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Integrated Practical Solutions

Report on
Detailed Site Investigation (Contamination)

Surface & Civil Alignment Works (SCAW) Package for
Sydney Metro - Western Sydney Airport (SMWSA)
Area of Environmental Concern (AEC) 35,
43A Luddenham Road, Orchard Hills

Prepared for
CPB Contractors Pty Limited & United Infrastructure
Pty Limited Joint Venture (CPBUI JV)

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Executive Summary

Douglas Partners Pty Ltd (DP) has been engaged by CPB Contractors Pty Limited & United Infrastructure Pty Limited Joint Venture (CPBUI JV) to complete this Detailed Site Investigation (Contamination) (DSI) for the Sydney Metro - Western Sydney Airport (SMWSA) Surface and Civil Alignment Works (SCAW) package at Area of Environmental Concern (AEC) 35.

Technical Paper 8: Contamination, prepared as part of Sydney Metro - Western Sydney Airport, Environmental Impact Statement (EIS), documents areas of environmental concern identified for the Sydney Metro - Western Sydney Airport project. The objective of the DSI is to assess the suitability of AEC 35 which will be disturbed for SCAW activities, and to determine whether further investigation and / or management is required. The site is shown on Drawing AEC35-1, Appendix A. The potential source of contamination for AEC 35 was identified in the EIS to be: *Potential farm waste burial area.*

The scope of work included soil sampling from 19 locations using an excavator; soil sampling from one location using a hand auger, soil sampling of a stockpile, installation and development of three groundwater monitoring wells, sampling from four groundwater monitoring wells, and laboratory analysis of soil and groundwater samples for potential contaminants and parameters.

At test pits and the hand auger borehole for the current investigation, fill was encountered to depths ranging from 0.1 m to 0.5 m. Fill materials comprised silty clay or gravelly silty clay, sandy clay and clayey sand. A trace of glass was noted in the fill at two locations. Fill was underlain by clay and / or silty clay to test pit termination depths of between 0.9 m and 2.5 m.

A stockpile (AEC35SP) was observed to comprise approximately 100 m^3 of pale brown, pale grey and red-orange clay with rootlets and wood. Piles of waste materials were observed on the ground surface at two locations as shown on Drawing AEC35-1, Appendix A. Waste materials included gas cylinders, metals, wood, plastics and glass bottles.

For the groundwater monitoring well boreholes for the current investigation, fill was encountered to depths ranging from 0.15 m to 0.6 m. Fill materials comprised silty sand. Fill was underlain by silty clay to depths of up to 5.09 m; and silty clay was underlain by siltstone from a depth of 4.5 m to a depth of 7.5 m at AEC35BH01. Measured groundwater depths were between 0.5 m and 2.17 m below ground level.

For soil samples for the current investigation, concentrations of chemicals for all analysed soil samples were below the Site Assessment Criteria (SAC); and asbestos was not detected in any analysed sample. For previous investigations, concentrations of contaminants are below the SAC except for TRH >C_{16}-C_{34} and benzo(a)pyrene in the sample from SMGW-BH-B106, depth 0.2 m (although the recorded benzo(a)pyrene concentration is significantly less than high reliability ecological guidelines from CRC CARE, *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,* 2017). Fill containing waste materials (including metal, a jerry can, glass, white fibres, hose, fishing wire, green substance and rubbish waste) was recorded to a depth of 3.95 m at this location.

For groundwater samples for the current investigation, TRH >C_{10}-C_{16}, TRH >C_{16}-C_{34}, and TRH >C_{34}-C_{40} were identified in the sample from SMGW-BH-B106. It is considered that the likely source of TRH in groundwater at SMGW-BH-B106 is from the fill containing waste materials at this location.

Concentrations of ammonia were recorded above the recreational aesthetic guideline at groundwater monitoring wells SMGW-BH-B106 and AEC35BH01. It is noted that it is possible (but not known) that the fill containing waste materials at SMGW-BH-B106 is contributing to the ammonia concentrations recorded at these wells.

With respect to fill, concentrations of chemical contaminants were below the CT1 criteria for general solid waste except for:

- TRH C_{10}-C_{36} in the sample from SMGW-BH-B106, depth 0.2 m. The concentration is below the CT2 criterion for restricted solid waste; and
- Benzo(a)pyrene in the sample from SMGW-BH-B106, depth 0.2 m. The concentration is below the SCC2 criterion for general solid waste, however, TCLP (toxicity characteristic leaching procedure) was apparently not undertaken.

For analysed fill samples, results for metals, TRH, BTEX, PAH and pH were below the associated criteria for excavated natural material (ENM) except for benzo(a)pyrene and TRH C_{10} - C_{36} in the sample from SMGW-BH-B106, depth 0.2 m.

With respect to natural soil samples, concentrations of chemical contaminants were within what are considered to be background levels and are considered to be consistent with the definition of virgin excavated natural material (VENM) except for TRH C_{10}-C_{40} in the sample from SMGW-BH-B106, depth 4-4.45 m.

For the stockpile (AEC35SP), concentrations of chemical contaminants were below the CT1 criteria for general solid waste and concentrations of metals, TRH, BTEX, PAH were below the associated criteria for ENM.

The position of SMGW-BH-B106 is on the proposed rail alignment where excavation is required (to an approximate depth of 2 m). It is understood that, as the fill at SMGW-BH-B106 is uncontrolled fill, it will need to be excavated (i.e., it cannot remain *in situ*) as it is not geotechnically suitable for the proposed development. Given this, it is recommended that:

- Once the material is excavated and stockpiled (and sorted, if required), an environmental consultant is to assess the material by inspection, sampling and analysis. A geotechnical engineer should assess and confirm that the uncontrolled fill has been removed (and provide written documentation confirming the removal);
- Following this assessment, material that is considered as not suitable for reuse for SCAW is to be given a waste classification for off-site disposal by the environmental consultant;
- Materials designated for off-site disposal will need to be disposed at a licensed landfill;
- Any liquid / water emanating from the fill (either at its original location or from the stockpile) is to be collected and assessed for disposal purposes; and
- Records of the excavation and waste tracking (of solid and liquid waste) are to be documented.

The plan for the above-listed recommendations, including validation, should be documented in a remediation action plan.

An unexpected finds protocol is to be in place for suspected contamination finds encountered during the excavation works.

Waste materials (such as gas cylinders, metals, wood and plastic) observed on the ground surface should be appropriately disposed to a licenced landfill.

It is considered that the site can be made suitable for the proposed development subject to the above recommendations.

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Appendices

Report on Detailed Site Investigation (Contamination)

Surface & Civil Alignment Works (SCAW) Package for Sydney Metro - Western Sydney Airport (SMWSA)

Area of Environmental Concern (AEC) 35, 43A Luddenham Road, Orchard Hills

1. Introduction

Douglas Partners Pty Ltd (DP) has been engaged by CPB Contractors Pty Limited & United Infrastructure Pty Limited Joint Venture (CPBUI JV) to complete this Detailed Site Investigation (Contamination) (DSI) for the Sydney Metro - Western Sydney Airport (SMWSA) Surface and Civil Alignment Works (SCAW) package at Area of Environmental Concern (AEC) 35.

Technical Paper 8: Contamination, prepared as part of *Sydney Metro - Western Sydney Airport, Environmental Impact Statement* (EIS), documents areas of environmental concern identified for the Sydney Metro - Western Sydney Airport project. The objective of the DSI is to assess the suitability of AEC 35 which will be disturbed for SCAW activities, and to determine whether further investigation and / or management is required. The site is shown on Drawing AEC35-1, Appendix A.

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

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

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

It is understood that the site will be subject to a Site Audit by Melissa Porter, a NSW Environment Protection Authority (EPA) Site Auditor accredited under the *Contaminated Land Management Act 1997*.

2. Site Identification and Proposed Development

Table 1 provides a summary of information for site identification. The site covers two areas which are within the SCAW package, as shown on Drawing AEC35-1, Appendix A.

Table 1: Site Identification Information

Item	Details
Site Address (from SIX Maps)	43A Luddenham Road, Orchard Hills, NSW
Legal Description (from SIX Maps)	(Part of) Lot 42, Deposited Plan 738126
Approximate area of site (AEC 35)	Western area: 0.41 ha Eastern area: 0.33 ha Total area: 0.74 ha
Zone (from ePlanning Spatial Viewer)	RU2: Rural Landscape; and Not zoned along proposed rail line.
Local Government Area	Penrith City Council

The SCAW package relates to the proposed construction of approximately 10 km of rail alignment between Orchard Hills and the Western Sydney International (future) Airport consisting of a combination of viaducts and surface rail. Areas alongside the proposed rail alignment will be used by contractors or for staging and maintenance for the Metro.

Cardno, *Human Health and Ecological Risk Assessment, Spoil Re-use Sydney Metro and Western Sydney Airport*, 29 June 2021 (80021888 SMSWA HHERARev3-Issued.docx) (Cardno, 2021b) (HHERA) provides (simple) conceptual site models (CSMs) for different general future land uses for the overall SMWSA project. The two general future land uses associated with the SCAW component of the project are considered to be:

- The rail corridor which will include the rail line, embankments / noise barriers, a stabling yard and maintenance facility and Luddenham station; and
- Passive open space. These are areas immediately adjacent to the rail corridor that may be used for bike / commuter paths. It is presumed that there is an absence of buildings in areas of passive open space.

AEC 35 will be part of an area used as a stabling yard and rail line (i.e., rail corridor usage), although a small part of the site (on the western fringe) may be part of passive open space.

Development of the site will likely include stripping of topsoil across the entire site and cut for rail lines and stabling yard. Stripped and cut soil from the site will be subject to reuse elsewhere within the greater SCAW area. Soil to raise ground levels (if required) may be sourced from off-site.

3. Scope of Work

The scope of work for the DSI was generally based on DP, *Sampling and Analysis Quality Plan (SAQP), Surface & Civil Alignment Works (SCAW) Package for Sydney Metro - Western Sydney Airport (SMWSA) Area of Environmental Concern (AEC) 35, 43A Luddenham Road, Orchard Hills,* August 2022, (204814.01.SAQP.003.DftA). It is noted that the site for the DSI includes the entire AEC 35 area, however, the site for the purposes of preparing the SAQP covered the majority (but not all) of AEC 35.

In addition, a stockpile was encountered during field work. Therefore, the scope for the DSI was expanded to include an additional (*in situ*) soil sampling point and stockpile sampling.

The scope of work was as follows:

- Collection of soil samples from test pits at 19 locations using an excavator;
- Collection of soil samples at one location using a hand auger;
- Collection of soil samples from a stockpile using an excavator;
- Using a drilling rig, installation of groundwater monitoring wells at three locations;
- Development of each of the three groundwater monitoring wells;
- Sampling of each of the three installed groundwater monitoring wells and an existing groundwater monitoring well (SMGW-BH-B106);
- Analysis of selected soil samples for potential contaminants and soil parameters;
- Analysis of groundwater water samples for potential contaminants and water parameters; and
- Preparation of this DSI including an assessment of analytical and field results.

4. Site Condition and Environment Information

Table 2 provides a summary of information relating to the site condition and environment.

Table 2: Site Condition and Environment Information

Item	Details
Geology	Bringelly Shale: comprising shale, carbonaceous claystone, claystone, laminate, fine to medium-grained lithic sandstone, rare coal and tuff for the majority of the site. (Penrith 1:100 000 Geology Sheet)
Soil landscape	Blacktown soil landscape which comprises residual soils. (Penrith 1:100 000 Soils Landscape Sheet).
Topography	The eastern part of the site is at approximately 42 m relative to Australian Height Datum (AHD). The western part of the site is at approximately 40 m AHD. Slopes at and around the site are generally down to the north and west.
Salinity	The site is at an area of moderate salinity potential. (Department of Infrastructure Planning and Natural Resources, Salinity Potential in Western Sydney Map).
Acid sulfate soils	The site is not within an area or close to an area associated with a risk of acid sulfate soils (NSW Acid Sulfate Soil Risk map).
Surface water and surface water bodies	Farm dams are located close to the site, with the nearest one located approximately 10 m to the south of the western area. Blaxland Creek is located approximately 340 m to the northwest of the site.

Item	Details
	Rainfall at the site is expected to infiltrate permeable surfaces. Runoff at the eastern area may flow to the north or west including towards the adjacent dam. Runoff at the western area is expected to flow to the west and northwest, generally towards Blaxland Creek.
Groundwater flow direction and discharge	Based on topography, shallow groundwater (if any) is expected to flow to the northwest and potentially discharge into Blaxland Creek.
Registered groundwater bores	Registered groundwater bore GW110455 (WaterNSW) is located approximately 150 m to the southwest of the western part of the site. The bore was installed in 2009 to depth of 44.4 m at the Patons Lane Landfill for monitoring purposes. Clay to a depth of 4.8 m was underlain by shale.
Site land use	The site is used for pastural paddocks (EIS).
Surrounding land use	Surrounding land is used for pastural paddocks. Dams, a horse track and a shed are in the land surrounding land (EIS).
Site Features	The site forms part of pastural paddocks (EIS).
Information from historical aerial photographs	The land at and surrounding the site appears to have been pastoral land since 1955. There appeared to be potential farm tip waste burial areas (including at AEC 35) (EIS).
NSW EPA records	There were no NSW EPA regulated sites (under the *Contaminated Land Management Act 1997*) located within a 1 km radius of the site (EIS). There were no sites notified to the NSW EPA (under the *Contaminated Land Management Act 1997*) within a 1 km radius of the site (EIS). The Patons Lane Landfill, located at 129 Patons Lane, Orchard Hills, approximately 140 m to the southwest of the site, is licensed (EPL 20814 and EPL 21259) under the *Protection of the Operations Act 1997.* The Patons Lane Landfill was formerly licensed to Orchard Holdings (NSW) Pty Ltd under EPL 11706 for land based extractive activity until 2012. In 2007 Orchard Holdings (NSW) Pty Ltd was issued with a clean-up notice due to unlawfully receiving soil and demolition waste at the quarry (EIS). There were no NSW EPA PFAS investigation sites within a 2 km radius of the site (EIS).

5. Previous Investigation Data

The following reports provide contamination data for the site:

- Golder and Douglas Partners, *Sydney Metro Greater West, Factual Contamination Report - Preliminary Site Investigation,* 19 February 2021 (19122621-003-Rev3) (Golder-DP, 2021a); and
- Golder and Douglas Partners, *Sydney Metro Western Sydney Airport, Groundwater Monitoring Report - Phase 1-4 Locations*, 3 August 2021 (19122621-019-R-GWMR13 Rev0) (Golder- DP, 2021b).

Table 3 summarises the sample locations for the site, the associated soil / rock profile, as well as groundwater monitoring well information and groundwater depths. Sample locations are indicated on Drawing AEC35-01, Appendix A. Table 4 lists the laboratory tests undertaken for contaminants and (relevant) soil parameters for soil samples. Table 5 lists the laboratory tests undertaken for groundwater samples.

Table 3: Sample Location, Profile and Groundwater Wells

Sample Location	Test Pit / Borehole	Date	Soil / Rock Profile	Groundwater Well Details	Groundwater Depth (m)
SMGW-TP-B316 (at the western part of the site)	Test pit	9/12/2020	Silty clay fill to a depth of 0.3 m was underlain by silty clay and clay to a depth of 2.2 m, then siltstone to a depth of 3 m.	Not applicable	Not encountered
SMGW-BH-B106 (at the western part of the site)	Borehole (hand auger to 0.5 m, solid flight auger with tc-bit to 4.5 m, HQ3 core barrel to 25 m)	15 to 21/2/2020	Waste fill (including metal, a jerry can, glass, white fibres, hose, fishing wire, green substance) (with silty clay from 1.5 m) to a depth of 2.4 m underlain by silty clay fill with glass and rubbish waste to a depth of 3.95 m, then clay to a depth of 6.91 m. Clay was underlain by siltstone and interbedded and interlaminated sandstone and siltstone to a depth of 25 m.	Installed to 5 m deep. Slotted screen at 1 m to 4 m depth (in fill). Gravel pack at 0.8 to 5 m depth. Bentonite plug at 0.3 to 0.8 m depth. Gatic cover at surface. Cement bentonite grout at 9.6 to 25 m and bentonite at 5 to 9.6 m. Developed on 10/3/2020.	1.07 (on 19/2/202); 2.9 (on 20/2/2020); 3.9 (on 21/2/2020);

Table 4: Soil Sample Testing

Sample Location	Sample Depth (m)	Fill / Natural Soil	Laboratory Testing Suite
SMGW-TP-B316	0 - 0.1	Fill	Asbestos; pH; metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc); total phenols; polychlorinated biphenyls (PCB); organochlorine pesticides (OCP); organophosphorus pesticides (OPP); monocyclic aromatic hydrocarbons (MAH); oxygenated compounds; carbon disulfide; fumigants; halogenated aliphatic compounds; halogenated aromatic compounds; trihalomethane; polynuclear aromatic hydrocarbons (PAH); total recoverable hydrocarbons (TRH); benzene, toluene, ethylbenzene, xylenes, naphthalene (BTEXN); and per- and poly-fluoroalkyl substances (PFAS).

Sample Location	Sample Depth (m)	Fill / Natural Soil	Laboratory Testing Suite
	0.4 - 0.5	Natural	Asbestos; pH; (8) metals; total cyanide; ammonia; OCP; OPP; MAH; oxygenated compounds; carbon disulfide; fumigants; halogenated aliphatic compounds; halogenated aromatic compounds; trihalomethane; PAH; TRH; BTEXN; and PFAS.
	1 - 1.1	Natural	pH; (8) metals; OCP; OPP; PAH; TRH; and BTEXN.
	2.6 - 2.7	Natural Rock	pH; (8) metals; OCP; OPP; PAH; TRH; BTEXN; and PFAS.
SMGW-BH-B106	0.2	Fill	(8) metals, OCP, OPP, PAH, TRH, and BTEXN.
	4.0 - 4.45	Fill	(8) metals, OCP, OPP, PAH, TRH, and BTEXN.

Table 5: Groundwater Sample Testing

Sample Location	Sample Date	Laboratory Testing Suite
SMGW-BH-B106	27/4/2020	pH; electrical conductivity (EC); total dissolved solids (TDS); total suspended solids (TSS); alkalinity; sulfate; chloride; dissolved major cations; hardness; dissolved and total metals (aluminium, arsenic, beryllium, barium, cadmium, chromium, copper, cobalt, nickel, lead, zinc, mercury, manganese, molybdenum, selenium, strontium, vanadium, boron, iron); fluoride; ammonia; nitrite; total kjeldahl nitrogen; total nitrogen; total phosphorus; reactive phosphorus; ionic balance; methane; monocyclic aromatic hydrocarbons (MAH); oxygenated compounds; carbon disulfide; fumigants; halogenated aliphatic compounds; halogenated aromatic compounds; trihalomethanes; PAH; TRH; BTEXN; and PFAS.
	27/5/2020	pH; EC; TDS; TSS; alkalinity; sulfate; chloride; dissolved major cations; hardness; dissolved and total (19) metals; fluoride; ammonia; nitrite; total kjeldahl nitrogen; total nitrogen; total phosphorus; reactive phosphorus; ionic balance; and sulfate reducing bacteria.
	30/06/2020	pH; EC; TDS; TSS; alkalinity; sulfate; chloride; dissolved major cations; hardness; dissolved and total (19) metals; fluoride; ammonia nitrite; total kjeldahl nitrogen; total nitrogen; total phosphorus; reactive phosphorus; ionic balance; and sulfate reducing bacteria.
	31/7/2020	pH; EC; TDS; TSS; hardness; alkalinity; sulfate; chloride; dissolved major cations; dissolved and total (19) metals; fluoride; ammonia; nitrite; nitrate; total kjeldahl nitrogen; total phosphorus; reactive phosphorus; and ionic balance.
	26/8/2020	pH; EC; TDS; TSS; alkalinity; sulfate; chloride; dissolved major cations; hardness; dissolved and total (19) metals; fluoride; ionic balance; and sulfate reducing bacteria.

Sample Location	Sample Date	Laboratory Testing Suite
	15/2/2021	pH; EC; TDS; TSS; hardness; alkalinity; sulfate; chloride; dissolved major cations; dissolved and total (19) metals; fluoride; ammonia; nitrite; nitrate; total kjeldahl nitrogen; total phosphorus; reactive phosphorus; ionic balance; and sulfate reducing bacteria.

Test pit and borehole logs and results tables extracted from Golder-DP (2021a) and Golder-DP (2021b) are provided in Appendix C. The analytical results are summarised in Tables C1 to C5, Appendix C. It is noted that Golder-DP (2021a) and Golder-DP (2021b) were factual reports and did not provide an assessment of results with respect to the proposed development. Therefore, the analytical results are discussed in Section 11.

6. Potential Contamination Sources and Preliminary Conceptual Site Model

The potential source of contamination for AEC 35 as identified in the EIS to be: *Potential farm waste burial area.*

For AEC 35, contaminants of potential concern (CoPC) were identified in the EIS to comprise: heavy metals, nutrients, TRH, semi-volatile organic compounds (SVOC), volatile organic compounds (VOC), asbestos, biological hazards and aesthetic impacts. DP notes that specific metals, SVOC and VOC were not listed in the EIS.

Table 6 summarises the potential source of contamination and what are considered to be the contaminants of potential concern for the DSI. Note that biological hazards (presumably animal waste and animal parts) and aesthetic impacts are to be initially assessed by visual means.

Table 6: Potential Source of Contamination and Contaminants of Potential Concern

Potential Source of Contamination	Contaminants of Potential Concern
Buried farm waste	• Metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc) • Total recoverable hydrocarbons (TRH) • Benzene, toluene, ethylbenzene and xylenes (BTEX) • Polycyclic aromatic hydrocarbons (PAH) • Organochlorine pesticides (OCP) • Organophosphorus pesticides (OPP) • Polychlorinated biphenyls (PCB) • Phenols • Asbestos • Volatile organic compounds (VOC) (for groundwater)

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 may become contaminated and how potential receptors may be exposed to contamination either in the present or the future i.e., it enables an assessment of the potential source - pathway - receptor linkages (complete pathways). The preliminary conceptual site model for the proposed development of the site is presented in Table 7.

Table 7: Preliminary CSM

Potential Contamination Source	Potential Exposure Pathway	Potential Receptors
Buried farm waste.	– Ingestion and direct contact – Inhalation of dust – Inhalation of vapours	– Construction workers (for the proposed development) – Future site workers including maintenance workers (post-development) – Pedestrians and commuters
	– Inhalation of dust – Inhalation of vapours	– Adjacent site users
	– Surface run-off – Leaching of contaminants into groundwater and lateral migration of groundwater	– Surface water bodies
	– Leaching of contaminants into groundwater	– Groundwater
	– Ingestion, inhalation and direct contact	– Terrestrial ecosystems
	– Direct contact	– In ground structures

Although *Table B2: Activities associated with PFAS contamination more broadly* of Appendix B of HEPA, *PFAS National Environmental Management Plan* (NEMP) (HEPA, 2020) lists '*Agriculture: Potentially used as an adjuvant or active ingredient in fertilisers and pesticides*….', it is considered that investigation for PFAS is not warranted given that crops did not appear to be established at the site, and, thus, there is a low probability that substantial fertiliser application has occurred. In addition, PFAS concentrations in soil samples from SMGW-TP-B316 and the groundwater sample from SMGW-BH-B106 (27 April 2020) were below laboratory limits (see Section 11).

7. Fieldwork

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 *In situ* Soil Sampling

Based on the CSM and data quality objectives (DQO), a broad grid sampling strategy was adopted to provide data for *in situ* soil across the site. Ten soil sample points were adopted for each area of AEC 35 including AEC35TP01 to AEC35TP09 and AEC35HA20 at the western area and AEC35TP10 to AEC35TP19 at the eastern area. Sample densities were based on the minimum recommended sample densities listed in Table A of NSW EPA, *Sampling Design Guidelines*, 1995 (NSW EPA, 1995). A total of twelve sample points at the western area (including previous sample locations SMGW-BH-B106 and SMGW-TP-B316) meets the recommended sample density of 11 to 12 sample points for a 0.41 ha area. Ten sample points at the eastern area meets the recommended sample density of 10 sample points for a 0.33 ha area. Sampling from test pits (at AEC35TP01 to AEC35TP19) was carried out on 28 to 29 July 2022. Sampling using a hand auger (at AEC35HA20) was carried out on 21 September 2022. It is noted that the majority of soil sampling was conducted prior to the release of NSW EPA, *Contaminated Land Guidelines Sampling design part 1 - application*, 2022 in August 2022 (NSW EPA, 2022), however, recommended sample densities in NSW EPA (2022) are the same for the size of each area mentioned above.

It is noted that the number of sampling points was (one) greater than that proposed in the SAQP (19 sampling points) given the slightly larger area for the investigation. It is also noted that a hand auger was used instead of an excavator at one soil sample point given that an excavator was not available at that location at the time of sampling and that the probability of deep / significant fill was considered to be unlikely at that location at the time of sampling.

Soil sampling was carried out in accordance with DP standard operating procedures. The general soil sampling and sample management procedure adopted is as follows:

- Collect soil samples from excavator bucket returns or the hand auger including at the surface / near surface and regular depth intervals (approximately every 0.5 m) and / or at changes of strata;
- Transfer samples in laboratory-prepared glass jars with Teflon lined lids by hand, capping immediately and minimising headspace within the sample jar;

- Collect replicate samples in zip-lock bags for screening using a photo-ionisation detector (PID);
- For fill/topsoil samples, collect ~500 ml samples in zip-lock bags (for asbestos analysis);
- Wear a new disposable nitrile glove for each sample point thereby minimising potential for cross-contamination;
- Label sample containers with individual and unique identification details, including project number, sample location and sample depth (where applicable);
- Place samples into a cooled, insulated and sealed container for transport to the laboratory; and
- Use chain of custody documentation.

As trace glass (anthropogenic material) was noted in the surficial fill at AEC35TP11 and AEC35TP14, bulk soil samples from these two locations, from a depth of 0-0.1 m, were subject to screening / sieving for asbestos containing materials (ACM). A bulk fill sample from nearby test pit, AEC35TP12, depth 0-0.1 m, was also subject to screening / sieving for ACM. The screening / sieving procedure is as follows:

- Weigh each bulk (10 L) sample;
- Screen each bulk sample through a ≤7 mm aperture sieve;
- Weigh all retrieved potential ACM fragments; and
- Calculate the asbestos concentration (% w/w) in soil as per the procedure described in NEPC (2013).

7.3 Stockpile Sampling

Stockpile sampling (of stockpile SP35SP) was undertaken on 29 July 2022. Soil sampling was carried out with the use of an excavator in accordance with DP standard operating procedures. The general soil sampling and sample management procedure adopted is as follows:

- Collect soil samples from the excavator bucket returns from different locations / depths of the stockpile at a rate of one sample per 25 m^3 of stockpile (generally as per NEPC, 2013);
- Transfer samples in laboratory-prepared glass jars with Teflon lined lids by hand, capping immediately and minimising headspace within the sample jar;
- Collect ~500 ml samples in zip-lock bags (for asbestos analysis);
- Wear a new disposable nitrile glove for each sample point thereby minimising potential for cross-contamination;
- Label sample containers with individual and unique identification details, including project number, sample location and sample depth (where applicable);
- Place samples into a cooled, insulated and sealed container for transport to the laboratory; and
- Use chain of custody documentation.

Four stockpile samples were collected (AEC35SP-1 to AEC35SP-4).

It is noted that stockpile sampling was not proposed in the SAQP as the stockpile was identified at the time of field work.

7.4 Groundwater Monitoring Well Installation and Development

Boreholes for groundwater monitoring wells (AEC35BH01 to AEC35BH03) were drilled to depths of between 3.8 m and 7.5 m using a track-mounted drilling rig, with a solid flight auger with tc-bit attachment, on 19 to 22 August 2022. AEC35BH01 was positioned at a (hydrogeological) down-gradient location at the western area. AEC35BH03 was positioned at an up-gradient location and AEC35BH02 was positioned at a down-gradient location at the eastern area. The wells were positioned as per proposed locations in the SAQP.

Monitoring wells were constructed using class 18 uPVC machine slotted screen and blank sections with screw threaded joints. The screened section of each well was backfilled with a washed sand filter pack to approximately 0.5 m above the screened interval. Each well was completed with a hydrated bentonite plug of at least 0.5 m thick and then grout to the surface (except for AEC35BH01 which had a bentonite plug up to the ground surface).

The three groundwater monitoring wells were developed on 25 August 2022 using a Twister (plastic) pump.

7.5 Groundwater Well Sampling

Groundwater sampling of the existing groundwater monitoring well (SMGW-BH-B106) and the three installed groundwater wells (AEC35BH01 to AEC35BH03) was carried out on 8 September 2022 in accordance with DP standard operating procedures. The sampling method adopted is as follows:

- Measure the static water level using an electronic interface probe;
- Lower the well-dedicated tubing into the well at a depth that is at the screened section of the well;
- Set up the peristatic pump to draw water at a low rate that produces laminar flow;
- Measure physical parameters by continuously passing the purged water through a flow cell;
- Following stabilisation of the field parameters using a water quality meter, collect samples in laboratory-prepared bottles minimising headspace within the sample bottle and cap immediately. Samples for metals analysis are filtered in the field using a 0.45 µm filter (prior to bottling of the sample);
- Place samples into a cooled, insulated and sealed container for transport to the laboratory; and
- Use chain of custody documentation.

8. Laboratory Analysis

8.1 Soil Samples from *In situ* Test Locations

Fill samples from the majority of test locations were analysed at a NATA accredited laboratory for COPC comprising: metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc), TRH, BTEX, PAH, OCP, OPP, PCB, total phenols and asbestos (in 500 mL soil) as fill was considered to have a greater risk of contamination compared to the observed underlying natural soil.

Natural soil samples from seven sample locations were analysed to obtain data for the natural soil profile. The natural soil samples were analysed for metals, TRH, BTEX, PAH, OCP, OPP, PCB and total phenols. A natural soil sample from AEC35TP03 was also analysed for asbestos.

Three soil samples were analysed for pH and cation exchange capacity (CEC) for the calculation of EIL.

Laboratory certificates and chain of custody are provided in Appendix E.

8.2 Soil Samples from Stockpile

Three stockpile samples (AEC35SP-1 to AEC35SP-3) were analysed for COPC comprising: metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc), TRH, BTEX, PAH, OCP, OPP, PCB, total phenols and asbestos (in 500 mL soil). One stockpile sample (AEC35SP-4) was analysed for metals, TRH, BTEX, PAH and asbestos.

8.3 Groundwater Samples

A groundwater sample from each sample location (AEC35BH01 to AEC35BH03 and SMGW-BH-B106) were analysed for COPC including metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc), PAH, TRH, BTEX, VOC, OCP, OPP, PCB and phenols. Hardness was also analysed for the calculation of hardness adjusted default guideline values (DGV).

9. Site Assessment Criteria

Tier 1 Site Assessment Criteria (SAC) for the assessment of soils and groundwater, informed by the CSM, at the site are listed in Appendix F.

The majority of the site will form part of the rail corridor land usage as it is part of the proposed stabling yard and rail line, and a small part of the site may be part of passive open space. Therefore, both SAC for rail corridor usage (land use scenario D) and passive open space (land use scenario C) have been adopted. It is also noted that soil sourced from the site may be used elsewhere within the greater SCAW area which also has similar land uses (rail corridor usage and passive open space) to which the SAC would apply.

10. Field Work Results

10.1 Test Pits and Hand Auger Borehole

The test pit logs and the hand auger borehole log for this assessment are included in Appendix G and should be referenced for detailed soil descriptions. In summary:

- Fill was encountered to depths ranging from 0.1 m to 0.5 m. Fill materials comprised silty clay or gravelly silty clay, sandy clay and clayey sand. A trace of glass was noted in the fill at AEC35TP11, depth 0-0.1 m, and AEC35TP14, depth 0-0.2 m. Anthropogenic materials were otherwise not observed in fill; and
- Fill was underlain by clay and / or silty clay to test pit termination depths of between 0.9 m and 2.5 m.

No ACM was recovered from screening/sieving of fill samples from AEC35TP11, AECTP12 and AEC35TP14. The record of asbestos samples is provided in Appendix H.

PID results were less than 5 ppm, indicating a low potential for the presence of volatile contaminants. The PID calibration certificates are provided in Appendix H.

No signs of gross contamination (e.g., odours, staining or potential asbestos-containing materials) were observed during sampling. No signs of animal waste were observed during sampling.

Free groundwater was observed at AEC35TP11 (depth 0.5 m) and AEC35TP4 (depth 0.45 m). Free groundwater was not observed at other test pits or the hand auger borehole.

10.2 Stockpile and Waste Materials

The stockpile (AEC35SP) was observed to comprise approximately 100 m^3 of medium to high plasticity, pale brown, pale grey and red-orange clay with rootlets and wood. The stockpile was covered in grass (see Photographs 1 and 2, Appendix K). No signs of contamination or animal waste were observed in the sampled soil. The location of the stockpile is shown on Drawing AEC35-1, Appendix A.

Piles of waste materials were observed on the ground surface at two locations as shown on Drawing AEC35-1, Appendix A. Waste materials included gas cylinders, metals, wood, plastics and glass bottles (see Photographs 3 and 4, Appendix K). (The waste materials were not sampled).

10.3 Groundwater Well Boreholes

The borehole logs with monitoring well construction details are provided in Appendix H and should be referenced for detailed soil descriptions. In summary:

- Fill was encountered to depths ranging from 0.15 m to 0.6 m. Fill materials comprised silty sand. No anthropogenic materials were observed in the fill;
- Fill was underlain by silty clay to depths of up to 5.09 m; and
- Silty clay was underlain by siltstone from a depth of 4.5 m to a depth of 7.5 m at AEC35BH01.

No signs of contamination were noted whilst drilling.

Water seepage was observed at each borehole whilst drilling including at a depth of 6.5 m at AEC35BH01, 3.7 m at AEC35BH02, and 2.5 m at AEC35BH03.

10.4 Groundwater Sampling

Measured groundwater levels are summarised in Table 8.

Table 8: Groundwater Levels

Borehole	Prior to Well Development on 25 August 2022		Prior to Well Sampling on 8 September 2022	
	Groundwater Depth (m bgl)	Groundwater Level (m AHD)	Groundwater Depth (m bgl)	Groundwater Level (m AHD)
AEC35BH01	2.17	36.23	2.09	36.31
AEC35BH02	0.60	40.80	0.55	40.85
AEC35BH03	0.56	41.74	0.50	41.80
SMGW-BH-B106	N/A	N/A	1.40	38.03

Groundwater levels indicate that groundwater flows to the northwest. It should be noted that groundwater levels are affected by climatic conditions and soil permeability and will therefore vary with time.

The water from development of AEC35BH01 was observed to be dark brown, cloudy, and have no odour. The water from development of AEC35BH02 was observed to be brown, cloudy and have no odour. The water from development of AEC35BH03 was observed to be orange-brown, cloudy and have no odour.

No phase separated hydrocarbons were identified in any of the wells from use of the interface dipmeter prior to sampling. The water sampled from AEC35BH01 was observed to be grey, clear and have no odour. The water sampled from AEC35BH02 was observed to slightly cloudy, grey and have no odour. The water sampled from AEC35BH03 was observed to moderately cloudy, red-brown and have no odour. The water sampled from SMGW-BH-B106 was observed to be slightly cloudy, grey and have no odour.

The groundwater field sheets and water quality meter calibration record are provided in Appendix H.

11. Discussion of Laboratory Analytical Results

11.1 Soil and Stockpile Samples

Analytical results for soil samples including stockpile samples for the current investigation are summarised in Table I1, Appendix I, against the most conservative (Tier 1) SAC (see Appendix F). Analytical results for previous sample locations compared to the SAC are shown in Tables C1 and C3, Appendix C.

For the current investigation, concentrations of chemicals for all analysed soil samples were below the SAC for all CoPC analysed. Asbestos was not detected in any analysed sample. It is noted that concentrations of TRH, BTEX, PAH, OCP, OPP, PCB and total phenols were less than the practical quantitation limits (PQL).

For previous sample locations (SMGW-BH-B106 and SMGW-TP-B316), concentrations of contaminants are below the SAC except for:

- TRH >C_{16}-C_{34} in the sample from SMGW-BH-B106, depth 0.2 m. The concentration (10,800 mg/kg) exceeds:
  - The health screening level (HSL) for direct contact for public open space (5300 mg/kg);
  - The ecological screening level (ESL) for public open space (1300 mg/kg);
  - The ESL for a commercial / industrial land use (2500 mg/kg);
  - The management limit for public open space (5000 mg/kg); and
  - The management limit for commercial/industrial sites (5000 mg/kg).
- Benzo(a)pyrene in the sample from SMGW-BH-B106, depth 0.2 m. The concentration (1.8 mg/kg) exceeds the ESL for public open space (0.7 mg/kg) and commercial / industrial site (1.4 mg/kg). This benzo(a)pyrene concentration is significantly less than high reliability ecological guidelines (33 mg/kg for public open space and 172 mg/kg for a commercial / industrial land use) from CRC CARE, *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,* 2017 (CRC CARE, 2017). It is considered, therefore, that this benzo(a)pyrene concentration (alone) does not trigger the need for remediation.

It is noted that concentrations of BTEX, OCP, OPP, total phenols, PCB, VOC and PFAS were less than the practical quantitation limits in soil samples from the previous investigation (test pit SMGW-TP-B316).

11.2 Groundwater Samples

Analytical results for groundwater samples for the current investigation are summarised in Table I2, Appendix I, against the SAC. Previous investigation results compared to the SAC are shown in Table C5, Appendix C. Although groundwater levels were typically less than 2 m from the ground surface, health screening levels (HSL) for vapour intrusion at depth 2 m to <4 m are shown as a general reference. Default guideline values (DGV) for metals have been adjusted for hardness where possible.

For the current investigation, concentrations of metals were below the SAC except for:

- Concentrations of copper in samples from SMGW-BH-B106 (7 µg/L), AEC35BH01 (2 µg/L and 3 µg/L) and AEC35BH02 (28 µg/L) which exceeded the default guideline value (DGV) (1.4 µg/L). These concentrations are considered likely to be representative of background copper concentrations in groundwater, particularly given that copper concentrations in tested fill / soil samples are low;
- The concentration of nickel in the sample from AEC35BH02 (220 µg/L) which exceeded the health guideline for recreational water (200 µg/L). This concentration is considered likely to be representative of background nickel concentrations in groundwater particularly given that nickel concentrations in tested fill / soil samples are low; and
- The concentration of zinc in the sample from AEC35BH02 (710 µg/L) which exceeded the DGV (256 µg/L). This concentration is considered likely to be representative of background zinc concentrations in groundwater particularly given that zinc concentrations in tested fill/soil samples are low.

For the current investigation, concentrations of PAH and VOC (including BTEX) were below the SAC. Low concentrations of chloroform in the sample from AEC35BH02 and naphthalene (0.01 µg/L) in the sample BD2/20220908 (from AEC35BH03) were recorded. Concentrations of OPP, OCP, PCB and phenols were less than the PQL and the SAC. Concentrations of TRH above the PQL included:

- TRH >C_{10}-C_{16} (130 µg/L), TRH >C_{16}-C_{34} (6900 µg/L) and TRH >C_{34}-C_{40} (210 µg/L) in the sample from SMGW-BH-B106. A fill sample from this location (depth 0.2 m) was recorded to contain TRH >C_{16}-C_{34} and TRH >C_{34}-C_{40}. A natural soil sample (depth 4-4.45 m) from this location was recorded to contain detectable TRH >C_{10}-C_{16}. It is considered that the likely source of TRH in groundwater at SMGW-BH-B106 is from the fill containing waste materials at this location, particularly as the monitoring well screen (1 m to 4 m depth) was installed within the fill profile (which meant that water entering the well was directly from the fill profile rather than the surrounding natural soil profile); and
- TRH >C_{10}-C_{16} (70 µg/L) and TRH >C_{16}-C_{34} (200 µg/L) in the replicate sample (BD2/20220908) from AEC35BH03. It is noted that concentrations of TRH in the primary sample from AEC35BH03 were less than the PQL. It is also noted that TRH >C_{10}-C_{16} and TRH >C_{16}-C_{34} was not identified in soil at nearby soil sampling locations. The detected TRH concentrations, albeit low concentrations, in groundwater at AEC35BH03 may be as a result of an off-site source. The recorded concentrations of TRH >C_{10}-C_{16} and TRH >C_{16}-C_{34} at AEC35BH03 are considered to be present a low risk to human receptors.

For the current investigation, concentrations of ammonia were below the SAC except for:

- The concentration of ammonia (as N) in the sample from SMGW-BH-B106 (650 µg/L) which exceeded the recreational aesthetic guideline (382 µg/L); and
- The concentrations of ammonia (as N) in the samples from AEC35BH01 (1500 µg/L) which exceeded the recreational aesthetic guideline and the freshwater DGV for pH 8 (900 µg/L). It is noted, however, that the measured groundwater pH at AEC35BH01 was 6.5. According to the Ammonia technical brief (on the ANZG, *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* website), the freshwater trigger value for pH 6.5 is 2460 µg/L (compared to 900 µg/L for pH 8). Concentrations of ammonia were below the freshwater trigger value.

It is noted that it is possible (but not known) that the fill containing waste materials at SMGW-BH-B106 is contributing to the above-listed ammonia concentrations at SMGW-BH-B106 and AEC35BH01.

For previous rounds of groundwater sampling at SMGW-BH-B106:

- Concentrations of sodium, chloride, sulfate exceeded the aesthetic drinking water guidelines. These concentrations are considered likely to be representative of background conditions as these chemicals are naturally occurring;
- Concentrations of ammonia (0.67 mg/L to 1.31 mg/L) exceeded the recreational aesthetic guideline and, in two cases, the freshwater DGV for pH 8. Concentrations of ammonia were, however, below the freshwater trigger value for pH 6.5;
- Concentrations of PFAS were below the PQL (and the SAC);
- Concentrations of PAH, TRH, VOC and BTEX were below the PQL (and the SAC); and
- Concentrations of (filtered) aluminium, cobalt, manganese, chromium, copper and zinc exceeded the DGV. Concentrations of aluminium and iron also exceeded the aesthetic drinking water guideline. It is considered that the recorded concentrations for these metals are likely to be representative of background conditions.

11.3 Preliminary Waste Classification Comments

Table I3, Appendix I, presents the results for soil for the current investigation against criteria from NSW EPA, *Waste Classification Guidelines*, 2014 (NSW EPA, 2014) and NSW EPA, *The excavated natural material order 2014*. Tables C2 and C4, Appendix C, present the analytical results for the previous investigation against the same criteria as well as NSW EPA, *Addendum to the Waste Classification Guidelines (2014) - Part 1: classifying waste*, 2016.

With respect to fill, concentrations of chemical contaminants were below the CT1 criteria for general solid waste except for:

- TRH C_{10}-C_{36} in the sample from SMGW-BH-B106, depth 0.2 m (10,800 mg/kg). This concentration is below the CT2 criterion for restricted solid waste; and
- Benzo(a)pyrene in the sample from SMGW-BH-B106, depth 0.2 m (1.8 mg/kg). This concentration is below the SCC2 criterion for general solid waste, however, TCLP (toxicity characteristic leaching procedure) was apparently not undertaken.

PFAS concentrations were less than PQL in fill samples.

For analysed fill samples, results for metals, TRH, BTEX, PAH and pH were below the associated criteria for excavated natural material (ENM) except for benzo(a)pyrene and TRH C_{10} - C_{36} in the sample from SMGW-BH-B106, depth 0.2 m. (The concentration of zinc in this sample also exceeded the maximum average concentration for ENM).

With respect to natural soil samples, concentrations of chemical contaminants were within what are considered to be background levels and are considered to be consistent with the definition of virgin excavated natural material (VENM), as defined in *Protection of the Environment Operations Act 1997* except for:

- TRH C_{10}-C_{40} in the sample from SMGW-BH-B106, depth 4-4.45 m (250 mg/kg). The source of the TRH is considered likely to be from the overlying fill. The concentration of TRH C_{10}-C_{36} in this sample is below the CT1 criterion for general solid waste.

For the stockpile (AEC35SP), concentrations of chemical contaminants were below the CT1 criteria for general solid waste and concentrations of metals, TRH, BTEX, PAH were below the associated criteria for ENM.

11.4 Data Quality Assurance and Quality Control

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

12. Conclusion

Soil contamination was not revealed from soil sampling for the current investigation. For a previous investigation, fill containing waste materials (including metal, a jerry can, glass, white fibres, hose, fishing wire, green substance and rubbish waste) to a depth of 3.95 m was encountered at borehole SMGW-BH-B106. A concentration of TRH >C_{16}-C_{34} above SAC was identified from analysis of a sample of this fill (in the previous investigation). In the current investigation, TRH was identified in the groundwater at SMGW-BH-B106 and is considered to be sourced from the fill containing waste materials (particularly as the well screen was within the fill profile). The position of SMGW-BH-B106 is on the proposed rail alignment where excavation is required (to an approximate depth of 2 m). It is understood that, as the fill at SMGW-BH-B106 is uncontrolled fill, it will need to be excavated (i.e., it cannot remain *in situ*) as it is not geotechnically suitable for the proposed development. Given this, it is recommended that:

- Once the material is excavated and stockpiled (and sorted, if required), an environmental consultant is to assess the material by inspection, sampling and analysis. A geotechnical engineer should assess and confirm that the uncontrolled fill has been removed (and provide written documentation confirming the removal);
- Following this assessment, material that is considered as not suitable for reuse for SCAW is to be given a waste classification for off-site disposal by the environmental consultant;
- Materials designated for off-site disposal will need to be disposed at a licensed landfill;
- Any liquid / water emanating from the fill (either at its original location or from the stockpile) is to be collected and assessed for disposal purposes; and
- Records of the excavation and waste tracking (of solid and liquid waste) are to be documented.

The plan for the above-listed recommendations, including validation, should be documented in a remediation action plan (RAP).

It is noted that tested in situ fill, soil and rock materials that are to be excavated at the site, other than those identified at SMGW-BH-B106, are considered suitable for use at the site. Despite this, an unexpected finds protocol is to be in place for suspected contamination finds encountered (between test locations) during the excavation works. This can be documented in the RAP.

Waste materials (such as gas cylinders, metals, wood and plastic) observed on the ground surface should be appropriately disposed to a licenced landfill.

It is considered that the site can be made suitable for the proposed development subject to the above recommendations.

13. Limitations

Douglas Partners (DP) has prepared this report (or services) for the SCAW package for SMWSA. The work was carried out under a Service Contract. This report is provided for the exclusive use of CPBUI JV 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.

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

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

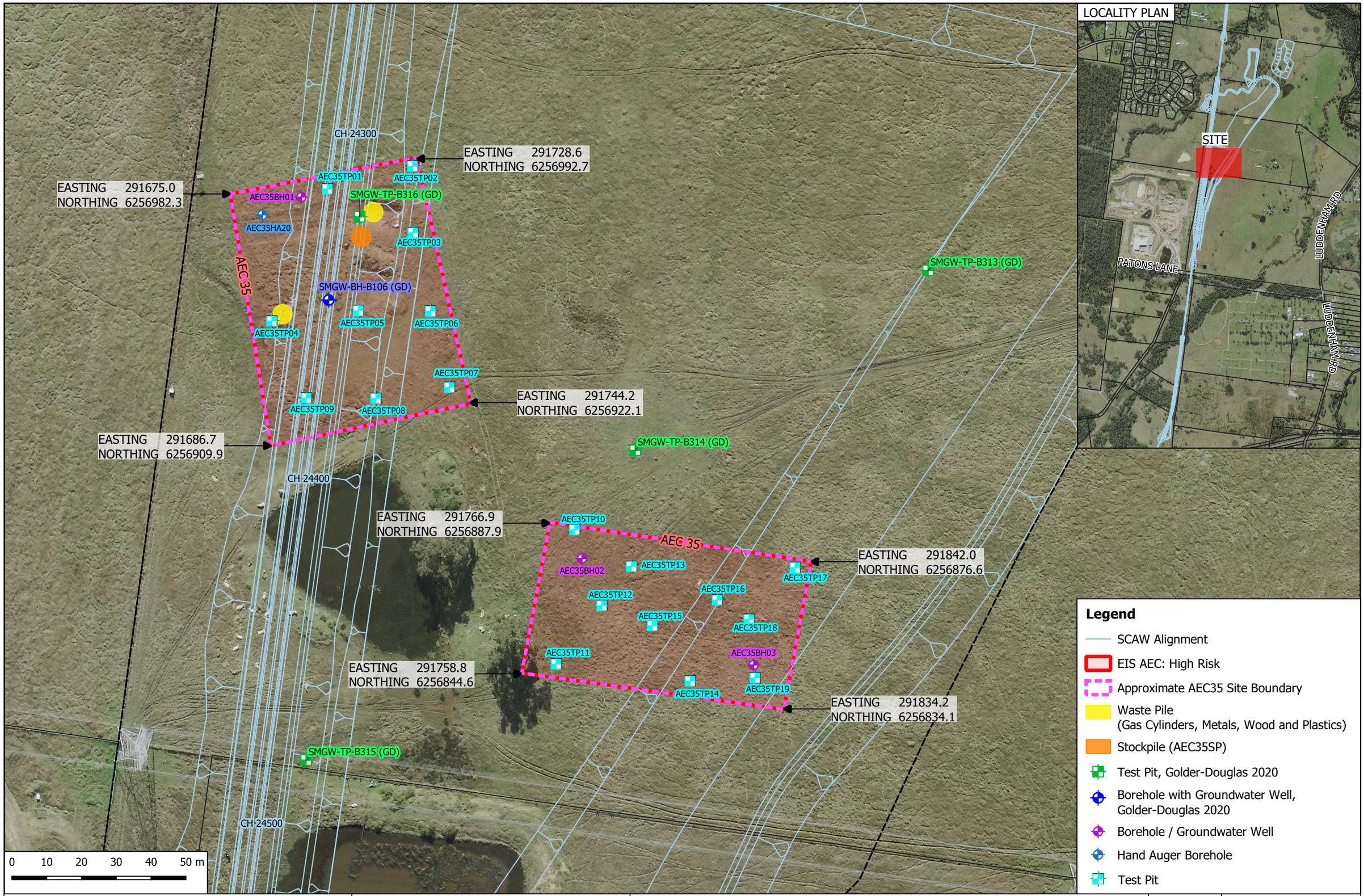
This report must be read in conjunction with all of the attached and should be kept in its entirety without separation of individual pages or sections. DP cannot be held responsible for interpretations or conclusions made by others unless they are supported by an expressed statement, interpretation,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

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

Douglas Partners Pty Ltd

Appendix A

Drawing



Douglas Partners
Geotechnics / Environment / Groundwater

CLIENT:	CPBUI JV		
OFFICE:	Sydney	DRAWN BY:	MG
SCALE:	1:1000 @ A3	DATE:	09/12/2022

TITLE: **AEC35 Test Location Plan**
Sydney Metro Western Sydney Airport - SCAW
Elizabeth Drive, Badgerys Creek

N

PROJECT No:	204814.01
DRAWING No:	AEC35-01
REVISION:	Rev 1

Appendix B

Notes About this Report

About this Report

Douglas Partners

Introduction

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

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

Copyright

Borehole and Test Pit Logs

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

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

Groundwater

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

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

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

Reports

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

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

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

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

About this Report

Site Anomalies

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

Information for Contractual Purposes

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

Site Inspection

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

Appendix C

Logs and Summary of Results from Previous Investigation

Sampling Methods

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Sampling

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

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

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

Test Pits

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

Large Diameter Augers

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

Continuous Spiral Flight Augers

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

Non-core Rotary Drilling

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

Continuous Core Drilling

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

Standard Penetration Tests

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

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

The test results are reported in the following form.

- In the case where full penetration is obtained with successive blow counts for each 150 mm of, say, 4, 6 and 7 as:

  4,6,7
  N=13

- In the case where the test is discontinued before the full penetration depth, say after 15 blows for the first 150 mm and 30 blows for the next 40 mm as:

  15, 30/40 mm

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

Dynamic Cone Penetrometer Tests / Perth Sand Penetrometer Tests

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

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

Description and Classification Methods

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

Soil Types

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

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

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

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

Definitions of grading terms used are:

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

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

In fine grained soils (>35% fines)

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

In coarse grained soils (>65% coarse)
- with clays or silts

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

In coarse grained soils (>65% coarse)
- with coarser fraction

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

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

Soil Descriptions

Cohesive Soils

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

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

Cohesionless Soils

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

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

Soil Origin

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

- Residual soil - derived from in-situ weathering of the underlying rock;
- Extremely weathered material – formed from in-situ weathering of geological formations. Has soil strength but retains the structure or fabric of the parent rock;
- Alluvial soil – deposited by streams and rivers;
- Estuarine soil – deposited in coastal estuaries;
- Marine soil – deposited in a marine environment;
- Lacustrine soil – deposited in freshwater lakes;
- Aeolian soil – carried and deposited by wind;
- Colluvial soil – soil and rock debris transported down slopes by gravity;
- Topsoil – mantle of surface soil, often with high levels of organic material.
- Fill – any material which has been moved by man.

Moisture Condition – Coarse Grained Soils

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

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

Moisture Condition – Fine Grained Soils

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

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

Rock Strength

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

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

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

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

Degree of Weathering

The degree of weathering of rock is classified as follows:

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

Rock Descriptions

Degree of Fracturing

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

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

Rock Quality Designation

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

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

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

Stratification Spacing

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

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

Symbols & Abbreviations

Douglas Partners

Introduction

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

Drilling or Excavation Methods

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

Water

▷	Water seep
▽	Water level

Sampling and Testing

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

Description of Defects in Rock

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

Defect Type

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

Orientation

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

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

Coating or Infilling Term

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

Coating Descriptor

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

Shape

cu	curved
ir	irregular
pl	planar
st	stepped
un	undulating

Roughness

po	polished
ro	rough
sl	slickensided
sm	smooth
vr	very rough

Other

fg	fragmented
bnd	band
qtz	quartz

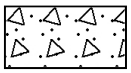
Symbols & Abbreviations

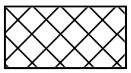
Graphic Symbols for Soil and Rock

General


Asphalt


Road base

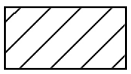

Concrete

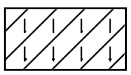

Filling

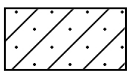
Soils


Topsoil

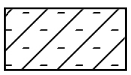

Peat

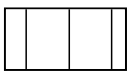

Clay

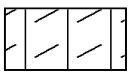

Silty clay

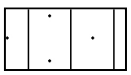

Sandy clay

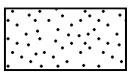

Gravelly clay

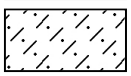

Shaly clay

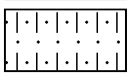

Silt


Clayey silt


Sandy silt

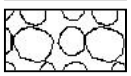

Sand

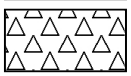

Clayey sand


Silty sand


Gravel

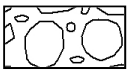

Sandy gravel


Cobbles, boulders

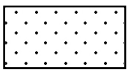

Talus

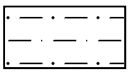
Sedimentary Rocks

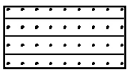

Boulder conglomerate

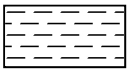

Conglomerate


Conglomeratic sandstone

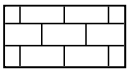

Sandstone


Siltstone

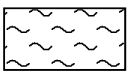

Laminite

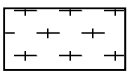

Mudstone, claystone, shale


Coal


Limestone

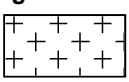
Metamorphic Rocks

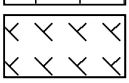

Slate, phyllite, schist

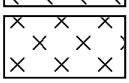

Gneiss

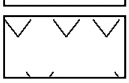

Quartzite

Igneous Rocks


Granite


Dolerite, basalt, andesite


Dacite, epidote


Tuff, breccia


Porphyry

Table C1- Summary of Soil Results for SMGW-BH-B016

Analyte	Units	EQL	HIL C	HIL D	HSL for Vapour Intrusion D, Clay, 0 to <1m	HSL C Direct Contact	HSL D Direct Contact	EIL Public Open Space	EIL Industrial / Commercial	ESL Public Open Space	ESL Commerical / Industrial	Management Limits Public Open Space	Management Limits Commercial/ Industrial			
Location_Code															B106	
Field_ID															BH-B106/0.2-0.2	BH-B106/4.0-4.45
Sample_Depth_Range															0.2-0.2	4-4.45
Sample Date															17/02/2020	17/02/2020
Miscellaneous Parameters																
Moisture Content (dried @ 40°C)	%	0.1													27.6	13.5
TPHs																
TPH C6 - C9 Fraction F1	mg/kg	10													<10	<10
TPH C10-C36	mg/kg	50													10800	260
TRHs																
TRH C6 - C10 Fraction F1	mg/kg	10										800	800		<10	<10
TRH C6 - C10 Fraction Less BTEX F1	mg/kg	10			310	5100	26000			180	215				<10	<10
TRH >C10 - C16 Fraction F2	mg/kg	50								120	170	1000	1000		<50	<50
TRH >C10 - C16 Fraction Less Naphthalene (F2)	mg/kg	50			NL	3,800	20,000								<50	250
TRH >C16 - C34 Fraction F3	mg/kg	100				5,300	27,000			1300	2500	3500	5000		10,800	250
TRH >C34 - C40 Fraction F4	mg/kg	100				7,400	38,000			5600	6600	10,000	10,000		640	<100
TRH+C10 - C40 (Sum of total) (Lab Reported)	mg/kg	50													11400	250
BTEXN																
Benzene	mg/kg	0.2			4	120	430			65	95				<0.2	<0.2
Toluene	mg/kg	0.5			NL	18,000	99,000			105	135				<0.5	<0.5
Ethylbenzene	mg/kg	0.5			NL	5300	27,000			105	135				<0.5	<0.5
Xylenes (m & p)	mg/kg	0.5													<0.5	<0.5
Xylene (o)	mg/kg	0.5													<0.5	<0.5
Xylenes (Sum of total) (Lab Reported)	mg/kg	0.5			NL	15,000	81,000			45	95				<0.5	<0.5
Total BTEX	mg/kg	0.2													<0.2	<0.2
Naphthalene	mg/kg	0.1			NL	1900	11,000	170	370						<0.1	<0.1
Heavy Metals																
Arsenic	mg/kg	4	300	3000				100	160						12	<5
Cadmium	mg/kg	0.4	90	900											<1	<1
Chromium (III+VI)	mg/kg	1	300	3600				410	230						24	6
Copper	mg/kg	1	17,000	240,000				160	230						12	52
Lead	mg/kg	1	600	1500				1100	1800						16	15
Mercury	mg/kg	0.1	80	730											<0.1	<0.1
Nickel	mg/kg	1	1200	6000				110	180						<2	9
Zinc	mg/kg	1	30,000	400,000				350	510						157	57
Organochlorine Pesticides																
a-BHC	mg/kg	0.05													<0.25	<0.05
Aldrin	mg/kg	0.05													<0.25	<0.05
Dieldrin	mg/kg	0.05													<0.25	<0.05
Aldrin & Dieldrin (Sum of total) (Lab Reported)	mg/kg	0.05	10	45											<0.08	<0.05
b-BHC	mg/kg	0.05													<0.25	<0.05
cis-Chlordane	mg/kg	0.05													<0.25	<0.05
gamma-Chlordane	mg/kg	0.05													<0.08	<0.05
trans-Chlordane	mg/kg	0.05													<0.25	<0.05
Chlordane (Sum of Total)	mg/kg	0.05	70	530											<0.25	<0.05
d-BHC	mg/kg	0.05													<0.25	<0.05
4,4-DDD	mg/kg	0.05													<0.25	<0.05
4,4-DDE	mg/kg	0.05													<0.25	<0.05
4,4-DDT	mg/kg	0.1						180	640						<1	<0.2
DDT+DDE+DDD (Sum of total) (Lab Reported)	mg/kg	0.05	400	3600											<0.08	<0.05
Endosulfan	mg/kg	0.05	340	2000											<0.15	<0.05
Endosulfan I	mg/kg	0.05													<0.25	<0.05
Endosulfan II	mg/kg	0.05													<0.25	<0.05
Endosulfan sulphate	mg/kg	0.05													<0.25	<0.05
Endrin	mg/kg	0.05	20	100											<0.25	<0.05
Endrin aldehyde	mg/kg	0.05													<0.25	<0.05
Endrin ketone	mg/kg	0.05													<0.25	<0.05
g-BHC (Lindane)	mg/kg	0.05													<0.25	<0.05
Heptachlor	mg/kg	0.05	10	50											<0.25	<0.05

Table C1- Summary of Soil Results for SMGW-BH-B016

Location_Code	B106	
Field_ID	BH-B106/0.2-0.2	BH-B106/4.0-4.45
Sample_Depth_Range	0.2-0.2	4-4.45
Sample Date	17/02/2020	17/02/2020

Analyte	Units	EQL	HIL C	HIL D	HSL for Vapour Intrusion D, Clay, 0 to <1m	HSL C Direct Contact	HSL D Direct Contact	EIL Public Open Space	EIL Industrial / Commercial	ESL Public Open Space	ESL Commerical / Industrial	Management Limits Public Open Space	Management Limits Commercial/ Industrial			
Heptachlor epoxide	mg/kg	0.05													<0.25	<0.05
Hexachlorobenzene	mg/kg	0.05	10	80											<0.25	<0.05
Methoxychlor	mg/kg	0.1	400	2500											<1	<0.2
Organophosphorus Pesticides																
Azinophos methyl	mg/kg	0.05													<0.25	<0.05
Bromophos-ethyl	mg/kg	0.05													<0.25	<0.05
Carbophenothion	mg/kg	0.05													<0.25	<0.05
Chlorfenvinphos	mg/kg	0.05													<0.25	<0.05
Chlorpyrifos	mg/kg	0.05	250	2000											<0.25	<0.05
Chlorpyrifos-methyl	mg/kg	0.05													<0.25	<0.05
Demeton-S-methyl	mg/kg	0.05													<0.25	<0.05
Diazinon	mg/kg	0.05													<0.25	<0.05
Dichlorvos	mg/kg	0.05													<0.25	<0.05
Dimethoate	mg/kg	0.05													<0.25	<0.05
Ethion	mg/kg	0.05													<0.25	<0.05
Fenamiphos	mg/kg	0.05													<0.25	<0.05
Fenthion	mg/kg	0.05													<0.25	<0.05
Malathion	mg/kg	0.05													<0.25	<0.05
Methyl parathion	mg/kg	0.2													<1	<0.2
Monocrotophos	mg/kg	0.2													<1	<0.2
Parathion	mg/kg	0.1													<1	<0.2
Pirimphos-ethyl	mg/kg	0.05													<0.25	<0.05
Prothiofos	mg/kg	0.05													<0.25	<0.05
PAHs																
Acenaphthene	mg/kg	0.1													<0.5	<0.5
Acenaphthylene	mg/kg	0.1													<0.5	<0.5
Anthracene	mg/kg	0.1													<0.5	<0.5
Benz(a)anthracene	mg/kg	0.1													<0.5	<0.5
Benzo(a) pyrene	mg/kg	0.05								0.7	1.4				1.8	<0.5
Benzo(a)pyrene TEQ (lower bound)	mg/kg	0.5	3	40											1.9	<0.5
Benzo(a)pyrene TEQ (medium bound)	mg/kg	0.5	3	40											2.2	0.6
Benzo(a)pyrene TEQ (upper bound)	mg/kg	0.5	3	40											2.5	1.2
Benzo(a)pyrene TEQ (Calculated)	mg/kg		3	40											2.217	<1.21
Benzo[b+j]fluoranthene	mg/kg	0.5													<0.5	<0.5
Benzo(g,h,i)perylene	mg/kg	0.1													<0.5	<0.5
Benzo(k)fluoranthene	mg/kg	0.5													0.5	<0.5
Chrysene	mg/kg	0.1													3.9	<0.5
Dibenz(a,h)anthracene	mg/kg	0.1													<0.5	<0.5
Fluoranthene	mg/kg	0.1													<0.5	<0.5
Fluorene	mg/kg	0.1													<0.5	<0.5
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1													<0.5	<0.5
Naphthalene	mg/kg	0.1			NL	1900	11,000	170	370						<0.5	<0.5
Phenanthrene	mg/kg	0.1													<0.5	<0.5
Pyrene	mg/kg	0.1													0.6	<0.5
PAH (Sum of Common 16 PAHs - Lab Reported)	mg/kg	0.5	300	4000											6.8	<0.5

Table C2- Summary of Waste Classificaiton Results for SMGW-BH-B016

						LocCode	B106	B106
						Sample ID	BH-B106/0.2-0.3	BH-B106/4.0-4.45
						Sample_Depth_Range	0.2-0.3	4-4.45
						Sample Date	17/02/2020	17/02/2020
Analyte	**Units**	**EQL**	**CT1 General Solid Waste**	**CT2 Restricted Solid Waste**	**ENM (absolute maximum concentration)***	**ENM (maximum average concentration)***		
Miscellaneous Parameters								
Moisture Content (dried @ 40°C)	%	0.1					27.6	13.5
TRHs								
TRH C6 - C10 Fraction F1	mg/kg	10					<10	<10
TRH C6 - C10 Fraction Less BTEX F1	mg/kg	10					<10	<10
TRH >C10 - C16 Fraction F2	mg/kg	50					<50	<50
TRH >C10 - C16 Fraction Less Naphthalene (F2)	mg/kg	50					<50	<50
TRH >C16 - C34 Fraction F3	mg/kg	100					10800	250
TRH >C34 - C40 Fraction F4	mg/kg	100					640	<100
TRH+C10 - C40 (Sum of total) (Lab Reported)	mg/kg	50					11400	250
TPH Group - Waste Classification								
C6 - C9	mg/kg	10	650	2600			<10	<10
C10 - C14	mg/kg	50					<50	<50
C15 - C28	mg/kg	100					6760	150
C29-C36	mg/kg	100					4030	110
+C10 - C36 (Sum of total)	mg/kg	50	10000	40000	500	250	10,800	260
BTEXN								
Benzene	mg/kg	0.2	10	40	0.5	NA	<0.2	<0.2
Toluene	mg/kg	0.5	288	1152	65	NA	<0.5	<0.5
Ethylbenzene	mg/kg	0.5	600	2400	25	NA	<0.5	<0.5
Xylenes (m & p)	mg/kg	0.5					<0.5	<0.5
Xylene (o)	mg/kg	0.5					<0.5	<0.5
Xylenes (Sum of total) (Lab Reported)	mg/kg	0.5	1000	4000	15	NA	<0.5	<0.5
Total BTEX	mg/kg	0.2					<0.2	<0.2
Naphthalene	mg/kg	0.1					<0.5	<0.5
Heavy Metals								
Arsenic	mg/kg	4	100	400	40	20	12	<5
Cadmium	mg/kg	0.4	20	80	1	0.5	<1	<1
Chromium (III+VI)	mg/kg	1	100 ##	400 ##	150	75	24	6
Copper	mg/kg	1			200	100	12	52
Lead	mg/kg	1	100	400	100	50	16	15
Mercury	mg/kg	0.1	4	16	1	0.5	<0.1	<0.1
Nickel	mg/kg	1	40	160	60	30	<2	9
Zinc	mg/kg	1			300	150	**157**	57
Organochlorine Pesticides								
a-BHC	mg/kg	0.05	<50 **	<50 **			<0.25	<0.05
Aldrin	mg/kg	0.05	<50 **	<50 **			<0.25	<0.05
Dieldrin	mg/kg	0.05	<50 **	<50 **			<0.25	<0.05
Aldrin & Dieldrin (Sum of total) (Lab Reported)	mg/kg	0.05	<50 **	<50 **			<0.08	<0.05
b-BHC	mg/kg	0.05	<50 **	<50 **			<0.25	<0.05
cis-Chlordane	mg/kg	0.05	<50 **	<50 **			<0.25	<0.05
gamma-Chlordane	mg/kg	0.05	<50 **	<50 **			<0.08	<0.05
trans-Chlordane	mg/kg	0.05	<50 **	<50 **			<0.25	<0.05
Chlordane (Sum of Total)	mg/kg	0.05	<50 **	<50 **			<0.25	<0.05
d-BHC	mg/kg	0.05	<50 **	<50 **			<0.25	<0.05
4,4-DDD	mg/kg	0.1	<50 **	<50 **			<0.25	<0.05
4,4-DDE	mg/kg	0.05	<50 **	<50 **			<0.25	<0.05
4,4-DDT	mg/kg	0.05	<50 **	<50 **			<1	<0.2
DDT+DDE+DDD (Sum of total) (Lab Reported)	mg/kg	0.05	<50 **	<50 **			<0.08	<0.05
Endosulfan	mg/kg	0.05					<0.15	<0.05
Endosulfan I	mg/kg	0.05	60	240			<0.25	<0.05
Endosulfan II	mg/kg	0.05					<0.25	<0.05
Endosulfan sulphate	mg/kg	0.05					<0.25	<0.05
Endrin	mg/kg	0.05	<50 **	<50 **			<0.25	<0.05
Endrin aldehyde	mg/kg	0.05	<50 **	<50 **			<0.25	<0.05
Endrin ketone	mg/kg	0.05					<0.25	<0.05
g-BHC (Lindane)	mg/kg	0.05	<50 **	<50 **			<0.25	<0.05
Heptachlor	mg/kg	0.05	<50 **	<50 **			<0.25	<0.05
Heptachlor epoxide	mg/kg	0.1	<50 **	<50 **			<0.25	<0.05
Hexachlorobenzene	mg/kg	0.05	<50 **	<50 **			<0.25	<0.05

Table C2- Summary of Waste Classificaiton Results for SMGW-BH-B016

						LocCode	B106	B106
						Sample ID	BH-B106/0.2-0.3	BH-B106/4.0-4.45
						Sample_Depth_Range	0.2-0.3	4-4.45
						Sample Date	17/02/2020	17/02/2020
Analyte	**Units**	**EQL**	**CT1 General Solid Waste**	**CT2 Restricted Solid Waste**	**ENM (absolute maximum concentration)***	**ENM (maximum average concentration)***		
Methoxychlor	mg/kg	0.2					<1	<0.2
Organophosphorus Pesticides								
Azinophos methyl	mg/kg	0.05					<0.25	<0.05
Bromophos-ethyl	mg/kg	0.05					<0.25	<0.05
Carbophenothion	mg/kg	0.05					<0.25	<0.05
Chlorfenvinphos	mg/kg	0.05					<0.25	<0.05
Chlorpyrifos	mg/kg	0.05	4	16			<0.25	<0.05
Chlorpyrifos-methyl	mg/kg	0.05					<0.25	<0.05
Demeton-S-methyl	mg/kg	0.05					<0.25	<0.05
Diazinon	mg/kg	0.05					<0.25	<0.05
Dichlorvos	mg/kg	0.05	250 +	1000 +			<0.25	<0.05
Dimethoate	mg/kg	0.05	250 +	1000 +			<0.25	<0.05
Ethion	mg/kg	0.05	250 +	1000 +			<0.25	<0.05
Fenamiphos	mg/kg	0.05					<0.25	<0.05
Fenthion	mg/kg	0.05	250 +	1000 +			<0.25	<0.05
Malathion	mg/kg	0.05	250 +	1000 +			<0.25	<0.05
Methyl parathion	mg/kg	0.2	250 +	1000 +			<1	<0.2
Monocrotophos	mg/kg	0.2					<1	<0.2
Parathion	mg/kg	0.1					<1	<0.2
Pirimphos-ethyl	mg/kg	0.05					<0.25	<0.05
Prothiofos	mg/kg	0.05					<0.25	<0.05
PAHs								
Acenaphthene	mg/kg	0.1					<0.5	<0.5
Acenaphthylene	mg/kg	0.1					<0.5	<0.5
Anthracene	mg/kg	0.1					<0.5	<0.5
Benz(a)anthracene	mg/kg	0.1					<0.5	<0.5
Benzo(a) pyrene	mg/kg	0.05	0.8	3.2	1	0.5	1.8	<0.5
Benzo(a)pyrene TEQ (half LOR)	mg/kg	0.5					2.2	0.6
Benzo(a)pyrene TEQ (LOR)	mg/kg	0.5					2.5	1.2
Benzo(a)pyrene TEQ (zero)	mg/kg	0.5					1.9	<0.5
Carcinogenic PAHs (as BaP TEQ)	mg/kg						2.217	<1.21
Benzo[b+j]fluoranthene	mg/kg	0.5					<0.5	<0.5
Benzo(g,h,i)perylene	mg/kg	0.1					<0.5	<0.5
Benzo(k)fluoranthene	mg/kg	0.5					0.5	<0.5
Chrysene	mg/kg	0.1					3.9	<0.5
Dibenz(a,h)anthracene	mg/kg	0.1					<0.5	<0.5
Fluoranthene	mg/kg	0.1					<0.5	<0.5
Fluorene	mg/kg	0.1					<0.5	<0.5
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1					<0.5	<0.5
Naphthalene	mg/kg	0.1					<0.5	<0.5
Phenanthrene	mg/kg	0.1					<0.5	<0.5
Pyrene	mg/kg	0.1					0.6	<0.5
PAH (Sum of Common 16 PAHs - Lab Reported)	mg/kg	0.5	200	800	40	20	6.8	<0.5

Notes

*: Only criteria exceeding the absolute maximum concentration is highlighted

**: Criterion of <50 mg/kg for the sum of Scheduled Chemicals

+: CT1 criterion of 250 mg/kg and CT2 criterion of 1000 mg/kg for the sum of Moderately Harmful Pesticides

##: Criteria for chromium VI

Table C3- Summary of Soil Results for SMGW-TP-B316

																LocCode	SMGW-TP-B316	SMGW-TP-B316	SMGW-TP-B316	SMGW-TP-B316
																Sample ID	SMGW-TP-B316_0-0.1	SMGW-TP-B316_0.4-0.5	SMGW-TP-B316_1.1-1.3	SMGW-TP-B316_2.6-2.7
																Sample Depth Range	0-0.1	0.4-0.5	1.1-1.3	2.6-2.7
																Sample Date	9/12/2020	9/12/2020	9/12/2020	9/12/2020
																Lab Report Number	ES2044077	ES2044077	ES2044077	ES2044077
Analyte	**Units**	**EQL**	**HIL C**	**HIL D**	**HSL for Vapour Intrusion D, Clay, 0 to <1m**	**HSL C Direct Contact**	**HSL D Direct Contact**	**EIL Public Open Space**	**EIL Industrial / Commercial**	**ESL Public Open Space**	**ESL Commerical / Industrial**	**Ecological Guideline Direct Exposure**	**Ecological Guideline Indirect Esposure**	**Management Limits Public Open Space**	**Management Limits Commercial/ Industrial**					
Moisture Content	%	0.1															13.4	14.5	14.6	10.5
Other Paramters																				
pH (Lab)	pH_Units	0.1															5.5	4.9	5.1	5.6
Ammonia as N																	-	<20	-	-
Cyanide Total	mg/kg	1	240	1500													-	<1	-	-
Asbestos																				
Asbestos (1 = asbestos detected, 0 = no asbestos detected)	g/kg																0	0	-	-
Asbestos Fines (1 = asbestos detected, 0 = no asbestos detected)	Fibres	5															0	0	-	-
Sample weight (dry)	g	0.1															72.6	128	-	-
Metals/Metalloids																				
Arsenic	mg/kg	4	300	3000				100	160								13	<5	28	18
Cadmium	mg/kg	0.4	90	900													<1	<1	<1	<1
Chromium (III+VI)	mg/kg	1	300	3600				410	670								15	4	10	5
Copper	mg/kg	1	17,000	240000				160	230								14	9	28	66
Lead	mg/kg	1	600	1500				1100	1800								13	8	18	34
Mercury	mg/kg	0.1	80	730													<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	1	1200	6000				110	180								2	<2	6	37
Zinc	mg/kg	1	30,000	400,000				350	510								16	<5	18	141
Total Recoverable Hydrocarbons																				
C6-C10	mg/kg	10												800	800		<10	<10	<10	<10
C6-C10 less BTEX (F1)	mg/kg	10			310	5100	26,000	215 [6]		180	215						<10	<10	<10	<10
C10-C16	mg/kg	50								120	170			1000	1000		<50	<50	<50	<50
F2-NAPHTHALENE	mg/kg	50			NL	3800	20,000	170 [6]									<50	<50	<50	<50
C16-C34	mg/kg	100				5300	27,000	1700 [6]		1300	2500			3500	5000		<100	<100	<100	<100
C34-C40	mg/kg	100				7400	38,000	3300 [6]		5600	6600			10000	10000		<100	<100	<100	<100
C10 - C40 (Sum of total)	mg/kg	50															<50	<50	<50	<50
Total Petroleum Hydrocarbons (Waste Classification)																				
C6 - C9	mg/kg	10															<10	<10	<10	<10
C10 - C14	mg/kg	50															<50	<50	<50	<50
C15 - C28	mg/kg	100															<100	<100	<100	<100
C29-C36	mg/kg	100															<100	<100	<100	<100
+C10 - C36 (Sum of total)	mg/kg	50															<50	<50	<50	<50
BTEX																				
Benzene	mg/kg	0.2			4	120	430	75 [6]		65	95						<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	0.5			NL	18,000	99,000	135 [6]		105	135						<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	0.5			NL	5300	27,000	165 [6]		105	135						<0.5	<0.5	<0.5	<0.5
Xylene (m & p)	mg/kg	0.5															<0.5	<0.5	<0.5	<0.5
Xylene (o)	mg/kg	0.5															<0.5	<0.5	<0.5	<0.5
Xylene Total	mg/kg	0.5			NL	15,000	81,000	95 [7]		45	95						<0.5	<0.5	<0.5	<0.5
Total BTEX	mg/kg	0.2															<0.2	<0.2	<0.2	<0.2
Organochlorine Pesticides																				
4,4-DDE	mg/kg	0.05															<0.05	<0.05	<0.05	<0.05
a-BHC	mg/kg	0.05															<0.05	<0.05	<0.05	<0.05
Aldrin	mg/kg	0.05															<0.05	<0.05	<0.05	<0.05
Aldrin + Dieldrin	mg/kg	0.05	10	45													<0.05	<0.05	<0.05	<0.05
b-BHC	mg/kg	0.05															<0.05	<0.05	<0.05	<0.05
chlordane	mg/kg	0.05	70	530													<0.05	<0.05	<0.05	<0.05
Chlordane (cis)	mg/kg	0.05															<0.05	<0.05	<0.05	<0.05
Chlordane (trans)	mg/kg	0.05															<0.05	<0.05	<0.05	<0.05
d-BHC	mg/kg	0.05															<0.05	<0.05	<0.05	<0.05
DDD	mg/kg	0.05															<0.05	<0.05	<0.05	<0.05
DDT	mg/kg	0.2						180	640								<0.2	<0.2	<0.2	<0.2
DDT+DDE+DDD	mg/kg	0.05	400	3600													<0.05	<0.05	<0.05	<0.05
Dieldrin	mg/kg	0.05															<0.05	<0.05	<0.05	<0.05
Endosulfan	mg/kg	0.05	340	2000													<0.05	<0.05	<0.05	<0.05
Endosulfan I	mg/kg	0.05															<0.05	<0.05	<0.05	<0.05
Endosulfan II	mg/kg	0.05															<0.05	<0.05	<0.05	<0.05
Endosulfan sulphate	mg/kg	0.05															<0.05	<0.05	<0.05	<0.05
Endrin	mg/kg	0.05	20	100													<0.05	<0.05	<0.05	<0.05
Endrin aldehyde	mg/kg	0.05															<0.05	<0.05	<0.05	<0.05
Endrin ketone	mg/kg	0.05															<0.05	<0.05	<0.05	<0.05
g-BHC (Lindane)	mg/kg	0.05															<0.05	<0.05	<0.05	<0.05
Heptachlor	mg/kg	0.05	10	50													<0.05	<0.05	<0.05	<0.05
Heptachlor epoxide	mg/kg	0.05															<0.05	<0.05	<0.05	<0.05
Methoxychlor	mg/kg	0.2	400	2500													<0.2	<0.2	<0.2	<0.2
Organophosphorus Pesticides																				
Azinophos methyl	mg/kg	0.05															<0.05	<0.05	<0.05	<0.05
Bromophos-ethyl	mg/kg	0.05															<0.05	<0.05	<0.05	<0.05
Carbophenothion	mg/kg	0.05															<0.05	<0.05	<0.05	<0.05
Chlorfenvinphos	mg/kg	0.05															<0.05	<0.05	<0.05	<0.05
Chlorpyrifos	mg/kg	0.05	250	2000													<0.05	<0.05	<0.05	<0.05
Chlorpyrifos-methyl	mg/kg	0.05															<0.05	<0.05	<0.05	<0.05
Demeton-S-methyl	mg/kg	0.05															<0.05	<0.05	<0.05	<0.05

Table C3- Summary of Soil Results for SMGW-TP-B316

Analyte	Units	EQL	HIL C	HIL D	HSL for Vapour Intrusion D, Clay, 0 to <1m	HSL C Direct Contact	HSL D Direct Contact	EIL Public Open Space	EIL Industrial / Commercial	ESL Public Open Space	ESL Commerical / Industrial	Ecological Guideline Direct Exposure	Ecological Guideline Indirect Esposure	Management Limits Public Open Space	Management Limits Commercial/ Industrial	LocCode	SMGW-TP-B316	SMGW-TP-B316	SMGW-TP-B316	SMGW-TP-B316
																Sample ID	SMGW-TP-B316_0-0.1	SMGW-TP-B316_0.4-0.5	SMGW-TP-B316_1.1-1.3	SMGW-TP-B316_2.6-2.7
																Sample Depth Range	0-0.1	0.4-0.5	1.1-1.3	2.6-2.7
																Sample Date	9/12/2020	9/12/2020	9/12/2020	9/12/2020
																Lab Report Number	ES2044077	ES2044077	ES2044077	ES2044077
Diazinon	mg/kg	0.05															<0.05	<0.05	<0.05	<0.05
Dichlorvos	mg/kg	0.05															<0.05	<0.05	<0.05	<0.05
Dimethoate	mg/kg	0.05															<0.05	<0.05	<0.05	<0.05
Ethion	mg/kg	0.05															<0.05	<0.05	<0.05	<0.05
Fenamiphos	mg/kg	0.05															<0.05	<0.05	<0.05	<0.05
Fenthion	mg/kg	0.05															<0.05	<0.05	<0.05	<0.05
Malathion	mg/kg	0.05															<0.05	<0.05	<0.05	<0.05
Methyl parathion	mg/kg	0.2															<0.2	<0.2	<0.2	<0.2
Monocrotophos	mg/kg	0.2															<0.2	<0.2	<0.2	<0.2
Parathion	mg/kg	0.2															<0.2	<0.2	<0.2	<0.2
Pirimphos-ethyl	mg/kg	0.05															<0.05	<0.05	<0.05	<0.05
Prothiofos	mg/kg	0.05															<0.05	<0.05	<0.05	<0.05
Polycyclic Aromatic Hydrocarbons																				
Acenaphthene	mg/kg	0.5															<0.5	<0.5	<0.5	<0.5
Acenaphthylene	mg/kg	0.5															<0.5	<0.5	<0.5	<0.5
Anthracene	mg/kg	0.5															<0.5	<0.5	<0.5	<0.5
Benz(a)anthracene	mg/kg	0.5															<0.5	<0.5	<0.5	<0.5
Benzo(a) pyrene	mg/kg	0.5								0.7	1.4						<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ (medium bound)	mg/kg	0.5	3	40													0.6	0.6	0.6	0.6
Benzo(a)pyrene TEQ (upper bound)	mg/kg	0.5	3	40													1.2	1.2	1.2	1.2
Benzo(a)pyrene TEQ (lower bound)	mg/kg	0.5	3	40													<0.5	<0.5	<0.5	<0.5
Carcinogenic PAHs (as BaP TEQ)	mg/kg		3	40													<1.21	<1.21	<1.21	<1.21
Benzo(g,h,i)perylene	mg/kg	0.5															<0.5	<0.5	<0.5	<0.5
Benzo[b+j]fluoranthene	mg/kg	0.5															<0.5	<0.5	<0.5	<0.5
Benzo(k)fluoranthene	mg/kg	0.5															<0.5	<0.5	<0.5	<0.5
Chrysene	mg/kg	0.5															<0.5	<0.5	<0.5	<0.5
Dibenz(a,h)anthracene	mg/kg	0.5															<0.5	<0.5	<0.5	<0.5
Fluoranthene	mg/kg	0.5															<0.5	<0.5	<0.5	<0.5
Fluorene	mg/kg	0.5															<0.5	<0.5	<0.5	<0.5
Indeno(1,2,3-c,d)pyrene	mg/kg	0.5															<0.5	<0.5	<0.5	<0.5
Naphthalene	mg/kg	0.5			NL			170	370								<0.5	<0.5	<0.5	<0.5
Phenanthrene	mg/kg	0.5															<0.5	<0.5	<0.5	<0.5
Pyrene	mg/kg	0.5															<0.5	<0.5	<0.5	<0.5
PAHs (Sum of total)	mg/kg	0.5	300	4000													<0.5	<0.5	<0.5	<0.5
Phenols																				
Phenolics Total	mg/kg	1															<1	-	-	-
Polychlorinated Biphenyls																				
PCBs (Sum of total)	mg/kg	0.1	1	7													<0.1	-	-	-
Volatile Organic Compounds																				
1,2,3-trichlorobenzene	mg/kg	0.5															<0.5	<0.5	-	-
1,2,4-trichlorobenzene	mg/kg	0.5															<0.5	<0.5	-	-
1,2-dichlorobenzene	mg/kg	0.5															<0.5	<0.5	-	-
1,3-dichlorobenzene	mg/kg	0.5															<0.5	<0.5	-	-
1,4-dichlorobenzene	mg/kg	0.5															<0.5	<0.5	-	-
2-chlorotoluene	mg/kg	0.5															<0.5	<0.5	-	-
4-chlorotoluene	mg/kg	0.5															<0.5	<0.5	-	-
Bromobenzene	mg/kg	0.5															<0.5	<0.5	-	-
Chlorobenzene	mg/kg	0.5															<0.5	<0.5	-	-
Hexachlorobenzene	mg/kg	0.05															<0.05	<0.05	<0.05	<0.05
1,2,4-trimethylbenzene	mg/kg	0.5															<0.5	<0.5	-	-
1,3,5-trimethylbenzene	mg/kg	0.5															<0.5	<0.5	-	-
Isopropylbenzene	mg/kg	0.5															<0.5	<0.5	-	-
n-butylbenzene	mg/kg	0.5															<0.5	<0.5	-	-
n-propylbenzene	mg/kg	0.5															<0.5	<0.5	-	-
p-isopropyltoluene	mg/kg	0.5															<0.5	<0.5	-	-
sec-butylbenzene	mg/kg	0.5															<0.5	<0.5	-	-
Styrene	mg/kg	0.5															<0.5	<0.5	-	-
tert-butylbenzene	mg/kg	0.5															<0.5	<0.5	-	-
2-hexanone (MBK)	mg/kg	5															<5	<5	-	-
Methyl Ethyl Ketone	mg/kg	5															<5	<5	-	-
4-Methyl-2-pentanone	mg/kg	5															<5	<5	-	-
Carbon disulfide	mg/kg	0.5															<0.5	<0.5	-	-
Vinyl acetate	mg/kg	5															<5	<5	-	-
1,1,1,2-tetrachloroethane	mg/kg	0.5															<0.5	<0.5	-	-
1,1,1-trichloroethane	mg/kg	0.5															<0.5	<0.5	-	-
1,1,2,2-tetrachloroethane	mg/kg	0.5															<0.5	<0.5	-	-
1,1,2-trichloroethane	mg/kg	0.5															<0.5	<0.5	-	-
1,1-dichloroethane	mg/kg	0.5															<0.5	<0.5	-	-
1,1-dichloroethene	mg/kg	0.5															<0.5	<0.5	-	-
1,1-dichloropropene	mg/kg	0.5															<0.5	<0.5	-	-
1,2,3-trichloropropane	mg/kg	0.5															<0.5	<0.5	-	-
1,2-dibromo-3-chloropropane	mg/kg	0.5															<0.5	<0.5	-	-
1,2-dibromoethane	mg/kg	0.5															<0.5	<0.5	-	-

Table C3- Summary of Soil Results for SMGW-TP-B316

Analyte	Units	EQL	HIL C	HIL D	HSL for Vapour Intrusion D, Clay, 0 to <1m	HSL C Direct Contact	HSL D Direct Contact	EIL Public Open Space	EIL Industrial / Commercial	ESL Public Open Space	ESL Commerical / Industrial	Ecological Guideline Direct Exposure	Ecological Guideline Indirect Esposure	Management Limits Public Open Space	Management Limits Commercial/ Industrial		LocCode	SMGW-TP-B316	SMGW-TP-B316	SMGW-TP-B316	SMGW-TP-B316
																	Sample ID	SMGW-TP-B316_0-0.1	SMGW-TP-B316_0.4-0.5	SMGW-TP-B316_1.1-1.3	SMGW-TP-B316_2.6-2.7
																	Sample Depth Range	0-0.1	0.4-0.5	1.1-1.3	2.6-2.7
																	Sample Date	9/12/2020	9/12/2020	9/12/2020	9/12/2020
																	Lab Report Number	ES2044077	ES2044077	ES2044077	ES2044077
1,2-dichloroethane	mg/kg	0.5																<0.5	<0.5	-	-
1,2-dichloropropane	mg/kg	0.5																<0.5	<0.5	-	-
1,3-dichloropropane	mg/kg	0.5																<0.5	<0.5	-	-
2,2-dichloropropane	mg/kg	0.5																<0.5	<0.5	-	-
Bromodichloromethane	mg/kg	0.5																<0.5	<0.5	-	-
Bromoform	mg/kg	0.5																<0.5	<0.5	-	-
Bromomethane	mg/kg	5																<5	<5	-	-
Carbon tetrachloride	mg/kg	0.5																<0.5	<0.5	-	-
Chlorodibromomethane	mg/kg	0.5																<0.5	<0.5	-	-
Chloroethane	mg/kg	5																<5	<5	-	-
Chloroform	mg/kg	0.5																<0.5	<0.5	-	-
Chloromethane	mg/kg	5																<5	<5	-	-
cis-1,2-dichloroethene	mg/kg	0.5																<0.5	<0.5	-	-
cis-1,3-dichloropropene	mg/kg	0.5																<0.5	<0.5	-	-
cis-1,4-Dichloro-2-butene	mg/kg	0.5																<0.5	<0.5	-	-
Dibromomethane	mg/kg	0.5																<0.5	<0.5	-	-
Dichlorodifluoromethane	mg/kg	5																<5	<5	-	-
Hexachlorobutadiene	mg/kg	0.5																<0.5	<0.5	-	-
Iodomethane	mg/kg	0.5																<0.5	<0.5	-	-
Pentachloroethane	mg/kg	0.5																<0.5	<0.5	-	-
Trichloroethene	mg/kg	0.5																<0.5	<0.5	-	-
Trichlorofluoromethane	mg/kg	5																<5	<5	-	-
Tetrachloroethene	mg/kg	0.5																<0.5	<0.5	-	-
trans-1,2-dichloroethene	mg/kg	0.5																<0.5	<0.5	-	-
trans-1,3-dichloropropene	mg/kg	0.5																<0.5	<0.5	-	-
trans-1,4-Dichloro-2-butene	mg/kg	0.5																<0.5	<0.5	-	-
Vinyl chloride	mg/kg	5																<5	<5	-	-
Per- and Polyfluoroalkyl Substances																					
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	mg/kg	0.0005																<0.0005	<0.0005	-	<0.0005
6:2 Fluorotelomer Sulfonate (6:2 FtS)	mg/kg	0.0005																<0.0005	<0.0005	-	<0.0005
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	mg/kg	0.0005																<0.0005	<0.0005	-	<0.0005
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	mg/kg	0.0005																<0.0005	<0.0005	-	<0.0005
Perfluorooctane sulfonamide (FOSA)	mg/kg	0.0002																<0.0002	<0.0002	-	<0.0002
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	mg/kg	0.0005																<0.0005	<0.0005	-	<0.0005
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	mg/kg	0.0002																<0.0002	<0.0002	-	<0.0002
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	mg/kg	0.0005																<0.0005	<0.0005	-	<0.0005
N-Methyl perfluorooctane sulfonamide (MeFOSA)	mg/kg	0.0005																<0.0005	<0.0005	-	<0.0005
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	mg/kg	0.0002																<0.0002	<0.0002	-	<0.0002
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE Alcohol)	mg/kg	0.0005																<0.0005	<0.0005	-	<0.0005
Perfluorobutane sulfonic acid (PFBS)	mg/kg	0.0002																<0.0002	<0.0002	-	<0.0002
Perfluoropentane sulfonic acid (PFPeS)	mg/kg	0.0002																<0.0002	<0.0002	-	<0.0002
Perfluorohexane sulfonic acid (PFHxS)	mg/kg	0.0002																<0.0002	<0.0002	-	<0.0002
Perfluoroheptane sulfonic acid (PFHpS)	mg/kg	0.0002																<0.0002	<0.0002	-	<0.0002
Perfluorooctane sulfonic acid (PFOS)	mg/kg	0.0002										1	0.01					<0.0002	<0.0002	-	<0.0002
Perfluorodecane sulfonic acid (PFDS)	mg/kg	0.0002																<0.0002	<0.0002	-	<0.0002
Perfluorobutanoic acid (PFBA)	mg/kg	0.001																<0.001	<0.001	-	<0.001
Perfluoropentanoic acid (PFPeA)	mg/kg	0.0002																<0.0002	<0.0002	-	<0.0002
Perfluorohexanoic acid (PFHxA)	mg/kg	0.0002																<0.0002	<0.0002	-	<0.0002
Perfluoroheptanoic acid (PFHpA)	mg/kg	0.0002																<0.0002	<0.0002	-	<0.0002
Perfluorooctanoate (PFOA)	mg/kg	0.0002	10	50								10						<0.0002	<0.0002	-	<0.0002
Perfluorononanoic acid (PFNA)	mg/kg	0.0002																<0.0002	<0.0002	-	<0.0002
Perfluorodecanoic acid (PFDA)	mg/kg	0.0002																<0.0002	<0.0002	-	<0.0002
Perfluoroundecanoic acid (PFUnDA)	mg/kg	0.0002																<0.0002	<0.0002	-	<0.0002
Perfluorododecanoic acid (PFDoDA)	mg/kg	0.0002																<0.0002	<0.0002	-	<0.0002
Perfluorotridecanoic acid (PFTrDA)	mg/kg	0.0002																<0.0002	<0.0002	-	<0.0002
Perfluorotetradecanoic acid (PFTeDA)	mg/kg	0.0005																<0.0005	<0.0005	-	<0.0005
Sum of PFAS	mg/kg	0.0002																<0.0002	<0.0002	-	<0.0002
Sum of PFHxS and PFOS	mg/kg	0.0002	1	20														<0.0002	<0.0002	-	<0.0002
Sum of PFAS (WA DER List)	mg/kg	0.0002																<0.0002	<0.0002	-	<0.0002

Notes:

-: Not analysed

Table C4 - Summary of Waste Classification Results for SMGW-TP-B316

											LocCode	SMGW-TP-B316	SMGW-TP-B316	SMGW-TP-B316	SMGW-TP-B316
											Sample ID	SMGW-TP-B316_0-0.1	SMGW-TP-B316_0.4-0.5	SMGW-TP-B316_1.1-1.3	SMGW-TP-B316_2.6-2.7
											Sample Depth Range	0-0.1	0.4-0.5	1.1-1.3	2.6-2.7
											Sample Date	9/12/2020	9/12/2020	9/12/2020	9/12/2020
											Lab Report Number	ES2044077	ES2044077	ES2044077	ES2044077
Analyte	**Units**	**EQL**	NSW EPA 2014 General Solid Waste (CT1)	NSW EPA 2014 General Solid Waste SCC1	TCLP1 General Solid Waste (µg/l or mg/l)^#	NSW EPA 2014 Restricted Solid Waste CT2	NSW EPA 2014 Restricted Solid Waste SCC2	TCLP2 Restricted Solid Waste (µg/l or mg/l)^#	NSW 2014 Excavated Natural Material (Absolute Max)	NSW 2014 Excavated Natural Material (Max Average)				
Moisture Content	%	0.1							-	-	13.4	14.5	14.6	10.5
Asbestos														
Asbestos (1 = asbestos detected, 0 = no asbestos detected)	Fibres	5									0	0	-	-
Asbestos Fines (1 = asbestos detected, 0 = no asbestos detected)	Fibres	5									0	0	-	-
Sample weight (dry)	--										72.6	128	-	-
Other Parameters														
pH (Lab)	pH_Units	0.1							4.5 to 10	5 to 9	5.5	4.9	5.1	5.6
Ammonia as N	mg/kg	20									-	<20	-	-
Cyanide Total	mg/kg	1	320	5900	16	1280	23600	64			-	<1	-	-
Metals/Metalloids														
Arsenic	mg/kg	4	100	500	5	400	2000	20	40	20	13	<5	28	18
Cadmium	mg/kg	0.4	20	100	1	80	400	4	1	0.5	<1	<1	<1	<1
Chromium (III+VI)	mg/kg	1	100 ~	1900 ~	5	400 ~	7600 ~	20	150	75	15	4	10	5
Copper	mg/kg	1	-	-	-	-	-	-	200	100	14	9	28	66
Lead	mg/kg	1	100	1500	5	400	6000	20	100	50	13	8	18	34
Mercury	mg/kg	0.1	4	50	0.2	16	200	0.8	1	0.5	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	1	40	1050	2	160	4200	8	60	30	2	<2	6	37
Zinc	mg/kg	1	-	-	-	-	-	-	300	150	16	<5	18	141
Total Recoverable Hydrocarbons														
C6-C10	mg/kg	10									<10	<10	<10	<10
C6-C10 less BTEX (F1)	mg/kg	10									<10	<10	<10	<10
C10-C16	mg/kg	50									<50	<50	<50	<50
F2-NAPHTHALENE	mg/kg	50									<50	<50	<50	<50
C16-C34	mg/kg	100									<100	<100	<100	<100
C34-C40	mg/kg	100									<100	<100	<100	<100
C10 - C40 (Sum of total)	mg/kg	50									<50	<50	<50	<50
Total Petroleum Hydrocarbons (Waste Classification)														
C6 - C9	mg/kg	10	650	650	N/A	2600	2600	N/A	-	-	<10	<10	<10	<10
C10 - C14	mg/kg	50							-	-	<50	<50	<50	<50
C15 - C28	mg/kg	100							-	-	<100	<100	<100	<100
C29-C36	mg/kg	100							-	-	<100	<100	<100	<100
+C10 - C36 (Sum of total)	mg/kg	50	10000	10000	N/A	40000	40000	N/A	500	250	<50	<50	<50	<50
BTEX														
Benzene	mg/kg	0.2	10	18	0.5	40	72	2	0.5	-	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	0.5	288	518	14.4	1152	2073	57.6	65	-	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	0.5	600	1080	30	2400	4320	120	25	-	<0.5	<0.5	<0.5	<0.5
Xylene (m & p)	mg/kg	0.5							-	-	<0.5	<0.5	<0.5	<0.5
Xylene (o)	mg/kg	0.5							-	-	<0.5	<0.5	<0.5	<0.5
Xylene Total	mg/kg	0.5	1000	1800	50	4000	7200	200	15	-	<0.5	<0.5	<0.5	<0.5
Total BTEX	mg/kg	0.2							-	-	<0.2	<0.2	<0.2	<0.2
Organochlorine Pesticides														
Scheduled chemicals (Waste Classification Guidelines)	mg/kg	-	50	50	N/A	50	50	N/A			<1.35	<1.35	<0.85	<0.85
4,4-DDE	mg/kg	0.05							-	-	<0.05	<0.05	<0.05	<0.05
a-BHC	mg/kg	0.05							-	-	<0.05	<0.05	<0.05	<0.05
Aldrin	mg/kg	0.05							-	-	<0.05	<0.05	<0.05	<0.05
Aldrin + Dieldrin	mg/kg	0.05							-	-	<0.05	<0.05	<0.05	<0.05
b-BHC	mg/kg	0.05							-	-	<0.05	<0.05	<0.05	<0.05
chlordane	mg/kg	0.05							-	-	<0.05	<0.05	<0.05	<0.05
Chlordane (cis)	mg/kg	0.05							-	-	<0.05	<0.05	<0.05	<0.05
Chlordane (trans)	mg/kg	0.05							-	-	<0.05	<0.05	<0.05	<0.05
d-BHC	mg/kg	0.05							-	-	<0.05	<0.05	<0.05	<0.05
DDD	mg/kg	0.05							-	-	<0.05	<0.05	<0.05	<0.05
DDT	mg/kg	0.1							-	-	<0.2	<0.2	<0.2	<0.2
DDT+DDE+DDD	mg/kg	0.05							-	-	<0.05	<0.05	<0.05	<0.05
Dieldrin	mg/kg	0.05							-	-	<0.05	<0.05	<0.05	<0.05
Endosulfan	mg/kg	0.05	60	108	3	240	432	12	-	-	<0.05	<0.05	<0.05	<0.05
Endosulfan I	mg/kg	0.05							-	-	<0.05	<0.05	<0.05	<0.05
Endosulfan II	mg/kg	0.05							-	-	<0.05	<0.05	<0.05	<0.05
Endosulfan sulphate	mg/kg	0.05							-	-	<0.05	<0.05	<0.05	<0.05

Table C4 - Summary of Waste Classification Results for SMGW-TP-B316

											LocCode	SMGW-TP-B316	SMGW-TP-B316	SMGW-TP-B316	SMGW-TP-B316
											Sample ID	SMGW-TP-B316_0-0.1	SMGW-TP-B316_0.4-0.5	SMGW-TP-B316_1.1-1.3	SMGW-TP-B316_2.6-2.7
											Sample Depth Range	0-0.1	0.4-0.5	1.1-1.3	2.6-2.7
											Sample Date	9/12/2020	9/12/2020	9/12/2020	9/12/2020
											Lab Report Number	ES2044077	ES2044077	ES2044077	ES2044077
Analyte	**Units**	**EQL**	NSW EPA 2014 General Solid Waste (CT1)	NSW EPA 2014 General Solid Waste SCC1	TCLP1 General Solid Waste (µg/l or mg/l)^#	NSW EPA 2014 Restricted Solid Waste CT2	NSW EPA 2014 Restricted Solid Waste SCC2	TCLP2 Restricted Solid Waste (µg/l or mg/l)^#	NSW 2014 Excavated Natural Material (Absolute Max)	NSW 2014 Excavated Natural Material (Max Average)				
Endrin	mg/kg	0.05							-	-	<0.05	<0.05	<0.05	<0.05
Endrin aldehyde	mg/kg	0.05							-	-	<0.05	<0.05	<0.05	<0.05
Endrin ketone	mg/kg	0.05							-	-	<0.05	<0.05	<0.05	<0.05
g-BHC (Lindane)	mg/kg	0.05							-	-	<0.05	<0.05	<0.05	<0.05
Heptachlor	mg/kg	0.05							-	-	<0.05	<0.05	<0.05	<0.05
Heptachlor epoxide	mg/kg	0.05							-	-	<0.05	<0.05	<0.05	<0.05
Methoxychlor	mg/kg	0.1							-	-	<0.2	<0.2	<0.2	<0.2
Organophosphorus Pesticides														
Moderately Harrmful Pesticides (Waste Classification Guidelines)	mg/kg	-	250	250	N/A	1000	1000	N/A	-	-	<0.5	<0.5	<0.5	<0.5
Azinophos methyl	mg/kg	0.05							-	-	<0.05	<0.05	<0.05	<0.05
Bromophos-ethyl	mg/kg	0.05							-	-	<0.05	<0.05	<0.05	<0.05
Carbophenothion	mg/kg	0.05							-	-	<0.05	<0.05	<0.05	<0.05
Chlorfenvinphos	mg/kg	0.05							-	-	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos	mg/kg	0.05	4	7.5	0.2	16	30	0.8	-	-	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos-methyl	mg/kg	0.05							-	-	<0.05	<0.05	<0.05	<0.05
Demeton-S-methyl	mg/kg	0.05							-	-	<0.05	<0.05	<0.05	<0.05
Diazinon	mg/kg	0.05							-	-	<0.05	<0.05	<0.05	<0.05
Dichlorvos	mg/kg	0.05							-	-	<0.05	<0.05	<0.05	<0.05
Dimethoate	mg/kg	0.05							-	-	<0.05	<0.05	<0.05	<0.05
Ethion	mg/kg	0.05							-	-	<0.05	<0.05	<0.05	<0.05
Fenamiphos	mg/kg	0.05							-	-	<0.05	<0.05	<0.05	<0.05
Fenthion	mg/kg	0.05							-	-	<0.05	<0.05	<0.05	<0.05
Malathion	mg/kg	0.05							-	-	<0.05	<0.05	<0.05	<0.05
Methyl parathion	mg/kg	0.2							-	-	<0.2	<0.2	<0.2	<0.2
Monocrotophos	mg/kg	0.2							-	-	<0.2	<0.2	<0.2	<0.2
Pirimphos-ethyl	mg/kg	0.1							-	-	<0.05	<0.05	<0.05	<0.05
Parathion	mg/kg	0.05							-	-	<0.2	<0.2	<0.2	<0.2
Prothiofos	mg/kg	0.05							-	-	<0.05	<0.05	<0.05	<0.05
Polycyclic Aromatic Hydrocarbons														
Acenaphthene	mg/kg	0.1							-	-	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	mg/kg	0.1							-	-	<0.5	<0.5	<0.5	<0.5
Anthracene	mg/kg	0.1							-	-	<0.5	<0.5	<0.5	<0.5
Benz(a)anthracene	mg/kg	0.1							-	-	<0.5	<0.5	<0.5	<0.5
Benzo(a) pyrene	mg/kg	0.05	0.8	10	0.04	3.2	23	0.16	1	0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ	mg/kg	-							-	-	<1.21	<1.21	<1.21	<1.21
Benzo(a)pyrene TEQ (half LOR)	mg/kg	0.5							-	-	0.6	0.6	0.6	0.6
Benzo(a)pyrene TEQ (LOR)	mg/kg	0.5							-	-	1.2	1.2	1.2	1.2
Benzo(a)pyrene TEQ (zero)	mg/kg	0.5							-	-	<0.5	<0.5	<0.5	<0.5
Benzo[b+j]fluoranthene	mg/kg	0.5							-	-	<0.5	<0.5	<0.5	<0.5
Benzo(g,h,i)perylene	mg/kg	0.1							-	-	<0.5	<0.5	<0.5	<0.5
Benzo(k)fluoranthene	mg/kg	0.5							-	-	<0.5	<0.5	<0.5	<0.5
Carcinogenic PAHs (as BaP TEQ)	mg/kg	-							-	-	<1.21	<1.21	<1.21	<1.21
Chrysene	mg/kg	0.1							-	-	<0.5	<0.5	<0.5	<0.5
Dibenz(a,h)anthracene	mg/kg	0.1							-	-	<0.5	<0.5	<0.5	<0.5
Fluoranthene	mg/kg	0.1							-	-	<0.5	<0.5	<0.5	<0.5
Fluorene	mg/kg	0.1							-	-	<0.5	<0.5	<0.5	<0.5
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1							-	-	<0.5	<0.5	<0.5	<0.5
Naphthalene	mg/kg	0.1							-	-	<0.5	<0.5	<0.5	<0.5
Phenanthrene	mg/kg	0.1							-	-	<0.5	<0.5	<0.5	<0.5
Pyrene	mg/kg	0.1							-	-	<0.5	<0.5	<0.5	<0.5
PAHs (Sum of total)	mg/kg	0.5/0.05							40	20	<0.5	<0.5	<0.5	<0.5
PAH (total, NSW Waste 2014)	mg/kg	-	200	200	N/A	800	800	N/A	-	-	<7.5	<7.5	<7.5	<7.5
Phenols														
Phenolics Total	mg/kg	1							-	-	<1	-	-	-
Polychlorinated Biphenyls														
PCBs (Sum of total)	mg/kg	0.1	<50		N/A	<50		N/A	-	-	<0.1	-	-	-
Volatile Organic Compounds														
1,2,3-trichlorobenzene	mg/kg	0.5							-	-	<0.5	<0.5	-	-
1,2,4-trichlorobenzene	mg/kg	0.5							-	-	<0.5	<0.5	-	-

Table C4 - Summary of Waste Classification Results for SMGW-TP-B316

											LocCode	SMGW-TP-B316	SMGW-TP-B316	SMGW-TP-B316	SMGW-TP-B316
											Sample ID	SMGW-TP-B316_0-0.1	SMGW-TP-B316_0.4-0.5	SMGW-TP-B316_1.1-1.3	SMGW-TP-B316_2.6-2.7
											Sample Depth Range	0-0.1	0.4-0.5	1.1-1.3	2.6-2.7
											Sample Date	9/12/2020	9/12/2020	9/12/2020	9/12/2020
											Lab Report Number	ES2044077	ES2044077	ES2044077	ES2044077
Analyte	**Units**	**EQL**	NSW EPA 2014 General Solid Waste (CT1)	NSW EPA 2014 General Solid Waste SCC1	TCLP1 General Solid Waste (µg/l or mg/l)^#	NSW EPA 2014 Restricted Solid Waste CT2	NSW EPA 2014 Restricted Solid Waste SCC2	TCLP2 Restricted Solid Waste (µg/l or mg/l)^#	NSW 2014 Excavated Natural Material (Absolute Max)	NSW 2014 Excavated Natural Material (Max Average)					
1,2-dichlorobenzene	mg/kg	0.5	86	155	4.3	344	620	17.2	-	-	<0.5	<0.5	-	-
1,3-dichlorobenzene	mg/kg	0.5							-	-	<0.5	<0.5	-	-
1,4-dichlorobenzene	mg/kg	0.5	150	270	7.5	600	1080	30	-	-	<0.5	<0.5	-	-
2-chlorotoluene	mg/kg	0.5							-	-	<0.5	<0.5	-	-
4-chlorotoluene	mg/kg	0.5							-	-	<0.5	<0.5	-	-
Bromobenzene	mg/kg	0.5							-	-	<0.5	<0.5	-	-
Chlorobenzene	mg/kg	0.5	2000	3600	100	8000	14400	400	-	-	<0.5	<0.5	-	-
Hexachlorobenzene	mg/kg	0.05							-	-	<0.05	<0.05	<0.05	<0.05
cis-1,4-Dichloro-2-butene	mg/kg	0.5							-	-	<0.5	<0.5	-	-
Pentachloroethane	mg/kg	0.5							-	-	<0.5	<0.5	-	-
trans-1,4-Dichloro-2-butene	mg/kg	0.5							-	-	<0.5	<0.5	-	-
1,2,4-trimethylbenzene	mg/kg	0.5							-	-	<0.5	<0.5	-	-
1,3,5-trimethylbenzene	mg/kg	0.5							-	-	<0.5	<0.5	-	-
Isopropylbenzene	mg/kg	0.5							-	-	<0.5	<0.5	-	-
n-butylbenzene	mg/kg	0.5							-	-	<0.5	<0.5	-	-
n-propylbenzene	mg/kg	0.5							-	-	<0.5	<0.5	-	-
p-isopropyltoluene	mg/kg	0.5							-	-	<0.5	<0.5	-	-
sec-butylbenzene	mg/kg	0.5							-	-	<0.5	<0.5	-	-
Styrene	mg/kg	0.5	60	108	3	240	432	12	-	-	<0.5	<0.5	-	-
tert-butylbenzene	mg/kg	0.5							-	-	<0.5	<0.5	-	-
2-hexanone (MBK)	mg/kg	5							-	-	<5	<5	-	-
Methyl Ethyl Ketone	mg/kg	5	4000	7200	200	16000	28800	800	-	-	<5	<5	-	-
4-Methyl-2-pentanone	mg/kg	5							-	-	<5	<5	-	-
Carbon disulfide	mg/kg	0.5							-	-	<0.5	<0.5	-	-
Vinyl acetate	mg/kg	5							-	-	<5	<5	-	-
1,1,1,2-tetrachloroethane	mg/kg	0.5	200	360	10	800	1440	40	-	-	<0.5	<0.5	-	-
1,1,1-trichloroethane	mg/kg	0.5	600	1080	30	2400	4320	120	-	-	<0.5	<0.5	-	-
1,1,2,2-tetrachloroethane	mg/kg	0.5	26	46.8	1.3	104	187.2	5.2	-	-	<0.5	<0.5	-	-
1,1,2-trichloroethane	mg/kg	0.5	24	43.2	1.2	96	172.8	4.8	-	-	<0.5	<0.5	-	-
1,2-dibromoethane	mg/kg	0.5							-	-	<0.5	<0.5	-	-
1,1-dichloroethane	mg/kg	0.5							-	-	<0.5	<0.5	-	-
1,1-dichloroethene	mg/kg	0.5	14	25	0.7	56	100	2.8	-	-	<0.5	<0.5	-	-
1,1-dichloropropene	mg/kg	0.5							-	-	<0.5	<0.5	-	-
1,2,3-trichloropropane	mg/kg	0.5							-	-	<0.5	<0.5	-	-
1,2-dibromo-3-chloropropane	mg/kg	0.5							-	-	<0.5	<0.5	-	-
1,2-dichloroethane	mg/kg	0.5	10	18	0.5	40	72	2	-	-	<0.5	<0.5	-	-
1,2-dichloropropane	mg/kg	0.5							-	-	<0.5	<0.5	-	-
1,3-dichloropropane	mg/kg	0.5							-	-	<0.5	<0.5	-	-
2,2-dichloropropane	mg/kg	0.5							-	-	<0.5	<0.5	-	-
Bromodichloromethane	mg/kg	0.5							-	-	<0.5	<0.5	-	-
Bromoform	mg/kg	0.5							-	-	<0.5	<0.5	-	-
Bromomethane	mg/kg	5							-	-	<5	<5	-	-
Carbon tetrachloride	mg/kg	0.5	10	18	0.5	40	72	2	-	-	<0.5	<0.5	-	-
Chlorodibromomethane	mg/kg	0.5							-	-	<0.5	<0.5	-	-
Chloroethane	mg/kg	5							-	-	<5	<5	-	-
Chloroform	mg/kg	0.5	120	216	6	480	864	24	-	-	<0.5	<0.5	-	-
Chloromethane	mg/kg	5							-	-	<5	<5	-	-
cis-1,2-dichloroethene	mg/kg	0.5							-	-	<0.5	<0.5	-	-
cis-1,3-dichloropropene	mg/kg	0.5							-	-	<0.5	<0.5	-	-
Dibromomethane	mg/kg	0.5							-	-	<0.5	<0.5	-	-
Dichlorodifluoromethane	mg/kg	5							-	-	<5	<5	-	-
Hexachlorobutadiene	mg/kg	0.5							-	-	<0.5	<0.5	-	-
Iodomethane	mg/kg	0.5							-	-	<0.5	<0.5	-	-
Trichloroethene	mg/kg	0.5	10	18	0.5	40	72	2	-	-	<0.5	<0.5	-	-
Trichlorofluoromethane	mg/kg	5							-	-	<5	<5	-	-
Tetrachloroethene	mg/kg	0.5	14	25.2	0.7	56	100.8	2.8	-	-	<0.5	<0.5	-	-
trans-1,2-dichloroethene	mg/kg	0.5							-	-	<0.5	<0.5	-	-
trans-1,3-dichloropropene	mg/kg	0.5							-	-	<0.5	<0.5	-	-
Vinyl chloride	mg/kg	5	4	7.2	0.2	16	28.8	0.8	-	-	<5	<5	-	-

Table C4 - Summary of Waste Classification Results for SMGW-TP-B316

											LocCode	SMGW-TP-B316	SMGW-TP-B316	SMGW-TP-B316	SMGW-TP-B316
											Sample ID	SMGW-TP-B316_0-0.1	SMGW-TP-B316_0.4-0.5	SMGW-TP-B316_1.1-1.3	SMGW-TP-B316_2.6-2.7
											Sample Depth Range	0-0.1	0.4-0.5	1.1-1.3	2.6-2.7
											Sample Date	9/12/2020	9/12/2020	9/12/2020	9/12/2020
											Lab Report Number	ES2044077	ES2044077	ES2044077	ES2044077
Analyte	**Units**	**EQL**	NSW EPA 2014 General Solid Waste (CT1)	NSW EPA 2014 General Solid Waste SCC1	TCLP1 General Solid Waste (µg/l or mg/l)^#	NSW EPA 2014 Restricted Solid Waste CT2	NSW EPA 2014 Restricted Solid Waste SCC2	TCLP2 Restricted Solid Waste (µg/l or mg/l)^#	NSW 2014 Excavated Natural Material (Absolute Max)	NSW 2014 Excavated Natural Material (Max Average)				
Per- and Polyfluoroalkyl Substances														
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	mg/kg	0.0005							-	-	<0.0005	<0.0005	-	<0.0005
6:2 Fluorotelomer Sulfonate (6:2 FtS)	mg/kg	0.0005							-	-	<0.0005	<0.0005	-	<0.0005
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	mg/kg	0.0005							-	-	<0.0005	<0.0005	-	<0.0005
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	mg/kg	0.0005							-	-	<0.0005	<0.0005	-	<0.0005
Perfluorooctane sulfonamide (FOSA)	mg/kg	0.0002							-	-	<0.0002	<0.0002	-	<0.0002
N-Methyl perfluorooctane sulfonamide (MeFOSA)	mg/kg	0.0005							-	-	<0.0005	<0.0005	-	<0.0005
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	mg/kg	0.0005							-	-	<0.0005	<0.0005	-	<0.0005
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE Alcohol)	mg/kg	0.0005							-	-	<0.0005	<0.0005	-	<0.0005
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE	mg/kg	0.0005							-	-	<0.0005	<0.0005	-	<0.0005
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	mg/kg	0.0002							-	-	<0.0002	<0.0002	-	<0.0002
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	mg/kg	0.0002							-	-	<0.0002	<0.0002	-	<0.0002
Perfluorobutane sulfonic acid (PFBS)	mg/kg	0.0002							-	-	<0.0002	<0.0002	-	<0.0002
Perfluoropentane sulfonic acid (PFPeS)	mg/kg	0.0002							-	-	<0.0002	<0.0002	-	<0.0002
Perfluorohexane sulfonic acid (PFHxS)	mg/kg	0.0002							-	-	<0.0002	<0.0002	-	<0.0002
Perfluoroheptane sulfonic acid (PFHpS)	mg/kg	0.0002							-	-	<0.0002	<0.0002	-	<0.0002
Perfluorooctane sulfonic acid (PFOS)	mg/kg	0.0002							-	-	<0.0002	<0.0002	-	<0.0002
Perfluorodecane sulfonic acid (PFDS)	mg/kg	0.0002							-	-	<0.0002	<0.0002	-	<0.0002
Perfluorobutanoic acid (PFBA)	mg/kg	0.001							-	-	<0.001	<0.001	-	<0.001
Perfluoropentanoic acid (PFPeA)	mg/kg	0.0002							-	-	<0.0002	<0.0002	-	<0.0002
Perfluorohexanoic acid (PFHxA)	mg/kg	0.0002							-	-	<0.0002	<0.0002	-	<0.0002
Perfluoroheptanoic acid (PFHpA)	mg/kg	0.0002							-	-	<0.0002	<0.0002	-	<0.0002
Perfluorooctanoate (PFOA)	mg/kg	0.0002		18	500		72	2000	-	-	<0.0002	<0.0002	-	<0.0002
Perfluorononanoic acid (PFNA)	mg/kg	0.0002							-	-	<0.0002	<0.0002	-	<0.0002
Perfluorodecanoic acid (PFDA)	mg/kg	0.0002							-	-	<0.0002	<0.0002	-	<0.0002
Perfluoroundecanoic acid (PFUnDA)	mg/kg	0.0002							-	-	<0.0002	<0.0002	-	<0.0002
Perfluorododecanoic acid (PFDoDA)	mg/kg	0.0002							-	-	<0.0002	<0.0002	-	<0.0002
Perfluorotridecanoic acid (PFTrDA)	mg/kg	0.0002							-	-	<0.0002	<0.0002	-	<0.0002
Perfluorotetradecanoic acid (PFTeDA)	mg/kg	0.0005							-	-	<0.0005	<0.0005	-	<0.0005
Sum of PFAS	mg/kg	0.0002							-	-	<0.0002	<0.0002	-	<0.0002
Sum of PFHxS and PFOS	mg/kg	0.0002		1.8	50		7.2	200	-	-	<0.0004	<0.0004	-	<0.0004
Sum of PFAS (WA DER List)	mg/kg	0.0002							-	-	<0.0002	<0.0002	-	<0.0002

Notes:
-: Not analysed
mg/kg: miligrams per kilogram
Sum of Scheduled Chemicals (SC) calculated by summing reported results (not all SC were included in the analytical suite)
Sum of Moderately Harmful Pesticides (MHP) calculated by summing reported results (not all MHP were included in the analytical suite)
~: Waste Classification criteria for chromium VI
^: Where TCLP testing has been undertaken, the SCC and TCLP values are adopted as opposed to CT values

Table C5 - Summary of Groundwater Results for SMGW-BH-B106

						19122621	19122621	19122621	19122621	19122621	19122621
						ES2014202	ES2018302	ES2022565	ES2026610	ES2030053	ES2105242
						SMGW-BH-B106	SMGW-BH-B106	SMGW-BH-B106	SMGW-BH-B106	SMGW-BH-B106	SMGW_BH_B106
						SMGW-BH-B106	SMGW-BH-B106	SMGW-BH-B106	SMGW-BH-B106	SMGW-BH-B106	SMGW-BH-B106
						27/04/2020	27/05/2020	30/06/2020	31/07/2020	26/08/2020	15/02/2021
	Unit	EQL	DGV	Drinking Water Health x10	Drinking Water Aesthetic						
EIL Parameters											
Electrical Conductivity @ 25°C	µS/cm	1				17,200	16,000	16,700	19,800	20,300	21,100
pH (Lab)	pH_Units	0				7.19	7.03	6.44	6.59	6.96	6.55
Total Dissolved Solids @180°C	mg/L	5				12,700	11,900	15,500	13,700	14,200	15,700
Total Dissolved Solids @180°C (filtered)	mg/L	5				-	-	-	-	-	-
Sodium (filtered)	mg/L	0.1			180	**2,310**	**2,370**	**3,050**	**2,510**	**2,950**	**3,270**
Potassium (filtered)	mg/L	0.1				20	19	20	19	16	17
Calcium (filtered)	mg/L	0.1				357	265	305	235	255	256
Magnesium (filtered)	mg/L	0.1				691	690	961	729	892	1,000
Chloride	mg/L	1			250	5,350	5,190	6,690	5,890	6,810	6,720
Sulphate (as SO4) (filtered)	mg/L	1		5,000	250	1,410	-	-	-	-	-
Sulfate as SO4 - Turbidimetric (filtered)	mg/L	1		5,000	250	-	1,330	1,580	1,520	1,550	1,650
Bicarbonate Alkalinity (as CaCO3)	mg/L	1				381	278	264	286	231	252
Carbonate Alkalinity (as CaCO3)	mg/L	1				<1	<1	<1	<1	<1	<1
Hydroxide Alkalinity (as CaCO3)	mg/L	1				<1	<1	<1	<1	<1	<1
Total Alkalinity (as CaCO3)	mg/L	1				381	278	264	286	231	252
Nitrate (as N)	mg/L	0.005		113		4.06	2.45	0.63	2.20	-	0.32
Nitrite (as N)	mg/L	0.005		6.8		0.03	0.01	<0.01	<0.01	-	<0.01
Ammonia (as N)	mg/L	0.005	0.9		0.38	0.67	0.80	1.31	1.23	-	0.84
Total Kjeldahl Nitrogen (as N)	mg/L	0.05				1.2	1.2	1.7	1.6	-	1.3
Nitrogen (Total)	mg/L	0.05				5.3	3.7	2.3	3.8	-	1.6
Fluoride	mg/L	0.1		15		0.4	0.3	0.3	0.3	0.2	0.2
Reactive Phosphorus (as P)	mg/L	0.005				<0.01	<0.01	<0.01	<0.01	-	<0.01
Total Phosphorus (as P)	mg/L	0.01				0.06	0.22	0.10	0.08	-	0.08
Total Suspended Solids	mg/L	5				65	2,430	3,310	792	3,100	560
Total Anions	meq/L	0.01				188	180	227	204	229	229
Total Cations	meq/L	0.01				176	174	227	181	215	238
Ionic Balance (Lab)	%	0.01				3.36	1.72	0.13	5.75	3.18	1.88
Hardness (as CaCO3)	µg/L	1,000				-	-	-	3,590,000	-	4,760,000
Hardness (as CaCO3) (filtered)	µg/L	1,000				3,740,000	3,500,000	4,720,000	-	4,310,000	-
Sample Quality Parameters											
Nitrate + Nitrite (as N)	mg/L	0.01				4.09	2.46	0.63	2.20	-	0.32
Microbiological											
Sulphate Reducing Bacteria Population Estimate	pac/mL	1				-	500,000	6,000	27,000	115,000	115,000
Other											
Methane	µg/L	5				19	-	-	-	-	-
Perfluorinated Compounds											
10:2 Fluorotelomer sulfonic acid	µg/L	0.01				<0.05	-	-	-	-	-
4:2 Fluorotelomer sulfonic acid	µg/L	0.0005				<0.05	-	-	-	-	-
8:2 Fluorotelomer sulfonate	µg/L	0.0005				<0.05	-	-	-	-	-
N-Et-FOSA	µg/L	0.0025				<0.05	-	-	-	-	-

Table C5 (continued)- Summary of Groundwater Results for SMGW-BH-B106

								19122621	19122621	19122621	19122621	19122621	19122621
								ES2014202	ES2018302	ES2022565	ES2026610	ES2030053	ES2105242
								SMGW-BH-B106	SMGW-BH-B106	SMGW-BH-B106	SMGW-BH-B106	SMGW-BH-B106	SMGW_BH_B106
								SMGW-BH-B106	SMGW-BH-B106	SMGW-BH-B106	SMGW-BH-B106	SMGW-BH-B106	SMGW-BH-B106
								27/04/2020	27/05/2020	30/06/2020	31/07/2020	26/08/2020	15/02/2021
	Unit	EQL	DGV	Water Quality Guidelines	Drinking Water Health (x10)	Drinking Water Aesthetic	Recreational Water Quality Guidelines	HSL fo Vapour Intrusion, Clay 2 to<4m						
N-Et-FOSE	µg/L	0.0025							<0.05	-	-	-	-	-
N-Me-FOSA	µg/L	0.0025							<0.05	-	-	-	-	-
N-Me-FOSE	µg/L	0.0025							<0.05	-	-	-	-	-
Perfluorobutanoic acid (PFBA)	µg/L	0.0005							<0.1	-	-	-	-	-
Perfluoroheptane sulfonic acid	µg/L	0.0002							<0.02	-	-	-	-	-
Perfluoro-n-hexadecanoic acid	µg/L	0.002							-	-	-	-	-	-
Perfluoro-n-pentanoic acid (PFPeA)	µg/L	0.0005							<0.02	-	-	-	-	-
Perfluoropentane sulfonic acid	µg/L	0.001							<0.02	-	-	-	-	-
Perfluoro-1-dodecanesulfonate	µg/L	0.0005							-	-	-	-	-	-
Perfluorononanesulfonic acid (PFNS)	ng/l	0.5							-	-	-	-	-	-
PFDcS	µg/L	0.0005							<0.02	-	-	-	-	-
Sum of PFAS (Swedish WQ Guideline plus 8	µg/L	0.01							-	-	-	-	-	-
N-methyl-perfluorooctanesulfonamidoacetic acid	µg/L	0.0025							<0.02	-	-	-	-	-
Sum of PFHxS and PFOS (lab reported)	µg/L	0.0002					2		<0.01	-	-	-	-	-
Sum of US EPA PFAS (PFOS + PFOA)	µg/L	0.01							-	-	-	-	-	-
Sum of WA DER PFAS (n=10)	µg/L	0.01							<0.01	-	-	-	-	-
Sum of PFASs (n=28)	µg/L	0.01							<0.01	-	-	-	-	-
Perfluorobutanesulfonic acid (PFBS)	µg/L	0.001							<0.02	-	-	-	-	-
Perfluorodecanesulfonic acid (PFDS)	µg/L	0.02							-	-	-	-	-	-
Perfluorodecanoic acid (PFDA)	µg/L	0.001							<0.02	-	-	-	-	-
Perfluorododecanoic acid (PFDoA)	µg/L	0.001							<0.02	-	-	-	-	-
Perfluoroheptanoic acid (PFHpA)	µg/L	0.0005							<0.02	-	-	-	-	-
Perfluorooctanesulfonic acid (PFOS)3	µg/L	0.0002		0.00023					<0.01	-	-	-	-	-
Perfluorooctanoate (PFOA)	µg/L	0.0005		19			10		<0.01	-	-	-	-	-
Perfluorohexanesulfonic acid (PFHxS)	µg/L	0.0002							<0.02	-	-	-	-	-
Perfluorononanoic acid (PFNA)	µg/L	0.001							<0.02	-	-	-	-	-
Perfluorohexanoic acid (PFHxA)	µg/L	0.0005							<0.02	-	-	-	-	-
6:2 Fluorotelomer Sulfonate (6:2 FtS)	µg/L	0.0005							<0.05	-	-	-	-	-
N-ethyl-perfluorooctanesulfonamidoacetic acid	µg/L	0.0025							<0.02	-	-	-	-	-
Perfluorooctanesulfonamide (PFOSA)	µg/L	0.002							<0.02	-	-	-	-	-
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.001							<0.05	-	-	-	-	-
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.001							<0.02	-	-	-	-	-
Perfluoroundecanoic acid (PFUnA)	µg/L	0.001							<0.02	-	-	-	-	-
TRH - HSL														
TRH C6 - C10 Fraction F1	mg/L	0.01							<0.02	-	-	-	-	-
TRH C6 - C10 Fraction Less BTEX F1	mg/L	0.01						NL	<0.02	-	-	-	-	-
TRH >C10 - C16 Fraction F2	mg/L	0.05							<0.1	-	-	-	-	-
TRH >C10 - C16 Fraction Less Naphthalene (F2)	mg/L	0.05						NL	<0.1	-	-	-	-	-
TRH >C16 - C34 Fraction F3	mg/L	0.1							<0.1	-	-	-	-	-
TRH >C34 - C40 Fraction F4	mg/L	0.1							<0.1	-	-	-	-	-
TRH C37 - C40 Fraction	mg/L	0.2							-	-	-	-	-	-
TRH+C10 - C40 (Sum of total) (Lab Reported)	mg/L	0.1							<0.1	-	-	-	-	-
TPH Group - Waste Classification														
TRH C6 - C9 Fraction	mg/L	0.01							<0.02	-	-	-	-	-
TRH C10 - C14 Fraction	mg/L	0.05							<0.05	-	-	-	-	-
TRH C15 - C28 Fraction	mg/L	0.1							<0.1	-	-	-	-	-
TRH C29 - C36 Fraction	mg/L	0.05							<0.05	-	-	-	-	-
TRH+C10 - C36 (Sum of total) (Lab Reported)	mg/L	0.05							<0.05	-	-	-	-	-
BTEX														
Benzene	µg/L	0.5	950		10	-		30,000	<1	-	-	-	-	-
Toluene	µg/L	0.5	180		8,000	25		NL	<2	-	-	-	-	-
Ethylbenzene	µg/L	0.5	80		3,000	3		NL	<2	-	-	-	-	-
Xylenes (m & p)	µg/L	1	75+200						<2	-	-	-	-	-
Xylene (o)	µg/L	0.5	350						<2	-	-	-	-	-
Xylenes (Sum of total) (Lab Reported)	µg/L	1.5			6,000	20		NL	<2	-	-	-	-	-
Total BTEX	µg/L	1							<1	-	-	-	-	-
Heavy Metals														
Aluminium	µg/L	5	0.8			0.2			880	5,800	960	1,500	2,380	2,940
Aluminium (filtered)	µg/L	5	0.8			0.2			<10	<10	20	<10	10	90
Barium	µg/L	1			20,000				90	104	53	71	55	74
Barium (filtered)	µg/L	1			20,000				83	64	50	48	41	45
Beryllium	µg/L	0.5			600				<1	1	<1	<1	<1	1
Beryllium (filtered)	µg/L	0.5			600				<1	<1	<1	<1	<1	1
Boron	µg/L	5	940		40,000				<50	<50	<50	<50	<50	<50
Boron (filtered)	µg/L	5	940		40,000				<50	<50	<50	<50	<50	<50
Cobalt	µg/L	1	1.4						120	174	240	177	282	294
Cobalt (filtered)	µg/L	1	1.4						113	133	230	172	258	327
Iron	mg/L	0.005				0.3			3.27	13.7	12.8	2.29	16.0	22.4
Iron (filtered)	mg/L	0.005				0.3			2.23	2.08	10.6	0.62	13.2	17.5
Manganese	µg/L	1	1900		5,000				2,570	3,260	5,210	3,480	4,860	5,420
Manganese (filtered)	µg/L	1	1900		5,000				2,550	2,560	4,710	3,280	4,950	5,170
Molybdenum	µg/L	1	34		500				5	2	<1	1	<1	<1
Molybdenum (filtered)	µg/L	1	34		500				4	2	<1	<1	<1	<1
Selenium	µg/L	1	5		100				<10	<10	<10	<10	<10	<10
Selenium (filtered)	µg/L	1	5		100				<10	<10	<10	<10	<10	10
Strontium	µg/L	1							2,880	2,460	2,640	1,840	2,320	1,930
Strontium (filtered)	µg/L	1							2,820	2,200	2,640	1,860	2,310	2,100
Vanadium	µg/L	1	6						<10	20	<10	<10	<10	<10
Vanadium (filtered)	µg/L	1	6						<10	<10	<10	<10	<10	<10
Arsenic	µg/L	1	13 (As III)		100				<1	4	<1	<1	1	1
Arsenic (filtered)	µg/L	1	13 (As III)		100				<1	<1	2	<1	<1	<1
Cadmium	µg/L	0.1	7.5		20				0.7	0.8	0.4	0.8	0.4	0.5
Cadmium (filtered)	µg/L	0.1	7.5		20				0.6	0.8	0.4	0.7	0.4	0.3
Chromium	µg/L	1	94 for Cr (III) and 1 for Cr(VI)		500 for Cr(VI)				<1	14	3	2	4	4
Chromium (filtered)	µg/L	1	94 for Cr (III) and 1 for Cr(VI)		500 for Cr(VI)				<1	<1	<1	<1	<1	<1
Copper	µg/L	1	1.4		20,000	1,000			8	41	9	9	14	30
Copper (filtered)	µg/L	1	1.4		20,000	1,000			37	7	3	6	8	1

Table C5 (continued)- Summary of Groundwater Results for SMGW-BH-B106

						19122621	19122621	19122621	19122621	19122621	19122621
						ES2014202	ES2018302	ES2022565	ES2026610	ES2030053	ES2105242
						SMGW-BH-B106	SMGW-BH-B106	SMGW-BH-B106	SMGW-BH-B106	SMGW-BH-B106	SMGW_BH_B106
						SMGW-BH-B106	SMGW-BH-B106	SMGW-BH-B106	SMGW-BH-B106	SMGW-BH-B106	SMGW-BH-B106
						27/04/2020	27/05/2020	30/06/2020	31/07/2020	26/08/2020	15/02/2021
	Unit	EQL	DGV	Drinking Water Health (x10)	Drinking Water Aesthetic						
Lead	µg/L	1	603	100		<1	15	2	1	4	4
Lead (filtered)	µg/L	1	603	100		<1	<1	<1	<1	<1	<1
Mercury	µg/L	0.05	0.06	10		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Mercury (filtered)	µg/L	0.05	0.06	10		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	µg/L	1	352	200		98	132	168	128	195	208
Nickel (filtered)	µg/L	1	352	200		97	106	163	128	175	223
Zinc	µg/L	1	256		3000	167	297	274	281	345	487
Zinc (filtered)	µg/L	1	256		3000	178	184	279	271	322	274
PAH											
Acenaphthene	µg/L	0.1				<1.0	-	-	-	-	-
Acenaphthylene	µg/L	0.1				<1.0	-	-	-	-	-
Anthracene	µg/L	0.1	0.01			<1.0	-	-	-	-	-
Benz(a)anthracene	µg/L	0.1				<1.0	-	-	-	-	-
Benzo(a)pyrene	µg/L	0.1	0.1	0.1		<0.5	-	-	-	-	-
Benzo(a)pyrene TEQ (lower bound)*	µg/L	0.5				<0.5	-	-	-	-	-
Benzo(b)&(j)fluoranthene	µg/L	0.1				<1.0	-	-	-	-	-
Benzo(g,h,i)perylene	µg/L	0.1				<1.0	-	-	-	-	-
Benzo(k)fluoranthene	µg/L	0.1				<1.0	-	-	-	-	-
Chrysene	µg/L	0.1				<1.0	-	-	-	-	-
Dibenz(a,h)anthracene	µg/L	0.1				<1.0	-	-	-	-	-
Fluoranthene	µg/L	0.1	1			<1.0	-	-	-	-	-
Fluorene	µg/L	0.1				<1.0	-	-	-	-	-

Table C5 (continued)- Summary of Groundwater Results for SMGW-BH-B106

					19122621	19122621	19122621	19122621	19122621	19122621
					ES2014202	ES2018302	ES2022565	ES2026610	ES2030053	ES2105242
					SMGW-BH-B106	SMGW-BH-B106	SMGW-BH-B106	SMGW-BH-B106	SMGW-BH-B106	SMGW_BH_B106
					SMGW-BH-B106	SMGW-BH-B106	SMGW-BH-B106	SMGW-BH-B106	SMGW-BH-B106	SMGW-BH-B106
					27/04/2020	27/05/2020	30/06/2020	31/07/2020	26/08/2020	15/02/2021
	Unit	EQL	DGV	HSL Vapour Intrusion D, clay, 2 to <4 m						
Indeno(1,2,3-c,d)pyrene	µg/L	0.1			<1.0	-	-	-	-	-
Naphthalene	µg/L	0.1	16	NL	<1.0	-	-	-	-	-
Phenanthrene	µg/L	0.1	0.6		<1.0	-	-	-	-	-
Pyrene	µg/L	0.1			<1.0	-	-	-	-	-
PAH (Sum of Common 16 PAHs - Lab Reported)	µg/L	0.5			<0.5	-	-	-	-	-

Table C5 (continued)- Summary of Groundwater Results for SMGW-BH-B106

						19122621	19122621	19122621	19122621	19122621	19122621
						ES2014202	ES2018302	ES2022565	ES2026610	ES2030053	ES2105242
						SMGW-BH-B106	SMGW-BH-B106	SMGW-BH-B106	SMGW-BH-B106	SMGW-BH-B106	SMGW_BH_B106
						SMGW-BH-B106	SMGW-BH-B106	SMGW-BH-B106	SMGW-BH-B106	SMGW-BH-B106	SMGW-BH-B106
						27/04/2020	27/05/2020	30/06/2020	31/07/2020	26/08/2020	15/02/2021
	Unit	EQL	SMW 95% Protection of Species ANZG 2018	Drinking Water Health (x10)	Drinking Water Aesthetic						
Volatile Organic Compounds											
1,4-Dichlorobenzene	µg/L	0.3	60	400	0.3	<5	-	-	-	-	-
4-Chlorotoluene	µg/L	0.5				<5	-	-	-	-	-
1,2,3-Trichlorobenzene	µg/L	0.5	3			<5	-	-	-	-	-
1,2,4-Trichlorobenzene	µg/L	0.5	85			<5	-	-	-	-	-
1,2-Dichlorobenzene	µg/L	0.5	160	15,000	1	<5	-	-	-	-	-
1,3-Dichlorobenzene	µg/L	0.5	260		20	<5	-	-	-	-	-
2-Chlorotoluene	µg/L	0.5				<5	-	-	-	-	-
Bromobenzene	µg/L	0.5				<5	-	-	-	-	-
Chlorobenzene	µg/L	0.5	55	3,000	10	<5	-	-	-	-	-
1,2,4-trimethylbenzene	µg/L	0.5				<5	-	-	-	-	-
1,3,5-Trimethylbenzene	µg/L	0.5				<5	-	-	-	-	-
Isopropylbenzene	µg/L	0.5	30			<5	-	-	-	-	-
n-Butylbenzene	µg/L	0.5				<5	-	-	-	-	-
n-Propylbenzene	µg/L	0.5				<5	-	-	-	-	-
p-Isopropyltoluene	µg/L	0.5				<5	-	-	-	-	-
sec-Butylbenzene	µg/L	0.5				<5	-	-	-	-	-
Styrene	µg/L	0.5		300		<5	-	-	-	-	-
tert-Butylbenzene	µg/L	0.5				<5	-	-	-	-	-
Methyl Ethyl Ketone	µg/L	10				<50	-	-	-	-	-
2-Hexanone	µg/L	5				<50	-	-	-	-	-
Methyl iso-butyl ketone	µg/L	5				<50	-	-	-	-	-
Vinyl acetate	µg/L	10				<50	-	-	-	-	-
1,1,1,2-Tetrachloroethane	µg/L	0.5				<5	-	-	-	-	-
1,1,2,2-Tetrachloroethane	µg/L	0.5	400			<5	-	-	-	-	-
1,1,1-Trichloroethane	µg/L	0.5	270			<5	-	-	-	-	-
1,1,2-Trichloroethane	µg/L	0.5	6,500			<5	-	-	-	-	-
1,2,3-Trichloropropane	µg/L	0.5				<5	-	-	-	-	-
1,2-Dibromo-3-chloropropane	µg/L	0.5				<5	-	-	-	-	-
1,2-Dibromoethane	µg/L	0.5				<5	-	-	-	-	-
1,1-Dichloroethane	µg/L	0.5				<5	-	-	-	-	-
1,2-Dichloroethane	µg/L	0.5	1,900	30		<5	-	-	-	-	-
1,1-Dichloroethene	µg/L	0.5	700	300		<5	-	-	-	-	-
cis-1,2-Dichloroethene	µg/L	0.5				<5	-	-	-	-	-
trans-1,2-dichloroethene	µg/L	0.5				<5	-	-	-	-	-
1,2-Dichloropropane	µg/L	0.5	900			<5	-	-	-	-	-
1,3-Dichloropropane	µg/L	0.5	1,100			<5	-	-	-	-	-
2,2-Dichloropropane	µg/L	0.5				<5	-	-	-	-	-
1,1-Dichloropropene	µg/L	0.5				<5	-	-	-	-	-
cis-1,3-Dichloropropene	µg/L	0.5				<5	-	-	-	-	-
trans-1,3-dichloropropene	µg/L	0.5				<5	-	-	-	-	-
cis-1,4-Dichloro-2-butene	µg/L	1				<5	-	-	-	-	-
trans-1,4-Dichloro-2-butene	µg/L	1				<5	-	-	-	-	-
Bromodichloromethane	µg/L	0.5				<5	-	-	-	-	-
Bromoform	µg/L	0.5				<5	-	-	-	-	-
Bromomethane	µg/L	10				<50	-	-	-	-	-
Carbon disulfide	µg/L	2	20			<5	-	-	-	-	-
Carbon tetrachloride	µg/L	0.5	240	30		<5	-	-	-	-	-
Chlorodibromomethane	µg/L	0.5				<5	-	-	-	-	-
Chloroethane	µg/L	5				<50	-	-	-	-	-
Chloroform	µg/L	0.5	370			<5	-	-	-	-	-
Chloromethane	µg/L	5				<50	-	-	-	-	-
Dibromomethane	µg/L	0.5				<5	-	-	-	-	-
Dichlorodifluoromethane	µg/L	5				<50	-	-	-	-	-
Hexachlorobutadiene	µg/L	0.5		7		<5	-	-	-	-	-
Iodomethane	µg/L	5				<5	-	-	-	-	-
Pentachloroethane	µg/L	0.5	80			<5	-	-	-	-	-
Trichloroethene	µg/L	0.5	330			<5	-	-	-	-	-
Tetrachloroethene	µg/L	0.5	70	500		<5	-	-	-	-	-
Trichlorofluoromethane	µg/L	1				<50	-	-	-	-	-
Vinyl chloride	µg/L	0.3	100	3		<50	-	-	-	-	-

Statistics

* A Non Detect Multiplier of 0.5 has been applied.

Appendix D

Data Quality Objectives

Data Quality Objectives
DSI for AEC35, 43A Luddenham Road, Orchard Hills
SCAW Package for SMWSA

As shown in the table below, 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 NEPC *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM]* (NEPC, 2013).

Step	Summary
1: State the problem	The problem to be addressed is that the extent and nature of potential contamination at the site is unknown and it is unclear whether the site is suitable for the proposed uses. The objective of the proposed DSI is to determine the contamination status of the site with respect to the proposed land use and, if contamination is confirmed, to make recommendations for further investigations and / or remediation to render the site suitable for the proposed uses. In addition, soil from the site may potentially be reused elsewhere within SCAW and the data obtained in the DSI, therefore, may also be used for this purpose. A preliminary conceptual site model (CSM) has been prepared for the proposed development. The project team consists of experienced environmental engineers and scientists.
2: Identify the decisions / goal of the study	The site history has identified possible contaminating previous uses which are identified in the preliminary CSM. The SAC for potential contaminants are detailed in the DSI. The decision is to establish whether or not the results fall below the SAC or whether or not the 95% upper confidence limit of the sample population falls below the SAC. On this basis, an assessment of the site's suitability from a contamination perspective and whether (or not) further assessment and / or remediation will be derived.
3: Identify the information inputs	Inputs to the investigation will be the results of analysis of samples to measure the concentrations of potential contaminants at the site using NATA accredited laboratories and methods, where possible. The SAC for each of the potential contaminants are detailed in the DSI. A photoionization detector (PID) is used on-site to screen soils for volatile contaminants. PID readings were used to inform sample selection for laboratory analysis.
4: Define the study boundaries	The site is identified in the DSI. The lateral boundaries of the investigation area are shown on Drawing 1, Appendix A.

5: Develop the analytical approach (or decision rule)	The decision rule is to compare all analytical results with SAC. Initial comparisons will be with individual results then, where required and if possible, summary statistics (including mean, standard deviation and 95% upper confidence limit (UCL) of the arithmetic mean (95% UCL)) to assess potential risks posed by the site contamination. Where a sample result exceeds the adopted criterion, a further site-specific assessment will be made as to the risk posed by the presence of that contaminant(s). Quality control results are to be assessed according to their relative percent difference (RPD) values. For field duplicates, triplicates and laboratory results, RPDs should generally be below 30%; for field blanks and rinsates, results should be at or less than the limits of reporting (NEPC, 2013).
6: Specify the performance or acceptance criteria	Baseline condition: Contaminants at the site and/or statistical analysis of data (in line with NEPC (2013)) exceed human health and environmental SAC and pose a potentially unacceptable risk to receptors (null hypothesis). Alternative condition: Contaminants at the site and statistical analysis of data (in line with NEPC (2013)) comply with human health and environmental SAC and as such, do not pose a potentially unacceptable risk to receptors (alternative hypothesis). Unless conclusive information from the collected data is sufficient to reject the null hypothesis, it is assumed that the baseline condition is true. Uncertainty that may exist due to the above potential decision errors shall be mitigated as follows: • As well as a primary screening exercise, the use of the 95% UCL as per NEPC (2013) may be applied, i.e.: 95% is the defined confidence level associated with the UCL on the geometric mean for contaminant data. The resultant 95%UCL shall subsequently be screened against the corresponding SAC. • The statistical assessment will only be able to be applied to certain data-sets, such as those obtained via systematic sampling. Identification of areas for targeted sampling will be via professional judgement and errors will not be able to have a probability assigned to them.
7: Optimise the design for obtaining data	As the purpose of the sampling program is to assess for potential contamination across the site, the sampling program is reliant on professional judgement to identify and sample the potentially affected areas. Further details regarding the sampling plan are presented in the DSI. Adequately experienced environmental scientists / engineers are to conduct field work and sample analysis interpretation.

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Appendix E

Laboratory Certificates and Chain of Custody

Appendix F

Site Assessment Criteria

Site Assessment Criteria for Soil for AEC35

Surface & Civil Alignment Works (SCAW) Package for Sydney Metro - Western Sydney Airport (SMWSA)

1.0 Introduction

It is understood that the two general future land uses associated at the site will comprise:

- The rail corridor. The rail corridor will include the rail line, embankments / noise barriers, a stabling yard and maintenance facility and stations; and
- Passive open space. These are areas immediately adjacent to the rail corridor that may be used for bike / commuter paths. It is assumed that there is an absence of buildings in areas of passive open space.

The following references were consulted for deriving 'Tier 1' SAC for soil for the two above-listed land uses:

- NEPC *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013)* [NEPM] (NEPC, 2013).
- CRC CARE *Health screening levels for petroleum hydrocarbons in soil and groundwater,* 2011 (CRC CARE, 2011).
- HEPA, *PFAS National Environmental Management Plan,* 2020 [NEMP] (HEPA, 2020).

2.0 Human Health-based Criteria

Human health-based SAC for soil and the associated future land uses are listed in Tables 1 to 5. Tier 1 criteria comprise:

- Health Investigation Levels (HIL) for a broad range of metals and organics (Table 1). HIL are applicable for assessing human health risk via all relevant pathways of exposure;
- Health Screening Levels (HSL) for vapour intrusion for selected petroleum hydrocarbons and fractions (Tables 2 and 3). These are applicable for assessing human health via the inhalation pathway. HSL are dependent on soil type and depth. HSL D are applicable to soil / areas to be covered by buildings (e.g., stations, offices and enclosed sheds);
- HSL for direct contact for selected petroleum hydrocarbons and fractions (Table 4). These are applicable for assessing human health via the direct contact pathway;
- Health investigation levels (HIL) for per- and poly-fluoroalkyl substances (PFAS) (Table 5). At the time of preparing this document, screening values were available only for perfluorooctane sulfonate (PFOS), perfluorooctanoic acid (PFOA) and perfluorohexane sulfonate (PFHxS); and
- Health screening levels for asbestos (Table 6).

For HSL for vapour intrusion, HSL for clay soils are shown as these are the predominant soil types at the site.

Table 1: Health Investigation Levels (Tier 1) from NEPM

Contaminant	HIL C for Passive Open Space (mg/kg)	HIL D for Rail Corridor (mg/kg)
Metals and Inorganics		
Arsenic	300	3000
Cadmium	90	900
Chromium (VI)	300	3600
Copper	17 000	240 000
Lead	600	1500
Mercury (inorganic)	80	730
Nickel	1200	6000
Zinc	30 000	400 000
Cyanide (free)	240	1500
Polycyclic Aromatic Hydrocarbons (PAH)		
Benzo(a)pyrene TEQ	3	40
Total PAH	300	4000
Phenols		
Phenol	40 000	240 000
Pentachlorophenol	120	660
Cresols	4000	25 000
Organochlorine Pesticides (OCP)		
DDT+DDE+DDD	400	3600
Aldrin and dieldrin	10	45
Chlordane	70	530
Endosulfan	340	2000
Endrin	20	100
Heptachlor	10	50
HCB	10	80
Methoxychlor	400	2500
Toxaphene	30	160
Organophosphorus Pesticides (OPP)		
Chlorpyrifos	250	2000
Polychlorinated Biphenyls (PCB)		
PCB	1	7

Table 2: Health Screening Levels (Tier 1) for Vapour Intrusion for Passive Open Space from NEPM

Contaminant	HSL C (mg/kg)	HSL C (mg/kg)	HSL C (mg/kg)	HSL C (mg/kg)
CLAY	**0 m to <1 m**	**1 m to <2 m**	**2 m to <4 m**	**4 m+**
Benzene	NL	NL	NL	NL
Toluene	NL	NL	NL	NL
Ethylbenzene	NL	NL	NL	NL
Xylenes	NL	NL	NL	NL
Naphthalene	NL	NL	NL	NL
TPH C6-C10 less BTEX	NL	NL	NL	NL
TPH >C10-C16 less naphthalene	NL	NL	NL	NL

Notes: TPH is total petroleum hydrocarbons

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'

Table 3: Health Screening Levels (Tier 1) for Vapour Intrusion for Rail Corridor from NEPM

Contaminant	HSL D (mg/kg)	HSL D (mg/kg)	HSL D (mg/kg)	HSL D (mg/kg)
CLAY	**0 m to <1 m**	**1 m to <2 m**	**2 m to <4 m**	**4 m+**
Benzene	4	6	9	20
Toluene	NL	NL	NL	NL
Ethylbenzene	NL	NL	NL	NL
Xylenes	NL	NL	NL	NL
Naphthalene	NL	NL	NL	NL
TPH C6-C10 less BTEX	310	480	NL	NL
TPH >C10-C16 less naphthalene	NL	NL	NL	NL

Notes: TPH is total petroleum hydrocarbons

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'

Table 4: Health Screening Levels (Tier 1) for Direct Contact from CRC CARE (2011)

Contaminant	HSL C for Passive Open Space (mg/kg)	HSL D for Rail Corridor (mg/kg)
Benzene	120	430
Toluene	18 000	99 000
Ethylbenzene	5300	27 000
Xylenes	15 000	81 000
Naphthalene	1900	11 000
TPH C6-C10 less BTEX	5100	26 000
TPH >C10-C16 less naphthalene	3800	20 000
TPH >C16-C34	5300	27 000
TPH >C34-C40	7400	38 000

Notes: TPH is total petroleum hydrocarbons.

Table 5: Health Investigation Levels (Tier 1) for PFAS from NEMP

Contaminant	HIL C for Passive Open Space (mg/kg)	HIL D for Rail Corridor (mg/kg)
PFOS and PFHxS *	1	20
PFOA	10	50

Notes: * Includes PFOS only, PFHxS only and the sum of the two.

Table 6: Health Screening Levels (Tier 1) for Asbestos from NEPM

Form of Asbestos	Health Screening Level C for Passive Open Space	Health Screening Level D for Rail Corridor
Bonded asbestos containing materials (ACM)	0.02%	0.05%
Fibrous asbestos (FA) and asbestos fines (AF) (friable asbestos)	0.001%	0.001%
All forms of asbestos	No visible asbestos for surface soil	No visible asbestos for surface soil

Notes: FA comprises friable asbestos material and includes severely weathered cement sheet, insulation products and woven asbestos material. This type of friable asbestos is defined here as asbestos material that is in a degraded condition such that it can be broken or crumbled by hand pressure. This material is typically unbonded or was previously bonded and is now significantly degraded (crumbling).
AF includes free fibres, small fibre bundles and also small fragments of bonded ACM that pass through a 7 mm x 7 mm sieve.
Surface soils defined as top 10 cm.

3.0 Ecological Criteria

Ecological SAC for soil and the associated future use are listed in Tables 7 to 9. Tier 1 criteria comprise:

- Ecological Investigation Levels (EIL) for arsenic, copper, chromium (III), nickel, lead, zinc, DDT and naphthalene (Table 7). These are derived using the interactive (excel) calculation spreadsheet on the NEPM toolbox website and are used to assess contamination with respect to terrestrial ecosystems. Site specific inputs (including soil parameters) are required to calculate EIL. EIL typically apply to the top 2 m of soil; and
- Ecological Screening Levels (ESL) for selected petroleum hydrocarbon compounds and fractions, and benzo(a)pyrene, and are used to assess contamination with respect to terrestrial ecosystems (Table 8). ESL are dependent on soil type and typically apply to the top 2 m of soil.
- Ecological Soil Guideline Values (EGV) for PFAS (Table 9). At the time of preparing this document, screening values were available only for PFOS and PFOA.

EIL were determined using the NEPC Ecological Investigation Level Spreadsheet based on the following inputs:

- A pH of 5.63 which is the average pH of the three analysed soil samples (see laboratory certificate 301941) and the four previous results for SMGW-TP-B316; and
- A Cation Exchange Capacity (CEC) of 8.17 meq/100g which is the average CEC for the three analysed soil samples (see laboratory certificate 301941);
- Contamination is assumed to be 'aged' based on site history;
- A organic carbon content value of 1% has been used as a default value;
- A clay content of 10% has been used as a relatively conservative value given the clay soil profile encountered during the investigation; and
- The state is NSW and the traffic volume is 'low'.

Clay soils were encountered during the investigation and, so, ESL for fine soils have been adopted.

Table 7: Ecological Investigation Levels (Tier 1) from NEPM toolbox

Contaminant	Public Open Space EIL for Passive Open Space (mg/kg)	Commercial and Industrial EIL for Rail Corridor (mg/kg)
Metals		
Arsenic	100	160
Copper	160	230
Nickel	110	180
Chromium III	410	670
Lead	1100	1800
Zinc	350	510
PAH		
Naphthalene	170	370

Contaminant	Public Open Space EIL for Passive Open Space (mg/kg)	Commercial and Industrial EIL for Rail Corridor (mg/kg)
OCP		
DDT	180	640

Table 8: Ecological Screening Levels (Tier 1) from NEPM

Contaminant	Soil Type	Public Open Space ESL for Passive Open Space (mg/kg)	Commercial and Industrial ESL for Rail Corridor (mg/kg)
Benzene	Fine	65	95
Toluene	Fine	105	135
Ethylbenzene	Fine	105	135
Xylenes	Fine	45	95
TPH C6-C10 less BTEX	Coarse/ Fine	180*	215*
TPH >C10-C16	Coarse/ Fine	120*	170*
TPH >C16-C34	Fine	1300	2500
TPH >C34-C40	Fine	5600	6600
Benzo(a)pyrene	Coarse / Fine	0.7	1.4

Notes: ESL are of low reliability except where indicated by * which indicates that the ESL is of moderate reliability
TPH is total petroleum hydrocarbons

Table 9: Ecological Soil Guideline Values (Tier 1) from NEMP for all Land Uses

Contaminant	Direct Exposure (mg/kg)	Indirect Exposure (mg/kg)
PFOS	1	0.01
PFOA	10	NC

Notes: NC no criterion
Direct exposure ecological soil guideline applies specifically to protection of organisms that live within, or in close contact with soil, such as earthworms and plants.
The indirect exposure ecological soil guideline accounts for the various pathways through which organisms can be exposed whether or not they are in direct contact with PFAS contaminated soil (i.e. exposure through the food chain). For intensively developed sites with no secondary consumers and minimal potential for indirect ecological exposure, a higher criterion of up to 0.14 mg/kg may be appropriate.

4.0 Management Limits

In addition to appropriate consideration and application of the human health and ecological criteria, 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.

Management limits are shown in Table 10. Predominantly clay soils were encountered during the investigation and, so, management limits for fine soils have been adopted.

Table 10: Management Limits for TPH from NEPM (mg/kg)

Contaminant	Soil Type	Public Open Space Management Limits for Passive Open Space (mg/kg)	Commercial and Industrial Management Limit for Rail Corridor (mg/kg)
TPH C6-C10	Fine	800	800
TRH >C10-C16	Fine	1000	1000
TPH >C16-C34	Fine	3500	5000
TPH >C34-C40	Fine	10 000	10 000

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Site Assessment Criteria for Groundwater for AEC35

Surface & Civil Alignment Works (SCAW) Package for Sydney Metro - Western Sydney Airport (SMWSA)

1.0 Introduction

The following references were consulted for deriving 'Tier 1' SAC for groundwater:

- NEPC *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM]* (NEPC, 2013).
- ANZG *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZG, 2018).
- NHMRC *Guidelines for Managing Risks In Recreational Water* (NHMRC, 2008).
- NHMRC, NRMMC *Australian Drinking Water Guidelines 6 2011, Version 3.8, 2022* (NHMRC, NRMMC, 2022).
- ANZECC *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZECC, 2000).
- HEPA *PFAS National Environmental Management Plan (NEMP)* (HEPA, 2020).

2.0 Ecological Criteria

SAC for the protection of aquatic freshwater ecosystems which may receive groundwater from the site include:

- Default guideline values (DGV) recommended for the protection of slightly to moderately disturbed freshwater ecosystems (or otherwise for an unknown level of protection) from ANZG (2018) (Table 1).
- Freshwater water quality guidelines from NEMP (Table 2). At the time of preparing this document, guideline values were available only for perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS). Guidelines are for 99% species protection to account for bioaccumulation in a slightly-to-moderately impacted system.

It is noted that livestock at surrounding farmland could potentially be a receptor to discharged groundwater (as surface water) that was sourced from the site, however, water quality guidelines for livestock in ANZECC (2000) are generally less conservative than the DGV (Table 1) and have not been listed herein.

Table 1: Default Guideline Values for Protection of Aquatic Ecosystems from ANZG (2018)

Contaminant	Fresh Water DGV (µg/L)
Metals	
Aluminium	0.8 for pH<6.5
Arsenic (III)	24
Arsenic (V)	13
Boron	940
Cadmium	7.5 *
Chromium (III)	94 *
Chromium (VI)	1.0
Cobalt	1.4
Copper	1.4
Lead	603 *
Manganese	1900
Mercury (inorganic)	0.06
Molybdenum	34
Nickel	352*
Selenium (total)	5
Vanadium	6
Zinc	256*
Aromatic Hydrocarbons (including BTEX)	
Benzene	950
Ethylbenzene	80
Toluene	180
m-Xylene	75
o-Xylene	350
p-Xylene	200
Isopropylbenzene	30
PAH	
Anthracene	0.01
Benzo(a)pyrene	0.1
Fluoranthene	1
Naphthalene	16
Phenanthrene	0.6
Phenols	
2,4-dinitrophenol	45
2,4-dimethylphenol	2

Contaminant	Fresh Water DGV (µg/L)
4-nitrophenol	58
Phenol	320
2,3,4,6-tetrachlorophenol	10
2,3,5,6-tetrachlorophenol	0.2
2,4,6-trichlorophenol	3
2,4-dichlorophenol	120
2,6-dichlorophenol	34
2-chlorophenol	340
Pentachlorophenol	3.6
OCP	
Aldrin	0.001
Chlordane	0.03
DDT	0.006
Dicofol	0.5
Dieldrin	0.01
Endosulfan	0.03
Endrin	0.01
Heptachlor	0.01
Lindane	0.2
Methoxychlor	0.005
Mirex	0.04
Toxaphene	0.1
Hexachlorobenzene	0.05
OPP	
Azinphos methyl	0.01
Chlorpyrifos	0.01
Diazinon	0.01
Dimethoate	0.15
Fenitrothion	0.2
Malathion	0.05
Parathion	0.004
PCB	
Aroclor 1242	0.3
Aroclor 1254	0.01
Ammonia	
Ammonia (as total ammonia nitrogen)	900

Contaminant	Fresh Water DGV (µg/L)
Other organics	
1,1,2-trichloroethane	6500
1,1-dichloroethene	700
1,2-dichloroethane	1900
1,2-dichloropropane	900
1,3-dichloropropane	1100
Carbon tetrachloride	240
Chloroform	370
Tetrachloroethene	70
Vinyl chloride	100
1,2,3-trichlorobenzene	3
1,2,4-trichlorobenzene	85
1,2-dichlorobenzene	160
1,3-dichlorobenzene	260
1,4-dichlorobenzene	60
Chlorobenzene	55
1,1,1-Trichloroethane	270
Trichloroethene	330
1,1,2,2-Tetrachloroethane	400
Carbon disulfide	20
Pentachloroethane	80

Notes: * Modified for hardness 1770 mgCaCO3/L

Table 2: Water Quality Guidelines from NEMP

Contaminant	Freshwater Water Quality Guidelines (µg/L)
PFOS	0.00023 *
PFOA	19

Notes: * Guideline value around laboratory limit of reporting offered by commercial laboratories.

3.0 Human Health and Aesthetic Criteria

Human health-based SAC include:

- Health Screening Levels (HSL) for vapour intrusion for selected petroleum hydrocarbons and fractions (Tables 3 and 4). These are applicable for assessing human health via the inhalation pathway. HSL are shown for clay, given that clay is the predominant soil type. HSL D are applicable for areas to be covered by buildings (e.g., stations, offices and enclosed sheds). Where groundwater levels are less than 2 m from the (proposed / final) ground surface, the laboratory practical quantitation limits will be adopted for initial screening purposes;
- Health-based guidelines for recreational waters (Table 5). These are health-based criteria from NHMRC, NRMMC (2022) multiplied by 10 (to account for lower human consumption of recreational waters compared to drinking water); and
- Recreational water quality guideline values (Table 6) from NEMP.

Given that groundwater in the area is not used for drinking or domestic purposes (according to groundwater bore registered with Water NSW), health-based drinking water guidelines have not been adopted as SAC.

For the consideration of aesthetics of recreational waters, aesthetic guideline values from NHMRC, NRMMC (2022) have been included in Table 5.

Table 3: Groundwater Health Screening Levels for Vapour Intrusion from NEPM for Passive Open Space

Contaminant	HSL C (µg/L)	HSL C (µg/L)	HSL C (µg/L)
CLAY	**2 m to <4 m**	**4 m to <8 m**	**8 m+**
Benzene	NL	NL	NL
Toluene	NL	NL	NL
Ethylbenzene	NL	NL	NL
Xylenes	NL	NL	NL
Naphthalene	NL	NL	NL
TPH C6-C10 minus BTEX	NL	NL	NL
TPH >C10-C16 minus naphthalene	NL	NL	NL

Notes: The solubility limit is defined as the groundwater concentration at which the water cannot dissolve any more of an individual chemical based on a petroleum mixture. The soil vapour that is in equilibrium with the groundwater will be at its maximum. If the derived groundwater HSL exceeds the water solubility limit, a soil vapour source concentration for a petroleum mixture could not exceed a level that would result 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'.

Table 4: Groundwater Health Screening Levels for Vapour Intrusion from NEPM for Rail Corridor

Contaminant	HSL D (µg/L)	HSL D (µg/L)	HSL D (µg/L)
CLAY	**2 m to <4 m**	**4 m to <8 m**	**8 m+**
Benzene	30 000	30 000	35 000
Toluene	NL	NL	NL
Ethylbenzene	NL	NL	NL
Xylenes	NL	NL	NL
Naphthalene	NL	NL	NL
TPH C6-C10 minus BTEX	NL	NL	NL
TPH >C10-C16 minus naphthalene	NL	NL	NL

Notes: The solubility limit is defined as the groundwater concentration at which the water cannot dissolve any more of an individual chemical based on a petroleum mixture. The soil vapour that is in equilibrium with the groundwater will be at its maximum. If the derived groundwater HSL exceeds the water solubility limit, a soil vapour source concentration for a petroleum mixture could not exceed a level that would result 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'.

Table 5: Guidelines for Protection of Recreational Waters from NHMRC (2008) and NHMRC, NRMMC (2022)

Contaminant	Health-based Guideline Value (µg/L)	Aesthetic Guideline Value (µg/L)
Metals		
Aluminium	-	200
Arsenic	100	-
Barium	20000	-
Beryllium	600	-
Boron	40 000	
Cadmium	20	-
Chromium (VI)	500	-
Copper	20 000	1000
Iron	-	300
Lead	100	-
Manganese	5000	-
Mercury	10	-
Molybdenum	500	-
Nickel	200	-
Selenium	100	-
Zinc	-	3000

Contaminant	Health-based Guideline Value (µg/L)	Aesthetic Guideline Value (µg/L)
BTEX		
Benzene	10	-
Toluene	8000	25
Ethylbenzene	3000	3
Xylene (total)	6000	20
PAH		
Benzo(a)pyrene	0.1	-
OCP		
Aldrin + Dieldrin	3	-
Chlordane	20	-
DDT	90	-
Endosulfan	200	-
Lindane	100	-
Heptachlor	3	-
Methoxychlor	3000	
OPP		
Azinphos methyl	300	-
Bromophos-ethyl	100	-
Chlorfenvinphos	20	-
Chlorpyrifos	100	-
Diazinon	40	-
Dichlorvos	50	-
Dimethoate	70	-
Disulfoton	40	-
Ethion	40	-
Ethoprophos (Ethoprop)	10	-
Fenitrothion	70	-
Fensulfothion	100	-
Fenthion	70	-
Malathion	700	-
Methyl parathion	7	-
Mevinphos (Phosdrin)	50	-
Monocrotophos	20	-
Omethoate	10	-
Pyrazophos	200	-

Contaminant	Health-based Guideline Value (µg/L)	Aesthetic Guideline Value (µg/L)
Terbufos	9	-
Tetrachlorvinphos	1000	-
Parathion	200	-
Pirimiphos-methyl	900	-
Halogenated Phenols		
2,4,6-trichlorophenol	200	2
2,4-dichlorophenol	2000	0.3
2-chlorophenol	3000	0.1
Pentachlorophenol	100	-
Other Organics		
1,1-dichloroethene	300	-
1,2-dichloroethane	30	-
Carbon tetrachloride	30	-
Hexachlorobutadiene	7	-
Tetrachloroethene	500	-
Vinyl chloride	3	-
1,2-dichlorobenzene	15 000	1
1,3-dichlorobenzene	-	20
1,4-dichlorobenzene	400	0.3
Chlorobenzene	3000	10
Styrene	300	4
Trihalomethanes	2500	-
1,2,3-Trichlorobenzenes (total)	300	5
1,3-Dichloropropene	1000	-
1,2-Dichloroethene	600	-
Dichloromethane (methylene chloride)	40	-
Other Inorganics		
Fluoride	15000	-
Sulfate	5 000 000	250 000
Chloride	-	250 000
Ammonia (as NH3)	-	500
Sodium	-	180000
Nitrate (as nitrate)	500 000	-
Nitrite (as nitrite)	30 000	-

Table 6: Recreational Water Quality Guideline Values From NEMP

Contaminant	Recreational Water Quality Guideline Values (µg/L)
Sum of PFOS and PFHxS	2
PFOA	10

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Appendix G

Test Pit Logs and Borehole Logs

PIEZOMETER CONSTRUCTION

HOLE NO : AEC35-BH01
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : SMF - Orchard Hills

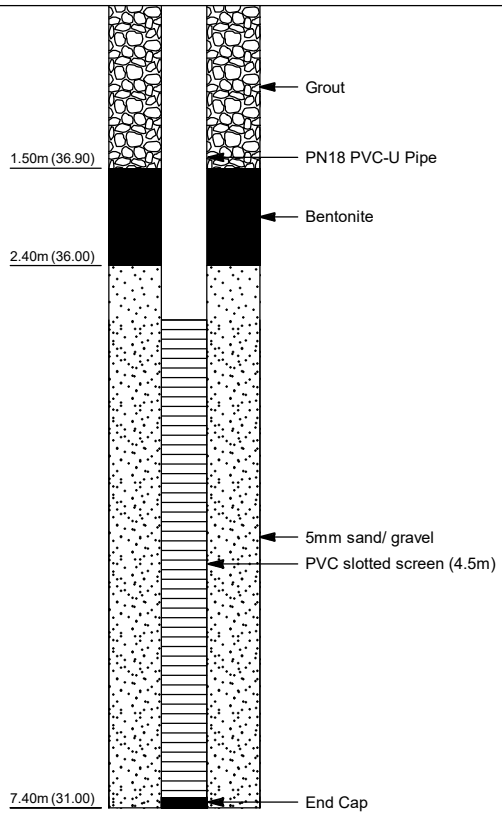
POSITION : E: 291695.4, N: 6256981.4 (56 MGA2020) SURFACE ELEVATION : 38.40 (mAHD) ANGLE FROM HORIZONTAL : 90°

RIG TYPE : Comacchio 305 MOUNTING : Track CONTRACTOR : Ground Test

DATE STARTED : 22/08/22 DATE COMPLETED : 22/08/22 DATE LOGGED : 22/08/22 LOGGED BY : BY CHECKED BY : MB

DRILLING				MATERIAL			PIEZOMETER CONSTRUCTION DETAILS
PROGRESS: DRILLING & CASING	PROGRESS: WATER LOSS	GROUND WATER LEVELS	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL (See geotechnical log for soil/rock detail)	
AD/T		Water Seepage	0.0			FILL: silty SAND: brown, fine to medium grained sand, trace fine to medium grained, angular to subangular gravel and rootlets	
						0.60m Below 0.3m: with gravel, no rootlets	
					CI-CH	Silty CLAY: medium to high plasticity, pale grey mottled orange-brown	
			2.0			2.50m	
					CI	Silty CLAY: medium plasticity, pale grey and red-brown, with fine to coarse grained, subangular to subrounded ironstone gravel and bands	
						3.50m	
			4.0		CL-CI	Silty CLAY: low to medium plasticity, grey and dark grey, extremely weathered siltstone	
						4.50m	
						SILTSTONE: grey and dark grey, apparently very low to low strength	
			6.0			7.50m	
						AEC35-BH01 TERMINATED AT 7.50 m Target depth	
			8.0				
			10.0				
			12.0				
			14.0				

ID 1 | Type | Stick Up & RL 0.60 m 37.80 m mAHD | Tip Depth & RL 7.40 m 31.00 mAHD | Installation Date 22/08/2022 | Static Water Level



This report of well/VWP installation must be read in conjunction with accompanying notes and abbreviations. The geotechnical log is a summary only and the detailed log should be referred to for strata details and any core loss zones.

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PIEZOMETER CONSTRUCTION

HOLE NO : AEC35-BH02
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

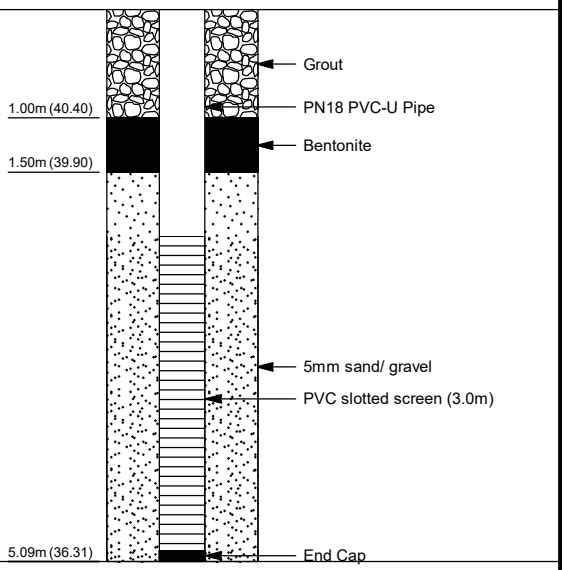
PROJECT : Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : SMF - Orchard Hills

POSITION : E: 291776.1, N: 6256877.5 (56 MGA2020) SURFACE ELEVATION : 41.40 (mAHD) ANGLE FROM HORIZONTAL : 90°

RIG TYPE : Comacchio 305 MOUNTING : Track CONTRACTOR : Ground Test

DATE STARTED : 19/08/22 DATE COMPLETED : 19/08/22 DATE LOGGED : 19/08/22 LOGGED BY : BY CHECKED BY : MB

DRILLING			MATERIAL			PIEZOMETER CONSTRUCTION DETAILS
PROGRESS: DRILLING & CASING	WATER LOSS	GROUND WATER LEVELS	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL (See geotechnical log for soil/rock detail)
AD/T		22/08/22 07:45	0.0			0.15m FILL: silty SAND: brown, fine to medium grained sand, trace clay and rootlets
						Silty CLAY: medium to high plasticity, pale grey mottled orange-brown
					CI-CH	
			2.0			2.50m
		Water Seepage				Silty CLAY: medium plasticity, pale grey and red-brown, with fine to coarse grained, subangular to subrounded ironstone gravel and bands
			4.0		CI	
						4.50m
					CL-CI	Silty CLAY: low to medium plasticity, grey and dark grey
						5.09m
						AEC35-BH02 TERMINATED AT 5.09 m Target depth
			6.0			
			8.0			
			10.0			
			12.0			
			14.0			



This report of well/VWP installation must be read in conjunction with accompanying notes and abbreviations. The geotechnical log is a summary only and the detailed log should be referred to for strata details and any core loss zones.

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PIEZOMETER CONSTRUCTION

HOLE NO : AEC35-BH03
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : SMF - Orchard Hills

POSITION : E: 291825.5, N: 6256847.0 (56 MGA2020) SURFACE ELEVATION : 42.30 (mAHD) ANGLE FROM HORIZONTAL : 90°

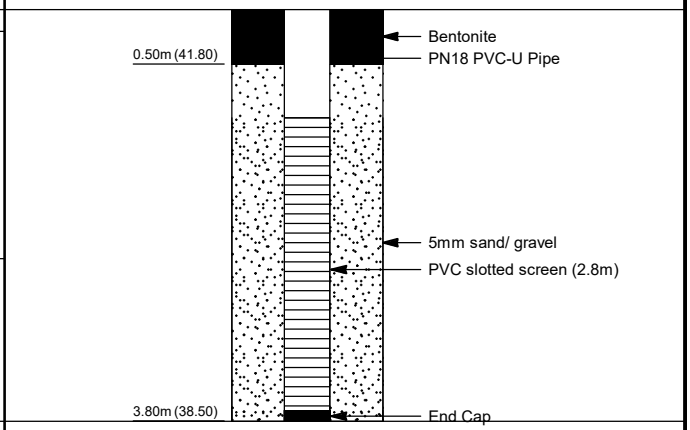
RIG TYPE : Comacchio 305 MOUNTING : Track CONTRACTOR : Ground Test

DATE STARTED : 19/08/22 DATE COMPLETED : 19/08/22 DATE LOGGED : 19/08/22 LOGGED BY : BY CHECKED BY : MB

DRILLING				MATERIAL			PIEZOMETER CONSTRUCTION DETAILS
PROGRESS: DRILLING & CASING	PROGRESS: WATER LOSS	GROUND WATER LEVELS	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL (See geotechnical log for soil/rock detail)	
AD/T		22/08/22 07:50	0.0			0.20m FILL: silty SAND: brown, fine to medium grained sand, trace clay and rootlets	
					CI-CH	Silty CLAY: medium to high plasticity, pale grey mottled orange-brown	
			2.0			2.30m	
		Water seepage			CI	Silty CLAY: medium plasticity, pale grey and red-brown, with fine to coarse grained, subangular to subrounded ironstone gravel and bands	
						3.80m	
			4.0			AEC35-BH03 TERMINATED AT 3.80 m Target depth	
			6.0				
			8.0				
			10.0				
			12.0				
			14.0				

PIEZOMETER CONSTRUCTION DETAILS

ID	Type	Stick Up & RL	Tip Depth & RL	Installation Date	Static Water Level
1		1.00 m 41.30 m mAHD	3.80 m 38.50 mAHD	19/08/2022	



This report of well/VWP installation must be read in conjunction with accompanying notes and abbreviations. The geotechnical log is a summary only and the detailed log should be referred to for strata details and any core loss zones.

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EXCAVATION - GEOLOGICAL LOG

PIT NO : AEC35TP01
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : SMF - Orchard Hills

POSITION : E: 291702.8, N: 6256983.5 (56 MGA2020)	SURFACE ELEVATION : 38.80 (mAHD)
EQUIPMENT TYPE : 14 tonne Excavator	METHOD : 800mm bucket
DATE EXCAVATED : 29/7/22	LOGGED BY : SR CHECKED BY : MB/DEM
EXCAVATION DIMENSIONS : 1.00 m LONG 0.80 m WIDE	

DRILLING | MATERIAL

VE / PENETRATION (E, F, H)	SUPPORT	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY / RELATIVE DENSITY	HAND PENETROMETER (kPa)	STRUCTURE & Other Observations
		Not Observed	ES 0.10m	0.0			0.10m FILL: gravelly silty CLAY: low to medium plasticity, dark brown, angular to subangular gravel, rootlets and wood	w<PL	-		FILL 0.00: PID=0
			0.20m ES 0.30m				0.30m FILL: silty CLAY: low to medium plasticity, red-orange, with angular to subangular gravel, rootlets and organic matter	w<PL			0.20: PID=0
				0.5			CLAY: medium to high plasticity, pale grey and orange, trace organic matter, ironstone gravel and rootlets				RESIDUAL SOIL
			0.80m ES 0.90m	1.0							0.80: PID<1
			1.50m ES 1.60m	1.5		CI-CH		w<PL			1.50: PID<1
							At 1.8m: extremely weathered ironstone gravel				
			2.10m ES 2.20m	2.0							2.10: PID<1
				2.5			2.50m EXCAVATION AEC35TP01 TERMINATED AT 2.50 m Target depth				
				3.0							
				3.5							
				4.0							
				4.5							
				5.0							

PHOTOGRAPHS NOTES ☒ YES ☐ NO

METHOD
- N Natural Exposure
- E Existing Excavation
- BH Backhoe Bucket
- B Bulldozer Blade
- R Ripper

SUPPORT
- T Timbering

PENETRATION
VE E F H VH — No Resistance

WATER
10 Oct., 73 Water Level on Date shown
water inflow
water outflow

SAMPLES & FIELD TESTS
- U50 - Undisturbed Sample 50 mm diameter
- D - Disturbed Sample
- B - Bulk Disturbed Sample
- MC - Moisture Content
- HP - Hand Penetrometer (UCS kPa)
- VS - Vane Shear; P-Peak, R-Remouded (uncorrected kPa)
- PBT - Plate Bearing Test

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

MOISTURE
- D - Dry
- M - Moist
- W - Wet

CONSISTENCY/ RELATIVE DENSITY

VS	- Very Soft
S	- Soft
F	- Firm
St	- Stiff
VSt	- Very Stiff
H	- Hard
VL	- Very Loose
L	- Loose
MD	- Medium Dense
D	- Dense
VD	- Very Dense

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EXCAVATION - GEOLOGICAL LOG

PIT NO : AEC35TP02
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : SMF - Orchard Hills

POSITION : E: 291727.2, N: 6256990.0 (56 MGA2020) | SURFACE ELEVATION : 39.40 (mAHD)
EQUIPMENT TYPE : 14 tonne Excavator | METHOD : 800mm bucket
DATE EXCAVATED : 29/7/22 | LOGGED BY : SR | CHECKED BY : MB/DEM
EXCAVATION DIMENSIONS : 1.00 m LONG 0.80 m WIDE

DRILLING | MATERIAL

VE / PENETRATION (E, F, H)	SUPPORT	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION (Soil Type, Colour, Plasticity or Particle Characteristic, Secondary and Minor Components)	MOISTURE CONDITION	CONSISTENCY / RELATIVE DENSITY	HAND PENETROMETER (kPa)	STRUCTURE & Other Observations
		Not Observed	ES 0.10m	0.0			0.10m FILL: gravelly silty CLAY: low to medium plasticity, dark brown, angular to subangular gravel, rootlets and wood	w<PL	-		FILL 0.00: PID<1
			0.20m								
			ES 0.30m				0.30m FILL: silty CLAY: low to medium plasticity, red-orange, with angular to subangular gravel and rootlets, trace organic matter	w<PL			0.20: PID<1
				0.5			CLAY: medium to high plasticity, pale grey and orange, with ironstone gravel, rootlets and organic matter				RESIDUAL SOIL
			0.80m ES 0.90m	1.0							0.80: PID<1
			1.50m ES 1.60m	1.5		CI-CH		w<PL			1.50: PID<1
							At 1.8m: extremely weathered ironstone gravel				
			2.10m ES 2.20m	2.0							2.10: PID<1
				2.5			2.50m EXCAVATION AEC35TP02 TERMINATED AT 2.50 m Target depth				
				3.0							
				3.5							
				4.0							
				4.5							
				5.0							

PHOTOGRAPHS NOTES ☒ YES ☐ NO

METHOD
N Natural Exposure
E Existing Excavation
BH Backhoe Bucket
B Bulldozer Blade
R Ripper

SUPPORT
T Timbering

PENETRATION
VE E F H VH — No Resistance

WATER
10 Oct., 73 Water Level on Date shown
water inflow
water outflow

SAMPLES & FIELD TESTS
U50 - Undisturbed Sample 50 mm diameter
D - Disturbed Sample
B - Bulk Disturbed Sample
MC - Moisture Content
HP - Hand Penetrometer (UCS kPa)
VS - Vane Shear; P-Peak, R-Remouded (uncorrected kPa)
PBT - Plate Bearing Test

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

MOISTURE
D - Dry
M - Moist
W - Wet

CONSISTENCY/ RELATIVE DENSITY

VS	- Very Soft
S	- Soft
F	- Firm
St	- Stiff
VSt	- Very Stiff
H	- Hard
VL	- Very Loose
L	- Loose
MD	- Medium Dense
D	- Dense
VD	- Very Dense

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EXCAVATION - GEOLOGICAL LOG

PIT NO : AEC35TP03
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : SMF - Orchard Hills

POSITION : E: 291727.4, N: 6256971.0 (56 MGA2020)	SURFACE ELEVATION : 39.60 (mAHD)
EQUIPMENT TYPE : 14 tonne Excavator	METHOD : 800mm bucket
DATE EXCAVATED : 29/7/22	LOGGED BY : SR CHECKED BY : MB/DEM
EXCAVATION DIMENSIONS : 1.00 m LONG 0.80 m WIDE	

DRILLING | MATERIAL

VE / PENETRATION (E, F, H)	SUPPORT	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY / RELATIVE DENSITY	HAND PENETROMETER (kPa)	STRUCTURE & Other Observations
		Not Observed	ES 0.10m	0.0			0.10m FILL: gravelly silty CLAY: low to medium plasticity, dark brown, angular to subangular gravel, rootlets	w<PL			FILL 0.00: PID<1
							CLAY: medium to high plasticity, pale orange and grey, with shale and ironstone gravel, rootlets and decomposed wood				RESIDUAL SOIL
			0.50m ES 0.60m	0.5		CI-CH		w<PL			0.50: PID<1
				1.0			1.00m CLAY: low to medium plasticity, pale grey with mottled orange, with extremely weathered ironstone, trace rootlets and organic matter		-		
			1.20m ES 1.30m	1.5		CL-CI		w<PL			1.20: PID<1
			2.20m ES 2.30m	2.0							2.20: PID<1
				2.5			2.50m EXCAVATION AEC35TP03 TERMINATED AT 2.50 m Target depth				
				3.0							
				3.5							
				4.0							
				4.5							
				5.0							

PHOTOGRAPHS NOTES ☒ YES ☐ NO

METHOD
- N Natural Exposure
- E Existing Excavation
- BH Backhoe Bucket
- B Bulldozer Blade
- R Ripper

SUPPORT
- T Timbering

PENETRATION
VE E F H VH — No Resistance

WATER
10 Oct., 73 Water Level on Date shown
water inflow
water outflow

SAMPLES & FIELD TESTS
- U50 - Undisturbed Sample 50 mm diameter
- D - Disturbed Sample
- B - Bulk Disturbed Sample
- MC - Moisture Content
- HP - Hand Penetrometer (UCS kPa)
- VS - Vane Shear; P-Peak, R-Remouded (uncorrected kPa)
- PBT - Plate Bearing Test

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

MOISTURE
- D - Dry
- M - Moist
- W - Wet

CONSISTENCY/ RELATIVE DENSITY

VS	- Very Soft
S	- Soft
F	- Firm
St	- Stiff
VSt	- Very Stiff
H	- Hard
VL	- Very Loose
L	- Loose
MD	- Medium Dense
D	- Dense
VD	- Very Dense

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EXCAVATION - GEOLOGICAL LOG

PIT NO : AEC35TP04
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : SMF - Orchard Hills

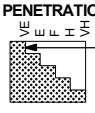
POSITION : E: 291686.7, N: 6256945.5 (56 MGA2020)	SURFACE ELEVATION : 38.00 (mAHD)
EQUIPMENT TYPE : 14 tonne Excavator	METHOD : 800mm bucket
DATE EXCAVATED : 29/7/22	LOGGED BY : SR CHECKED BY : MB/DEM
EXCAVATION DIMENSIONS : 1.00 m LONG 0.80 m WIDE	

DRILLING					MATERIAL						
VE / E / F / H PENETRATION	SUPPORT	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY / RELATIVE DENSITY	HAND PENETRO-METER 100 200 300 400	STRUCTURE & Other Observations
		Not Observed	ES 0.10m	0.0			FILL: gravelly silty CLAY: low to medium plasticity, dark grey, with rootlets, trace fine to coarse sand	w<PL and M			FILL 0.00: PID=0
			0.50m ES 0.60m	0.5			0.20m CLAY: medium to high plasticity, pale grey and orange, with rootlets, ironstone and shale gravel				RESIDUAL SOIL 0.50: PID=0
			1.20m ES 1.30m	1.0		CI-CH	1.10m CLAY: medium to high plasticity, pale grey and mottled yellow, with extremely weathered shale	w<PL	-		1.20: PID=0
			1.80m ES 1.90m	1.5		CI-CH		w<PL			1.80: PID=0
				2.0			2.10m EXCAVATION AEC35TP04 TERMINATED AT 2.10 m Target depth				
				2.5							
				3.0							
				3.5							
				4.0							
				4.5							
				5.0							

PHOTOGRAPHS NOTES ☒ YES ☐ NO

METHOD
- N Natural Exposure
- E Existing Excavation
- BH Backhoe Bucket
- B Bulldozer Blade
- R Ripper

SUPPORT
- T Timbering

PENETRATION


WATER


SAMPLES & FIELD TESTS
- U50 - Undisturbed Sample 50 mm diameter
- D - Disturbed Sample
- B - Bulk Disturbed Sample
- MC - Moisture Content
- HP - Hand Penetrometer (UCS kPa)
- VS - Vane Shear; P-Peak, R-Remouded (uncorrected kPa)
- PBT - Plate Bearing Test

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

MOISTURE
- D - Dry
- M - Moist
- W - Wet

CONSISTENCY/ RELATIVE DENSITY

VS	- Very Soft
S	- Soft
F	- Firm
St	- Stiff
VSt	- Very Stiff
H	- Hard
VL	- Very Loose
L	- Loose
MD	- Medium Dense
D	- Dense
VD	- Very Dense

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EXCAVATION - GEOLOGICAL LOG

PIT NO : AEC35TP05
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : SMF - Orchard Hills

POSITION : E: 291711.6, N: 6256948.5 (56 MGA2020)	SURFACE ELEVATION : 39.70 (mAHD)
EQUIPMENT TYPE : 14 tonne Excavator	METHOD : 800mm bucket
DATE EXCAVATED : 29/7/22	LOGGED BY : SR CHECKED BY : MB/DEM
EXCAVATION DIMENSIONS : 1.00 m LONG 0.80 m WIDE	

DRILLING | MATERIAL

PENETRATION (VE, E, F, H)	SUPPORT	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY RELATIVE DENSITY	HAND PENETRO-METER (100, 200, 300, 400)	STRUCTURE & Other Observations
		Not Observed	0.10m ES 0.20m	0.0			FILL: gravelly silty CLAY: low to medium plasticity, pale grey, with rootlets, wood and decomposed wood	w<PL			FILL 0.10: PID<1
				0.30m							
			0.50m ES 0.60m	0.5		CI	Silty CLAY: medium plasticity, red-orange, with ironstone gravel and rootlets	w<PL	-		RESIDUAL SOIL 0.50: PID<1 Field Replicate BD8/20220729 taken at 0.5-0.6m depth
				0.90m							
			1.20m ES 1.30m	1.0		CL-CI	Silty CLAY: low to medium plasticity, pale grey and yellow, trace extremely weathered ironstone gravel and rootlets	w<PL			1.20: PID<1
				1.50m 1.5			EXCAVATION AEC35TP05 TERMINATED AT 1.50 m Target depth				
				2.0							
				2.5							
				3.0							
				3.5							
				4.0							
				4.5							
				5.0							

PHOTOGRAPHS NOTES ☒ YES ☐ NO

METHOD
- N Natural Exposure
- E Existing Excavation
- BH Backhoe Bucket
- B Bulldozer Blade
- R Ripper

SUPPORT
- T Timbering

PENETRATION
VE E F H VH — No Resistance

WATER
10 Oct., 73 Water Level on Date shown
water inflow
water outflow

SAMPLES & FIELD TESTS
- U50 - Undisturbed Sample 50 mm diameter
- D - Disturbed Sample
- B - Bulk Disturbed Sample
- MC - Moisture Content
- HP - Hand Penetrometer (UCS kPa)
- VS - Vane Shear; P-Peak, R-Remouded (uncorrected kPa)
- PBT - Plate Bearing Test

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

MOISTURE
- D - Dry
- M - Moist
- W - Wet

CONSISTENCY/ RELATIVE DENSITY

VS	- Very Soft
S	- Soft
F	- Firm
St	- Stiff
VSt	- Very Stiff
H	- Hard
VL	- Very Loose
L	- Loose
MD	- Medium Dense
D	- Dense
VD	- Very Dense

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EXCAVATION - GEOLOGICAL LOG

PIT NO : AEC35TP06

PROJECT : Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : SMF - Orchard Hills

FILE / JOB NO : 204814.01
SHEET : 1 OF 1

POSITION : E: 291732.4, N: 6256948.4 (56 MGA2020)	SURFACE ELEVATION : 40.00 (mAHD)	
EQUIPMENT TYPE : 14 tonne Excavator	METHOD : 800mm bucket	
DATE EXCAVATED : 28/7/22	LOGGED BY : SR	CHECKED BY : MB/DEM
EXCAVATION DIMENSIONS : 1.00 m LONG 0.80 m WIDE		

DRILLING | MATERIAL

VE / PENETRATION E F H	SUPPORT	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY / RELATIVE DENSITY	HAND PENETRO-METER 100 200 300 400	STRUCTURE & Other Observations
		Not Observed	ES 0.10m	0.0			0.10m FILL: silty CLAY: low plasticity, pale brown, with rootlets	w<PL			FILL 0.00: PID<1
			0.20m ES 0.30m				Silty CLAY: low to medium plasticity, red-orange, with ironstone and shale gravel and rootlets At 0.2m: high plasticity, red-orange and grey, rootets				RESIDUAL SOIL 0.20: PID<1
			0.60m ES 0.70m	0.5		CL-CI		w<PL	-		0.60: PID<1
			1.00m ES 1.10m	1.0			0.80m CLAY: high plasticity, pale grey and mottled orange, with ironstone and shale gravel				1.00: PID<1
				1.5		CH	1.50m EXCAVATION AEC35TP06 TERMINATED AT 1.50 m Target depth	w<PL			
				2.0							
				2.5							
				3.0							
				3.5							
				4.0							
				4.5							
				5.0							

PHOTOGRAPHS NOTES ☒ YES ☐ NO

METHOD
- N Natural Exposure
- E Existing Excavation
- BH Backhoe Bucket
- B Bulldozer Blade
- R Ripper

SUPPORT
- T Timbering

PENETRATION

WATER

SAMPLES & FIELD TESTS
- U50 - Undisturbed Sample 50 mm diameter
- D - Disturbed Sample
- B - Bulk Disturbed Sample
- MC - Moisture Content
- HP - Hand Penetrometer (UCS kPa)
- VS - Vane Shear; P-Peak, R-Remouded (uncorrected kPa)
- PBT - Plate Bearing Test

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

MOISTURE
- D - Dry
- M - Moist
- W - Wet

CONSISTENCY/ RELATIVE DENSITY

VS	- Very Soft
S	- Soft
F	- Firm
St	- Stiff
VSt	- Very Stiff
H	- Hard
VL	- Very Loose
L	- Loose
MD	- Medium Dense
D	- Dense
VD	- Very Dense

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EXCAVATION - GEOLOGICAL LOG

PIT NO : AEC35TP07
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : SMF - Orchard Hills

POSITION : E: 291737.8, N: 6256926.4 (56 MGA2020)	SURFACE ELEVATION : 40.30 (mAHD)	
EQUIPMENT TYPE : 14 tonne Excavator	METHOD : 800mm bucket	
DATE EXCAVATED : 28/7/22	LOGGED BY : SR	CHECKED BY : MB/DEM
EXCAVATION DIMENSIONS : 1.00 m LONG 0.80 m WIDE		

DRILLING | MATERIAL

VE / PENETRATION E F H	SUPPORT	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY / RELATIVE DENSITY	HAND PENETRO-METER 100 200 300 400	STRUCTURE & Other Observations
		Not Observed	ES 0.10m	0.0			0.10m FILL: sandy CLAY: low to medium plasticity, pale brown, fine to medium, with rootlets	M			FILL 0.00: PID<1
			0.30m ES 0.40m				Silty CLAY: medium to high plasticity, red-brown and mottled grey, with ironstone and shale gravel	w<PL			RESIDUAL SOIL 0.30: PID<1
				0.5		CI-CH	At 0.55m: high plasticity, red-brown and mottled grey, with shale ironstone gravel				
			0.90m ES 1.00m	1.0				w<PL	-		0.90: PID<1
			1.40m ES 1.50m				1.30m Silty CLAY: low to medium plasticity, pale grey and mottled orange, with ironstone and shale gravel				1.40: PID<1
				1.5		CL-CI		w<PL			
				2.0			2.00m EXCAVATION AEC35TP07 TERMINATED AT 2.00 m Target depth				
				2.5							
				3.0							
				3.5							
				4.0							
				4.5							
				5.0							

PHOTOGRAPHS NOTES ☒ YES ☐ NO

METHOD
- N Natural Exposure
- E Existing Excavation
- BH Backhoe Bucket
- B Bulldozer Blade
- R Ripper

SUPPORT
- T Timbering

PENETRATION
VE E F H VH — No Resistance

WATER
10 Oct., 73 Water Level on Date shown
water inflow
water outflow

SAMPLES & FIELD TESTS
- U50 - Undisturbed Sample 50 mm diameter
- D - Disturbed Sample
- B - Bulk Disturbed Sample
- MC - Moisture Content
- HP - Hand Penetrometer (UCS kPa)
- VS - Vane Shear; P-Peak, R-Remouded (uncorrected kPa)
- PBT - Plate Bearing Test

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

MOISTURE
- D - Dry
- M - Moist
- W - Wet

CONSISTENCY/ RELATIVE DENSITY

VS	- Very Soft
S	- Soft
F	- Firm
St	- Stiff
VSt	- Very Stiff
H	- Hard
VL	- Very Loose
L	- Loose
MD	- Medium Dense
D	- Dense
VD	- Very Dense

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EXCAVATION - GEOLOGICAL LOG

PIT NO : AEC35TP08
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : SMF - Orchard Hills

POSITION : E: 291716.7, N: 6256923.3 (56 MGA2020)	SURFACE ELEVATION : 40.10 (mAHD)	
EQUIPMENT TYPE : 14 tonne Excavator	METHOD : 800mm bucket	
DATE EXCAVATED : 29/7/22	LOGGED BY : SR	CHECKED BY : MB/DEM
EXCAVATION DIMENSIONS : 1.00 m LONG 0.80 m WIDE		

DRILLING | MATERIAL

PENETRATION (VE, E, F, H)	SUPPORT	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY RELATIVE DENSITY	HAND PENETRO-METER (100, 200, 300, 400)	STRUCTURE & Other Observations
		Not Observed	0.10m ES 0.20m	0.0			FILL: gravelly silty CLAY: low to medium plasticity, dark brown, angular to subangular gravel, rootlets	w<PL	-		FILL 0.10: PID<1 Field Replicate BD7/20220729 taken at 0.1-0.2 depth
			0.50m ES 0.60m	0.5		CI-CH	0.30m Silty CLAY: medium to high plasticity, red-orange and dark brown, with shale and ironstone gravel and coarse gravel	w<PL			RESIDUAL SOIL 0.50: PID<1
			1.30m ES 1.40m	1.0		CI-CH	0.90m Silty CLAY: medium to high plasticity, pale grey and mottled red-orange, with extremely weathered ironstone gravel and rootlets	w<PL			1.30: PID<1
			1.90m ES 2.00m	1.5		CI-CH	1.80m CLAY: medium to high plasticity, pale grey and yellow, with extremely weathered ironstone gravel and rootlets	w<PL			1.90: PID<1
				2.0		CI-CH	2.30m EXCAVATION AEC35TP08 TERMINATED AT 2.30 m Target depth				
				2.5							
				3.0							
				3.5							
				4.0							
				4.5							
				5.0							

PHOTOGRAPHS NOTES ☒ YES ☐ NO

METHOD
- N Natural Exposure
- E Existing Excavation
- BH Backhoe Bucket
- B Bulldozer Blade
- R Ripper

SUPPORT
- T Timbering

PENETRATION
VE E F H VH — No Resistance

WATER
10 Oct., 73 Water Level on Date shown
water inflow
water outflow

SAMPLES & FIELD TESTS
- U50 - Undisturbed Sample 50 mm diameter
- D - Disturbed Sample
- B - Bulk Disturbed Sample
- MC - Moisture Content
- HP - Hand Penetrometer (UCS kPa)
- VS - Vane Shear; P-Peak, R-Remouded (uncorrected kPa)
- PBT - Plate Bearing Test

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

MOISTURE
- D - Dry
- M - Moist
- W - Wet

CONSISTENCY/ RELATIVE DENSITY

VS	- Very Soft
S	- Soft
F	- Firm
St	- Stiff
VSt	- Very Stiff
H	- Hard
VL	- Very Loose
L	- Loose
MD	- Medium Dense
D	- Dense
VD	- Very Dense

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EXCAVATION - GEOLOGICAL LOG

PIT NO : AEC35TP09
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : SMF - Orchard Hills

POSITION : E: 291696.7, N: 6256923.4 (56 MGA2020)	SURFACE ELEVATION : 38.60 (mAHD)
EQUIPMENT TYPE : 14 tonne Excavator	METHOD : 800mm bucket
DATE EXCAVATED : 29/7/22	LOGGED BY : SR — CHECKED BY : MB/DEM
EXCAVATION DIMENSIONS : 1.00 m LONG 0.80 m WIDE	

DRILLING | MATERIAL

VE / PENETRATION E F H	SUPPORT	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY RELATIVE DENSITY	HAND PENETRO-METER 100 200 300 400	STRUCTURE & Other Observations
			ES 0.10m	0.0			FILL: gravelly silty CLAY: low to medium plasticity, dark brown, angular to subangular gravel, rootlets	w<PL			FILL 0.00: PID<1
							0.30m				
			0.50m ES 0.60m	0.5		CH	CLAY: high plasticity, pale grey and orange, rootlets	w<PL			RESIDUAL SOIL 0.50: PID<1
		Not Observed					0.90m				
			1.20m ES 1.30m	1.0		CL-CI	Silty CLAY: low to medium plasticity, red-orange, with extremely weathered ironstone and organic matter, trace rootlets	w<PL	-		1.20: PID<1
			2.00m ES 2.10m	1.5							2.00: PID<1
				2.0			2.30m				
				2.5			EXCAVATION AEC35TP09 TERMINATED AT 2.30 m Target depth				
				3.0							
				3.5							
				4.0							
				4.5							
				5.0							

PHOTOGRAPHS NOTES ☒ YES ☐ NO

METHOD
- N Natural Exposure
- E Existing Excavation
- BH Backhoe Bucket
- B Bulldozer Blade
- R Ripper

SUPPORT
- T Timbering

PENETRATION
VE E F H VH — No Resistance

WATER
10 Oct., 73 Water Level on Date shown
water inflow
water outflow

SAMPLES & FIELD TESTS
- U50 - Undisturbed Sample 50 mm diameter
- D - Disturbed Sample
- B - Bulk Disturbed Sample
- MC - Moisture Content
- HP - Hand Penetrometer (UCS kPa)
- VS - Vane Shear; P-Peak, R-Remouded (uncorrected kPa)
- PBT - Plate Bearing Test

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

MOISTURE
- D - Dry
- M - Moist
- W - Wet

CONSISTENCY/ RELATIVE DENSITY

VS	- Very Soft
S	- Soft
F	- Firm
St	- Stiff
VSt	- Very Stiff
H	- Hard
VL	- Very Loose
L	- Loose
MD	- Medium Dense
D	- Dense
VD	- Very Dense

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EXCAVATION - GEOLOGICAL LOG

PIT NO : AEC35TP10
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : SMF - Orchard Hills

POSITION : E: 291773.8, N: 6256885.6 (56 MGA2020)	SURFACE ELEVATION : 41.20 (mAHD)
EQUIPMENT TYPE : 14 tonne Excavator	METHOD : 800mm bucket
DATE EXCAVATED : 28/7/22	LOGGED BY : SR CHECKED BY : MB/DEM
EXCAVATION DIMENSIONS : 1.00 m LONG 0.80 m WIDE	

DRILLING | MATERIAL

PENETRATION (VE, E, F, H)	SUPPORT	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY RELATIVE DENSITY	HAND PENETROMETER (100, 200, 300, 400)	STRUCTURE & Other Observations
		Not Observed	ES 0.10m 0.05m ES 0.20m 0.40m ES 0.50m 0.60m ES 0.70m	0.0 0.5		CL-CI	0.05m FILL: clayey SAND: fine to medium grained sand 0.20m FILL: silty CLAY: low to medium plasticity, red-orange and brown Silty CLAY: low to medium plasticity, red-orange and brown, ironstone gravel At 0.4m: becoming pale red-orange and mottled grey, with more ironstone gravel 0.90m	M w<PL	- -		FILL 0.00: PID<1 0.10: PID<1 Field Replicate BD5/20220728 taken at 0.1-0.2m depth RESIDUAL SOIL 0.60: PID<1
				1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0			EXCAVATION AEC35TP10 TERMINATED AT 0.90 m Target depth				

PHOTOGRAPHS NOTES ☒ YES ☐ NO

METHOD
- N Natural Exposure
- E Existing Excavation
- BH Backhoe Bucket
- B Bulldozer Blade
- R Ripper

SUPPORT
- T Timbering

PENETRATION
VE E F H VH — No Resistance

WATER
10 Oct., 73 Water Level on Date shown
water inflow
water outflow

SAMPLES & FIELD TESTS
- U50 - Undisturbed Sample 50 mm diameter
- D - Disturbed Sample
- B - Bulk Disturbed Sample
- MC - Moisture Content
- HP - Hand Penetrometer (UCS kPa)
- VS - Vane Shear; P-Peak, R-Remouded (uncorrected kPa)
- PBT - Plate Bearing Test

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

MOISTURE
- D - Dry
- M - Moist
- W - Wet

CONSISTENCY/ RELATIVE DENSITY

VS	- Very Soft
S	- Soft
F	- Firm
St	- Stiff
VSt	- Very Stiff
H	- Hard
VL	- Very Loose
L	- Loose
MD	- Medium Dense
D	- Dense
VD	- Very Dense

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EXCAVATION - GEOLOGICAL LOG

PIT NO : AEC35TP11
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : SMF - Orchard Hills

POSITION : E: 291768.5, N: 6256847.0 (56 MGA2020)	SURFACE ELEVATION : 41.60 (mAHD)
EQUIPMENT TYPE : 14 tonne Excavator	METHOD : 800mm bucket
DATE EXCAVATED : 28/7/22	LOGGED BY : SR CHECKED BY : MB/DEM
EXCAVATION DIMENSIONS : 1.00 m LONG 0.80 m WIDE	

DRILLING | MATERIAL

VE / PENETRATION E F H	SUPPORT	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY RELATIVE DENSITY	HAND PENETRO-METER 100 200 300 400	STRUCTURE & Other Observations
			ES 0.10m	0.0			0.10m FILL: clayey SAND: dark grey, fine to medium grained sand, with angular to subangular gravel and rootlets, trace glass	M			FILL 0.00: PID<1
							Silty CLAY: low to medium plasticity, red-orange and brown, angular to subangular gravel, shale gravel, wood and rootlets				Field Replicate BD6/20220728 taken at 0.0-0.1m depth
			0.40m ES 0.50m	0.5		CL-CI		w<PL			RESIDUAL SOIL 0.40: PID<1
		28/07/22					0.70m Silty CLAY: low to medium plasticity, red-orange and mottled grey, shale and ironstone gravel, trace rootlets		-		
			1.00m ES 1.10m	1.0		CL-CI		w<PL			1.00: PID<1
							1.30m EXCAVATION AEC35TP11 TERMINATED AT 1.30 m Target depth				
				1.5							
				2.0							
				2.5							
				3.0							
				3.5							
				4.0							
				4.5							
				5.0							

PHOTOGRAPHS NOTES ☒ YES ☐ NO

METHOD
- N Natural Exposure
- E Existing Excavation
- BH Backhoe Bucket
- B Bulldozer Blade
- R Ripper

SUPPORT
- T Timbering

PENETRATION
VE E F H VH — No Resistance

WATER
10 Oct., 73 Water Level on Date shown
water inflow
water outflow

SAMPLES & FIELD TESTS
- U50 - Undisturbed Sample 50 mm diameter
- D - Disturbed Sample
- B - Bulk Disturbed Sample
- MC - Moisture Content
- HP - Hand Penetrometer (UCS kPa)
- VS - Vane Shear; P-Peak, R-Remouded (uncorrected kPa)
- PBT - Plate Bearing Test

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

MOISTURE
- D - Dry
- M - Moist
- W - Wet

CONSISTENCY/ RELATIVE DENSITY

VS	- Very Soft
S	- Soft
F	- Firm
St	- Stiff
VSt	- Very Stiff
H	- Hard
VL	- Very Loose
L	- Loose
MD	- Medium Dense
D	- Dense
VD	- Very Dense

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EXCAVATION - GEOLOGICAL LOG

PIT NO : AEC35TP12
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : SMF - Orchard Hills

POSITION : E: 291781.6, N: 6256863.8 (56 MGA2020)	SURFACE ELEVATION : 41.70 (mAHD)
EQUIPMENT TYPE : 14 tonne Excavator	METHOD : 800mm bucket
DATE EXCAVATED : 28/7/22	LOGGED BY : SR CHECKED BY : MB/DEM
EXCAVATION DIMENSIONS : 1.00 m LONG 0.80 m WIDE	

DRILLING | MATERIAL

VE / PENETRATION / E / F / H	SUPPORT	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY RELATIVE DENSITY	HAND PENETRO-METER 100 200 300 400	STRUCTURE & Other Observations
		Not Observed	ES 0.10m	0.0			0.15m FILL: clayey SAND: dark grey, fine to medium grained sand, angular to subangular gravel, rootlets and wood	M			FILL 0.00: PID<1
			0.20m ES 0.30m				Silty CLAY: low to medium plasticity, red-orange and brown, with ironstone gravel, trace rootlets	w<PL			RESIDUAL SOIL 0.20: PID<1
			0.60m ES 0.70m	0.5		CL-CI	At 0.45m: medium to high plasticity, becoming red-orange and mottled grey, ironstone gravel	w<PL	-		0.60: PID<1
							0.90m EXCAVATION AEC35TP12 TERMINATED AT 0.90 m Target depth				
				1.0							
				1.5							
				2.0							
				2.5							
				3.0							
				3.5							
				4.0							
				4.5							
				5.0							

PHOTOGRAPHS NOTES ☒ YES ☐ NO

METHOD
- N Natural Exposure
- E Existing Excavation
- BH Backhoe Bucket
- B Bulldozer Blade
- R Ripper

SUPPORT
- T Timbering

PENETRATION
VE E F H VH — No Resistance

WATER
10 Oct., 73 Water Level on Date shown
water inflow
water outflow

SAMPLES & FIELD TESTS
- U50 - Undisturbed Sample 50 mm diameter
- D - Disturbed Sample
- B - Bulk Disturbed Sample
- MC - Moisture Content
- HP - Hand Penetrometer (UCS kPa)
- VS - Vane Shear; P-Peak, R-Remouded (uncorrected kPa)
- PBT - Plate Bearing Test

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

MOISTURE
- D - Dry
- M - Moist
- W - Wet

CONSISTENCY/ RELATIVE DENSITY

VS	- Very Soft
S	- Soft
F	- Firm
St	- Stiff
VSt	- Very Stiff
H	- Hard
VL	- Very Loose
L	- Loose
MD	- Medium Dense
D	- Dense
VD	- Very Dense

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EXCAVATION - GEOLOGICAL LOG

PIT NO : AEC35TP13
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : SMF - Orchard Hills

POSITION : E: 291790.1, N: 6256875.0 (56 MGA2020)	SURFACE ELEVATION : 41.70 (mAHD)
EQUIPMENT TYPE : 14 tonne Excavator	METHOD : 800mm bucket
DATE EXCAVATED : 28/7/22	LOGGED BY : SR CHECKED BY : MB/DEM
EXCAVATION DIMENSIONS : 1.00 m LONG 0.80 m WIDE	

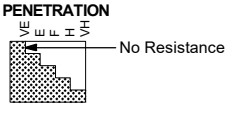
DRILLING | MATERIAL

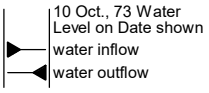
VE / PENETRATION E F H	SUPPORT	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY RELATIVE DENSITY	HAND PENETRO-METER 100 200 300 400	STRUCTURE & Other Observations
		Not Observed	ES 0.10m	0.0			FILL: clayey SAND: dark brown, fine to medium grained sand, with clay, angular to subangular gravel and rootlets	M			FILL 0.00: PID<1
			0.30m ES 0.40m	0.20			Silty CLAY: low to medium plasticity, red-orange, rootlets				RESIDUAL SOIL 0.30: PID<1
			0.70m ES 0.80m	0.5		CL-CI	At 0.5m: medium to high plasticity, becoming red-orange and mottled grey	w<PL	-		0.70: PID<1
				1.00			EXCAVATION AEC35TP13 TERMINATED AT 1.00 m Target depth				
				1.0							
				1.5							
				2.0							
				2.5							
				3.0							
				3.5							
				4.0							
				4.5							
				5.0							

PHOTOGRAPHS NOTES ☒ YES ☐ NO

METHOD
- N Natural Exposure
- E Existing Excavation
- BH Backhoe Bucket
- B Bulldozer Blade
- R Ripper

SUPPORT
- T Timbering

PENETRATION


WATER


SAMPLES & FIELD TESTS
- U50 - Undisturbed Sample 50 mm diameter
- D - Disturbed Sample
- B - Bulk Disturbed Sample
- MC - Moisture Content
- HP - Hand Penetrometer (UCS kPa)
- VS - Vane Shear; P-Peak, R-Remouded (uncorrected kPa)
- PBT - Plate Bearing Test

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

MOISTURE
- D - Dry
- M - Moist
- W - Wet

CONSISTENCY/ RELATIVE DENSITY

VS	- Very Soft
S	- Soft
F	- Firm
St	- Stiff
VSt	- Very Stiff
H	- Hard
VL	- Very Loose
L	- Loose
MD	- Medium Dense
D	- Dense
VD	- Very Dense

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EXCAVATION - GEOLOGICAL LOG

PIT NO : AEC35TP14
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : SMF - Orchard Hills

POSITION : E: 291807.0, N: 6256842.1 (56 MGA2020)	SURFACE ELEVATION : 42.40 (mAHD)	
EQUIPMENT TYPE : 14 tonne Excavator	METHOD : 800mm bucket	
DATE EXCAVATED : 28/7/22	LOGGED BY : SR	CHECKED BY : MB/DEM
EXCAVATION DIMENSIONS : 1.00 m LONG 0.80 m WIDE		

DRILLING | MATERIAL

DEPTH (m)	SAMPLES & FIELD TESTS	GROUND WATER LEVELS	SUPPORT	PENETRATION VE E F H	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY RELATIVE DENSITY	HAND PENETRO-METER kPa 100 200 300 400	STRUCTURE & Other Observations
0.0	ES 0.10m						FILL: clayey SAND: dark grey, fine to medium grained sand, with angular to subangular gravel and rootlets, trace glass	M			FILL 0.00: PID<1
	0.30m						0.20m Silty CLAY: low to medium plasticity, red-orange and brown, with rootlets				RESIDUAL SOIL 0.30: PID<1
0.5	ES 0.40m	28/07/22					At 0.45m: becoming high plasticity, red-orange, trace rootlets				
	0.70m					CL-CI		w<PL	-		0.70: PID<1
1.0	ES 0.80m						1.40m				
	1.50m						Silty CLAY: low to medium plasticity, pale grey and mottled orange, with ironstone gravel				1.50: PID<1
1.5	ES 1.60m					CL-CI	1.90m	w<PL			
2.0							EXCAVATION AEC35TP14 TERMINATED AT 1.90 m Target depth				
2.5											
3.0											
3.5											
4.0											
4.5											
5.0											

PHOTOGRAPHS NOTES ☒ YES ☐ NO

METHOD
- N Natural Exposure
- E Existing Excavation
- BH Backhoe Bucket
- B Bulldozer Blade
- R Ripper

SUPPORT
- T Timbering

PENETRATION
VE E F H VH — No Resistance

WATER
10 Oct., 73 Water Level on Date shown
water inflow
water outflow

SAMPLES & FIELD TESTS
- U50 - Undisturbed Sample 50 mm diameter
- D - Disturbed Sample
- B - Bulk Disturbed Sample
- MC - Moisture Content
- HP - Hand Penetrometer (UCS kPa)
- VS - Vane Shear; P-Peak, R-Remouded (uncorrected kPa)
- PBT - Plate Bearing Test

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

MOISTURE
- D - Dry
- M - Moist
- W - Wet

CONSISTENCY/ RELATIVE DENSITY

VS	- Very Soft
S	- Soft
F	- Firm
St	- Stiff
VSt	- Very Stiff
H	- Hard
VL	- Very Loose
L	- Loose
MD	- Medium Dense
D	- Dense
VD	- Very Dense

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EXCAVATION - GEOLOGICAL LOG

PIT NO : AEC35TP15
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : SMF - Orchard Hills

POSITION : E: 291796.2, N: 6256858.0 (56 MGA2020) | SURFACE ELEVATION : 42.00 (mAHD)
EQUIPMENT TYPE : 14 tonne Excavator | METHOD : 800mm bucket
DATE EXCAVATED : 28/7/22 | LOGGED BY : SR | CHECKED BY : MB/DEM
EXCAVATION DIMENSIONS : 1.00 m LONG 0.80 m WIDE

DRILLING					MATERIAL					
PENETRATION (VE, E, F, H)	SUPPORT	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY RELATIVE DENSITY	HAND PENETROMETER (kPa)	STRUCTURE & Other Observations
		Not Observed	ES 0.10m	0.0			FILL: silty CLAY: low to medium plasticity, dark brown, with angular to subangular gravel and rootlets	w<PL			FILL 0.00: PID<1
			0.30m ES 0.40m	0.20m			FILL: silty SAND: pale grey and pale yellow, fine to medium grained sand, trace gravel	M			0.30: PID<1
			0.60m ES 0.70m	0.40m 0.5			Silty CLAY: medium to high plasticity, red-orange and mottled grey		-		Field Replicate BD4/20220728 taken at 0.3-0.4m depth
						CI-CH		w<PL			RESIDUAL SOIL 0.60: PID<1
				1.00m 1.0			EXCAVATION AEC35TP15 TERMINATED AT 1.00 m Target depth				
				1.5							
				2.0							
				2.5							
				3.0							
				3.5							
				4.0							
				4.5							
				5.0							

PHOTOGRAPHS NOTES ☒ YES ☐ NO

METHOD
N Natural Exposure
E Existing Excavation
BH Backhoe Bucket
B Bulldozer Blade
R Ripper

SUPPORT
T Timbering

PENETRATION
VE E F H VH — No Resistance

WATER
10 Oct., 73 Water Level on Date shown
water inflow
water outflow

SAMPLES & FIELD TESTS
U50 - Undisturbed Sample 50 mm diameter
D - Disturbed Sample
B - Bulk Disturbed Sample
MC - Moisture Content
HP - Hand Penetrometer (UCS kPa)
VS - Vane Shear; P-Peak, R-Remouded (uncorrected kPa)
PBT - Plate Bearing Test

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

MOISTURE
D - Dry
M - Moist
W - Wet

CONSISTENCY/ RELATIVE DENSITY

VS	- Very Soft
S	- Soft
F	- Firm
St	- Stiff
VSt	- Very Stiff
H	- Hard
VL	- Very Loose
L	- Loose
MD	- Medium Dense
D	- Dense
VD	- Very Dense

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EXCAVATION - GEOLOGICAL LOG

PIT NO : AEC35TP16
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : SMF - Orchard Hills

POSITION : E: 291814.8, N: 6256865.4 (56 MGA2020)	SURFACE ELEVATION : 42.10 (mAHD)
EQUIPMENT TYPE : 14 tonne Excavator	METHOD : 800mm bucket
DATE EXCAVATED : 28/7/22	LOGGED BY : SR CHECKED BY : MB/DEM
EXCAVATION DIMENSIONS : 1.00 m LONG 0.80 m WIDE	

DRILLING | MATERIAL

DEPTH (m)	SAMPLES & FIELD TESTS	GROUND WATER LEVELS	SUPPORT	PENETRATION VE E F H	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY RELATIVE DENSITY	HAND PENETRO-METER 100 200 300 400	STRUCTURE & Other Observations
0.0	0.20m ES 0.30m	Not Observed					FILL: silty CLAY: low to medium plasticity, dark brown, with fine to medium, pale grey sand, angular to subangular gravel and rootlets	w<PL			FILL 0.20: PID<1 Field Replicate BD3/20220728 taken at 0.2-0.3m depth
0.40m											
0.5	0.60m ES 0.70m					CI-CH	Silty CLAY: medium to high plasticity, red-orange and mottled grey, rootlets	w<PL	-		RESIDUAL SOIL 0.60: PID<1
1.00m											
1.0							EXCAVATION AEC35TP16 TERMINATED AT 1.00 m Target depth				
1.5											
2.0											
2.5											
3.0											
3.5											
4.0											
4.5											
5.0											

PHOTOGRAPHS NOTES ☒ YES ☐ NO

METHOD
- N Natural Exposure
- E Existing Excavation
- BH Backhoe Bucket
- B Bulldozer Blade
- R Ripper

SUPPORT
- T Timbering

PENETRATION
VE E F H VH — No Resistance

WATER
10 Oct., 73 Water Level on Date shown
water inflow
water outflow

SAMPLES & FIELD TESTS
- U50 - Undisturbed Sample 50 mm diameter
- D - Disturbed Sample
- B - Bulk Disturbed Sample
- MC - Moisture Content
- HP - Hand Penetrometer (UCS kPa)
- VS - Vane Shear; P-Peak, R-Remouded (uncorrected kPa)
- PBT - Plate Bearing Test

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

MOISTURE
- D - Dry
- M - Moist
- W - Wet

CONSISTENCY/ RELATIVE DENSITY

VS	- Very Soft
S	- Soft
F	- Firm
St	- Stiff
VSt	- Very Stiff
H	- Hard
VL	- Very Loose
L	- Loose
MD	- Medium Dense
D	- Dense
VD	- Very Dense

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EXCAVATION - GEOLOGICAL LOG

PIT NO : AEC35TP17
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : SMF - Orchard Hills

POSITION : E: 291837.1, N: 6256874.7 (56 MGA2020)	SURFACE ELEVATION : 41.90 (mAHD)
EQUIPMENT TYPE : 14 tonne Excavator	METHOD : 800mm bucket
DATE EXCAVATED : 28/7/22	LOGGED BY : SR CHECKED BY : MB/DEM
EXCAVATION DIMENSIONS : 1.00 m LONG 0.80 m WIDE	

DRILLING | MATERIAL

VE / PENETRATION E F H	SUPPORT	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY RELATIVE DENSITY	HAND PENETRO-METER kPa	STRUCTURE & Other Observations
		Not Observed	ES 0.15m 0.20m ES 0.30m 0.60m ES 0.70m	0.0			0.15m FILL: silty CLAY: low to medium plasticity, dark brown, with fine to medium sand and rootlets	w<PL			FILL 0.00: PID<1
							0.30m FILL: silty SAND: pale grey and pale yellow, fine to medium grained sand, trace angular to subangular gravel and rootlets	M			0.20: PID<1
				0.5		CI-CH	Silty CLAY: medium to high plasticity, red-orange with mottled grey, trace rootlets	w<PL	-		RESIDUAL SOIL 0.60: PID<1
				1.0			1.00m EXCAVATION AEC35TP17 TERMINATED AT 1.00 m Target depth				
				1.5							
				2.0							
				2.5							
				3.0							
				3.5							
				4.0							
				4.5							
				5.0							

PHOTOGRAPHS NOTES ☒ YES ☐ NO

METHOD
- N Natural Exposure
- E Existing Excavation
- BH Backhoe Bucket
- B Bulldozer Blade
- R Ripper

SUPPORT
- T Timbering

PENETRATION
VE E F H VH — No Resistance

WATER
10 Oct., 73 Water Level on Date shown
water inflow
water outflow

SAMPLES & FIELD TESTS
- U50 - Undisturbed Sample 50 mm diameter
- D - Disturbed Sample
- B - Bulk Disturbed Sample
- MC - Moisture Content
- HP - Hand Penetrometer (UCS kPa)
- VS - Vane Shear; P-Peak, R-Remouded (uncorrected kPa)
- PBT - Plate Bearing Test

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

MOISTURE
- D - Dry
- M - Moist
- W - Wet

CONSISTENCY/ RELATIVE DENSITY

VS	- Very Soft
S	- Soft
F	- Firm
St	- Stiff
VSt	- Very Stiff
H	- Hard
VL	- Very Loose
L	- Loose
MD	- Medium Dense
D	- Dense
VD	- Very Dense

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EXCAVATION - GEOLOGICAL LOG

PIT NO : AEC35TP18
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : SMF - Orchard Hills

POSITION : E: 291823.9, N: 6256859.8 (56 MGA2020)	SURFACE ELEVATION : 42.10 (mAHD)	
EQUIPMENT TYPE : 14 tonne Excavator	METHOD : 800mm bucket	
DATE EXCAVATED : 28/7/22	LOGGED BY : SR	CHECKED BY : MB/DEM
EXCAVATION DIMENSIONS : 1.00 m LONG 0.80 m WIDE		

DRILLING | MATERIAL

VE / PENETRATION (E, F, H)	SUPPORT	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY / RELATIVE DENSITY	HAND PENETROMETER (kPa)	STRUCTURE & Other Observations
		Not Observed	ES	0.0			FILL: silty CLAY: low to medium plasticity, dark brown, trace angular to subangular gravel, fine to medium sand and rootlets	w<PL			FILL 0.10: PID<1
			0.30m	0.30m			FILL: silty SAND: pale grey, fine to medium grained sand, trace gravel and rootlets	M			0.40: PID<1
			0.40m ES 0.50m	0.50m			Silty CLAY: low to medium plasticity, red-orange, trace rootlets		-		RESIDUAL SOIL
			0.70m ES 0.80m	0.5		CL-CI		w<PL			0.70: PID<1 Field Replicate BD1/20220728 taken at 0.7-0.8m depth
				1.00m			EXCAVATION AEC35TP18 TERMINATED AT 1.00 m Target depth				
				1.0							
				1.5							
				2.0							
				2.5							
				3.0							
				3.5							
				4.0							
				4.5							
				5.0							

PHOTOGRAPHS NOTES ☒ YES ☐ NO

METHOD
- N Natural Exposure
- E Existing Excavation
- BH Backhoe Bucket
- B Bulldozer Blade
- R Ripper

SUPPORT
- T Timbering

PENETRATION
VE E F H VH — No Resistance

WATER
10 Oct., 73 Water Level on Date shown
water inflow
water outflow

SAMPLES & FIELD TESTS
- U50 - Undisturbed Sample 50 mm diameter
- D - Disturbed Sample
- B - Bulk Disturbed Sample
- MC - Moisture Content
- HP - Hand Penetrometer (UCS kPa)
- VS - Vane Shear; P-Peak, R-Remouded (uncorrected kPa)
- PBT - Plate Bearing Test

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

MOISTURE
- D - Dry
- M - Moist
- W - Wet

CONSISTENCY/ RELATIVE DENSITY

VS	- Very Soft
S	- Soft
F	- Firm
St	- Stiff
VSt	- Very Stiff
H	- Hard
VL	- Very Loose
L	- Loose
MD	- Medium Dense
D	- Dense
VD	- Very Dense

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EXCAVATION - GEOLOGICAL LOG

PIT NO : AEC35TP19
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : SMF - Orchard Hills

POSITION : E: 291825.6, N: 6256843.0 (56 MGA2020) | SURFACE ELEVATION : 42.40 (mAHD)
EQUIPMENT TYPE : 14 tonne Excavator | METHOD : 800mm bucket
DATE EXCAVATED : 28/7/22 | LOGGED BY : SR | CHECKED BY : MB/DEM
EXCAVATION DIMENSIONS : 1.00 m LONG 0.80 m WIDE

DRILLING | MATERIAL

VE / E / F / H	SUPPORT	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY RELATIVE DENSITY	HAND PENETRO-METER (kPa)	STRUCTURE & Other Observations
		Not Observed	0.10m ES 0.20m 0.30m ES 0.40m 0.60m ES 0.70m	0.0			FILL: silty CLAY: low to medium plasticity, dark brown, trace gravel and rootlets	w<PL			FILL 0.10: PID<1
							At 0.2m: becoming pale grey, trace gravel	w<PL			0.30: PID<1
				0.40m			Silty CLAY: low to medium plasticity, red-orange and brown, trace rootlets		-		RESIDUAL SOIL
				0.5		CL-CI		w<PL			0.60: PID<1
				0.90m			EXCAVATION AEC35TP19 TERMINATED AT 0.90 m Target depth				
				1.0							
				1.5							
				2.0							
				2.5							
				3.0							
				3.5							
				4.0							
				4.5							
				5.0							

PHOTOGRAPHS NOTES ☒ YES ☐ NO

METHOD
N Natural Exposure
E Existing Excavation
BH Backhoe Bucket
B Bulldozer Blade
R Ripper

SUPPORT
T Timbering

PENETRATION
VE E F H VH — No Resistance

WATER
10 Oct., 73 Water Level on Date shown
water inflow
water outflow

SAMPLES & FIELD TESTS
U50 - Undisturbed Sample 50 mm diameter
D - Disturbed Sample
B - Bulk Disturbed Sample
MC - Moisture Content
HP - Hand Penetrometer (UCS kPa)
VS - Vane Shear; P-Peak, R-Remouded (uncorrected kPa)
PBT - Plate Bearing Test

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

MOISTURE
D - Dry
M - Moist
W - Wet

CONSISTENCY/ RELATIVE DENSITY

VS	- Very Soft
S	- Soft
F	- Firm
St	- Stiff
VSt	- Very Stiff
H	- Hard
VL	- Very Loose
L	- Loose
MD	- Medium Dense
D	- Dense
VD	- Very Dense

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EXCAVATION - GEOLOGICAL LOG

PIT NO : AEC35HA20
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : SMF - Orchard Hills

POSITION : E: 291684.3, N: 6256976.3 (56 MGA2020) | SURFACE ELEVATION : 37.80 (mAHD)
EQUIPMENT TYPE : Hand Tools | METHOD :
DATE EXCAVATED : 21/9/22 | LOGGED BY : PJ | CHECKED BY : MB/DEM
EXCAVATION DIMENSIONS :

DRILLING | MATERIAL

PENETRATION (VE, E, F, H)	SUPPORT	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION (Soil Type, Colour, Plasticity or Particle Characteristic, Secondary and Minor Components)	MOISTURE CONDITION	CONSISTENCY / RELATIVE DENSITY	HAND PENETROMETER (kPa)	STRUCTURE & Other Observations
		Not Observed	ES 0.10m	0.0			FILL: sandy CLAY: low to medium plasticity, dark brown, fine to medium sand, with silt, trace rootlets	w~PL			FILL 0.00: PID <5
			0.30m ES 0.40m	0.20m		CI-CH	Silty CLAY: medium to high plasticity, red-brown, trace fine to medium ironstone gravel	w~PL	F to St		RESIDUAL SOIL 0.30: PID <5
			0.80m ES 0.90m	0.5 0.60m		CH	Silty CLAY: high plasticity, pale grey mottled red-brown	w~PL	St		0.80: PID <5
				0.90m 1.0			EXCAVATION AEC35HA20 TERMINATED AT 0.90 m Target depth				
				1.5							
				2.0							
				2.5							
				3.0							
				3.5							
				4.0							
				4.5							
				5.0							

PHOTOGRAPHS NOTES ☒ YES ☐ NO

METHOD
N Natural Exposure
E Existing Excavation
BH Backhoe Bucket
B Bulldozer Blade
R Ripper

SUPPORT
T Timbering

PENETRATION
VE E F H VH — No Resistance

WATER
10 Oct., 73 Water Level on Date shown
water inflow
water outflow

SAMPLES & FIELD TESTS
U50 - Undisturbed Sample 50 mm diameter
D - Disturbed Sample
B - Bulk Disturbed Sample
MC - Moisture Content
HP - Hand Penetrometer (UCS kPa)
VS - Vane Shear; P-Peak, R-Remouded (uncorrected kPa)
PBT - Plate Bearing Test

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

MOISTURE
D - Dry
M - Moist
W - Wet

CONSISTENCY/ RELATIVE DENSITY

VS	- Very Soft
S	- Soft
F	- Firm
St	- Stiff
VSt	- Very Stiff
H	- Hard
VL	- Very Loose
L	- Loose
MD	- Medium Dense
D	- Dense
VD	- Very Dense

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Appendix H

Field Sheets and Calibration Certificates

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CALIBRATION RECORD

Project: Luddenham WSA SCAW

Project Number: 204814.01

Calibrated Equipment

Model:	Minirae Lite
Serial No.:	595-00 2219
DP Reference:	PID3
Other:	10.6eV Lamp

Calibration

Date(s):	27/07/2022
Operator(s):	SR
Zero Gas:	ambient air
Span Gas:	isobutylene 100
Span Gas Concentration:	100
Response Factor:	1.0
Pre-calibration Reading:	99.1
Post-calibration Reading:	100.0

Approved: R. Kth.

Date: 27/7/2022

Multi Parameter Water Meter

Instrument **YSI Quatro Pro Plus**
Serial No. **11K101271**

airmet
Air-Met Scientific Pty Ltd
1300 137 067

Item	Test	Pass	Comments
Battery	Charge Condition	✓	
	Fuses	✓	
	Capacity	✓	
Switch/keypad	Operation	✓	
Display	Intensity	✓	
	Operation (segments)	✓	
Grill Filter	Condition	✓	
	Seal	✓	
PCB	Condition	✓	
Connectors	Condition	✓	
Sensor	1. pH	✓	
	2. mV	✓	
	3. EC	✓	
	4. D.O	✓	
	5. Temp	✓	
Alarms	Beeper	✓	
	Settings	✓	
Software	Version	✓	
Data logger	Operation	✓	
Download	Operation	✓	
Other tests:			

Certificate of Calibration

This is to certify that the above instrument has been calibrated to the following specifications:

Sensor	Serial no	Standard Solutions	Certified	Solution Bottle Number	Instrument Reading
1. pH 7.00		pH 7.00		381241	pH 6.98
2. pH 4.00		pH 4.00		389384	pH 3.94
3. mV		236.7mV		385070/387771	236.8mV
4. EC		2.76mS		385041	2.76mS
5. D.O		0ppm		379624	0.0ppm
6. Temp		21.5		MultiTherm	21.4

Calibrated by: **Alex Buist**

Calibration date: **01/09/2022**

Next calibration due: **28/02/2023**

PID Calibration Certificate

Instrument PhoCheck Tiger
Serial No. T-113854

airmet

Air-Met Scientific Pty Ltd
1300 137 067

Item	Test	Pass	Comments
Battery	Charge Condition	✓	
	Fuses	✓	
	Capacity	✓	
	Recharge OK?	✓	
Switch/keypad	Operation	✓	
Display	Intensity	✓	
	Operation (segments)	✓	
Grill Filter	Condition	✓	
	Seal	✓	
Pump	Operation	✓	
	Filter	✓	
	Flow	✓	
	Valves, Diaphragm	✓	
PCB	Condition	✓	
Connectors	Condition	✓	
Sensor	PID	✓	10.6 ev
Alarms	Beeper	✓	Low: 50ppm; High: 100ppm; TWA: ; STEL:
	Settings	✓	
Software	Version	✓	
Data logger	Operation	✓	
Download	Operation	✓	
Other tests:			

Certificate of Calibration

This is to certify that the above instrument has been calibrated to the following specifications:

Diffusion mode Aspirated mode

Sensor	Serial no	Calibration gas and concentration	Certified	Gas bottle No		Instrument Reading
PID Lamp		93ppm Isobutylene	NATA	SY361		90.2 ppm Isobutylene

Calibrated by: Alex Buist

Calibration date: 1/09/2022

Next calibration due: 28/02/2023

AEL35BH01

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GROUNDWATER ~~SAMPLING~~ FORM
DEVELOPMENT

Project: WSA SCAW Tender Design	**Project No:** 204814.01
Client: CPB Contractors Pty Limited & United Infrastructure Pty Limited (CPBUIJV)	
Location: Elizabeth Drive, Luddenham	
Sampling Method: Twister Pump	

Bore No.	AEL35BH01				
Purging Date	25/8/22				
Bore Casing Diameter (mm)	50				
SWL (m below top of casing)	2.76 m				
Height of Casing (m above GL*)	0.59				
SWL (m below GL*)	2.17				
Total Bore Depth (m below GL*)	7.98				
Well Volume (L) **[which for 50mm casing is 2L approx. per metre depth]	10.440				
Purged Volume (L) (≈ well vol x 3)	16.~~75~~ dry				
Sampling Date					
Sampling Time					
Temperature (°C)					
pH (record to one decimal place)					
EC (µS/cm)					
Dissolved Oxygen (% Sat)					
Dissolved Oxygen (mg/L)					
Turbidity (NTU)					
Redox (mV)					
TDS (mg/L)					
Odour	No				
Colour	Dark brown, cloudy				
Recharge Rate	72.43 mL/minute				
Observations	Dark brown, cloudy, no odour				
Notes:					
Supervisor: PJ			**Date:**		

Water quality meter calibration details (please tick calibration liquids used):

Meter ID							
Buffer (pH 4)	☐	Use-by Date		Conductivity Standard (2.76 mS/cm)	☐	Use-by Date	
Buffer (pH 6.88)	☐	Use-by Date		Total Dissolved Solids Standard (2 parts per thousand)	☐	Use-by Date	
Buffer (pH 9)	☐	Use-by Date		Rapid Cal Solution	☐	Use-by Date	

*GL – denotes ground level **Well Volume = πr^2 x depth of water, where r is internal casing radius

AEC35BH02

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GROUNDWATER SAMPLING FORM
DEVELOPMENT

Project: WSA SCAW Tender Design	**Project No:** 204814.01
Client: CPB Contractors Pty Limited & United Infrastructure Pty Limited (CPBUIJV)	
Location: Elizabeth Drive, Luddenham	
Sampling Method: Twister Pump	

Bore No.	AEC35BH02				
Purging Date	25/8/22				
Bore Casing Diameter (mm)	50mm				
SWL (m below top of casing)	1.51				
Height of Casing (m above GL*)	0.91				
SWL (m below GL*)	0.6				
Total Bore Depth (m below GL*)	6.00				
Well Volume (L) **[which for 50mm casing is 2L approx. per metre depth]	8.980				
Purged Volume (L) (≈ well vol x 3)	14 ~~00~~ dry				
Sampling Date					
Sampling Time					
Temperature (°C)					
pH (record to one decimal place)					
EC (µS/cm)					
Dissolved Oxygen (% Sat)					
Dissolved Oxygen (mg/L)					
Turbidity (NTU)					
Redox (mV)					
TDS (mg/L)					
Odour	No				
Colour	Brown, cloudy				
Recharge Rate	64.88 ~~ml/minute~~				
Observations	Brown, cloudy, no odour				
Notes:					
Supervisor: PJ			**Date:**		

Water quality meter calibration details (please tick calibration liquids used):

Meter ID							
Buffer (pH 4)	☐	Use-by Date		Conductivity Standard (2.76 mS/cm)	☐	Use-by Date	
Buffer (pH 6.88)	☐	Use-by Date		Total Dissolved Solids Standard (2 parts per thousand)	☐	Use-by Date	
Buffer (pH 9)	☐	Use-by Date		Rapid Cal Solution	☐	Use-by Date	

*GL – denotes ground level

**Well Volume = πr^2 x depth of water, where r is internal casing radius

AEC35BH03

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GROUNDWATER ~~SAMPLING~~ DEVELOPMENT FORM

Project: WSA SCAW Tender Design	**Project No:** 204814.01
Client: CPB Contractors Pty Limited & United Infrastructure Pty Limited (CPBUIJV)	
Location: Elizabeth Drive, Luddenham	
Sampling Method:	

Bore No.	AEC35 ~~BH~~ BH03				
Purging Date	26/8/22				
Bore Casing Diameter (mm)	50mm				
SWL (m below top of casing)	1.59				
Height of Casing (m above GL*)	1.03				
SWL (m below GL*)	~~1.59~~ 0.56				
Total Bore Depth (m below GL*)	3.96				
Well Volume (L) **[which for 50mm casing is 2L approx. per metre depth]	3.940				
Purged Volume (L) (≈ well vol x 3)	11820				
Sampling Date					
Sampling Time					
Temperature (°C)					
pH (record to one decimal place)					
EC (µS/cm)					
Dissolved Oxygen (% Sat)					
Dissolved Oxygen (mg/L)					
Turbidity (NTU)					
Redox (mV)					
TDS (mg/L)					
Odour	No				
Colour	Orange-brown, cloudy				
Recharge Rate					
Observations					
Notes:					
Supervisor:			**Date:**		

Water quality meter calibration details (please tick calibration liquids used):

Meter ID							
Buffer (pH 4)	☐	Use-by Date		Conductivity Standard (2.76 mS/cm)	☐	Use-by Date	
Buffer (pH 6.88)	☐	Use-by Date		Total Dissolved Solids Standard (2 parts per thousand)	☐	Use-by Date	
Buffer (pH 9)	☐	Use-by Date		Rapid Cal Solution	☐	Use-by Date	

*GL – denotes ground level

**Well Volume = πr^2 x depth of water, where r is internal casing radius

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RECORD OF ASBESTOS SAMPLES

Project: WSA SCAW Tender design	**Project Number:** 204814.01
Client: CPB Contractors	**Date:** 28/7/22
Location: Elizabeth downs, Hillcrest	**Field Staff:** SR

Sample ID	Sample Type	Sample Depth (m)	Weight of 10 L Bulk Sample (g)	Number of Fragments >7 mm	Condition of Fragments (good/ poor)	Size range of fragments (mm)	Weight of ACM and FA collected (g)
AEC 35 TP11	FILL / CLAYEY SAND	0-0.1	20125	-	-	-	-
AEC 35 TP12	FILL/clayey SAND	0-0.1	21326	-	-	-	-
AEC 35 TP14	FILL/clayey SAND	0-0.1	20224	-	-	-	-

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Groundwater Field Sheet

Bore Volume = casing volume + filter pack volume
$= \pi h_1 d_2^2/4 + n(\pi h_1 d_1^2/4 - \pi h_2 d_2^2/4)$
Where: $\pi = 3.14$
n = porosity (0.3 for most filter pack material)
h_1 = height of water column
d_1 = diameter of annulus
h_2 = length of filter pack
d_2 = diameter of casing
Bore Vol Normally: 7.2*h

Project and Bore Installation Details	
Bore / Standpipe ID:	SMGW - BH - BH106
Project Name:	SCAW
Project Number:	204814.01
Site Location:	
Bore GPS Co-ord:	
Installation Date:	
GW Level (during drilling):	- m bgl
Well Depth:	m bgl
Screened Interval:	m bgl
Contaminants/Comments:	-
Bore Development Details	
Date/Time:	
Purged By:	J
GW Level (pre-purge):	m bgl
GW Level (post-purge):	m bgl
PSH observed:	Yes / No (interface / visual). Thickness if observed:
Observed Well Depth:	m bgl
Estimated Bore Volume:	L
Total Volume Purged:	(target: no drill mud, min 3 well vol. or dry)
Equipment:	
Micropurge and Sampling Details	
Date/Time:	8/9/22 9:00am
Sampled By:	JH / LL
Weather Conditions:	SUNNY
GW Level (pre-purge):	1.40 m bgl
GW Level (post sample):	~~1.82~~ m bgl 1.84
PSH observed:	Yes / (No) ((interface) / visual). Thickness if observed:
Observed Well Depth:	4.94 m bgl
Estimated Bore Volume:	25 L
Total Volume Purged:	2.0 L
Equipment:	PERI - PUMP

Water Quality Parameters

Time / Volume	Temp (°C)	DO (mg/L)	EC (µS or mS/cm)	pH	Turbidity	Redox (mV)
Stabilisation Criteria (3 readings)	**0.1°C**	**+/- 0.3 mg/L**	**+/- 3%**	**+/- 0.1**	**+/- 10%**	**+/- 10 mV**
15 / 0.5	17.3	0.72	10531	5.52		123.9
30 / 1.0	17.5	0.36	10580	5.58		111.7
45 / 1.5	17.4	0.29	10490	5.63		104.8
60 / 2.0	17.4	0.23	10124	5.66		102.1
Additional Readings Following stabilisation:	DO % Sat	SPC	TDS			

Sample Details

Sampling Depth (rationale):	4 m bgl, MIDDLE OF SCREEN
Sample Appearance (e.g. colour, siltiness, odour):	SLIGHTLY TURBID, GREY, NO ODOUR / SHEEN
Sample ID:	SMGW - BH - BH106
QA/QC Samples:	—
Sampling Containers and filtration:	2 x AMBER 3 x PLASTIC 2 x VIALS
Comments / Observations:	LOGGER IN WELL

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Groundwater Field Sheet

Bore Volume = casing volume + filter pack volume
$= \pi h_1 d_1^2/4 + n(\pi h_1 d_1^2/4 - \pi h_2 d_2^2/4)$
Where: $\pi = 3.14$
n = porosity (0.3 for most filter pack material)
h_1 = height of water column
d_1 = diameter of annulus
h_2 = length of filter pack
d_2 = diameter of casing
Bore Vol Normally: 7.2*h

Project and Bore Installation Details	
Bore / Standpipe ID:	AEC35-BH01
Project Name:	SCAW
Project Number:	204814.01
Site Location:	ORCHARD HILLS
Bore GPS Co-ord:	
Installation Date:	
GW Level (during drilling):	- m bgl
Well Depth:	m bgl
Screened Interval:	m bgl
Contaminants/Comments:	-
Bore Development Details	
Date/Time:	
Purged By:	
GW Level (pre-purge):	m bgl
GW Level (post-purge):	m bgl
PSH observed:	Yes / No (interface / visual). Thickness if observed:
Observed Well Depth:	m bgl
Estimated Bore Volume:	L
Total Volume Purged:	(target: no drill mud, min 3 well vol. or dry)
Equipment:	
Micropurge and Sampling Details	
Date/Time:	8/9/22 8:00am
Sampled By:	JH/CL
Weather Conditions:	SUNNY
GW Level (pre-purge):	2.09 m bgl
GW Level (post sample):	3.14 m bgl
PSH observed:	Yes / (No) ((interface) / visual). Thickness if observed:
Observed Well Depth:	7.51 m bgl
Estimated Bore Volume:	39 L
Total Volume Purged:	3.0 L
Equipment:	PERI-PUMP

Water Quality Parameters

Time / Volume	Temp (°C)	DO (mg/L)	EC (µS or mS/cm)	pH	Turbidity	Redox (mV)
Stabilisation Criteria (3 readings)	***0.1° C***	**+/- 0.3 mg/L**	**+/- 3%**	**+/- 0.1**	**+/- 10%**	**+/- 10 mV**
30 / 0.5	17.0	0.81	29369	6.31		189.5
60 / 1.0	17.3	0.41	29665	6.46		175.0
90 / 1.5	17.2	0.48	29443	6.49		168.1
120 / 2.0	17.1	0.68	29066	6.50		165.4
150 / 2.5	17.0	0.71	28923	6.50		160.9
160 / 3.0	17.0	0.78	28864	6.50		
Additional Readings Following stabilisation:	DO % Sat	SPC	TDS			

Sample Details

Sampling Depth (rationale):	6 m bgl, MIDDLE OF SCREEN
Sample Appearance (e.g. colour, siltiness, odour):	NO ODOUR, NON-TURBID, GREY, NO SHEEN
Sample ID:	AEC35-BH01
QA/QC Samples:	BD1/20220908
Sampling Containers and filtration:	2x AMBER 3x PLASTIC 2x VIALS
Comments / Observations:	

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Groundwater Field Sheet

Bore Volume = casing volume + filter pack volume
$= \pi h_1 d_2^2/4 + n(\pi h_1 d_1^2/4 - \pi h_2 d_2^2/4)$
Where: $\pi = 3.14$
n = porosity (0.3 for most filter pack material)
h_1 = height of water column
d_1 = diameter of annulus
h_2 = length of filter pack
d_2 = diameter of casing
Bore Vol Normally: 7.2*h

Project and Bore Installation Details	
Bore / Standpipe ID:	AEC35BH02
Project Name:	SCAW
Project Number:	204814.01
Site Location:	ORCHARD HILLS
Bore GPS Co-ord:	
Installation Date:	
GW Level (during drilling):	- m bgl
Well Depth:	m bgl
Screened Interval:	m bgl
Contaminants/Comments:	-

Bore Development Details	
Date/Time:	
Purged By:	
GW Level (pre-purge):	m bgl
GW Level (post-purge):	m bgl
PSH observed:	Yes / No (interface / visual). Thickness if observed:
Observed Well Depth:	m bgl
Estimated Bore Volume:	L
Total Volume Purged:	(target: no drill mud, min 3 well vol. or dry)
Equipment:	

Micropurge and Sampling Details	
Date/Time:	8/9/22 9:30 am
Sampled By:	SH/LL
Weather Conditions:	SUNNY
GW Level (pre-purge):	0.55 m bgl
GW Level (post sample):	1.54 m bgl
PSH observed:	Yes / (No) ((interface) / visual). Thickness if observed:
Observed Well Depth:	5.09 m bgl
Estimated Bore Volume:	32 L
Total Volume Purged:	2.0 L
Equipment:	PERI-PUMP

Water Quality Parameters

Time / Volume	Temp (°C)	DO (mg/L)	EC (µS or mS/cm)	pH	Turbidity	Redox (mV)
Stabilisation Criteria (3 readings)	**0.1° C**	**+/- 0.3 mg/L**	**+/- 3%**	**+/- 0.1**	**+/- 10%**	**+/- 10 mV**
15 / 0.5	16.6	1.63	11575	6.80		3670
30 / 1.0	15.8	1.19	11364	3.76		3721
45 / 1.5	15.3	1.17	11324	3.77		3717
60 / 2.0	15.2	1.16	11321	3.78		3683
Additional Readings Following stabilisation:	DO % Sat	SPC	TDS			

Sample Details

Sampling Depth (rationale):	3 m bgl, MIDDLE OF SCREEN
Sample Appearance (e.g. colour, siltiness, odour):	SLIGHTLY TURBID, GREY, NO ODOUR/SHEEN.
Sample ID:	AEC35BH02
QA/QC Samples:	—
Sampling Containers and filtration:	2x AMBER 3x PLASTIC 2x VIALS
Comments / Observations:	STICK-UP +91cm

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Groundwater Field Sheet

Bore Volume = casing volume + filter pack volume
$= \pi h_1 d_2^2/4 + n(\pi h_1 d_1^2/4 - \pi h_2 d_2^2/4)$
Where: $\pi = 3.14$
n = porosity (0.3 for most filter pack material)
h_1 = height of water column
d_1 = diameter of annulus
h_2 = length of filter pack
d_2 = diameter of casing
Bore Vol Normally: 7.2*h

Project and Bore Installation Details	
Bore / Standpipe ID:	AEC35BH03
Project Name:	SCAW
Project Number:	204814.01
Site Location:	ORCHARD HILLS
Bore GPS Co-ord:	
Installation Date:	
GW Level (during drilling):	- m bgl
Well Depth:	m bgl
Screened Interval:	m bgl
Contaminants/Comments:	-

Bore Development Details	
Date/Time:	
Purged By:	
GW Level (pre-purge):	m bgl
GW Level (post-purge):	m bgl
PSH observed:	Yes / No (interface / visual). Thickness if observed:
Observed Well Depth:	m bgl
Estimated Bore Volume:	L
Total Volume Purged:	(target: no drill mud, min 3 well vol. or dry)
Equipment:	

Micropurge and Sampling Details	
Date/Time:	8/9/22 10am
Sampled By:	JH
Weather Conditions:	Clear
GW Level (pre-purge):	0.5 m bgl
GW Level (post sample):	~~3.04~~ m bgl 0.77
PSH observed:	Yes / No (interface / visual). Thickness if observed:
Observed Well Depth:	3.04 m bgl
Estimated Bore Volume:	17.9 L
Total Volume Purged:	2 L
Equipment:	PERI-PUMP

1.02

Water Quality Parameters

Time / Volume	Temp (°C)	DO (mg/L)	EC (µS or mS/cm)	pH	Turbidity	Redox (mV)
Stabilisation Criteria (3 readings)	***0.1° C***	**+/- 0.3 mg/L**	**+/- 3%**	**+/- 0.1**	**+/- 10%**	**+/- 10 mV**
15/0.5	~~14~~ 14.5	0.62	10754	3.82		331.7
~~30~~ 30/1	14.4	0.51	10792	3.96		336.8
45/1.5	14.3	0.46	10782	3.91		346.7
60/2	14.3	0.41	10765	3.93		347.3
Additional Readings Following stabilisation:	DO % Sat	SPC	TDS			

Sample Details

Sampling Depth (rationale):	2 m bgl, MIDDLE OF SCREEN
Sample Appearance (e.g. colour, siltiness, odour):	MODERATELY TURBID, RED-BROWN, NO ODOUR/SHEEN
Sample ID:	AEC35BH03
QA/QC Samples:	BD2/20220908
Sampling Containers and filtration:	2x AMBER 3x PLASTIC 2x VIALS
Comments / Observations:	

Appendix I

Summary of Results for Current Investigation

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Table I1: Summary of Laboratory Results for Soil – Metals, TRH, BTEX, PAH

				Metals								TRH						BTEX				PAH			
				Arsenic	Cadmium	Total Chromium	Copper	Lead	Mercury (inorganic)	Nickel	Zinc	TRH C6 - C10	TRH >C10-C16	TRH C6-C10 less BTEX	TRH >C10-C16 less Naphthalene	TRH >C16-C34	TRH >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 type	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
AEC35TP01	0 - 0.1 m	Fill	29/07/2022	13	<0.4	37	4	18	<0.1	6	12	<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 160	600 1100	80 -	1200 110	30000 350	- -	- 120	310 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -
AEC35TP02	0 - 0.1 m	Fill	29/07/2022	11	<0.4	32	10	17	<0.1	4	24	<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 160	600 1100	80 -	1200 110	30000 350	- -	- 120	310 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -
AEC35TP02	0.8 - 0.9 m	Natural	29/07/2022	5	<0.4	4	8	7	<0.1	<1	3	<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 160	600 1100	80 -	1200 110	30000 350	- -	- 120	310 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -
AEC35TP03	0.5 - 0.6 m	Natural	29/07/2022	10	<0.4	35	13	15	<0.1	3	7	<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 160	600 1100	80 -	1200 110	30000 350	- -	- 120	310 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -
AEC35TP04	0 - 0.1 m	Fill	29/07/2022	10	<0.4	14	12	13	<0.1	3	13	<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 160	600 1100	80 -	1200 110	30000 350	- -	- 120	310 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -
AEC35TP05	0.1 - 0.2 m	Fill	29/07/2022	8	<0.4	9	11	12	<0.1	2	9	<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 160	600 1100	80 -	1200 110	30000 350	- -	- 120	310 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -
AEC35TP05	0.5 - 0.6 m	Natural	29/07/2022	13	<0.4	24	13	12	<0.1	<1	5	<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 160	600 1100	80 -	1200 110	30000 350	- -	- 120	310 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -
BD8/20220729	0.5 - 0.6 m	Natural	29/07/2022	10	<0.4	21	16	13	<0.1	<1	6	<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 160	600 1100	80 -	1200 110	30000 350	- -	- 120	310 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -
AEC35TP06	0 - 0.1 m	Fill	28/07/2022	12	<0.4	35	15	20	<0.1	4	18	<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 160	600 1100	80 -	1200 110	30000 350	- -	- 120	310 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -
AEC35TP07	0 - 0.1 m	Fill	28/07/2022	11	<0.4	31	11	18	<0.1	3	12	<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 160	600 1100	80 -	1200 110	30000 350	- -	- 120	310 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -
AEC35TP08	0.5 - 0.6 m	Natural	29/07/2022	6	<0.4	9	15	10	<0.1	<1	5	<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 160	600 1100	80 -	1200 110	30000 350	- -	- 120	310 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -
AEC35TP08	1.9 - 2 m	Natural	29/07/2022	10	<0.4	5	8	13	<0.1	<1	3	<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 160	600 1100	80 -	1200 110	30000 350	- -	- 120	480 180	NL -	- 1300	- 5600	6 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -
AEC35TP09	0 - 0.1 m	Fill	29/07/2022	6	<0.4	24	10	62	<0.1	3	11	<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 160	600 1100	80 -	1200 110	30000 350	- -	- 120	310 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -
AEC35TP10	0.1 - 0.2 m	Fill	28/07/2022	6	<0.4	19	11	16	<0.1	2	12	<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 160	600 1100	80 -	1200 110	30000 350	- -	- 120	310 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -
AEC35TP11	0 - 0.1 m	Fill	28/07/2022	12	<0.4	25	11	14	<0.1	2	15	<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 160	600 1100	80 -	1200 110	30000 350	- -	- 120	310 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -
AEC35TP11	1 - 1.1 m	Natural	28/07/2022	12	<0.4	30	16	16	<0.1	3	16	<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 160	600 1100	80 -	1200 110	30000 350	- -	- 120	480 180	NL -	- 1300	- 5600	6 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -
AEC35TP12	0 - 0.1 m	Fill	28/07/2022	9	<0.4	26	8	14	<0.1	4	17	<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 160	600 1100	80 -	1200 110	30000 350	- -	- 120	310 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -
AEC35TP13	0 - 0.1 m	Fill	28/07/2022	12	<0.4	41	4	16	<0.1	3	6	<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 160	600 1100	80 -	1200 110	30000 350	- -	- 120	310 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -
AEC35TP14	0 - 0.1 m	Fill	28/07/2022	5	<0.4	15	6	12	<0.1	2	10	<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 160	600 1100	80 -	1200 110	30000 350	- -	- 120	310 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -
AEC35TP14	0.3 - 0.4 m	Natural	28/07/2022	7	<0.4	35	7	10	<0.1	2	3	<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 160	600 1100	80 -	1200 110	30000 350	- -	- 120	310 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -
AEC35TP15	0.3 - 0.4 m	Fill	28/07/2022	8	<0.4	27	5	9	<0.1	1	3	<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 160	600 1100	80 -	1200 110	30000 350	- -	- 120	310 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -
BD4/20220728	0.3 - 0.4 m	Fill	28/07/2022	12	<0.4	41	3	15	<0.1	2	3	<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 160	600 1100	80 -	1200 110	30000 350	- -	- 120	310 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -
AEC35TP16	0.2 - 0.3 m	Fill	28/07/2022	6	<0.4	21	4	11	<0.1	2	7	<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 160	600 1100	80 -	1200 110	30000 350	- -	- 120	310 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -
BD3/20220728	0.2 - 0.3 m	Fill	28/07/2022	18	<0.4	45	7	17	<0.1	<5	10	<20	<50	<20	<50	<100	<100	<0.1	<0.1	<0.1	<0.1	<0.5	<0.5	<0.5	<0.5
				300 100	90 -	300 410	17000 160	600 1100	80 -	1200 110	30000 350	- -	- 120	310 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -
AEC35TP16 - [TRIPLICATE]	0.2 - 0.3 m	Fill	28/07/2022	9	<0.4	26	5	12	<0.1	2	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				300 100	90 -	300 410	17000 160	600 1100	80 -	1200 110	30000 350	- -	- 120	310 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -
AEC35TP17	0 - 0.15 m	Fill	28/07/2022	9	<0.4	29	3	12	<0.1	2	5	<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 160	600 1100	80 -	1200 110	30000 350	- -	- 120	310 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -
AEC35TP18	0.1 - 0.2 m	Fill	28/07/2022	11	<0.4	44	3	15	<0.1	2	6	<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 160	600 1100	80 -	1200 110	30000 350	- -	- 120	310 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -
AEC35TP18	0.7 - 0.8 m	Natural	28/07/2022	7	<0.4	31	7	8	<0.1	2	3	<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 160	600 1100	80 -	1200 110	30000 350	- -	- 120	310 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -
BD1/20220728	0.7 - 0.8 m	Natural	28/07/2022	15	<0.4	55	12	13	<0.1	5.3	7.9	<20	<50	<20	<50	<100	<100	<0.1	<0.1	<0.1	<0.1	<0.5	<0.5	<0.5	<0.5
				300 100	90 -	300 410	17000 160	600 1100	80 -	1200 110	30000 350	- -	- 120	310 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -
AEC35TP19	0.3 - 0.4 m	Fill	28/07/2022	8	<0.4	41	<1	11	<0.1	1	1	<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 160	600 1100	80 -	1200 110	30000 350	- -	- 120	310 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -

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Table I1: Summary of Laboratory Results for Soil – Metals, TRH, BTEX, PAH

				Metals								TRH						BTEX				PAH			
				Arsenic	Cadmium	Total Chromium	Copper	Lead	Mercury (inorganic)	Nickel	Zinc	TRH C6 - C10	TRH >C10-C16	TRH C6-C10 less BTEX	TRH >C10-C16 less Naphthalene	TRH >C16-C34	TRH >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 type	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
AEC35HA20	0 - 0.1 m	Fill	21/09/2022	10	<0.4	27	10	16	<0.1	8	13	<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 160	600 1100	80 -	1200 110	30000 350	- -	- 120	310 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -
AEC35SP-1		stockpile	29/07/2022	11	<0.4	28	10	14	<0.1	3	9	<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 160	600 1100	80 -	1200 110	30000 350	- -	- 120	310 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -
AEC35SP-2		stockpile	29/07/2022	18	<0.4	15	12	14	<0.1	3	9	<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 160	600 1100	80 -	1200 110	30000 350	- -	- 120	310 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -
AEC35SP-3		stockpile	29/07/2022	9	<0.4	22	11	16	<0.1	4	10	<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 160	600 1100	80 -	1200 110	30000 350	- -	- 120	310 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -
AEC35SP-4		stockpile	29/07/2022	8	<0.4	23	7	15	<0.1	5	16	<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 160	600 1100	80 -	1200 110	30000 350	- -	- 120	310 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	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 Contact HSL

Notes:

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

b Reported naphthalene laboratory result obtained from BTEXN suite

c Criteria applies to DDT only

Site Assessment Criteria (SAC):

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

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

HIL C	Recreational / Open Space (NEPC, 2013)
HSL D	Commercial / Industrial (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)

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Table I1 (continued): Summary of Laboratory Results for Soil – Phenols, OCP, OPP, PCB, Asbestos

				Phenols	OCP												OPP		PCB	Asbestos			
				Total Phenols	DDD	DDT+DDE+DDD [c]	DDE	DDT	Aldrin & Dieldrin	Total Chlordane	Endrin	Total Endosulfan	Heptachlor	Hexachlorobenzene	Methoxychlor	Other OCP	Chlorpyriphos	Other OPP	Total PCB	Asbestos ID in soil >0.1g/kg	Trace Analysis	Asbestos ID in soil <0.1g/kg	FA and AF Estimation
			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				<0.001
Sample ID	Depth	Sample type	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	-	-	-	%(w/w)
AEC35TP01	0 - 0.1 m	Fill	29/07/2022	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1	NAD	NAD	NAD	<0.001
				120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -				
AEC35TP02	0 - 0.1 m	Fill	29/07/2022	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1	NAD	NAD	NAD	<0.001
				120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -				
AEC35TP02	0.8 - 0.9 m	Natural	29/07/2022	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1	-	-	-	-
				120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -				
AEC35TP03	0.5 - 0.6 m	Natural	29/07/2022	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1	NAD	NAD	NAD	<0.001
				120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -				
AEC35TP04	0 - 0.1 m	Fill	29/07/2022	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1	NAD	NAD	NAD	<0.001
				120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -				
AEC35TP05	0.1 - 0.2 m	Fill	29/07/2022	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1	NAD	NAD	NAD	<0.001
				120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -				
AEC35TP05	0.5 - 0.6 m	Natural	29/07/2022	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1	-	-	-	-
				120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -				
BD8/20220729	0.5 - 0.6 m	Natural	29/07/2022	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1	-	-	-	-
				120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -				
AEC35TP06	0 - 0.1 m	Fill	28/07/2022	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1	NAD	NAD	NAD	<0.001
				120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -				
AEC35TP07	0 - 0.1 m	Fill	28/07/2022	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1	NAD	NAD	NAD	<0.001
				120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -				
AEC35TP08	0.5 - 0.6 m	Natural	29/07/2022	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1	NAD	NAD	NAD	<0.001
				120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -				
AEC35TP08	1.9 - 2 m	Natural	29/07/2022	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1	-	-	-	-
				120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -				
AEC35TP09	0 - 0.1 m	Fill	29/07/2022	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1	NAD	NAD	NAD	<0.001
				120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -				
AEC35TP10	0.1 - 0.2 m	Fill	28/07/2022	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1	NAD	NAD	NAD	<0.001
				120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -				
AEC35TP11	0 - 0.1 m	Fill	28/07/2022	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1	NAD	NAD	NAD	<0.001
				120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -				
AEC35TP11	1 - 1.1 m	Natural	28/07/2022	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1	-	-	-	-
				120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -				
AEC35TP12	0 - 0.1 m	Fill	28/07/2022	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1	NAD	NAD	NAD	<0.001
				120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -				
AEC35TP13	0 - 0.1 m	Fill	28/07/2022	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1	NAD	NAD	NAD	<0.001
				120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -				
AEC35TP14	0 - 0.1 m	Fill	28/07/2022	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1	NAD	NAD	NAD	<0.001
				120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -				
AEC35TP14	0.3 - 0.4 m	Natural	28/07/2022	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1	-	-	-	-
				120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -				
AEC35TP15	0.3 - 0.4 m	Fill	28/07/2022	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1	NAD	NAD	NAD	<0.001
				120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -				
BD4/20220728	0.3 - 0.4 m	Fill	28/07/2022	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1	-	-	-	-
				120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -				
AEC35TP16	0.2 - 0.3 m	Fill	28/07/2022	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1	NAD	NAD	NAD	<0.001
				120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -				
BD3/20220728	0.2 - 0.3 m	Fill	28 Jul 2022	<PQL	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<PQL	<0.2	<PQL	<0.1	-	-	-	-
				120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -				
AEC35TP16 - [TRIPLICATE]	0.2 - 0.3 m	Fill	28/07/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -				
AEC35TP17	0 - 0.15 m	Fill	28/07/2022	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1	NAD	NAD	NAD	<0.001
				120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -				
AEC35TP18	0.1 - 0.2 m	Fill	28/07/2022	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1	NAD	NAD	NAD	<0.001
				120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -				

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Table I1 (continued): Summary of Laboratory Results for Soil – Phenols, OCP, OPP, PCB, Asbestos

				Phenols	OCP												OPP		PCB	Asbestos			
				Total Phenols	DDD	DDT+DDE+DDD [c]	DDE	DDT	Aldrin & Dieldrin	Total Chlordane	Endrin	Total Endosulfan	Heptachlor	Hexachlorobenzene	Methoxychlor	Other OCP	Chlorpyriphos	Other OPP	Total PCB	Asbestos ID in soil >0.1g/kg	Trace Analysis	Asbestos ID in soil <0.1g/kg	FA and AF Estimation
			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				<0.001
Sample ID	Depth	Sample type	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	-	-	-	%(w/w)
AEC35TP18	0.7 - 0.8 m	Natural	28/07/2022	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1	-	-	-	-
				120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -				
BD1/20220728	0.7 - 0.8 m	Natural	28 Jul 2022	<PQL	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<PQL	<0.2	<PQL	<0.1	-	-	-	-
				120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -				
AEC35TP19	0.3 - 0.4 m	Fill	28/07/2022	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1	NAD	NAD	NAD	<0.001
				120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -				
AEC35HA20	0 - 0.1 m	Fill	21/09/2022	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1	NAD	NAD	NAD	<0.001
				120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -				
AEC35SP-1	0 m	stockpile	29/07/2022	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1	NAD	NAD	NAD	<0.001
				120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -				
AEC35SP-2	0 m	stockpile	29/07/2022	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1	NAD	NAD	NAD	<0.001
				120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -				
AEC35SP-3	0 m	stockpile	29/07/2022	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1	NAD	NAD	NAD	<0.001
				120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -				
AEC35SP-4	0 m	stockpile	29/07/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NAD	NAD	NAD	<0.001
				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 Contact HSL

Notes:

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

b Reported naphthalene laboratory result obtained from BTEXN suite

c Criteria applies to DDT only

Site Assessment Criteria (SAC):

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

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

HIL C	Recreational / Open Space (NEPC, 2013)
HSL D	Commercial / Industrial (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)

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Table I2: Summary of Results of Groundwater Analysis (All results in µg/L)

Sample Location / Identification (Borehole or Replicate)	Sample Date	Metals (dissolved) Arsenic	Cadmium	Chromium (III + VI)	Copper	Lead	Mercury	Nickel	Zinc	Polycylic Aromatic Hydrocarbons Naphthalene	Anthracene	Fluoranthene	Benzo(a)pyrene	Phenanthrene	Other PAH
SMGW-BH-BH106 (from SMGW-BH-B106)	8/09/2022	1	0.2	<1	**7**	<1	<0.05	59	110	<0.2	<0.1	<0.1	<0.1	<0.1	<PQL
AEC35BH01	8/09/2022	3	1	<1	**2**	<1	<0.05	64	74	<0.2	<0.1	<0.1	<0.1	<0.1	<PQL
BD1/20220908	8/09/2022	2	0.9	<1	**3**	<1	<0.05	6	6	<0.2	<0.1	<0.1	<0.1	<0.1	<PQL
AEC35BH02	8/09/2022	2	0.7	<1	**28**	7	<0.05	**220**	**710**	<0.2	<0.1	<0.1	<0.1	<0.1	<PQL
AEC35BH03	8/09/2022	<1	<0.1	<1	<1	<1	<0.05	56	110	<0.2	<0.1	<0.1	<0.1	<0.1	<PQL
BD2/20220908	8/09/2022	<10	<2	<10	<10	<10	<1	53	97	0.01	<0.01	<0.01	<0.01	<0.01	<PQL
Assessment Criteria															
Freshwater DGV		24 for As(III) 13 for As(V)	7.5	94 for Cr(III) 1.0 for Cr(VI)	1.4	603	0.06	352	256	16	0.01	1	0.1	0.6	-
Guidelines for Recreational Water	**Health**	100	20	500 for Cr(VI)	20000	100	10	200	-	-	-	-	0.1	-	-
Guidelines for Recreational Water	**Aesthetic**	-	-	-	1000	-	-	-	3000	-	-	-	-	-	-
HSL D for Vapour Intrusion, Clay (depth 2 m to <4 m)		-	-	-	-	-	-	-	-	NL	-	-	-	-	-

Total Recoverable Hydrocarbons, BTEX and Volatile Organic Compounds

Sample Location / Identification (Borehole or Replicate)	Sample Date	TRH C6-C10 less BTEX	TRH >C10-C16 less Naphthalene	TRH C6-C10	TRH >C10-C16	TRH >C16-C34	TRH >C34-C40	Benzene	Toulene	Ethylbenzene	o-xylene	m+p-xylene	Isopropylbenzene	1,1-Dichloroethene	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	trans-1,3-Dichloropropene	cis-1,3-Dichloropropene	Vinyl chloride
SMGW-BH-BH106 (from SMGW-BH-B106)	8/09/2022	<10	**130**	<100	**130**	**6900**	**210**	<10	<10	<10	<10	<20	<10	<10	<10	<10	<10	<10	<100
AEC35BH01	8/09/2022	<10	<50	<10	<50	<100	<100	<1	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<10
BD1/20220908	8/09/2022	<10	<50	<10	<50	<100	<100	<1	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<10
AEC35BH02	8/09/2022	<10	<50	<10	<50	<100	<100	<1	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<10
AEC35BH03	8/09/2022	<10	<50	<10	<50	<100	<100	<1	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<10
BD2/20220908	8/09/2022	<20	**70**	<20	**70**	**200**	<100	<1	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<5
Assessment Criteria																			
Freshwater DGV		-	-	-	-	-	-	950	180	80	350	75 for m-xylene 200 for p-xylene	30	700	-	-	-		100
Guidelines for Recreational Water	**Health**	-	-	-	-	-	-	10	8000	3000	6000		-	300	600		1000		3
Guidelines for Recreational Water	**Aesthetic**	-	-	-	-	-	-	-	25	3	20		-	-	-		-		-
HSL D for Vapour Intrusion, Clay (depth 2 m to <4 m)		NL	NL	-	-	-	-	30000	NL	NL	NL		-	-	-	-	-	-	-

In this part, a value spans the next column when the cell to its right is blank: o-xylene with m+p-xylene; cis- with trans-1,2-Dichloroethene; and trans- with cis-1,3-Dichloropropene.

Sample Location / Identification (Borehole or Replicate)	Sample Date	Tetrachloroethene	Trichloroethene	1,2,3-Trichlorobenzene	1,2,4-Trichlorobenzene	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	Chlorobenzene	1,1,2,2-Tetrachloroethane	1,1,1-Trichloroethane	1,1,2-Trichloroethane	1,2-Dichloroethane	Carbon tetrachloride	Chloroform	Bromodichloromethane	Dibromochloromethane	Bromoform	1,2-Dichloropropane	1,3-Dichloropropane	Styrene	Hexachlorobutadiene	Carbon disulfide	Dichloromethane (methylene chloride)	Other VOC
SMGW-BH-BH106 (from SMGW-BH-B106)	8/09/2022	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	-	-	<PQL
AEC35BH01	8/09/2022	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	-	<PQL
BD1/20220908	8/09/2022	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	-	<PQL
AEC35BH02	8/09/2022	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	4	<1	<1	<1	<1	<1	<1	<1	-	-	<PQL
AEC35BH03	8/09/2022	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	-	<PQL
BD2/20220908	8/09/2022	<1	<1	-	-	<1	<1	<1	<1	<1	<1	<1	<1	<1	<5	<1	<1	<1	<1	<1	<1	-	<1	<5	<PQL
Assessment Criteria																									
Freshwater DGV		70	330	3	85	160	260	60	55	400	270	6500	1900	240	370	-	-	-	900	1100	-	-	20	-	-
Guidelines for Recreational Water	**Health**	500	-	300		15000	-	400	3000	-	-	-	30	30	2500				-	-	300	7	-	40	-
Guidelines for Recreational Water	**Aesthetic**	-	-	5		1	20	0.3	10	-	-	-	-	-	-				-	-	4	-	-	-	-
HSL D for Vapour Intrusion, Clay (depth 2 m to <4 m)		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

In this part, the Health and Aesthetic values for 1,2,3-Trichlorobenzene also cover 1,2,4-Trichlorobenzene (blank cells to their right). The Chloroform values in those two rows cover Chloroform through Bromoform (the next three cells are blank).

Notes:

PQL	Practical Quantitation Limit
-	not defined/ not analysed/ not applicable
NL	Not Limiting
BD1/20220908	Blind replicate from AEC35BH01
BD2/20220908	Blind replicate from AEC35BH03
(green)	Exceedance of DGV
(blue)	Exceedance of Drinking Water Guideline

Table I2 (continued): Summary of Results of Groundwater Analysis (All results in µg/L)

Sample Location / Identification (Borehole or Replicate)	Sample Date	Organochlorine Pesticides													Organophosphorus Pesticides																													Polychlorinated Biphenyls			Phenols												Ammonia
		Aldrin	Dieldrin	gamma-Chlordane	alpha-Chlordane	Total Chlordanes	pp-DDT	Endosulfan I	Endosulfan II	Endrin	Heptachlor	Methoxychlor	Lindane	Other OCP	Azinphos-methyl	Bromophos-ethyl	Chlorpyrifos	Chlorfenvinphos	Diazinon	Dichlorovos	Dimethoate	Disulfoton	Ethion	Ethoprophos (Ethoprop)	Fenitrothion	Fensulfothion	Fenthion	Malathion	Mevinphos (Phosdrin)	Monocrotophos	Omethoate	Parathion	Methyl Parathion	Pyrazophos	Terbufos	Tetrachlorvinphos	Pirimiphos-methyl	Other OPP	Arocior 1242	Arocior 1254	Other PCB	Phenol	2,4,6-Trichlorophenol	2,4-Dinitrophenol	4-Nitrophenol	2,3,4,6-Tetrachlorophenol	Total Tetrachlorophenols	Pentachlorophenol	2-Chlorophenol	2,4-Dimethylphenol	2,4-Dichlorophenol	2,6-Dichlorophenol	Other Phenols	Ammonia as N
SMGW-BH-BH106 (from SMGW-BH-B106)	8/09/2022	<0.1	<0.1	<0.1	<0.1	-	<0.06	<0.1	<0.1	<0.1	<0.1	<0.1	-	<PQL	<0.04	<0.4	<0.02	-	<0.02	<0.4	<0.3	-	<0.4	-	<0.4	-	-	<0.1	-	-	-	<0.02	<0.4	-	-	-	-	<PQL	<0.1	<0.1	<PQL	<1	<1	<20	<20	<1	-	<5	<1	<1	<1	<1	<PQL	650
AEC35BH01	8/09/2022	<0.01	<0.01	<0.01	<0.01	-	<0.006	<0.01	<0.01	<0.01	<0.01	<0.01	-	<PQL	<0.02	<0.2	<0.01	-	<0.01	<0.2	<0.15	-	<0.2	-	<0.2	-	-	<0.05	-	-	-	<0.01	<0.2	-	-	-	-	<PQL	<0.1	<0.1	<PQL	<1	<1	<20	<20	<1	-	<5	<1	<1	<1	<1	<PQL	1500
BD1/20220908	8/09/2022	<0.01	<0.01	<0.01	<0.01	-	<0.006	<0.01	<0.01	<0.01	<0.01	<0.01	-	<PQL	<0.02	<0.2	<0.01	-	<0.01	<0.2	<0.15	-	<0.2	-	<0.2	-	-	<0.05	-	-	-	<0.01	<0.2	-	-	-	-	<PQL	<0.1	<0.1	<PQL	<1	<1	<20	<20	<1	-	<5	<1	<1	<1	<1	<PQL	1500
AEC35BH02	8/09/2022	<0.01	<0.01	<0.01	<0.01	-	<0.006	<0.01	<0.01	<0.01	<0.01	<0.01	-	<PQL	<0.02	<0.2	<0.01	-	<0.01	<0.2	<0.15	-	<0.2	-	<0.2	-	-	<0.05	-	-	-	<0.01	<0.2	-	-	-	-	<PQL	<0.1	<0.1	<PQL	<1	<1	<20	<20	<1	-	<5	<1	<1	<1	<1	<PQL	340
AEC35BH03	8/09/2022	<0.01	<0.01	<0.01	<0.01	-	<0.006	<0.01	<0.01	<0.01	<0.01	<0.01	-	<PQL	<0.02	<0.2	<0.01	-	<0.01	<0.2	<0.15	-	<0.2	-	<0.2	-	-	<0.05	-	-	-	<0.01	<0.2	-	-	-	-	<PQL	<0.1	<0.1	<PQL	<1	<1	<20	<20	<1	-	<5	<1	<1	<1	<1	<PQL	79
BD2/20220908	8/09/2022	<0.2	<0.2	-	-	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<PQL	<2	-	<2	<20	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<20	<2	<2	<2	<2	<2	<20	<PQL	<1	<1	<PQL	<3	<10	<30	<30	-	<30	<10	<3	<3	<3	<3	<PQL	40
Assessment Criteria																																																						
Freshwater DGV		0.001	0.01	0.03		0.006	0.03		0.01	0.01	0.005	-	-	0.01	-	0.01	-	0.01	-	0.15	-	-	-	0.2	-	-	0.05	-	-	-	0.004	-	-	-	-	-	-	0.3	0.01	-	320	3	45	58	10	0.2	3.6	340	2	120	34	-	900
Guidelines for Recreational Water	**Health**	3		20		90	200		-	3	3000	100	-	300	100	100	20	40	50	70	40	40	10	70	100	70	700	50	20	10	200	7	200	9	1000	900	-	-	-	-	-	200	-	-	-	-	100	3000	-	2000	-	-	-
	Aesthetic	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	0.1	-	0.3	-	-	382
HSL D for Vapour Intrusion, Clay (depth 2 m to <4 m)		-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

PQL	Practical Quantitation Limit
-	not defined/ not analysed/ not applicable
BD1/20220908	Blind replicate from AEC35BH01
BD2/20220908	Blind replicate from AEC35BH03
	Exceedance of DGV and Drinking Water Guideline
	Exceedance of Drinking Water Guidelkine

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Table I3: Summary of Laboratory Results for Waste Classification – Metals, TRH, BTEX, PAH, Phenol, OCP, OPP, PCB, Asbestos

				Metals								TRH		BTEX				PAH		Phenol						OCP		OPP		PCB	Asbestos	pH
				Arsenic	Cadmium	Total Chromium	Copper	Lead	Mercury (inorganic)	Nickel	Zinc	TRH C6 - C9	TRH C10-C36	Benzene	Toluene	Ethylbenzene	Xylenes (total)	Benzo(a)pyrene (BaP)	Total PAHs	2-Methylphenol (o-Cresol)	Cresol (total)	Total Phenols	2,4,5-trichlorophenol	2,4,6-trichlorophenol	Phenol (non-halogenated)	Total Endosulfan	Total Analysed OCP	Chlorpyriphos	Total Analysed OPP	Total PCB	Total Asbestos	pH
			PQL	4	0.4	1	1	1	0.1	1	1	25	50	0.2	0.5	1	1	0.05	0.05	0.2	0.5	5	1	1	0.5	0.1	0.1	0.1	0.1	0.1	0.001	
Sample ID	Depth	Sample Type	Sample Date	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	-	
AEC35TP01	0 - 0.1 m	Fill	29/07/2022	13	<0.4	37	4	18	<0.1	6	12	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	-	-	<5	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	6.8
AEC35TP02	0 - 0.1 m	Fill	29/07/2022	11	<0.4	32	10	17	<0.1	4	24	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	-	-	<5	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	
AEC35TP02	0.8 - 0.9 m	Natural	29/07/2022	5	<0.4	4	8	7	<0.1	<1	3	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	-	-	<5	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	
AEC35TP03	0.5 - 0.6 m	Natural	29/07/2022	10	<0.4	35	13	15	<0.1	3	7	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	-	-	<5	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	
AEC35TP04	0 - 0.1 m	Fill	29/07/2022	10	<0.4	14	12	13	<0.1	3	13	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	-	-	<5	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	
AEC35TP05	0.1 - 0.2 m	Fill	29/07/2022	8	<0.4	9	11	12	<0.1	2	9	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	
AEC35TP05	0.5 - 0.6 m	Natural	29/07/2022	13	<0.4	24	13	12	<0.1	<1	5	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	-	-	<5	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	
BD8/20220729	0.5 - 0.6 m	Natural	29/07/2022	10	<0.4	21	16	13	<0.1	<1	6	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	-	-	<5	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	
AEC35TP06	0 - 0.2 m	Fill	28/07/2022	12	<0.4	35	15	20	<0.1	4	18	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	-	-	<5	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	
AEC35TP07	0 - 0.1 m	Fill	28/07/2022	11	<0.4	31	11	18	<0.1	3	12	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	-	-	<5	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	
AEC35TP08	0.5 - 0.6 m	Natural	29/07/2022	6	<0.4	9	15	10	<0.1	<1	5	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	-	-	<5	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	5.2
AEC35TP08	1.9 - 2 m	Natural	29/07/2022	10	<0.4	5	8	13	<0.1	<1	3	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	-	-	<5	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	
AEC35TP09	0 - 0.1 m	Fill	29/07/2022	6	<0.4	24	10	62	<0.1	3	11	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	-	-	<5	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	
AEC35TP10	0.1 - 0.2 m	Fill	28/07/2022	6	<0.4	19	11	16	<0.1	2	12	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	-	-	<5	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	
AEC35TP11	0 - 0.1 m	Fill	28/07/2022	12	<0.4	25	11	14	<0.1	2	15	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	-	-	<5	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	
AEC35TP11	1 - 1.1 m	Natural	28/07/2022	12	<0.4	30	16	16	<0.1	3	16	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	-	-	<5	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	
AEC35TP12	0 - 0.1 m	Fill	28/07/2022	9	<0.4	26	8	14	<0.1	4	17	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	-	-	<5	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	
AEC35TP13	0 - 0.1 m	Fill	28/07/2022	12	<0.4	41	4	16	<0.1	3	6	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	-	-	<5	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	
AEC35TP14	0 - 0.1 m	Fill	28/07/2022	5	<0.4	15	6	12	<0.1	2	10	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	-	-	<5	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	
AEC35TP14	0.3 - 0.4 m	Natural	28/07/2022	7	<0.4	35	7	10	<0.1	2	3	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	
AEC35TP15	0.3 - 0.4 m	Fill	28/07/2022	8	<0.4	27	5	9	<0.1	1	3	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	-	-	<5	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	6.3
BD4/20220728	0.3 - 0.4 m	Fill	28/07/2022	12	<0.4	41	3	15	<0.1	2	3	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	-	-	<5	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	
AEC35TP16	0.2 - 0.3 m	Fill	28/07/2022	6	<0.4	21	4	11	<0.1	2	7	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	-	-	<5	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	
BD3/20220728	0.2 - 0.3 m	Fill	28 Jul 2022	18	<0.4	45	7	17	<0.1	<5	10	<20	<50	<0.1	<0.1	<0.1	<0.3	<0.5	<0.5	<0.2	<0.5	<PQL	<1	<1	<0.5	<0.05	<0.05	<0.2	<0.2	<0.1	-	
AEC35TP16 - [TRIPLICATE]	0.2 - 0.3 m	Fill	28/07/2022	9	<0.4	26	5	12	<0.1	2	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
AEC35TP17	0 - 0.15 m	Fill	28/07/2022	9	<0.4	29	3	12	<0.1	2	5	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	-	-	<5	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	
AEC35TP18	0.1 - 0.2 m	Fill	28/07/2022	11	<0.4	44	3	15	<0.1	2	6	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	-	-	<5	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	
AEC35TP18	0.7 - 0.8 m	Natural	28/07/2022	7	<0.4	31	7	8	<0.1	2	3	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	-	-	<5	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	
BD1/20220728	0.7 - 0.8 m	Natural	28 Jul 2022	15	<0.4	55	12	13	<0.1	5.3	7.9	<20	<50	<0.1	<0.1	<0.1	<0.3	<0.5	<0.5	<0.2	<0.5	<PQL	<1	<1	<0.5	<0.05	<0.05	<0.2	<0.2	<0.1	-	
AEC35TP19	0.3 - 0.4 m	Fill	28/07/2022	8	<0.4	41	<1	11	<0.1	1	1	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	-	-	<5	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	
AEC35HA20	0 - 0.1 m	Fill	21/09/2022	10	<0.4	27	10	16	<0.1	8	13	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	-	-	<5	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	
AEC35SP-1		stockpile	29/07/2022	11	<0.4	28	10	14	<0.1	3	9	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	-	-	<5	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	
AEC35SP-2		stockpile	29/07/2022	18	<0.4	15	12	14	<0.1	3	9	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	
AEC35SP-3		stockpile	29/07/2022	9	<0.4	22	11	16	<0.1	4	10	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	-	-	<5	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	
AEC35SP-4		stockpile	29/07/2022	8	<0.4	23	7	15	<0.1	5	16	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	-	-	-	-	-	-	-	-	-	-	-	NAD	
Waste Classification Criteria [f]																																
CT1				100	20	100	NC	100	4	40	NC	650	10000	10	288	600	1000	0.8	200	4000	4000	-	8000	40	288	60	<50	4	-	<50	NC	
SCC1				500	100	1900	NC	1500	50	1050	NC	650	10000	18	518	1080	1800	10	200	7200	200	-	14400	72	518	108	<50	7.5	-	<50	NC	
TCLP1				N/A	N/A	N/A	NC	N/A	N/A	N/A	NC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-	N/A	N/A	N/A	N/A	N/A	N/A	-	N/A	NC	
CT2				400	80	400	NC	400	16	160	NC	2600	40000	40	1152	2400	4000	3.2	800	16000	16000	-	32000	160	1152	240	<50	16	-	<50	NC	
SCC2				2000	400	7600	NC	6000	200	4200	NC	2600	40000	72	2073	4320	7200	23	800	28800	28800	-	57600	288	2073	432	<50	30	-	<50	NC	
TCLP2				N/A	N/A	N/A	NC	N/A	N/A	N/A	NC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-	N/A	N/A	N/A	N/A	N/A	N/A	-	N/A	NC	
Excavated Natural Material (ENM) criteria																																
Maximum average concentration				20	0.5	75	100	50	0.5	30	150	NC	250	N/A	N/A	N/A	N/A	0.5	20	-	-	-	-	-	-	-	-	-	-	-	-	5 to 9
Absolute maximum concentration				40	1	150	200	100	1	60	300	NC	500	0.5	65	25	15	1	40	-	-	-	-	-	-	-	-	-	-	-	-	4.5 to 10

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

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

Notes:

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

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

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

d Criteria for scheduled chemicals used as an initial screen

e Criteria for Chlorpyrifos used as initial screen

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

PQL Practical quantitation limit

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

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

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

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

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

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

Appendix J

Data Quality Assurance and Quality Control

Data Quality Assurance and Quality Control Report for DSI for AEC35

Surface & Civil Alignment Works (SCAW) Package for Sydney Metro - Western Sydney Airport (SMWSA)

1.0 Field and Laboratory Data Quality Assurance and Quality Control

The field and laboratory data quality assurance and quality control (QA / QC) procedures and results are summarised in the following Table 1. Reference should be made to the field work methodology and the laboratory results / certificates of analysis for further details. The relative percentage difference (RPD) results, along with the other field QC samples are included in the summary results Tables QA1 to QA7.

Table 1: Field and Laboratory Quality Control

Item	Evaluation / Acceptance Criteria	Compliance
Analytical laboratories used	NATA accreditation	C
Holding times	Various based on type of analysis	PC
Intra-laboratory replicates	5% of primary samples	C
	<30% RPD	PC
Inter-laboratory replicates	5% of primary samples	C
	<30% RPD	PC
Trip Spikes	1 per sampling event; 60-140% recovery	C
Trip Blanks	1 per sampling event; <PQL	C
Rinsate	1 per sampling event; <PQL	C for groundwater NR for soil
Laboratory / Reagent Blanks	1 per batch; <PQL	C
Laboratory Duplicate	1 per lab batch; As laboratory certificate	PC
Matrix Spikes	1 per lab batch; 70-130% recovery (inorganics); 60-140% recovery (organics)	PC
Surrogate Spikes	All organics analysis; 70-130% recovery (inorganics); 60-140% recovery (organics)	PC
Control Samples	1 per lab batch; 70-130% recovery (inorganics); 60-140% recovery (organics)	C
Standard Operating Procedures (SOP)	Adopting SOP for all aspects of the sampling field work	C

Notes: C = compliance; PC = partial compliance; NC = non-compliance; NR Not required

Laboratory analysis for soil was undertaken within recommended holding times except for pH analysis. The analysis of pH slightly outside of the recommended holding time (7 days) is not considered to affect the assessment of analytical results.

Laboratory analysis for the groundwater interlaboratory replicate sample (BD2/20220908) was slightly outside the recommended holding time (7 days) for TRH, PAH, OCP, OPP, VOC, phenols (non-halogenated) and PCB analysis. The analysis slightly outside of the recommended holding time is not considered to affect the assessment of analytical results.

As noted in laboratory certificate 301941, the spike recovery was not possible to report for arsenic, cadmium and lead in sample 301941-22 due to the inhomogeneous nature of the elements in the sample, however, an acceptable recovery was obtained for the laboratory control sample.

As noted in laboratory certificate 301941, the laboratory RPD acceptance criterion was exceeded for chromium in sample 301941-31, so a triplicate result was issued as sample number 301941-46. It is noted that all the chromium concentrations were generally low for this sample, and it is considered that the high RPD does not affect the assessment of results.

As noted in laboratory certificate 305367, the PQL for TRH and BTEX and naphthalene for sample 305367-2 (SMGW-BH-B106) was raised as the sample was foamy and therefore required dilution. Also, the recovery for the surrogate was not possible to report as the high concentrations of TRH C_{10}-C_{40} caused interference. Given that TRH concentrations were recorded (above the PQL) for sample 305367-2, the raised PQL is not considered to significantly affect the overall assessment of groundwater.

As noted in laboratory certificate 305367 and 305367-B, the PQL for OCP, OPP and VOC in water was raised due to interference from TRH in sample 305367-2. It is considered that the PQL were not excessively raised and the OCP and OPP data for sample 305367-2 is usable for the assessment.

As noted in laboratory certificate 306482, laboratory RPD acceptance criteria have been exceeded for 306482-74 for chromium, copper, lead and nickel. Therefore, a triplicate result was issued as laboratory sample number 306482-79. It is noted that the concentrations of chromium, copper, lead and nickel were relatively low and the elevated RPD results are not considered to be significant for the overall assessment.

As noted in laboratory certificate 911123-S, the matrix spike recovery for endrin aldehyde was outside of the recommended acceptance criterion for sample S22-Au0009526, however, an acceptable recovery was obtained for the laboratory control sample indicating a sample matrix interference.

As noted in laboratory certificate 911123-W, the surrogate recovery for chlordanes for sample S22-Se0016459 was outside the acceptable range, however, an acceptable recovery was obtained for the laboratory control sample indicating a sample matrix interference.

The RPD results for inter-laboratory and intra-laboratory soil replicates were within the acceptable range with the exception of half of the results for metals analysis. The exceedances are not, however, considered to be of concern given low actual differences in the concentrations between the primary and replicate samples.

The RPD results for inter-laboratory and intra-laboratory groundwater samples were within the acceptable range with the exception of metals (arsenic, copper, nickel and zinc) in the samples from AEC35BH01; and TRH >C_{10}-C_{16} , TRH >C_{16}-C_{34} and ammonia in the samples from AEC35BH03. The exceedances for arsenic and copper are not considered to be of concern given that the actual differences in concentrations are low. The exceedances for nickel and zinc are not considered to be of concern given that the concentrations are at what are considered to be background levels. The exceedances for TRH and ammonia are not considered to be of concern given that the actual differences in concentrations are relatively low.

For groundwater sampling, the electronic interface probe, flow cell and probes were decontaminated between monitoring wells by rinsing in a diluted Liquinox solution and then rinsing in demineralised water. A rinsate (Rinsate-W080922) was collected by running demineralised water over the decontaminated sampling equipment and directing the water into sampling bottles provided by the laboratory. Rinsate test results were all less than the practical quantitation limits. For soil and sediment sampling, to avoid the need for decontaminating sampling equipment, disposable nitrile gloves were changed between each sampling event and used for sample collection. Soil and sediment samples collected from the hand auger were carefully done so as to be representative of the target strata/material (e.g., natural soil samples were observed to be free of overlying fill).

Trip spikes and trip blanks were subject to the same conditions in the field as collected soil and water samples. Results for BTEX in trip spikes were within the acceptable range and the results for BTEX in trip blanks were less than the practical quantitation limits.

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

2.0 Data Quality Indicators

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

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

Table 2: Data Quality Indicators

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

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

3.0 Conclusion

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

4.0 References

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

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Table QA1: Relative Percentage Difference Results – Soil Replicates

			Metals								TRH				BTEX				PAH				Phenols	OCP												OPP		PCB
			Arsenic	Cadmium	Total Chromium	Copper	Lead	Mercury (inorganic)	Nickel	Zinc	TRH C6 - C10	TRH >C10-C16	TRG >C16-C34	TRH >C34-C40	Benzene	Toluene	Ethylbenzene	Total Xylenes	Naphthalene [b]	Benzo(a)pyrene (BaP)	Benzo(a)pyrene TEQ	Total PAHs	Total Phenols	DDD	DDT+DDE+DDD [c]	DDE	DDT	Aldrin & Dieldrin	Total Chlordane	Endrin	Total Endosulfan	Heptachlor	Hexachlorobenzene	Methoxychlor	Other OCP	Chlorpyriphos	Other OPP	Total PCB
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	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
BD8/20220729	0.5 - 0.6 m	29/07/2022	10	<0.4	21	16	13	<0.1	<1	6	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1
AEC35TP05	0.5 - 0.6 m	29/07/2022	13	<0.4	24	13	12	<0.1	<1	5	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1
		Difference	3	0	3	3	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		RPD	26%	0%	13%	21%	8%	0%	0%	18%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
BD4/20220728	0.3 - 0.4 m	28/07/2022	12	<0.4	41	3	15	<0.1	2	3	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1
AEC35TP15	0.3 - 0.4 m	28/07/2022	8	<0.4	27	5	9	<0.1	1	3	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1
		Difference	4	0	14	2	6	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		RPD	**40%**	0%	**41%**	**50%**	**50%**	0%	**67%**	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
BD3/20220728	0.2 - 0.3 m	28/07/2022	18	<0.4	45	7	17	<0.1	<5	10	<20	<50	<100	<100	<0.1	<0.1	<0.1	<0.1	<0.5	<0.5	<0.5	<0.5	<PQL	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<PQL	<0.2	<PQL	<0.1
AEC35TP16	0.2 - 0.3 m	28/07/2022	6	<0.4	21	4	11	<0.1	2	7	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1
		Difference	12	0	24	3	6	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		RPD	**100%**	0%	**73%**	**55%**	**43%**	0%	0%	**35%**	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
BD1/20220728	0.7 - 0.8 m	28/07/2022	15	<0.4	55	12	13	<0.1	5.3	7.9	<20	<50	<100	<100	<0.1	<0.1	<0.1	<0.1	<0.5	<0.5	<0.5	<0.5	<PQL	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<PQL	<0.2	<PQL	<0.1
AEC35TP18	0.7 - 0.8 m	28/07/2022	7	<0.4	31	7	8	<0.1	2	3	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1
		Difference	8	0	24	5	5	0	3.3	4.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		RPD	**73%**	0%	**56%**	**53%**	**48%**	0%	**90%**	**90%**	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

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Table QA2: Trip Blank Results - Soils (mg/kg)

Sample ID	Sample Date	Benzene	Toluene	Ethylbenzene	o-Xylene	m+p-Xylene
TB-20220728	28/07/2022	<0.2	<0.5	<1	<1	<2
TB-20220729	29/07/2022	<0.2	<0.5	<1	<1	<2
TB-210922	21/09/2022	<0.2	<0.5	<1	<1	<2

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Table QA3: Trip Spike Results – Soils (% Recovery)

Sample ID	Sample Date	Benzene	Toluene	Ethylbenzene	o-Xylene	m+p-Xylene
TS-20220728	28/07/2022	103	102	103	104	103
TS-20220729	29/07/2022	107	105	106	107	106
TS-210922	21/09/2022	81	79	82	82	82

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Table QA4: Relative Percentage Difference Results for Groundwater

	Metals								TRH				BTEX					PAH							Phenols												OCP										
	Arsenic	Cadmium	Total Chromium	Copper	Lead	Mercury (inorganic)	Nickel	Zinc	TRH C6 - C10	TRH >C10-C16	TRH >C16-C34	TRH >C34-C40	Benzene	Toluene	Ethylbenzene	o-xylene	m+p-xylene	Naphthalene	Anthracene	Fluoranthene	Benzo(a)pyrene	Phenanthrene	Other PAH	Phenol	2,4,6-Trichlorophenol	2,4-Dinitrophenol	4-Nitrophenol	2,3,4,6-Tetrachlorophenol	Total Tetrachlorophenols	Pentachlorophenol	2-Chlorophenol	2,4-Dimethylphenol	2,4-Dichlorophenol	2,6-Dichlorophenol	Other Phenols	Aldrin	Dieldrin	gamma-Chlordane	alpha-Chlordane	pp-DDT	Endosulfan I	Endosulfan II	Endrin	Heptachlor	Methoxychlor
Sample ID	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
BD1/20220908	2	0.9	<1	3	<1	<0.05	6	6	<10	<50	<100	<100	<1	<1	<1	<1	<2	<0.2	<0.1	<0.1	<0.1	<0.1	<PQL	<1	<1	<20	<20	<1	-	<5	<1	<1	<1	<1	<PQL	<0.01	<0.01	<0.01	<0.01	<0.06	<0.01	<0.01	<0.01	<0.01	<0.01
AEC35BH01	3	1	<1	2	<1	<0.05	64	74	<10	<50	<100	<100	<1	<1	<1	<1	<2	<0.2	<0.1	<0.1	<0.1	<0.1	<PQL	<1	<1	<20	<20	<1	-	<5	<1	<1	<1	<1	<PQL	<0.01	<0.01	<0.01	<0.01	<0.06	<0.01	<0.01	<0.01	<0.01	<0.01
	1	0.1	0	1	0	0	58	68	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	40%	11%	0%	**40%**	0%	0%	**165%**	**170%**	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
BD2/20220908	<10	<2	<10	<10	<10	<1	53	97	<20	70	200	<100	<1	<1	<1	<1	<2	0.01	<0.01	<0.01	<0.01	<0.01	<PQL	<3	<10	<30	<30	-	<30	<10	<3	<3	<3	<3	<PQL	<0.2	<0.2	<2		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
AEC35BH03	<1	<0.1	<1	<1	<1	<0.05	56	110	<10	<50	<100	<100	<1	<1	<1	<1	<2	<0.2	<0.1	<0.1	<0.1	<0.1	<PQL	<1	<1	<20	<20	<1	-	<5	<1	<1	<1	<1	<PQL	<0.01	<0.01	<0.01	<0.01	<0.06	<0.01	<0.01	<0.01	<0.01	<0.01
	0	0	0	0	0	0	3	13	0	20	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0%	0%	0%	0%	0%	0%	6%	13%	0%	**33%**	**67%**	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

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Table QA4: Relative Percentage Difference Results for Groundwater

		OPP												PCB		
	Other OCP	Azinphos-methyl	Bromophos-ethyl	Chlorpyrifos	Diazinon	Dichlorovos	Dimethoate	Ethion	Fenitrothion	Malathion	Parathion	Methyl Parathion	Other OPP	Aroclor 1242	Aroclor 1254	Other PCB
Sample ID	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
BD1/20220908	<PQL	<0.02	<0.2	<0.01	<0.01	<0.2	<0.15	<0.2	<0.2	<0.05	<0.01	<0.2	<PQL	<0.1	<0.1	<0.1
AEC35BH01	<PQL	<0.02	<0.2	<0.01	<0.01	<0.2	<0.15	<0.2	<0.2	<0.05	<0.01	<0.2	<PQL	<0.1	<0.1	<0.1
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
BD2/20220908	<PQL	<2	-	<2	<2	<2	<2	<2	<2	<2	<2	<2	<PQL	<1	<1	<PQL
AEC35BH03	<PQL	<0.02	<0.2	<0.01	<0.01	<0.2	<0.15	<0.2	<0.2	<0.05	<0.01	<0.2	<PQL	<0.1	<0.1	<0.1
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

	VOC														
	Isopropylbenzene	1,1-Dichloroethene	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	trans-1,3-Dichloropropene	cis-1,3-Dichloropropene	Vinyl chloride	Tetrachloroethene	Trichloroethene	1,2,3-Trichlorobenzene	1,2,4-Trichlorobenzene	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	Chlorobenzene
Sample ID	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
BD1/20220908	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1	<1	<1	<1	<1	<1
AEC35BH01	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1	<1	<1	<1	<1	<1
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
BD2/20220908	<1	<1	<1	<1	<1	<1	<5	<1	<1	-	-	<1	<1	<1	<1
AEC35BH03	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1	<1	<1	<1	<1	<1
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

	VOC														Ammonia
	1,1,2,2-Tetrachloroethane	1,1,1-Trichloroethane	1,1,2-Trichloroethane	1,2-Dichloroethane	Carbon tetrachloride	Chloroform	Bromodichloromethane	Dibromochloromethane	Bromoform	1,2-Dichloropropane	1,3-Dichloropropane	Styrene	Hexachlorobutadiene	Other VOC	Ammonia as N
Sample ID	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
BD1/20220908	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<PQL	1500
AEC35BH01	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<PQL	1500
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
BD2/20220908	<1	<1	<1	<1	<1	<5	<1	<1	<1	<1	<1	<1	-	<PQL	40
AEC35BH03	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<PQL	79
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	39
	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	**66%**

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Table QA5: Trip Blank Results - Water (µg/L)

Sample ID	Sampling Date	Benzene	Toluene	Ethylbenzene	o-Xylene	m+p-Xylene
TB-W080922	8/09/2022	<1	<1	<1	<1	<2

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Table QA6: Trip Spike Results – Water (% Recovery)

Sample ID	Sampling Date	Benzene	Toluene	Ethylbenzene	o-Xylene	m+p-Xylene
TS-W080922	8/09/2022	92	97	102	119	119

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Table QA7: Rinsate Results for Water Sampling

		Metals								TRH				BTEX					PAH						Phenols											OCP											
		Arsenic	Cadmium	Total Chromium	Copper	Lead	Mercury (inorganic)	Nickel	Zinc	TRH C6 - C10	TRH >C10-C16	TRH >C16-C34	TRH >C34-C40	Benzene	Toluene	Ethylbenzene	o-xylene	m+p-xylene	Naphthalene	Anthracene	Fluoranthene	Benzo(a)pyrene	Phenanthrene	Other PAH	Phenol	2,4,6-Trichlorophenol	2,4-Dinitrophenol	4-Nitrophenol	2,3,4,6-Tetrachlorophenol	Pentachlorophenol	2-Chlorophenol	2,4-Dimethylphenol	2,4-Dichlorophenol	2,6-Dichlorophenol	Other Phenols	Aldrin	Dieldrin	gamma-Chlordane	alpha-Chlordane	pp-DDT	Endosulfan I	Endosulfan II	Endrin	Heptachlor	Methoxychlor	Other OCP
Sample ID	Sampling Date	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Rinsate-W080922	22/09/2022	<1	<0.1	<1	<1	<1	<0.05	<1	<1	<10	<50	<100	<100	<1	<1	<1	<1	<2	<0.2	<0.1	<0.1	<0.1	<0.1	<PQL	<1	<1	<1	<20	<1	<5	<1	<20	<1	<1	<PQL	<0.01	<0.01	<0.01	<0.01	<0.006	<0.01	<0.01	<0.01	<0.01	<0.01	<PQL

Appendix K

Site Photographs

Photograph 1 - Stockpile AEC35SP

Photograph 2 - Stockpile AEC35SP

Douglas Partners Geotechnics / Environment / Groundwater	**Site Photographs - AEC 35** **Sydney Metro Western Sydney Airport - SCAW, Elizabeth Drive, Badgerys Creek**	PROJECT: 204814.01 PLATE No: 1 REV: 0
	CLIENT: CPBUI JV	DATE: 13-Oct-22

REVIEW COMMENTS SHEET

DOCUMENT NO.	TITLE	VER	STATUS	NO.	DATE	COMPANY	RAISED BY	REVIEW DOC. NO.*	DOCUMENT REF*	DEED REF*	COMMENTS / RESPONSE	COMMENT CATEGORY*	CLOSED OUT
SMWSASCA-CPU-1NL-NL000-CT-RPT-000002	**DSI AEC 35 - Detail Site Investigation - Area of Environmental Concern 35**	00.01	S3	01	12/01/2023	NPA	AMENET	SMWSASCA-CPU-OHE-SF153-CT-RPT-000002	waste classification	12.19 (d) (ii)	It is noted that under Clause 12.19 (d) (ii), the DSI must include in-situ waste classification of solid waste at sampling densities not less than ASC NEPM 2013 and IWRG except for ENM or VENM. Preliminary waste classification comments are included in the DSI however the waste classifications are not included. Can the waste classifications please be provided per the deed requirements for all material which can not be reused onsite. Alternatively, please comment on suitability for onsite reuse.	Potential Non-Compliance	N
								SMWSASCA-CPU-OHE-SF153-CT-RPT-000002	waste classification	12.19 (d) (ii)	Comments on the suitability of soil have been added. Sorting of buried wastes (including non-soil materials) is to be documented in RAP as standard test bores/pits are not sufficent for waste classification of various non-soil materials.	Potential Non-Compliance	N
				02	12/01/2023	NPA	AMENET	SMWSASCA-CPU-OHE-SF153-CT-RPT-000002	auditor review	12.19 (c) (vii)	Under clause 12.19 (c) (vii), the DSI must be accompanied by an IAA. SM has agreed to review and provide interim comments ahead of the IAA as requested by CPBU. It is expected that the IAA and auditor endorsement will be provided per 12.19 (c) (vi and vii) upon revision of the DSI. Please advise how this requirement is proposed to be met.	Potential Non-Compliance	N
								SMWSASCA-CPU-OHE-SF153-CT-RPT-000002	auditor review	12.19 (c) (vii)	IAA for DSI has been issued.	Potential Non-Compliance	N
				03	12/01/2023	NPA	AMENET	SMWSASCA-CPU-OHE-SF153-CT-RPT-000002	remediation and requirement documentation	12.20 (a) (i)	Please state if the site is considered suitable for the proposed land use based on DSI outcomes (or not). The DSI concludes that the site can be made suitable for the proposed works if the recommendations are implemented, however, it is unclear if remediation is required. It is understood that excavation and offsite disposal of contaminated soils are required at BH-B106, which is within an area to be disturbed by SCAW activities. Please advise whether or not remediation is required (E93), and how this will be documented (for example, if a RAP and validation report will be prepared as required by 12.20 (a) (i)).	Potential Non-Compliance	N
								SMWSASCA-CPU-OHE-SF153-CT-RPT-000002	remediation and requirement documentation	12.20 (a) (i)	Statement on preparation of a RAP has been added.	Potential Non-Compliance	N
				04	19/01/2023	SMD	TSOLOMON				No Comments		Y
													Y