16/05/2022
Date analysed	-	16/05/2022
Arsenic	mg/kg	<4
Cadmium	mg/kg	<0.4
Chromium	mg/kg	18
Copper	mg/kg	76
Lead	mg/kg	13
Mercury	mg/kg	<0.1
Nickel	mg/kg	27
Zinc	mg/kg	39

Moisture						
Our Reference		295300-1	295300-2	295300-3	295300-4	295300-5
Your Reference	UNITS	BH101	BH102	BH103	BH104	BH105
Depth		0.08-0.4	0.1-0.2	0.2-0.3	0.1-0.2	0.03-0.3
Composite Reference		-	-	-	-	-
Date Sampled		9/05/2022	6/05/2022	6/05/2022	6/05/2022	6/05/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	13/05/2022	13/05/2022	13/05/2022	13/05/2022	13/05/2022
Date analysed	-	14/05/2022	14/05/2022	14/05/2022	14/05/2022	14/05/2022
Moisture	%	7.7	7.0	8.0	6.5	2.9

Moisture						
Our Reference		295300-6	295300-7	295300-8	295300-9	295300-10
Your Reference	UNITS	BH106	BH107	BH108	BH109	BH110
Depth		0.05-0.3	0.09-0.1	0.05-0.35	0.08-0.3	0.03-0.3
Composite Reference		-	-	-	-	-
Date Sampled		6/05/2022	6/05/2022	6/05/2022	09/05/2022	6/05/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	13/05/2022	13/05/2022	13/05/2022	13/05/2022	13/05/2022
Date analysed	-	14/05/2022	14/05/2022	14/05/2022	14/05/2022	14/05/2022
Moisture	%	7.1	4.2	5.5	6.8	3.1

Moisture						
Our Reference		295300-11	295300-12	295300-13	295300-14	295300-15
Your Reference	UNITS	BH111	BH112	BH113	BH114	BH115
Depth		0.05-0.3	0.05-0.1	0-0.1	0.02-0.4	0.3-0.4
Composite Reference		-	-	-	-	-
Date Sampled		6/05/2022	09/05/2022	6/05/2022	6/05/2022	09/05/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	13/05/2022	13/05/2022	13/05/2022	13/05/2022	13/05/2022
Date analysed	-	14/05/2022	14/05/2022	14/05/2022	14/05/2022	14/05/2022
Moisture	%	4.7	11	1.3	6.3	6.9

Moisture						
Our Reference		295300-16	295300-17	295300-18	295300-19	295300-20
Your Reference	UNITS	BH116	BH117	BH118	BH119	BH120
Depth		0.4-0.5	0.2-0.3	0.25-0.35	0.2-0.3	0.04-0.3
Composite Reference		-	-	-	-	-
Date Sampled		6/05/2022	6/05/2022	6/05/2022	6/05/2022	6/05/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	13/05/2022	13/05/2022	13/05/2022	13/05/2022	13/05/2022
Date analysed	-	14/05/2022	14/05/2022	14/05/2022	14/05/2022	14/05/2022
Moisture	%	8.0	6.1	9.9	6.4	6.8

Moisture						
Our Reference		295300-21	295300-22	295300-25	295300-26	295300-56
Your Reference	UNITS	BH121	BH122	BD1	BD2	C1
Depth		0.3-0.4	0.05-0.3	-	-	-
Composite Reference		-	-	-	-	1 +2
Date Sampled		6/05/2022	09/05/2022	6/05/2022	09/05/2022	6/05/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	13/05/2022	13/05/2022	13/05/2022	13/05/2022	13/05/2022
Date analysed	-	14/05/2022	14/05/2022	14/05/2022	14/05/2022	14/05/2022
Moisture	%	7.7	7.8	4.0	8.3	8.0

Moisture						
Our Reference		295300-57	295300-58	295300-59	295300-60	295300-61
Your Reference	UNITS	C2	C3	C4	C5	C6
Depth		-	-	-	-	-
Composite Reference		3+4	5+6	7+8	9+10	11+12
Date Sampled		6/05/2022	6/05/2022	6/05/2022	6/05/2022	6/05/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	13/05/2022	13/05/2022	13/05/2022	13/05/2022	13/05/2022
Date analysed	-	14/05/2022	14/05/2022	14/05/2022	14/05/2022	14/05/2022
Moisture	%	6.7	5.8	3.7	4.5	4.7

Moisture						
Our Reference		295300-62	295300-63	295300-64	295300-65	295300-66
Your Reference	UNITS	C7	C8	C9	C10	C11
Depth		-	-	-	-	-
Composite Reference		13+14	15+15	17+18	19+20	21+22
Date Sampled		6/05/2022	6/05/2022	6/05/2022	6/05/2022	6/05/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	13/05/2022	13/05/2022	13/05/2022	13/05/2022	13/05/2022
Date analysed	-	14/05/2022	14/05/2022	14/05/2022	14/05/2022	14/05/2022
Moisture	%	3.7	1.2	11	5.4	27

Asbestos ID - soils						
Our Reference		295300-1	295300-2	295300-3	295300-4	295300-5
Your Reference	UNITS	BH101	BH102	BH103	BH104	BH105
Depth		0.08-0.4	0.1-0.2	0.2-0.3	0.1-0.2	0.03-0.3
Composite Reference		-	-	-	-	-
Date Sampled		9/05/2022	6/05/2022	6/05/2022	6/05/2022	6/05/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	17/05/2022	17/05/2022	17/05/2022	17/05/2022	17/05/2022
Sample mass tested	g	Approx. 30g	Approx. 50g	Approx. 50g	Approx. 50g	Approx. 40g
Sample Description	-	Brown sandy soil & rocks	Brown sandy soil & rocks	Brown sandy soil & rocks	Brown sandy soil & rocks	Brown sandy soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected

Asbestos ID - soils						
Our Reference		295300-6	295300-7	295300-8	295300-9	295300-10
Your Reference	UNITS	BH106	BH107	BH108	BH109	BH110
Depth		0.05-0.3	0.09-0.1	0.05-0.35	0.08-0.3	0.03-0.3
Composite Reference		-	-	-	-	-
Date Sampled		6/05/2022	6/05/2022	6/05/2022	09/05/2022	6/05/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	17/05/2022	17/05/2022	17/05/2022	17/05/2022	17/05/2022
Sample mass tested	g	Approx. 50g	Approx. 55g	Approx. 45g	Approx. 40g	Approx. 50g
Sample Description	-	Brown sandy soil & rocks	Brown coarse-grained soil & rocks	Brown sandy soil & rocks	Brown sandy soil & rocks	Brown sandy soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected

Asbestos ID - soils						
Our Reference		295300-11	295300-12	295300-13	295300-14	295300-15
Your Reference	UNITS	BH111	BH112	BH113	BH114	BH115
Depth		0.05-0.3	0.05-0.1	0-0.1	0.02-0.4	0.3-0.4
Composite Reference		-	-	-	-	-
Date Sampled		6/05/2022	09/05/2022	6/05/2022	6/05/2022	09/05/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	17/05/2022	17/05/2022	17/05/2022	17/05/2022	17/05/2022
Sample mass tested	g	Approx. 40g	Approx. 35g	Approx. 35g	Approx. 35g	Approx. 30g
Sample Description	-	Brown sandy soil & rocks	Brown sandy soil & rocks	Brown fine-grained soil & rocks	Brown coarse-grained soil & rocks	Brown fine-grained soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected

Asbestos ID - soils						
Our Reference		295300-16	295300-17	295300-18	295300-19	295300-20
Your Reference	UNITS	BH116	BH117	BH118	BH119	BH120
Depth		0.4-0.5	0.2-0.3	0.25-0.35	0.2-0.3	0.04-0.3
Composite Reference		-	-	-	-	-
Date Sampled		6/05/2022	6/05/2022	6/05/2022	6/05/2022	6/05/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	17/05/2022	17/05/2022	17/05/2022	17/05/2022	17/05/2022
Sample mass tested	g	Approx. 35g	Approx. 55g	Approx. 40g	Approx. 50g	Approx. 40g
Sample Description	-	Brown fine-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected

Asbestos ID - soils			
Our Reference		295300-21	295300-22
Your Reference	UNITS	BH121	BH122
Depth		0.3-0.4	0.05-0.3
Composite Reference		-	-
Date Sampled		6/05/2022	09/05/2022
Type of sample		Soil	Soil
Date analysed	-	17/05/2022	17/05/2022
Sample mass tested	g	Approx. 45g	Approx. 40g
Sample Description	-	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
Trace Analysis	-	No asbestos detected	No asbestos detected

Misc Soil - Inorg			
Our Reference		295300-10	295300-20
Your Reference	UNITS	BH110	BH120
Depth		0.03-0.3	0.04-0.3
Composite Reference		-	-
Date Sampled		6/05/2022	6/05/2022
Type of sample		Soil	Soil
Date prepared	-	13/05/2022	13/05/2022
Date analysed	-	13/05/2022	13/05/2022
Total Phenolics (as Phenol)	mg/kg	<5	<5

Misc Inorg - Soil				
Our Reference		295300-1	295300-10	295300-20
Your Reference	UNITS	BH101	BH110	BH120
Depth		0.08-0.4	0.03-0.3	0.04-0.3
Composite Reference		-	-	-
Date Sampled		9/05/2022	6/05/2022	6/05/2022
Type of sample		Soil	Soil	Soil
Date prepared	-	13/05/2022	13/05/2022	13/05/2022
Date analysed	-	16/05/2022	16/05/2022	16/05/2022
pH 1:5 soil:water	pH Units	5.5	8.0	9.1

CEC				
Our Reference		295300-1	295300-10	295300-20
Your Reference	UNITS	BH101	BH110	BH120
Depth		0.08-0.4	0.03-0.3	0.04-0.3
Composite Reference		-	-	-
Date Sampled		9/05/2022	6/05/2022	6/05/2022
Type of sample		Soil	Soil	Soil
Date prepared	-	17/05/2022	17/05/2022	17/05/2022
Date analysed	-	17/05/2022	17/05/2022	17/05/2022
Exchangeable Ca	meq/100g	3.8	4.9	36
Exchangeable K	meq/100g	0.5	0.1	1
Exchangeable Mg	meq/100g	2.9	1.5	0.5
Exchangeable Na	meq/100g	<0.1	<0.1	0.6
Cation Exchange Capacity	meq/100g	7.2	6.5	38

VOC Suite 1 in Carbon tubes			
Our Reference		295300-27	295300-28
Your Reference	UNITS	SV101	SV122
Depth		-	-
Composite Reference		-	-
Date Sampled		10/05/2022	10/05/2022
Type of sample		Vapour	Vapour
Date extracted	-	16/05/2022	16/05/2022
Date analysed	-	18/05/2022	18/05/2022
Vinyl Chloride*	µg/tube	#	#
1,1-Dichloroethene	µg/tube	#	#
Cis 1,2-Dichloroethene	µg/tube	#	#
Trans 1,2-Dichloroethene	µg/tube	#	#
Trichloroethene (TCE)	µg/tube	#	#
Tetrachloroethene (PCE)	µg/tube	#	#

Method ID	Methodology Summary
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.
Inorg-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-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Inorg-031	Total Phenolics by segmented flow analyser (in line distillation with colourimetric finish). Solids are extracted in a caustic media prior to analysis.
Metals-020	Determination of various metals by ICP-AES.
Metals-020	Determination of exchangeable cations and cation exchange capacity in soils using 1M Ammonium Chloride exchange and ICP-OES analytical finish.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
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-020/022	Organic Vapours using GC-FID and GC-MS analysis in accordance with NIOSH methodolgy. Analysis carried out by MPL (Envirolab Group), NATA site no. 2901.
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.

Method ID	Methodology Summary
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.
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-2	295300-2
Date extracted	-			13/05/2022	1	13/05/2022	13/05/2022		13/05/2022	13/05/2022
Date analysed	-			16/05/2022	1	16/05/2022	16/05/2022		16/05/2022	16/05/2022
TRH C_6 - C_9	mg/kg	25	Org-023	<25	1	<25	<25	0	121	125
TRH C_6 - C_{10}	mg/kg	25	Org-023	<25	1	<25	<25	0	121	125
Benzene	mg/kg	0.2	Org-023	<0.2	1	<0.2	<0.2	0	118	120
Toluene	mg/kg	0.5	Org-023	<0.5	1	<0.5	<0.5	0	118	121
Ethylbenzene	mg/kg	1	Org-023	<1	1	<1	<1	0	119	125
m+p-xylene	mg/kg	2	Org-023	<2	1	<2	<2	0	125	130
o-Xylene	mg/kg	1	Org-023	<1	1	<1	<1	0	125	130
Naphthalene	mg/kg	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	110	1	107	103	4	112	105

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	295300-22
Date extracted	-			[NT]	11	13/05/2022	13/05/2022		13/05/2022	13/05/2022
Date analysed	-			[NT]	11	16/05/2022	16/05/2022		16/05/2022	16/05/2022
TRH C_6 - C_9	mg/kg	25	Org-023	[NT]	11	<25	<25	0	117	122
TRH C_6 - C_{10}	mg/kg	25	Org-023	[NT]	11	<25	<25	0	117	122
Benzene	mg/kg	0.2	Org-023	[NT]	11	<0.2	<0.2	0	112	116
Toluene	mg/kg	0.5	Org-023	[NT]	11	<0.5	<0.5	0	112	115
Ethylbenzene	mg/kg	1	Org-023	[NT]	11	<1	<1	0	116	122
m+p-xylene	mg/kg	2	Org-023	[NT]	11	<2	<2	0	122	128
o-Xylene	mg/kg	1	Org-023	[NT]	11	<1	<1	0	121	128
Naphthalene	mg/kg	1	Org-023	[NT]	11	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	[NT]	11	109	94	15	107	106

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]	21	13/05/2022	13/05/2022		[NT]	[NT]
Date analysed	-			[NT]	21	16/05/2022	16/05/2022		[NT]	[NT]
TRH C_6 - C_9	mg/kg	25	Org-023	[NT]	21	<25	<25	0	[NT]	[NT]
TRH C_6 - C_{10}	mg/kg	25	Org-023	[NT]	21	<25	<25	0	[NT]	[NT]
Benzene	mg/kg	0.2	Org-023	[NT]	21	<0.2	<0.2	0	[NT]	[NT]
Toluene	mg/kg	0.5	Org-023	[NT]	21	<0.5	<0.5	0	[NT]	[NT]
Ethylbenzene	mg/kg	1	Org-023	[NT]	21	<1	<1	0	[NT]	[NT]
m+p-xylene	mg/kg	2	Org-023	[NT]	21	<2	<2	0	[NT]	[NT]
o-Xylene	mg/kg	1	Org-023	[NT]	21	<1	<1	0	[NT]	[NT]
Naphthalene	mg/kg	1	Org-023	[NT]	21	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	[NT]	21	104	111	7	[NT]	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	295300-2
Date extracted	-			13/05/2022	1	13/05/2022	13/05/2022		13/05/2022	13/05/2022
Date analysed	-			14/05/2022	1	14/05/2022	14/05/2022		14/05/2022	14/05/2022
TRH C_{10} - C_{14}	mg/kg	50	Org-020	<50	1	<50	<50	0	111	114
TRH C_{15} - C_{28}	mg/kg	100	Org-020	<100	1	<100	<100	0	101	112
TRH C_{29} - C_{36}	mg/kg	100	Org-020	<100	1	<100	<100	0	117	118
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	<50	1	<50	<50	0	111	114
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	<100	1	<100	<100	0	101	112
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	<100	1	<100	<100	0	117	118
Surrogate o-Terphenyl	%		Org-020	86	1	95	96	1	112	112

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	295300-22
Date extracted	-			[NT]	11	13/05/2022	13/05/2022		13/05/2022	13/05/2022
Date analysed	-			[NT]	11	14/05/2022	14/05/2022		14/05/2022	14/05/2022
TRH C_{10} - C_{14}	mg/kg	50	Org-020	[NT]	11	<50	<50	0	106	94
TRH C_{15} - C_{28}	mg/kg	100	Org-020	[NT]	11	<100	<100	0	98	89
TRH C_{29} - C_{36}	mg/kg	100	Org-020	[NT]	11	<100	<100	0	112	#
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	[NT]	11	<50	<50	0	106	94
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	[NT]	11	<100	<100	0	98	89
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	[NT]	11	<100	<100	0	112	#
Surrogate o-Terphenyl	%		Org-020	[NT]	11	84	86	2	111	80

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	21	13/05/2022	13/05/2022		[NT]	[NT]
Date analysed	-			[NT]	21	14/05/2022	14/05/2022		[NT]	[NT]
TRH C_{10} - C_{14}	mg/kg	50	Org-020	[NT]	21	<50	<50	0	[NT]	[NT]
TRH C_{15} - C_{28}	mg/kg	100	Org-020	[NT]	21	100	<100	0	[NT]	[NT]
TRH C_{29} - C_{36}	mg/kg	100	Org-020	[NT]	21	310	270	14	[NT]	[NT]
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	[NT]	21	<50	<50	0	[NT]	[NT]
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	[NT]	21	290	240	19	[NT]	[NT]
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	[NT]	21	450	380	17	[NT]	[NT]
Surrogate o-Terphenyl	%		Org-020	[NT]	21	99	99	0	[NT]	[NT]

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	295300-2
Date extracted	-			13/05/2022	1	13/05/2022	13/05/2022		13/05/2022	13/05/2022
Date analysed	-			13/05/2022	1	13/05/2022	13/05/2022		13/05/2022	13/05/2022
Naphthalene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	92	90
Acenaphthylene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	95	97
Fluorene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	97	99
Phenanthrene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	98	98
Anthracene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	100	96
Pyrene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	103	103
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	85	81
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	<0.05	1	<0.05	<0.05	0	104	104
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	97	1	87	85	2	98	98

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	295300-22
Date extracted	-			[NT]	11	13/05/2022	13/05/2022		13/05/2022	13/05/2022
Date analysed	-			[NT]	11	13/05/2022	13/05/2022		13/05/2022	13/05/2022
Naphthalene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	92	86
Acenaphthylene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	97	87
Fluorene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	97	79
Phenanthrene	mg/kg	0.1	Org-022/025	[NT]	11	0.2	0.2	0	98	#
Anthracene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	[NT]	11	0.7	0.5	33	100	#
Pyrene	mg/kg	0.1	Org-022/025	[NT]	11	0.6	0.4	40	107	#
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	[NT]	11	0.2	0.2	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	[NT]	11	0.2	0.1	67	85	#
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	[NT]	11	0.4	0.3	29	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	[NT]	11	0.2	0.1	67	106	#
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	[NT]	11	0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	[NT]	11	93	89	4	100	96

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	21	13/05/2022	13/05/2022		[NT]	[NT]
Date analysed	-			[NT]	21	13/05/2022	13/05/2022		[NT]	[NT]
Naphthalene	mg/kg	0.1	Org-022/025	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Acenaphthylene	mg/kg	0.1	Org-022/025	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-022/025	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Phenanthrene	mg/kg	0.1	Org-022/025	[NT]	21	0.1	0.1	0	[NT]	[NT]
Anthracene	mg/kg	0.1	Org-022/025	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	[NT]	21	0.4	0.4	0	[NT]	[NT]
Pyrene	mg/kg	0.1	Org-022/025	[NT]	21	0.4	0.4	0	[NT]	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	[NT]	21	0.3	0.3	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	[NT]	21	0.2	0.2	0	[NT]	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	[NT]	21	0.5	0.4	22	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	[NT]	21	0.3	0.3	0	[NT]	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	[NT]	21	0.1	0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	[NT]	21	0.2	0.2	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	[NT]	21	85	86	1	[NT]	[NT]

QUALITY CONTROL: Organochlorine Pesticides in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	295300-56
Date extracted	-			13/05/2022	57	13/05/2022	13/05/2022		13/05/2022	13/05/2022
Date analysed	-			13/05/2022	57	13/05/2022	13/05/2022		13/05/2022	13/05/2022
alpha-BHC	mg/kg	0.1	Org-022/025	<0.1	57	<0.1	<0.1	0	96	86
HCB	mg/kg	0.1	Org-022/025	<0.1	57	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022/025	<0.1	57	<0.1	<0.1	0	99	92
gamma-BHC	mg/kg	0.1	Org-022/025	<0.1	57	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022/025	<0.1	57	<0.1	<0.1	0	101	69
delta-BHC	mg/kg	0.1	Org-022/025	<0.1	57	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-022/025	<0.1	57	<0.1	<0.1	0	103	101
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	<0.1	57	<0.1	<0.1	0	106	100
gamma-Chlordane	mg/kg	0.1	Org-022/025	<0.1	57	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-022/025	<0.1	57	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-022/025	<0.1	57	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-022/025	<0.1	57	<0.1	<0.1	0	98	98
Dieldrin	mg/kg	0.1	Org-022/025	<0.1	57	<0.1	<0.1	0	100	100
Endrin	mg/kg	0.1	Org-022/025	<0.1	57	<0.1	<0.1	0	96	88
Endosulfan II	mg/kg	0.1	Org-022/025	<0.1	57	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-022/025	<0.1	57	<0.1	<0.1	0	98	100
Endrin Aldehyde	mg/kg	0.1	Org-022/025	<0.1	57	<0.1	<0.1	0	<0.1	[NT]
pp-DDT	mg/kg	0.1	Org-022/025	<0.1	57	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022/025	<0.1	57	<0.1	<0.1	0	80	60
Methoxychlor	mg/kg	0.1	Org-022/025	<0.1	57	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	102	57	92	91	1	102	96

QUALITY CONTROL: Organochlorine Pesticides in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	[NT]
Date extracted	-			[NT]	[NT]	[NT]	[NT]	[NT]	13/05/2022	[NT]
Date analysed	-			[NT]	[NT]	[NT]	[NT]	[NT]	13/05/2022	[NT]
alpha-BHC	mg/kg	0.1	Org-022/025	[NT]	[NT]	[NT]	[NT]	[NT]	90	[NT]
beta-BHC	mg/kg	0.1	Org-022/025	[NT]	[NT]	[NT]	[NT]	[NT]	92	[NT]
Heptachlor	mg/kg	0.1	Org-022/025	[NT]	[NT]	[NT]	[NT]	[NT]	79	[NT]
Aldrin	mg/kg	0.1	Org-022/025	[NT]	[NT]	[NT]	[NT]	[NT]	103	[NT]
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	[NT]	[NT]	[NT]	[NT]	[NT]	100	[NT]
pp-DDE	mg/kg	0.1	Org-022/025	[NT]	[NT]	[NT]	[NT]	[NT]	101	[NT]
Dieldrin	mg/kg	0.1	Org-022/025	[NT]	[NT]	[NT]	[NT]	[NT]	100	[NT]
Endrin	mg/kg	0.1	Org-022/025	[NT]	[NT]	[NT]	[NT]	[NT]	98	[NT]
pp-DDD	mg/kg	0.1	Org-022/025	[NT]	[NT]	[NT]	[NT]	[NT]	102	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022/025	[NT]	[NT]	[NT]	[NT]	[NT]	62	[NT]
Surrogate TCMX	%		Org-022/025	[NT]	[NT]	[NT]	[NT]	[NT]	103	[NT]

QUALITY CONTROL: Organophosphorus Pesticides in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	295300-56
Date extracted	-			13/05/2022	57	13/05/2022	13/05/2022		13/05/2022	13/05/2022
Date analysed	-			13/05/2022	57	13/05/2022	13/05/2022		13/05/2022	13/05/2022
Dichlorvos	mg/kg	0.1	Org-022/025	<0.1	57	<0.1	<0.1	0	117	106
Dimethoate	mg/kg	0.1	Org-022/025	<0.1	57	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-022/025	<0.1	57	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos-methyl	mg/kg	0.1	Org-022/025	<0.1	57	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-022/025	<0.1	57	<0.1	<0.1	0	126	118
Fenitrothion	mg/kg	0.1	Org-022/025	<0.1	57	<0.1	<0.1	0	102	99
Malathion	mg/kg	0.1	Org-022/025	<0.1	57	<0.1	<0.1	0	73	83
Chlorpyriphos	mg/kg	0.1	Org-022/025	<0.1	57	<0.1	<0.1	0	102	106
Parathion	mg/kg	0.1	Org-022/025	<0.1	57	<0.1	<0.1	0	75	77
Bromophos-ethyl	mg/kg	0.1	Org-022	<0.1	57	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-022/025	<0.1	57	<0.1	<0.1	0	76	81
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-022/025	<0.1	57	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	102	57	92	91	1	102	96

QUALITY CONTROL: Organophosphorus Pesticides in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	[NT]
Date extracted	-			[NT]	[NT]	[NT]	[NT]	[NT]	13/05/2022	[NT]
Date analysed	-			[NT]	[NT]	[NT]	[NT]	[NT]	13/05/2022	[NT]
Dichlorvos	mg/kg	0.1	Org-022/025	[NT]	[NT]	[NT]	[NT]	[NT]	103	[NT]
Ronnel	mg/kg	0.1	Org-022/025	[NT]	[NT]	[NT]	[NT]	[NT]	126	[NT]
Fenitrothion	mg/kg	0.1	Org-022/025	[NT]	[NT]	[NT]	[NT]	[NT]	102	[NT]
Malathion	mg/kg	0.1	Org-022/025	[NT]	[NT]	[NT]	[NT]	[NT]	86	[NT]
Chlorpyriphos	mg/kg	0.1	Org-022/025	[NT]	[NT]	[NT]	[NT]	[NT]	108	[NT]
Parathion	mg/kg	0.1	Org-022/025	[NT]	[NT]	[NT]	[NT]	[NT]	77	[NT]
Ethion	mg/kg	0.1	Org-022/025	[NT]	[NT]	[NT]	[NT]	[NT]	82	[NT]
Surrogate TCMX	%		Org-022/025	[NT]	[NT]	[NT]	[NT]	[NT]	103	[NT]

QUALITY CONTROL: PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	295300-56
Date extracted	-			13/05/2022	57	13/05/2022	13/05/2022		13/05/2022	13/05/2022
Date analysed	-			13/05/2022	57	13/05/2022	13/05/2022		13/05/2022	13/05/2022
Aroclor 1016	mg/kg	0.1	Org-021	<0.1	57	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021	<0.1	57	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021	<0.1	57	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021	<0.1	57	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021	<0.1	57	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021	<0.1	57	<0.1	<0.1	0	92	80
Aroclor 1260	mg/kg	0.1	Org-021	<0.1	57	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-021	102	57	92	91	1	102	96

QUALITY CONTROL: PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	[NT]
Date extracted	-			[NT]	[NT]	[NT]	[NT]	[NT]	13/05/2022	[NT]
Date analysed	-			[NT]	[NT]	[NT]	[NT]	[NT]	13/05/2022	[NT]
Aroclor 1254	mg/kg	0.1	Org-021	[NT]	[NT]	[NT]	[NT]	[NT]	95	[NT]
Surrogate TCMX	%		Org-021	[NT]	[NT]	[NT]	[NT]	[NT]	103	[NT]

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	295300-57
Date prepared	-			16/05/2022	56	16/05/2022	16/05/2022		16/05/2022	16/05/2022
Date analysed	-			16/05/2022	56	16/05/2022	16/05/2022		16/05/2022	16/05/2022
Arsenic	mg/kg	4	Metals-020	<4	56	<4	<4	0	109	102
Cadmium	mg/kg	0.4	Metals-020	<0.4	56	<0.4	<0.4	0	108	91
Chromium	mg/kg	1	Metals-020	<1	56	7	8	13	108	99
Copper	mg/kg	1	Metals-020	<1	56	20	28	33	107	#
Lead	mg/kg	1	Metals-020	<1	56	12	13	8	107	92
Mercury	mg/kg	0.1	Metals-021	<0.1	56	<0.1	<0.1	0	106	127
Nickel	mg/kg	1	Metals-020	<1	56	8	10	22	108	95
Zinc	mg/kg	1	Metals-020	<1	56	46	60	26	112	101

QUALITY CONTROL: Misc Soil - Inorg					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	[NT]
Date prepared	-			13/05/2022	[NT]	[NT]	[NT]	[NT]	13/05/2022	[NT]
Date analysed	-			13/05/2022	[NT]	[NT]	[NT]	[NT]	13/05/2022	[NT]
Total Phenolics (as Phenol)	mg/kg	5	Inorg-031	<5	[NT]	[NT]	[NT]	[NT]	102	[NT]

QUALITY CONTROL: Misc Inorg - Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	[NT]
Date prepared	-			13/05/2022	[NT]	[NT]	[NT]	[NT]	13/05/2022	[NT]
Date analysed	-			16/05/2022	[NT]	[NT]	[NT]	[NT]	16/05/2022	[NT]
pH 1:5 soil:water	pH Units		Inorg-001	[NT]	[NT]	[NT]	[NT]	[NT]	101	[NT]

QUALITY CONTROL: CEC					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	[NT]
Date prepared	-			17/05/2022	[NT]	[NT]	[NT]	[NT]	17/05/2022	[NT]
Date analysed	-			17/05/2022	[NT]	[NT]	[NT]	[NT]	17/05/2022	[NT]
Exchangeable Ca	meq/100g	0.1	Metals-020	<0.1	[NT]	[NT]	[NT]	[NT]	115	[NT]
Exchangeable K	meq/100g	0.1	Metals-020	<0.1	[NT]	[NT]	[NT]	[NT]	123	[NT]
Exchangeable Mg	meq/100g	0.1	Metals-020	<0.1	[NT]	[NT]	[NT]	[NT]	115	[NT]
Exchangeable Na	meq/100g	0.1	Metals-020	<0.1	[NT]	[NT]	[NT]	[NT]	122	[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

TRH Soil C10-C40 NEPM - # Percent recovery for the matrix spike is not possible to report as the high concentration of analytes in sample 295300-22ms have caused interference.

PAHs in Soil - # Percent recovery is not possible to report due to the inhomogeneous nature of the element/s in the sample/s. However an acceptable recovery was obtained for the LCS.

Asbestos: A portion of the supplied sample was sub-sampled for asbestos according to ASB-001 asbestos subsampling procedure. We cannot guarantee that this sub-sample is indicative of the entire sample. Envirolab/MPL recommends supplying 40-60g or 500ml of sample in its own container.
Note: Samples 295300-1 to 22 were sub-sampled from bags provided by the client.

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

VOC Suite 1 in Carbon tubes - Analysed by MPL, report no 281618.

Douglas Partners
Geotechnics | Environment | Groundwater

CHAIN OF CUSTODY DESPATCH SHEET

Project No:	204718.02	**Suburb:**	Campbelltown	**To:**	Envirolab Services
Project Name:	Lot 245 Farrow Road, DSI	**Order Number**			Ashley St, Chatswood
Project Manager:	Grant Russell	**Sampler:**	AJ	**Attn:**	
Emails:	grant.russell@douglaspartners.com.au; ashika.jagdish@douglaspartners.com.au				
Date Required:	Same day ☐ 24 hours ☐ 48 hours ☐ 72 hours ☐ Standard x			**Email:**	
Prior Storage:	☐ Esky x Fridge ☐ Shelved	Do samples contain 'potential' HBM?	Yes ☐ No x (If YES, then handle, transport and store in accordance with FPM HAZID)		

Sample ID	Lab ID	Date Sampled	Sample Type (S - soil W - water)	Container Type (G - glass P - plastic)	Analytes: Heavy Metals	OCP	TRH and BTEX	Asbestos 50g	PAH	OPP/PCB	Total Phenols	pH and CEC	Hold	Notes/preservation
BH101/0.08-0.4	1	9.5.22	S	G & P			x	x	x			x		Composite samples BH101/0.08-0.4 and BH102/0.1-0.2 for OCP/OPP/PCB and metals
BH102/0.1-0.2	2	6.5.22	S	G & P			x	x	x					
BH103-0.2-0.3	3	6.5.22	S	G & P			x	x	x					Composite samples BH103/0.2-0.3 and BH104/0.1-0.2 for OCP/OPP/PCB and metals
BH104/0.1-0.2	4	6.5.22	S	G & P			x	x	x					
BH105/0.03-0.3	5	6.5.22	S	G & P			x	x	x					Composite samples BH105/0.03-0.3 and BH106/0.05-0.3 for OCP/OPP/PCB and metals
BH106/0.05-0.3	6	6.5.22	S	G & P			x	x	x					
BH107/0.09-0.1	7	6.5.22	S	G & P			x	x	x					Composite samples BH107/0.09-0.1 and BH108/0.05-035 for OCP/OPP/PCB and metals
BH108/0.05-0.35	8	6.5.22	S	G & P			x	x	x					
BH109/0.08-0.3	9	9.5.22	S	G & P			x	x	x					Composite samples BH109/0.08-0.35 and BH110/0.03-0.3 for OCP/OPP/PCB and metals
BH110/0.03-0.3	10	6.5.22	S	G & P			x	x	x		x	x		
BH111/0.05-0.3	11	6.5.22	S	G & P			x	x	x					Composite samples BH111/0.05-0.3 and BH112/0.05-0.1 for OCP/OPP/PCB and metals
BH112/0.05-0.1	12	9.5.22	S	G & P			x	x	x					
BH113/0-0.1	13	6.5.22	S	G & P			x	x	x					Composite samples BH113/0-0.1 and BH114/0.02-0.4 for OCP/OPP/PCB and metals
BH114/0.02-0.4	14	6.5.22	S	G & P			x	x	x					
BH115/0.3-0.4	15	9.5.22	S	G & P			x	x	x					Composite with BH116/0.4-0.5 for OCP/OPP/PCB and metals
PQL (S) mg/kg												ANZECC PQLs req'd for all water analytes ☐		

C1 57
C2 57
C3 58
C4 59
C5 60
C6 61
C7 62
C8 63

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

Metals to Analyse: 8HM unless specified here:

Lab Report/Reference No:

Total number of samples in container: | Relinquished by: | Transported to laboratory by:

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

Signed: | Received by: Nancy Zhang 11/05/2022 15:30 | Date & Time:

ENVIROLAB

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

Job No: 295300
Date Received: 11/05/2022
Time Received: 15:30
Received by:
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

14°C.

Douglas Partners
Geotechnics | Environment | Groundwater

CHAIN OF CUSTODY DESPATCH SHEET

Project No:	204718.02	**Suburb:**	Campbelltown	**To:**	Envirolab Services
Project Name:	Lot 245 Farrow Road, DSI	**Order Number**			Ashley St, Chatswood
Project Manager:	Grant Russell	**Sampler:**	AJ	**Attn:**	
Emails:	grant.russell@douglaspartners.com.au; ashika.jagdish@douglaspartners.com.au				
Date Required:	Same day ☐ 24 hours ☐ 48 hours ☐ 72 hours ☐ Standard x			**Email:**	
Prior Storage:	☐ Esky x Fridge ☐ Shelved	Do samples contain 'potential' HBM?	Yes ☐ No x (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: Heavy Metals	OCP	TRH and BTEX	Asbestos 50g	PAH	OPP/PCB	Total Phenols	pH and CEC	Hold	Notes/preservation
BH116/0.4-0.5	16	6.5.22	S	G & P			x	x	x					Composite with BH115/0.3-0.4 for OCP/OPP/PCB and metals
BH117/0.2-0.3	17	6.5.22	S	G & P			x	x	x					Composite samples BH117/0.2-0.3 and BH118/0.25-0.35 for OCP/OPP/PCB and metals
BH118/0.25-0.3	18	6.5.22	S	G & P			x	x	x					
BH119/0.2-0.3	19	6.5.22	S	G & P			x	x	x					Composite samples BH119/0.2-0.3 and BH120/0.04-0.3 for OCP/OPP/PCB and metals
BH120/0.04-0.3	20	6.5.22	S	G & P			x	x	x		x	x		
BH121/0.3-0.4	21	6.5.22	S	G & P			x	x	x					Composite samples BH121/0.3-0.4 and BH122/0.05-0.3 for OCP/OPP/PCB and metals
BH122/0.05-0.3	22	9.5.22	S	G & P			x	x	x					
TS	23	6.5.22	S	G			x							
TB	24	6.5.22	S	G			x							
BD1	25	6.5.22	S	G			x		x					
BD2	26	9.5.22	S	G			x		x					
SV101	27	10.5.22	V	Vapour			x							TRH +VOCs
SV122	28	10.5.22	V	Vapour			x							TRH +VOCs
PQL (S) mg/kg												ANZECC PQLs req'd for all water analytes ☐		

C9 64
C10 65
C11 66

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

Metals to Analyse: 8HM unless specified here:

Lab Report/Reference No:

Total number of samples in container:	**Relinquished by:**	**Transported to laboratory by:**	
Send Results to:	Douglas Partners Pty Ltd	**Address**	**Phone:** **Fax:**
Signed:	**Received by:** Nancy Zhang	**Date & Time:** 11/05/2022 15:30	

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

Job No: 285300
Date Received: 11/05/2022
Time Received: 15:30
Received by:
Temp: Cool/Ambient
Cooling: Ice/Icepack 14°
Security: Intact/Broken/None

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CHAIN OF CUSTODY DESPATCH SHEET

Project No:	204718.02	**Suburb:**	Campbelltown	**To:**	Envirolab Services
Project Name:	Lot 245 Farrow Road, DSI	**Order Number**			Ashley St, Chatswood
Project Manager:	Grant Russell	**Sampler:**	AJ	**Attn:**	
Emails:	grant.russell@douglaspartners.com.au; ashika.jagdish@douglaspartners.com.au				
Date Required:	Same day ☐ 24 hours ☐ 48 hours ☐ 72 hours ☐ Standard x			**Email:**	
Prior Storage:	☐ Esky x Fridge ☐ Shelved	Do samples contain 'potential' HBM?	Yes ☐ No x (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: Heavy Metals	OCP	TRH and BTEX	Asbestos 50g	PAH	OPP/PCB	Total Phenols	pH and CEC	Hold	Notes/preservation
BH101/0.4-0.5	29	9.5.22	S	G										hold
BH102/0.5-0.6	30	6.5.22	S	G										hold
BH103/0.5-0.6	31	6.5.22	S	G										hold
BH104/0.5-0.6	32	6.5.22	S	G										hold
BH105/0.9-1.0	33	6.5.22	S	G										hold
BH106/0.3-0.4	34	6.5.22	S	G										hold
BH107/0.3-0.4	35	6.5.22	S	G										hold
BH108/0.5-0.6	36	6.5.23	S	G										hold
BH109/0.4-0.5	37	9.5.22	S	G										hold
BH110/0.4-0.5	38	6.5.22	S	G										hold
BH111/0.4-0.5	39	6.5.22	S	G										hold
BH112/0.6-0.7	40	9.5.22	S	G										hold
BH113/0.2-0.3	41	6.5.22	S	G										hold
BH114/0.5-0.6	42	6.5.22	S	G										hold
BH115/0.6-0.7	43	9.5.22	S	G										hold
PQL (S) mg/kg												ANZECC PQLs req'd for all water analytes ☐		

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

Metals to Analyse: 8HM unless specified here:

Lab Report/Reference No:

Total number of samples in container: Relinquished by: #REF! Transported to laboratory by: #REF!

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

Signed: Received by: Nancy Zhang Date & Time: 11/05/2022 15:30

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

Job No: 285300
Date Received: 11/05/2022
Time Received: 15:30
Received by:
Temp: Cool/Ambient 14°
Cooling: Ice/Icepack
Security: Intact/Broken/None

Douglas Partners
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CHAIN OF CUSTODY DESPATCH SHEET

Project No: 204718.02	**Suburb:** Campbelltown	**To:** Envirolab Services	
Project Name: Lot 245 Farrow Road, DSI	**Order Number**	Ashley St, Chatswood	
Project Manager: Grant Russell	**Sampler:** AJ	**Attn:**	
Emails: grant.russell@douglaspartners.com.au; ashika.jagdish@douglaspartners.com.au			
Date Required: Same day ☐ 24 hours ☐ 48 hours ☐ 72 hours ☐ Standard x		**Email:**	
Prior Storage: ☐ Esky x Fridge ☐ Shelved	Do samples contain 'potential' HBM? Yes ☐ No x (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: Heavy Metals	OCP	TRH and BTEX	Asbestos 50g	PAH	OPP/PCB	Total Phenol	pH and CEC	Hold	Notes/preservation
BH116/0.02-0.4	44	6.5.22	S	G & P										hold
BH116/0.5-0.6	45	6.5.22	S	G										hold
BH117/0.5-0.6	46	6.5.22	S	G										hold
BH118/0.5-0.6	47	6.5.22	S	G										hold
BH119/0.4-0.5	48	6.5.22	S	G										hold
BH120/0.4-0.5	49	6.5.22	S	G										hold
BH121/0.5-0.6	50	6.5.22	S	G										hold
BH122/0.4-0.5	51	9.5.22	S	G										hold
BH105/0.3-0.4	52													
BH112/0.2-0.3	53													
BH115/0.05-0.2	54													
BH119/0.03-0.2	55													
		N2												
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:

Lab No: 295302

Total number of samples in container: Relinquished by: #REF! Transported to laboratory by: #REF!

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

Signed: Received by: Nancy Zhang Date & Time: 11/05/2022 15:30

Date Received: 11/05/2022

Time Received: 15:30

Received by:

Temp: Cool/Ambient 14°

Cooling: Icepack

Security: Intact/Broken/None

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

Appendix H

QA/QC

Appendix H
Data Quality Assurance and Quality Control Assessment

H1 Data Quality Indicators

Field and laboratory procedures were assessed against the following data quality indicators (DQIs):

Table G1: Data Quality Indicators

DQI	Performance Indicator	Acceptable Range
Precision		
Field considerations	SOPs appropriate and complied with	Field staff follow SOPs in the DP *Field Procedures Manual*
	field replicates	Precision average relative percent difference (RPD) result <5 times PQL, no limit; results >5 times PQL, 0% - 30%
Laboratory considerations	laboratory duplicates	Precision average RPD result <5 times PQL, no limit; results >5 times PQL, 0% - 50%
	laboratory-prepared volatile trip spikes	Recovery of 60 - 140%
Accuracy (bias)		
Field considerations	SOPs appropriate and complied with	Field staff to follow SOPs in the DP *Field Procedures Manual*
Laboratory considerations	Analysis of:	
	laboratory-prepared volatile trip spikes	Recovery of 60-140%
	Laboratory-prepared trip blanks (field blanks)	<PQL
	method blanks (laboratory blanks)	Recovery of 60-140%
	matrix spikes	Recovery of 70-130% (inorganics); 60 - 140% (organics)
	matrix spike duplicates	Recovery of 70-130% (inorganics); 60 - 140% (organics); Recovery 70 “low” to 130% “high” indicates interference
	surrogate spikes	Recovery of 70 - 130% (inorganics); 60 - 140% (organics)
	laboratory control samples	Recovery of 70-130% (inorganics); 60 - 140% (organics)
Completeness		
Field considerations	All critical locations sampled	All critical locations sampled in accordance with the DQO’s (Appendix D)
	SOPs appropriate and complied with	Field staff to follow SOPs in the DP *Field Procedures Manual*
	Experienced sampler	Experienced DP Environmental Engineer to conduct field work and sampling
	Documentation correct	Maintain COC documentation at all times
	Sample holding times complied with	Sample holding times complied with

DQI	Performance Indicator	Acceptable Range
Laboratory considerations	All critical samples analysed according to DQO's	All critical locations analysed in accordance with the DQO's
	Appropriate methods and PQLs	Appropriate methods and PQLs have been used by the contract laboratory
	Sample documentation complete	Maintain COC documentation at all times
Comparability		
Field considerations	Same SOPs used on each occasion	Field staff to follow SOPs in the DP *Field Procedures Manual*
	Experienced sampler	Experienced DP Environmental Scientist/Engineer to conduct field work and sampling
	Same types of samples collected	Same types of samples collected
Laboratory considerations	Sample analytical methods used (including clean-up)	Methods to be NATA accredited
	Sample PQLs (justify/quantify if different)	Consistent PQLs to be used
	Same laboratories (justify/quantify if different)	Same analytical laboratory for primary samples to be used
Representativeness		
Field considerations	Appropriate media sampled according to DQO's (Appendix D)	Appropriate media sampled according to DQO's (Appendix D)
	All media identified in DQO's sampled	All media identified in DQO's sampled
Laboratory considerations	All samples analysed according to DQO's	All samples analysed according to DQO's

Notes to Table 1: SOP – Standard Operating Procedure
DQO – Data Quality Objectives (Appendix D)

H2 Field Quality Assurance and Quality Control

The field QC procedures for sampling as prescribed in the standard operating procedures (SOPs) in the Douglas Partners *Field Procedures Manual* were followed at all times during the assessment. All sample locations and media were in accordance with the DQO (i.e. as per scope of work in DP's proposal).

H2.1 Sampling Team

Sampling was undertaken by an experienced DP Environmental Scientist.

H2.2 Sample Collection and Weather Conditions

Sample collection procedures and dispatch are reported in body of the report. Sampling was undertaken during sunny and hot conditions.

H2.3 Logs

Logs for each soil sampling location were recorded in the field. The individual samples were recorded on the field logs along with the sample identity, location, depth, initials of sampler, duplicate locations, duplicate type and site observations. Logs are presented in Appendix D.

H2.4 Chain-of-Custody

Chain-of-Custody information was recorded on the Chain-of-Custody (COC) sheets and accompanied samples to the analytical laboratory. Signed copies of COCs are presented in Appendix F, prior to the laboratory certificates.

H2.5 Sample Splitting Techniques

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

H2.6 Duplicate Frequency

Field sampling comprised intra-laboratory duplicate sampling, at a rate of approximately one duplicate sample for every 20 primary samples.

H2.7 Relative Percentage Difference

A measure of the consistency of results for field samples is derived by the calculation of relative percentage differences (RPDs) for duplicate samples. RPDs have only been considered where a concentration is greater than five times the practical quantitation limit (PQL).

H2.7.1 Intra-Laboratory Replicate Analysis

Replicates were tested to assess data 'precision' and the reproducibility within the primary laboratory (Envirolab Pty Ltd) as a measure of consistency of sampling techniques. Three replicate samples were analysed. The Relative Percent Difference (RPD) between replicate results is used as a measure of laboratory reproducibility and is given by the following:

$$\text{RPD} = \frac{(\text{Replicate result 1} - \text{Replicate result 2})}{(\text{Replicate result 1} + \text{Replicate result 2})/2} \text{ x } 100$$

The RPD can have a value between 0% and 200%. An RPD data quality objective of up to 30% is considered to be within the acceptable range.

The comparative results of analysis between primary and duplicate samples are summarised in Table H2. Where one or both results were below the PQL, an RPD was not calculated.

Table H2: RPD Results

Sample	Fluoranthene	Pyrene
BH120/0.04-0.3	0.6	<0.1
BD1	0.1	<0.1
Difference	0.5	-
RPD (%)	**142**	-
BH109/0.08-0.3	0.2	0.1
BD2	0.2	0.1
Difference	0	0
RPD (%)	0	0

Notes: Bold RPD >30
Concentration of either paired duplicated not greater than five times PQL

All RPD values were within the acceptable range of ± 30 with the exception of:

- Fluoranthene in soil intra-laboratory duplicate pair BH120/0.04-0.3 and BD1.

The exceedances in soil are considered likely due to the heterogeneity of the fill soil. The exceedances are not considered to affect the results of the investigation.

Overall, the intra-laboratory and inter-laboratory comparisons indicate that the sampling technique was consistent and repeatable and therefore acceptable precision was achieved.

H3 Laboratory Quality Assurance and Quality Control

Envirolab Services was used as the primary laboratory. Appropriate methods and PQLs were used by the laboratory. Sample methods were NATA accredited (noting the exception for fibrous asbestos (FA) and asbestos fines (AF) quantification to 0.001% w/w).

H3.1 Surrogate Spike

This sample is prepared by adding a known amount of surrogate, which behaves similarly to the analyte, prior to analysis to each sample. The recovery result indicates the proportion of the known concentration of the surrogate that is detected during analysis and is used to assess data 'accuracy'. Results within acceptance limits indicate that the extraction technique was effective.

H3.2 Reference and Daily Check Sample Results – Laboratory Control Sample (LCS)

This sample comprises spiking either a standard reference material or a control matrix (such as a blank of sand or water) with a known concentration of specific analytes. The LCS is then analysed and results compared against each other to determine how the laboratory has performed with regard to sample preparation and analytical procedure and is used to assess data 'accuracy'. LCSs are analysed at a frequency of one in 20, with a minimum of one analysed per batch.

H3.3 Laboratory Duplicate Results

These are additional portions of a sample which are analysed in exactly the same manner as all other samples and is used to assess data 'precision'. The laboratory acceptance criteria for duplicate samples is: in cases where the level is <5Xpql - any RPD is acceptable; and in cases where the level is >5xPQL - 0-50% RPD is acceptable.

H3.4 Laboratory Blank Results

The laboratory blank, sometimes referred to as the method blank or reagent blank is the sample prepared and analysed at the beginning of every analytical run, following calibration of the analytical apparatus and is used to assess data 'accuracy'. This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, it can be determined by processing solvents and reagents in exactly the same manner as for samples. Laboratory blanks are analysed at a frequency of 1 in 20, with a minimum of one per batch.

H3.5 Matrix Spike

This is a sample duplicate prepared by adding a known amount of analyte prior to analysis, and then treated exactly the same as all other samples. The recovery result indicates the proportion of the known concentration of the analyte that is detected during analysis and is used to assess data 'accuracy'. The laboratory acceptance criteria for matrix spike samples are generally 70 - 130% for inorganic/metals; and 60 - 140% for organics; and 10 - 140% for SVOC and speciated phenols.

H3.6 Results of Laboratory QC

The laboratory QC for surrogate spikes, LCS, laboratory duplicate results, laboratory blanks and matrix spikes results are reported in the laboratory certificate of analysis.

The laboratory quality control samples were within the laboratory acceptance criteria. It is considered that an acceptable level of laboratory precision and accuracy was achieved and that surrogate spikes, LCS, laboratory duplicate results, laboratory blanks and matrix spike results were of an acceptable level overall. On the basis of this assessment, the laboratory data set is considered to have complied with the DQIs.

H3.7 Overall Assessment of QA/QC

Specific limits associated with sample handling and laboratory QA/QC was assessed against the DQIs and a summary of compliance is presented in the following table.

Table H5: Data Quality Indicators

DQI	Performance Indicator	Acceptable Range	Compliance
Precision			
Field considerations	SOPs appropriate and complied with	Field staff follow SOPs in the DP *Field Procedures Manual*	C
	field replicates	Precision average relative percent difference (RPD) result <5 times PQL, no limit; results >5 times PQL, 0% - 30%	C
Laboratory considerations	laboratory duplicates	Precision average RPD result <5 times PQL, no limit; results >5 times PQL, 0 - 50%	C
	laboratory-prepared volatile trip spikes	Recovery of 60-140%	C
Accuracy (bias)			
Field considerations	SOPs appropriate and complied with	Field staff to follow SOPs in the DP *Field Procedures Manual*	C
Laboratory considerations	Analysis of:		
	laboratory-prepared volatile trip spikes	Recovery of 60 - 140%	C
	laboratory-prepared trip blanks (field blanks)	<PQL	C
	method blanks (laboratory blanks)	Recovery of 60 - 140%	C
	matrix spikes	Recovery of 70 - 130% (inorganics); 60 - 140% (organics)	C
	matrix spike duplicates	Recovery of 70 - 130% (inorganics); 60 - 140% (organics); Recovery 70 “low” to 130% “high” indicates interference	C
	surrogate spikes	Recovery of 70 - 30% (inorganics); 60 - 40% (organics)	C
	laboratory control samples	Recovery of 70 - 130% (inorganics); 60 - 140% (organics)	C

DQI	Performance Indicator	Acceptable Range	Compliance
Completeness			
Field considerations	All critical locations sampled	All critical locations sampled in accordance with the SAQP	C
	SOPs appropriate and complied with	Field staff to follow SOPs in the DP *Field Procedures Manual*	C
	Experienced sampler	Experienced DP Environmental Scientist/Engineer to conduct field work and sampling	C
	Documentation correct	Maintain COC documentation at all times	C
	Sample holding times complied with	Sample holding times complied with	C
Laboratory considerations	All critical samples analysed according to SAQP	All critical locations analysed in accordance with the SAQP	C
	Appropriate methods and PQLs	Appropriate methods and PQLs have been used by the contract laboratory	C
	Sample documentation complete	Maintain COC documentation at all times	C
Comparability			
Field considerations	Same SOPs used on each occasion	Field staff to follow SOPs in the DP *Field Procedures Manual*	C
	Experienced sampler	Experienced DP Environmental Scientist/Engineer to conduct field work and sampling	C
	Same types of samples collected (filtered)	Field filtering for metals	NA
Laboratory considerations	Sample analytical methods used (including clean-up)	Methods to be NATA accredited	C
	Sample PQLs (justify/quantify if different)	Consistent PQLs to be used	C
	Same laboratories (justify/quantify if different)	Same analytical laboratory for primary samples to be used	C
Representativeness			
Field considerations	Appropriate media sampled according to DQOs	Appropriate media sampled according to DQOs	C
	All media identified in DQOs sampled	All media identified in DQOs sampled	C
Laboratory considerations	All samples analysed according to DQOs	All samples analysed according to DQOs	C

Notes to Table 5:
C – Compliance
PC – Partial Compliance
NC – Non-Compliance
NA – Not Applicable
SOP – Standard Operating Procedure
DQO – Data Quality Objectives

A review of the adopted QA/QC procedures and results indicates that the DQIs have generally been met with compliance and a minor partial-compliance. On this basis, the sampling and laboratory methods used during the investigation were found to meet DQOs for this project.

Appendix I

About this Report

About this Report

Douglas Partners

Introduction

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

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

Copyright

Borehole and Test Pit Logs

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

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

Groundwater

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

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

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

Reports

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

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

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

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

About this Report

Site Anomalies

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

Information for Contractual Purposes

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

Site Inspection

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