Douglas Partners
Geotechnics / Environment / Groundwater

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Report on
Detailed Site Investigation (Contamination)

Surface & Civil Alignment Works (SCAW) Package for
Sydney Metro - Western Sydney Airport (SMWSA)
Area of Environmental Concern (AEC) 30, 22-26
Lansdowne 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) 30.

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 34 that will be disturbed for SCAW activities and to determine whether further investigation and / or management is required. It is understood that the site will be subject to a Site Audit (by Melissa Porter).

The scope of work for the DSI included the collection of soil samples from eighteen test pits (AEC30 TP01 to TP14, TP16, TP17, TP20 and TP21); collection of samples from two small stockpiles; installation of three monitoring wells (AEC30 BH01 to BH03); analysis of selected soil samples and the groundwater sample for potential contaminants and parameters; and preparation of this report.

At all test pit and borehole locations, the soil profile was observed to comprise a surface layer of silty sand or silty clay fill, 0.05 m to 0.8 m thick, underlain by silty clay to depths of 4.0 m and 4.5 m and then siltstone. No signs of contamination were observed during sampling. The groundwater level was recorded at a depths of between 3.67 m bgl and 6.27 m bgl (32.23 m AHD and 27.03 m AHD) prior to sampling on 15 February 2023.

Concentrations of chemicals for all analysed soil samples were within the site assessment criteria (SAC), with the exception ecological investigation level (EIL) exceedances in sample AEC30SP2 for arsenic (300 mg/kg) exceeding the EIL of 100 mg/kg and copper (370 mg/kg) exceeding the EIL of 190 mg/kg. Asbestos was not detected in any analysed sample.

Groundwater concentrations for arsenic, chromium, lead, total recoverable hydrocarbons (TRH), benzene, toluene, ethylbenzene and xylenes (BTEX), organochlorine pesticides (OCP), organophosphorus pesticides (OPP), polychlorinated biphenyls (PCB) and phenols were less than the laboratory practical quantification limit (PQL) and within the site assessment criteria (SAC). Concentrations of cadmium, mercury, nickel, zinc and polycyclic aromatic hydrocarbons (PAH) were within the SAC and at levels which are considered to be background levels.

With respect to stockpile samples, concentrations of chemical contaminants were within the CT1 criteria for general solid waste (GSW) except for arsenic (300 mg/kg) and total chromium (130 mg/kg) in the surface sample from AEC30SP2. TCLP (toxicity characteristic leaching procedure) was conducted on this sample and concentrations of arsenic and chromium were within the SCC1 and TCLP1 criteria for GSW. The concentrations of arsenic and chromium exceed the excavated natural material (ENM) absolute maximum concentrations which prevent stockpile AEC30SP2 being classifiable as ENM. Stockpile AEC30SP1 may be classifiable as ENM subject to further analysis on accordance with the ENM Order.

With respect to fill samples, concentrations of chemical contaminants were within the CT1 criteria for general solid waste (GSW). Concentrations of metals, TRH, BTEX, PAH and pH are within criteria for excavated natural material (ENM) except for arsenic (23 mg/kg) in the sample from AEC30TP16, depth 0-0.1 m, which exceeds the maximum average concentration (20 mg/kg) but not the absolute maximum concentration (40 mg/kg) for ENM.

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

Field observations and analysis of soil and groundwater samples has not revealed contamination that requires remediation. Based on the results reported herein, it is considered, from a contamination perspective, that the site (AEC 30) is suitable for the proposed development.

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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) 30.

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 the part of AEC 30 that will be disturbed by SCAW activities (the site) and to determine whether further investigation and / or management is required. The site is shown on Drawing AEC30-01, 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).

The site is 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 the majority of AEC 30 as shown in Drawing AEC30-01, Appendix A.

Table 1: Site Identification Information

Item	Details
Site Address (from SIX Maps)	22-26 & 28-32 Lansdowne Road, Orchard Hills, NSW
Legal Description (from SIX Maps)	(Part of) Lots 82 & 83, Deposited Plan 29388
Approximate site area (within AEC 30)	0.75 ha
Zones for site (from ePlanning Spatial Viewer)	RU4: Primary Production Small Lots; and Not Zoned: along proposed rail line.
Local Government Area	Penrith City Council
Site Owner	Sydney Metro

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. The alignment of the proposed rail line is shown on Drawing AEC30-01, Appendix A

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, 2021e) (HHERA) provides (simple) conceptual site models 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 assumed that there is absence of buildings in areas of passive open space.

It is assumed that the site will comprise both of the above-listed land uses.

Development of the site will likely include stripping of topsoil and placement of (geotechnically suitable) soil to raise the ground level (up to approximately 6 m above current ground levels) for the surface rail line. Soil to raise ground levels is likely to be sourced from off-site. Stripped topsoil from the site will be subject to reuse elsewhere for SCAW.

3. Scope of Work

The scope of work for the DSI, generally based on DP, *Report on Sampling and Analysis Quality Plan (SAQP), Surface & Civil Alignment Works (SCAW) Package for Sydney Metro - Western Sydney Airport (SMWSA), Area of Environmental Concern (AEC) 30, 22-26 Lansdowne Road, Orchard Hills,* August 2022 (204814.01.SAQP.010.DftA), included the following:

- Collection of soil samples from 18 test pits using an excavator (TP01 to TP14, TP16, TP17, TP20 & TP21);
- Collection of soil samples from two small stockpiles;
- Installation of three groundwater monitoring wells using a drilling rig (BH01 to BH03);
- Development of each of the three groundwater monitoring wells and then return to site to collect groundwater samples;
- Analysis of selected soil samples for potential contaminants and soil parameters;
- Analysis of groundwater samples for potential contaminants and water parameters; and
- Preparation of this DSI including an assessment of analytical and field results.

It is noted that the site boundary for the DSI is different to that in the SAQP and so the investigation scope differs from that proposed in the SAQP as discussed in this report.

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 (Penrith 1:100,000 Geology Sheet).
Soil landscape	Blacktown soil landscape which comprises residual soils (Penrith 1:100,000 Soils Landscape Sheet).
Topography	AEC 30 is at approximately 35 m AHD and slopes generally down to the towards an unnamed creek (NSW 2 m elevation contours map).
Salinity	Southern edge of AEC 30 is at an area of high salinity potential. The remainder of AEC 30 is in 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).

Item	Details
Surface water	A farm dam is adjacent to the west of AEC 30. An unnamed creek is adjacent to the south of AEC 30. The unnamed creek flows into Blaxland Creek, approximately 380 m to the east of the site (SIX Maps). The surface water flow direction across the site and off site is expected to follow the surface contours and flow to the south and south-east towards the nearest water receptors (Blaxland Creek and its tributaries).
Groundwater flow direction and discharge	Based on topography, shallow groundwater (if any) is anticipated to flow generally to the south-east and potentially discharge into the unnamed creek.
Registered groundwater bores	There are no registered groundwater bores within 500 m of the site (WaterNSW).
Site use and features	The site is used for rural purposes and may be part of land used for a small commercial business. The site may have been used for, laydown and stockpile area (EIS).
Surrounding land use and features	Properties in the area typically contain rural residential buildings with sheds and paddocks and appear to be used primarily as hobby farms. AEC 30 appeared to contain a small commercial business AEC 30 had a potential workshop, laydown and stockpile area (EIS).
Information from historical aerial photographs	A small shed was present on the eastern boundary of AEC 30 in 1980 and 1994. A circular depression was located in the southeast corner of AEC 30 in 2005 and has since been filled in. The southern and western boundaries were used as laydown area for unknown equipment/construction materials (EIS).
NSW EPA records	There were no NSW EPA regulated sites (under the Contaminated Land Management Act 1997) within 1 km of the site (EIS). There were no sites notified to the NSW EPA (under the Contaminated Land Management Act 1997) within 500 m of the site (EIS). There were no (current or former) NSW EPA licensed sites (under the Protection of the Environment Operations Act 1997) within 500 m of the site (EIS). There were no NSW EPA PFAS investigation sites within 2 kms of the site (EIS).

At the time of field work the site was a grassed area with some mature trees. The following features were noted (refer to Drawing 1 in Appendix A):

- The site was generally covered by long unkept grass approximately 400 mm high;
- Scattered building rubble was present across the site predominantly along the southern boundary and the western fence line. Some building rubble was present along the eastern boundary. No potential asbestos-containing materials were identified within the building rubble.
- The footprint of the old shed targeted by AEC30TP17 could not be located likely due to long grass, however, building rubble on the eastern boundary could potentially be from the old shed;

- The circular depression targeted by AEC30TP06 and AEC30TP03 could not be located likely due to long grass (a large ant mound was located next to AEC30TP03);
- Two small stockpiles were observed on the site; the northern stockpile was covered in building rubble; and
- No potential sources of contamination (e.g., staining, odours), excluding building rubble, were identified.

Adjacent land to the north, has been subject to excavation and stockpiling works.

5. Potential Contamination Sources and Preliminary Conceptual Site Model

Potential sources of contamination for AEC 30 were identified in the EIS to be: *potential workshops, minor waste storage / on-site disposal, use or storage of hazardous building materials*. Associated contaminants of potential concern were identified in the EIS to be: heavy metals, total recoverable hydrocarbons (TRH), semi-volatile organic compounds (SVOC), volatile organic compounds (VOC) and asbestos. DP notes that specific heavy metals, SVOC and VOC are not listed in the EIS.

Table 4 summarises the potential sources of contamination and what are considered to be the contaminants of potential concern for the DSI.

Table 4: Potential Source of Contamination and Contaminants of Potential Concern

Potential Source of Contamination		Contaminants of Potential Concern
Contaminated ground from:	- potential workshops	- Metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc) - Total recoverable hydrocarbons (TRH) - Benzene, toluene, ethylbenzene and xylenes (BTEX) - Polycyclic aromatic hydrocarbons (PAH)* - Phenols - Volatile organic compounds (VOC) (for groundwater)
	- minor waste storage / on-site disposal	- Metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc) - TRH - BTEX - PAH* - Phenols - Organochlorine pesticides (OCP) - Organophosphorus pesticides (OPP) - Polychlorinated biphenyls (PCB) - Asbestos
	- use or storage of hazardous building materials	- Lead (in lead-paint) - PCB - Asbestos

Note: *Based on a review of site history, analysis for a larger suite of SVOC was not considered warranted.

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 have 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). Table 5 provides the preliminary CSM which forms the basis of the investigation.

Table 5: Preliminary CSM

Potential Contamination Source	Potential Exposure Pathway	Potential Receptors
Contaminated ground from potential workshops, minor waste storage/on-site disposal, use or storage of hazardous building materials.	− 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 surrounding area, and, thus, there is a low probability that substantial fertiliser application has occurred.

6. Field Work

6.1 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 C.

6.2 *In Situ* Soil Sampling

Based on the CSM and data quality objectives (DQO), a broad grid sampling strategy was adopted to provide data across the site. A total of 18 soil sample points for the site was adopted to meet the recommended number of sampling points in NSW EPA, *Sampling Design Part 1 -Application, Contaminated Land Guidelines,* 2022. Sample point AEC30TP03 was positioned to target the 'circular depression' at the southeast corner. Sample point AEC30TP17 was positioned in the apparent location of a former shed.

Soil sampling from test pits was undertaken on 15 December 2022.

Soil sampling was carried out in accordance with DP standard operating procedures. The general sampling and sample management procedures 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 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.

Bulk (10 L) soil samples from a depth of 0-0.1 m at AEC30TP12, AEC30TP13 and AEC30TP16 were subject to sieving / screening for asbestos on 15 December 2023:

- Weigh the bulk sample and record the mass;
- Screen the bulk sample through a ≤7 mm aperture sieve. Clods of soil were broken down by hand to fit through the sieve. Materials retained on the sieve were examined for any asbestos containing material (ACM) or suspect material; and
- Weigh all retrieved potential ACM (if any). Record the condition, size, and mass of the potential ACM.

6.3 Stockpile Sampling

Stockpile sampling was undertaken on 15 December 2022 and 17 January 2023. Samples were taken from two stockpiles of similar material located in the central area of the southern half of the site north of test pit AEC30TP05. Samples AEC30SP1, AEC30SP1A and AEC30SP1B were taken from stockpile AEC30SP1 and sample AEC30SP2 from stockpile AEC30SP2. Approximate stockpile dimensions were SP1 – 2.5 m wide by 3 m long and 1.5 m high; and SP2 – 1.5 m wide by 1.5 m long and 1 m high.

The general soil sampling and sample management procedure comprised:

- Collection of soil samples from the excavator bucket returns or hand tools from difference locations / depths throughout the stockpiles;
- 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.

Bulk (10 L) soil samples from a depth of 0.3 m at stockpiles AEC30SP1 and AEC30SP2 were subject to sieving / screening for asbestos on 15 December 2023:

- Weigh the bulk sample and record the mass;
- Screen the bulk sample through a ≤7 mm aperture sieve. Clods of soil were broken down by hand to fit through the sieve. Materials retained on the sieve were examined for any asbestos containing material (ACM) or suspect material; and
- Weigh all retrieved potential ACM (if any). Record the condition, size, and mass of the potential ACM.

6.4 Groundwater Well Installation and Development

Boreholes for groundwater monitoring wells (AEC30BH01 to AEC30BH03) were drilled to depths of between 9 m and 15 m using a track-mounted drilling rig on 8 and 9 February 2023. The groundwater monitoring wells were positioned to provide general site coverage and to determine (approximate) groundwater flow direction. Groundwater well AEC30BH01 was positioned in the north and (hydrogeological) down-gradient to the neighbouring rural property. The other groundwater wells AEC30BH03 and AEC30BH02 were positioned in the southwest and southeast correspondingly. AEC20BH02 was considered to be hydraulically lower point on the site (southeast corner).

Auger drilling with a tc-bit was utilised at AEC43BH02. Auger drilling with a tc-bit then washbore drilling were utilised at AEC43BH01 and AEC43BH03.

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 ground surface.

The groundwater monitoring wells were developed on 10 February 2023 using a Twister (plastic) pump.

Locations of the groundwater monitoring wells are shown on Drawing AEC30-01, Appendix A.

6.5 Groundwater Sampling

Groundwater sampling of monitoring wells was carried out on 15 February 2023. The sampling method adopted is as follows:

- Wear new disposable nitrile gloved for each sample point thereby minimising potential for cross-contamination;
- 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.

7. Laboratory Analysis

7.1 Soil Samples from Test Pits

Fill samples from each sample location were analysed at a NATA accredited laboratory for the COPC (see Section 5) comprising: metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel, and zinc), TRH, BTEX, PAH, OCP, OPP, PCB, total phenols and asbestos (in 500 ml of soil) as fill / topsoil was considered to have a greater risk of contamination compared to the observed natural soil.

Natural soil samples from three sample locations (AEC30TP11 (0.4-0.5), AEC30TP12 (0.4-0.5) and AEC30TP20 (0.5-0.6) beneath surface fill / topsoil were analysed for the same suite of COPC excluding asbestos to obtain some data for the natural profile across the site. Three samples from AEC30 were analysed for CEC and pH.

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

7.2 Soil Samples from Stockpiles

Stockpile samples were analysed for metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel, and zinc), TRH, BTEX, PAH, OCP, OPP, PCB, total phenols and asbestos (in 500 ml of soil).

The stockpile sample AEC30SP2 was analysed for arsenic and chromium in toxicity characteristic leaching procedure (TCLP) for waste classification assessment purposes.

7.3 Groundwater Samples

Groundwater samples were analysed for COPC comprising VOC, dissolved metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel, and zinc), TRH, BTEX, PAH, OCP, OPP, PCB and speciated phenols. The samples were also analysed for hardness. (Samples were also analysed for pH, electrical conductivity, sulfate, and chloride for geotechnical purposes and have not been reported herein).

8. Site Assessment Criteria

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

9. Field Work Results

9.1 *In Situ* Soil (Test Pits)

The test pit logs are included in Appendix G and should be referenced for detailed soil descriptions. In summary:

- Fill comprising silty sand and/or silty clay was encountered at all test pits to depths of between 0.05 m and 0.8 m. Wire and timber were identified in the fill at AEC30TP12 (depth 0-0.35 m); and
- Fill was underlain by silty clay to depths of between 0.8 m and 1.3 m. Test pits were discontinued in silty clay.

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.

Anthropogenic materials were only observed in the fill at AEC30TP12 (wire and timber). Signs of contamination (e.g. ,odours) were not observed in the soil in test pits. It is noted that the site was grass-covered which inhibited making observations of the soil at the ground surface. No potential asbestos-containing material was observed.

No free groundwater was observed at the test pits.

9.2 Stockpiles

On 15 December 2022, two stockpiles (AEC30SP1 and AEC30SP2) were identified at the locations shown in Drawing AEC30-1, Appendix A. AEC30SP1 was observed to be approximately 11.25 m^3 and AECSP2 was observed to be approximately 2.25 m^3. Each stockpile was observed to comprise grey sand with rootlets and gravel (i.e., similar material). Stockpile sampling was undertaken on 15 December 2022 and 17 January 2023. On 17 January 2023, stockpile AECSP2 was observed to be covered in tiles which had been placed over the stockpile. DP has not been provided any additional

information about where the tiles came from or who placed them on the stockpiles. No potential asbestos-containing material was observed. Photographs of stockpiles on both dates are provided in Appendix J.

The following samples were taken:

- Stockpile AEC30SP1: Three samples taken from 0-0.3 m depth (AEC30SP1, AEC30SP1A and AEC30SP1B)
- Stockpile AESP2: One sample taken from 0-0.3 m depth (AEC30SP2)

The source of the stockpiles is not known however there were excavation and stockpiling works on the site to the north which may, or may not, be related.

9.3 Groundwater Monitoring Wells

The borehole logs for groundwater monitoring wells for this assessment are included in Appendix G. Boreholes for groundwater monitoring wells were drilled through a surface layer of silty clay topsoil (0.2 m thick) in BH01 and directly into silty clay to depths of 4 m to 4.5 m, and then siltstone to termination depths (between 9 m and 15 m). No signs of contamination were noted whilst drilling.

Groundwater seepage was observed whilst drilling at a depth of 6.0 m at AEC30BH01. Groundwater was not observed whilst drilling at AEC30BH02 and AEC30BH03. It should be noted that groundwater levels are affected by climatic conditions and soil permeability and will therefore vary with time.

9.4 Groundwater Well Development and Sampling

Groundwater levels are summarised in Table 6.

Table 6: Groundwater Levels

Borehole	Prior to Well Development		Prior to Well Sampling	
	Groundwater Depth (m bgl)	Groundwater Level (m AHD)	Groundwater Depth (m bgl)	Groundwater Level (m AHD)
AEC30BH01 RL 35.9m AHD	2.0 (10/2/2023)	33.9	3.67 (15/2/2023)	32.23
AEC30BH02 RL 33.3m AHD	0.93 (10/2/2023)	32.37	4.05 (15/2/2023)	29.25
AEC30BH03 RL 33.3m AHD	10.87 (10/2/2023)	22.43	6.27 (15/2/2023)	27.03

The wells were developed the day after the wells were installed and sampled five days after development. The depths to groundwater recorded prior to sampling are considered to be more representative of the two readings as the groundwater levels had longer to stabilise post drilling; and hence the variation in depth to groundwater in the wells between the two readings.

Groundwater levels indicate that the general groundwater flow direction at the site is to the southwest. Although the inferred groundwater flow direction, based on topography is to the southeast, measured groundwater levels indicate groundwater flow to the southwest. Monitoring of groundwater levels over a longer period may provide a better indication of groundwater flow direction at the site.

During development groundwater was observed to be dark brown with high turbidity and no odour in AEC30BH01 and AEC30BH02, but pale brown with low turbidity and no odour in AEC30BH03. Following development and during sampling groundwater was observed to be slightly cloudy with low turbidity and no odour in AEC30BH01 and clear with very low turbidity and no odour in the other wells.

No phase separated hydrocarbons were identified in any of the wells from use of the interface dipmeter prior to sampling.

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

10. Discussion of Laboratory Analytical Results

10.1 Soil and Stockpile Samples

Analytical results for soil samples for the current assessment are summarised in Table I1, Appendix I, against the most conservative (Tier 1) SAC (see Appendix E). The most conservative health-based SAC are shown on the table as well as the ecological SAC for public open space which are more conservative than for a commercial / industrial land use.

Asbestos was not detected in any of the analysed samples. It is noted that concentrations of TRH C_6 - C_{10}, TRH >C_{10} - C_{16}, TRH >C_{34}-C_{40}, BTEX, PAH, OPP, PCB, and total phenols were less than the practical quantitation limits (PQL) for samples taken from test pits.

Asbestos was not detected in any of the analysed stockpile samples. It is noted that concentrations of TRH C_6 - C_{10}, TRH >C_{10} - C_{16}, TRH >C_{34}-C_{40}, BTEX, PAH, OPP, PCB, and total phenols were less than the practical quantitation limits (PQL) for samples taken from stockpiles.

Exceedances of EIL were noted in stockpile sample AEC30SP2 for arsenic (300 mg/kg) exceeding the EIL of 100 mg/kg and copper (370 mg/kg) exceeding the EIL of 190 mg/kg.

10.2 Groundwater Samples

Analytical results for groundwater samples are summarised in Table I2, Appendix I.

Concentrations of arsenic, chromium, lead, TRH, BTEX, OCP, OPP, OCB and phenols were less than the PQL and within the SAC. Concentrations of cadmium, mercury, nickel, zinc, and PAH were below the DGV (SAC) and at levels which are considered to be background levels.

10.3 Preliminary Waste Classification Comments

Table I3, Appendix I, presents the analytical results 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*.

With respect to stockpile samples, concentrations of chemical contaminants were within the CT1 criteria for general solid waste (GSW) except for arsenic (300 mg/kg) and total chromium (130 mg/kg) in the surface sample from AEC30SP2. TCLP (toxicity characteristic leaching procedure) was conducted on this sample and concentrations of arsenic and chromium were within the SCC1 and TCLP1 criteria for GSW. The concentrations of arsenic and chromium exceed the excavated natural material (ENM) absolute maximum concentrations which prevent stockpile AEC30SP2 being classifiable as ENM. Stockpile AEC30SP1 may be classifiable as ENM subject to further analysis on accordance with the ENM Order.

With respect to fill samples, concentrations of chemical contaminants were within the CT1 criteria for general solid waste (GSW). Concentrations of metals, TRH, BTEX, PAH and pH are within criteria for excavated natural material (ENM) except for: arsenic (23 mg/kg) in the sample from AEC30TP16, depth 0-0.1 m, which exceeds the maximum average concentration (20 mg/kg) but not the absolute maximum concentration (40 mg/kg) for ENM;

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

10.4 Data Quality Assurance and Quality Control

The data quality assurance and quality control (QA / QC) results are included in Appendix K. 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.

11. Conclusion

Field observations and analysis of *in situ* soil and groundwater samples has not revealed contamination that requires remediation. Based on the results provided herein, the site is considered suitable for the final intended land use as commercial / industrial (railway corridor)and public open space land use (passive open space adjacent to the rail corridor).

Based on the laboratory results, the stockpiled material (AEC30SP1 and AEC30SP2) is considered suitable from a contamination standpoint for re-use on the site in areas of limited ecological value, for example below slabs, roads. The placement of stockpile AEC30SP2should include consideration of the possible leachable nature of the arsenic present in the fill material in the stockpile.

While the fate of the stockpiled material (AEC30SP1 and AEC30SP2) has not been confirmed, it is considered based on the presence of tiles on AEC30SP2 and results listed above, it may be preferable to remove the stockpile from the site. If the stockpiles are to be disposed off-site, these are provisionally classified as general solid waste (GSW) – non putrescible. Stockpile AEC30SP2 is not classifiable as ENM. Stockpile AEC30SP1 may be classifiable as ENM subject to further analysis on accordance with the ENM Order.

Based on the results reported herein and the conditions above relating to the stockpile on the site, it is considered, from a contamination perspective, that the site (AEC 30) is suitable for the final intended land use.

12. 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 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 further 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.

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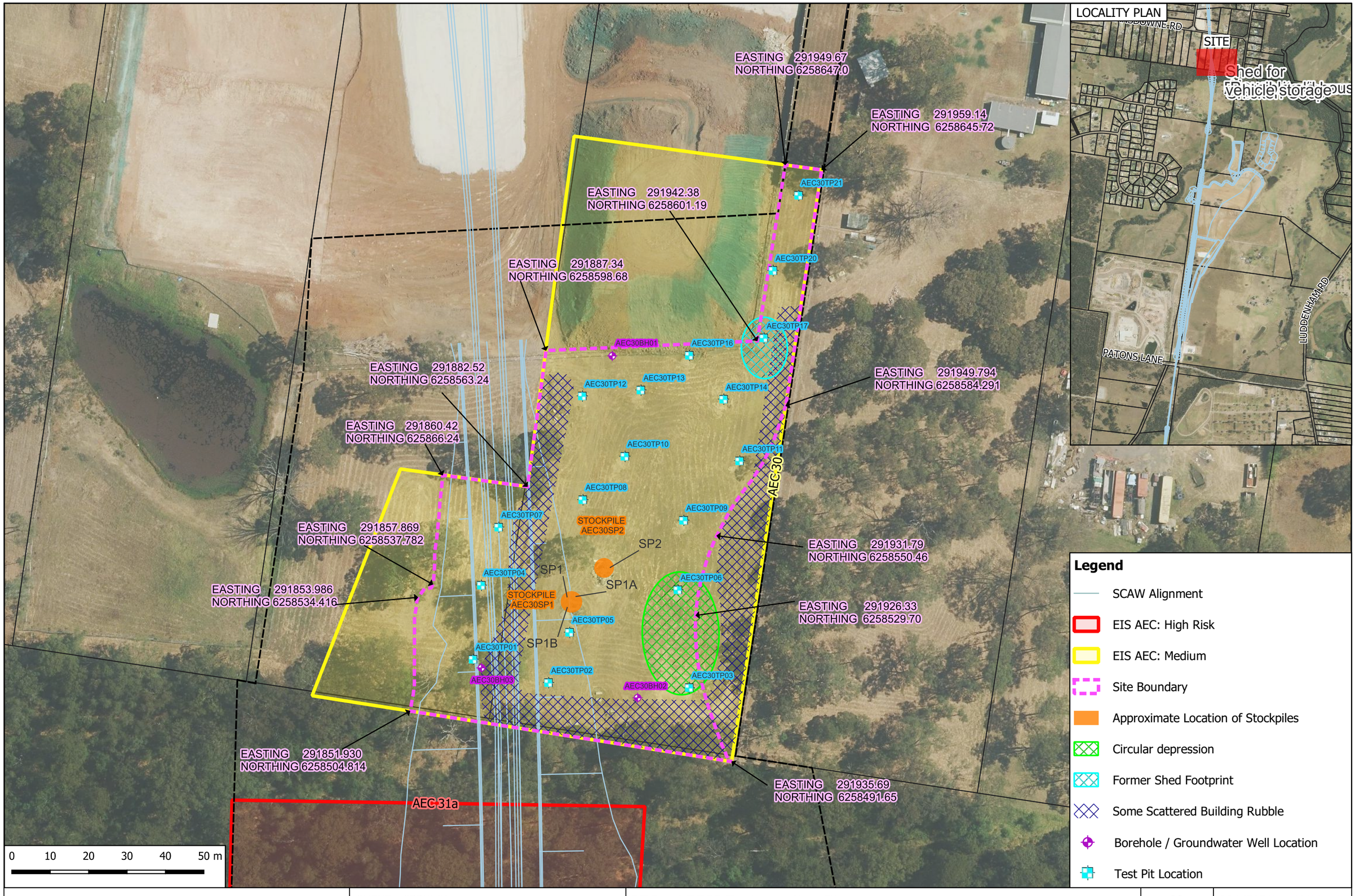
Appendix A

Drawing



Douglas Partners
Geotechnics / Environment / Groundwater

CLIENT:	CPBUI JV		
OFFICE:	Sydney	DRAWN BY:	MG/MN
SCALE:	1:900 @ A3	DATE:	17/05/2023

TITLE: **AEC30 Test Location Plan**
Sydney Metro Western Sydney Airport - SCAW
22-26 Landsdowne Road, Orchard Hills

PROJECT No:	204814.01
DRAWING No:	AEC30-01
REVISION:	0

Appendix B

About this Report

About this Report

Douglas Partners

Introduction

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

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

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

Borehole and Test Pit Logs

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

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

Groundwater

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

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

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

Reports

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

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

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

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

About this Report

Site Anomalies

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

Information for Contractual Purposes

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

Site Inspection

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

Appendix C

Data Quality Objectives

Data Quality Objectives
DSI for AEC30, 22-26 Lansdowne 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 Appendix E. 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 Appendix E. A photoionisation 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 D

Laboratory Certificates and Chain of Custody

Appendix E

Site Assessment Criteria - Soil

Site Assessment Criteria for Soil for AEC30

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).

2.0 Human Health-based Criteria

Human health-based SAC for soil and the associated future land uses are listed in Tables 1 to 6. 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; and
- Health screening levels for asbestos (Table 5).

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
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 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 6 and 7. 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.

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

- A pH of 6.1 which is the average pH for the three analysed soil samples (see Laboratory Certificate 313366);
- A Cation Exchange Capacity (CEC) of 9.1 meq/100g which is the average CEC for the two analysed soil samples (see laboratory certificate 313366);
- 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 1% has been used as a relatively conservative value; and
- The state is NSW and the traffic volume is 'low'.

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

Table 6: 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	190	270
Nickel	140	230
Chromium III	190	320
Lead	1100	1800
Zinc	450	660
PAH		
Naphthalene	170	370
OCP		
DDT	180	640

Table 7: Ecological Screening Levels (Tier 1) from NEPM

Contaminant	Soil [TW1][PM2][TW3][PM4]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

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 8. As clay and sand soils were encountered during the investigation and, so, management limits for fine and coarse soils have been adopted.

Table 8: 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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Appendix F

Site Assessment Criteria – Water

Appendix F
Site Assessment Criteria for Groundwater for AEC30
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).

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).

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 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	
Arsenic (III)	24
Arsenic (V)	13
Cadmium	15.1 *
Chromium (III)	177.3 *
Chromium (VI)	1.0
Copper	1.4
Lead	1626.9 *
Mercury (inorganic)	0.06
Nickel	683.9 *
Zinc	497.4 *
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
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

Contaminant	Fresh Water DGV (µg/L)
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
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

Contaminant	Fresh Water DGV (µg/L)
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

Notes: * Modified for hardness 3866 mgCaCO3/L

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 2 and 3). 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); and
- Health-based guidelines for recreational waters (Table 4). 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).

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 4.

Table 2: 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 3: 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 4: 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		
Arsenic	100	-
Cadmium	20	-
Chromium (VI)	500	-
Copper	20 000	1000
Lead	100	-
Mercury	10	-
Nickel	200	-
Zinc	-	3000
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	-

Contaminant	Health-based Guideline Value (µg/L)	Aesthetic Guideline Value (µg/L)
Fensulfothion	100	-
Fenthion	70	-
Malathion	700	-
Methyl parathion	7	-
Mevinphos (Phosdrin)	50	-
Monocrotophos	20	-
Omethoate	10	-
Pyrazophos	200	-
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	-

Appendix G

Test Pit Logs and Borehole Logs

EXCAVATION - GEOLOGICAL LOG

PIT NO : AEC30TP01
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Sydney Metro Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : Lansdowne Road - Orchard Hills

POSITION : E: 291868.2, N: 6258518.1 (56 MGA2020)	SURFACE ELEVATION : 33.20 (mAHD)	
EQUIPMENT TYPE : 8 tonne Excavator	METHOD : 800mm bucket	
DATE EXCAVATED : 15/12/22	LOGGED BY : PJ	CHECKED BY : MB
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 100 200 300 400	STRUCTURE & Other Observations
		Not Observed	ES 0.10m 0.05m ES 0.20m 0.60m ES 0.70m	0.0 0.5		CI-CH	0.05m FILL: silty SAND: brown, fine to medium grained sand, low to medium plasticity silt, with rootlets Silty CLAY: medium to high plasticity, red-brown, trace fine to medium ironstone gravel 0.80m EXCAVATION AEC30TP01 TERMINATED AT 0.80 m Target depth	D w<PL	St to VSt	× (0.00: HP =210 kPa) × (0.60: HP =180 kPa)	FILL 0.00: PID<5 Field Replicate BD1/20221215 taken at 0-0.05m RESIDUAL SOIL 0.10: HP =210 kPa 0.10: PID<5 0.60: HP =180 kPa 0.60: PID<5

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 : AEC30TP02
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Sydney Metro Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : Lansdowne Road - Orchard Hills

POSITION : E: 291887.8, N: 6258512.0 (56 MGA2020)	SURFACE ELEVATION : 33.30 (mAHD)	
EQUIPMENT TYPE : 8 tonne Excavator	METHOD : 800mm bucket	
DATE EXCAVATED : 15/12/22	LOGGED BY : PJ	CHECKED BY : MB
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 kPa)	STRUCTURE & Other Observations
		Not Observed	ES 0.10m 0.05m ES 0.20m 0.60m ES 0.70m	0.0			0.05m FILL: silty SAND: brown, fine to medium grained sand, low to medium plasticity silt, with rootlets	D			FILL 0.00: PID<5 RESIDUAL SOIL 0.10: HP =190 kPa 0.10: PID<5
				0.5		CI-CH	Silty CLAY: medium to high plasticity, red-brown, trace fine to medium ironstone gravel	w<PL	St to VSt		0.60: HP =220 kPa 0.60: PID<5
							0.80m EXCAVATION AEC30TP02 TERMINATED AT 0.80 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 : AEC30TP03
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Sydney Metro Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : Lansdowne Road - Orchard Hills

POSITION : E: 291924.5, N: 6258510.7 (56 MGA2020)	SURFACE ELEVATION : 33.00 (mAHD)	
EQUIPMENT TYPE : 8 tonne Excavator	METHOD : 800mm bucket	
DATE EXCAVATED : 15/12/22	LOGGED BY : PJ	CHECKED BY : MB
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 100 200 300 400	STRUCTURE & Other Observations
		Not Observed	ES 0.05m 0.20m ES 0.30m	0.0			0.05m FILL: silty SAND: brown, fine to medium grained sand, low to medium plasticity silt, trace rootlets	D			FILL 0.00: PID<5
							FILL: silty CLAY: medium to high plasticity, red-brown mottled grey with brown, trace fine to medium ironstone gravel, (reworked natural)	w<PL			0.20: PID<5
				0.5			0.60m Silty CLAY: medium to high plasticity, red-brown, trace fine to medium ironstone gravel	w<PL	St to VSt	×	RESIDUAL SOIL 0.70: HP =190 kPa 0.70: PID<5
			0.70m ES 0.80m 1.20m ES 1.30m	1.0		CI-CH	1.30m			×	1.20: HP =210 kPa 1.20: PID<5
				1.5			EXCAVATION AEC30TP03 TERMINATED AT 1.30 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 : AEC30TP04
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Sydney Metro Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : Lansdowne Road - Orchard Hills

POSITION : E: 291870.3, N: 6258537.5 (56 MGA2020)	SURFACE ELEVATION : 34.40 (mAHD)	
EQUIPMENT TYPE : 8 tonne Excavator	METHOD : 800mm bucket	
DATE EXCAVATED : 15/12/22	LOGGED BY : PJ	CHECKED BY : MB
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 100 200 300 400	STRUCTURE & Other Observations
		Not Observed	ES 0.10m 0.05m ES 0.20m 0.60m ES 0.70m	0.0 0.5		CI-CH	0.05m FILL: silty SAND: brown, fine to medium grained sand, low to medium plasticity silt, trace rootlets Silty CLAY: medium to high plasticity, red-brown, trace fine to medium ironstone gravel 0.90m	D w<PL	St to VSt	× (0.10m) × (0.60m)	FILL 0.00: PID<5 Field Replicate BD2/20221215 taken at 0-0.05m RESIDUAL SOIL 0.10: HP =210 kPa 0.10: PID<5 0.60: HP =190 kPa 0.60: PID<5
				1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0			EXCAVATION AEC30TP04 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 : AEC30TP05
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Sydney Metro Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : Lansdowne Road - Orchard Hills

POSITION : E: 291893.4, N: 6258525.2 (56 MGA2020)	SURFACE ELEVATION : 33.90 (mAHD)	
EQUIPMENT TYPE : 8 tonne Excavator	METHOD : 800mm bucket	
DATE EXCAVATED : 15/12/22	LOGGED BY : PJ	CHECKED BY : MB
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 0.05m ES 0.20m	Not Observed					0.05m FILL: silty SAND: brown, fine to medium grained sand, low to medium plasticity silt, trace rootlets	D			FILL 0.00: PID<5
0.5	0.60m ES 0.70m					CI-CH	Silty CLAY: medium to high plasticity, red-brown, trace fine to medium ironstone gravel 0.80m	w<PL	St to VSt		RESIDUAL SOIL 0.10: HP =220 kPa 0.10: PID<5 0.60: HP =210 kPa 0.60: PID<5
1.0							EXCAVATION AEC30TP05 TERMINATED AT 0.80 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 : AEC30TP06
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Sydney Metro Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : Lansdowne Road - Orchard Hills

POSITION : E: 291921.6, N: 6258536.2 (56 MGA2020)	SURFACE ELEVATION : 34.00 (mAHD)	
EQUIPMENT TYPE : 8 tonne Excavator	METHOD : 800mm bucket	
DATE EXCAVATED : 15/12/22	LOGGED BY : PJ	CHECKED BY : MB
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 100 200 300 400	STRUCTURE & Other Observations
		Not Observed	ES 0.10m	0.0			0.15m FILL: silty CLAY: medium to high plasticity, red-brown with brown, with fine to medium sand, trace rootlets, (possible reworked natural)	w<PL			FILL 0.00: PID<5
			0.20m ES 0.30m	0.5		CI-CH	Silty CLAY: medium to high plasticity, red-brown, trace fine to medium ironstone gravel	w<PL	St to VSt	×	RESIDUAL SOIL 0.20: HP =230 kPa 0.20: PID<5
			0.70m ES 0.80m				0.90m			×	0.70: HP =210 kPa 0.70: PID<5
				1.0			EXCAVATION AEC30TP06 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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EXCAVATION - GEOLOGICAL LOG

PIT NO : AEC30TP07
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Sydney Metro Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : Lansdowne Road - Orchard Hills

POSITION : E: 291874.9, N: 6258552.5 (56 MGA2020)	SURFACE ELEVATION : 35.00 (mAHD)	
EQUIPMENT TYPE : 8 tonne Excavator	METHOD : 800mm bucket	
DATE EXCAVATED : 15/12/22	LOGGED BY : PJ	CHECKED BY : MB
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 100 200 300 400	STRUCTURE & Other Observations
		Not Observed	ES 0.10m	0.0			FILL: silty SAND: brown, fine to medium grained sand, low to medium plasticity silt, trace rootlets	D			FILL 0.00: PID<5
			0.30m ES 0.40m	0.25			Silty CLAY: medium to high plasticity, red-brown, trace fine to medium ironstone gravel	w<PL	St to VSt	×	Field Replicate BD3/20221215 taken at 0-0.1m RESIDUAL SOIL 0.30: HP =220 kPa 0.30: PID<5
			0.80m ES 0.90m	0.5		CI-CH				×	0.80: HP =190 kPa 0.80: PID<5
				0.90			EXCAVATION AEC30TP07 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 : AEC30TP08
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Sydney Metro Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : Lansdowne Road - Orchard Hills

POSITION : E: 291896.8, N: 6258559.7 (56 MGA2020)	SURFACE ELEVATION : 34.80 (mAHD)	
EQUIPMENT TYPE : 8 tonne Excavator	METHOD : 800mm bucket	
DATE EXCAVATED : 15/12/22	LOGGED BY : PJ	CHECKED BY : MB
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 100 200 300 400	STRUCTURE & Other Observations
		Not Observed	ES 0.10m	0.0			FILL: silty SAND: brown, fine to medium grained sand, low to medium plasticity silt, trace rootlets and fine to medium ironstone gravel	D			FILL 0.00: PID<5
			0.30m ES 0.40m	0.20m			Silty CLAY: medium to high plasticity, red-brown, trace fine to medium ironstone gravel	w<PL	St to VSt	×	RESIDUAL SOIL 0.30: HP =200 kPa 0.30: PID<5
			0.70m ES 0.80m	0.5		CI-CH				×	0.70: HP =190 kPa 0.70: PID<5
				0.80m			EXCAVATION AEC30TP08 TERMINATED AT 0.80 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 : AEC30TP09
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Sydney Metro Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : Lansdowne Road - Orchard Hills

POSITION : E: 291923.0, N: 6258554.3 (56 MGA2020)	SURFACE ELEVATION : 34.40 (mAHD)	
EQUIPMENT TYPE : 8 tonne Excavator	METHOD : 800mm bucket	
DATE EXCAVATED : 15/12/22	LOGGED BY : PJ	CHECKED BY : MB
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 100 200 300 400	STRUCTURE & Other Observations
		Not Observed	ES 0.10m	0.0			FILL: silty CLAY: medium to high plasticity, brown with red-brown, trace roolets, fine to medium ironstone gravel, (possible reworked natural)	w<PL			FILL 0.00: PID<5
			0.50m ES 0.60m	0.5		CI-CH	0.40m Silty CLAY: medium to high plasticity, yellow to red-brown, trace fine to medium ironstone gravel	w<PL	St to VSt	×	RESIDUAL SOIL 0.50: HP =210 kPa 0.50: PID<5
			1.00m ES 1.10m	1.0			1.10m EXCAVATION AEC30TP09 TERMINATED AT 1.10 m Target depth			×	1.00: HP =240 kPa 1.00: PID<5
				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 : AEC30TP10
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Sydney Metro Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : Lansdowne Road - Orchard Hills

POSITION : E: 291907.7, N: 6258571.0 (56 MGA2020)	SURFACE ELEVATION : 35.00 (mAHD)	
EQUIPMENT TYPE : 8 tonne Excavator	METHOD : 800mm bucket	
DATE EXCAVATED : 15/12/22	LOGGED BY : PJ	CHECKED BY : MB
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: silty SAND: brown, fine to medium grained sand, low to medium plasticity silt, trace rootlets and fine to medium gravel	D			FILL 0.00: PID<5
			0.50m ES 0.60m	0.45m 0.5		CI-CH	Silty CLAY: medium to high plasticity, red-brown, trace fine to medium ironstone gravel	w<PL	St to VSt	×	RESIDUAL SOIL 0.50: HP =220 kPa 0.50: PID<5
			0.90m ES 1.00m	1.00m 1.0			EXCAVATION AEC30TP10 TERMINATED AT 1.00 m Target depth			×	0.90: HP =190 kPa 0.90: PID<5
				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 : AEC30TP11
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Sydney Metro Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : Lansdowne Road - Orchard Hills

POSITION : E: 291937.6, N: 6258569.7 (56 MGA2020)	SURFACE ELEVATION : 34.60 (mAHD)	
EQUIPMENT TYPE : 8 tonne Excavator	METHOD : 800mm bucket	
DATE EXCAVATED : 15/12/22	LOGGED BY : PJ	CHECKED BY : MB
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 SAND: brown, fine to medium grained sand, low to medium plasticity silt, trace rootlets and fine to medium gravel	D			FILL 0.00: PID<5 Field Replicate BD4/20221215 taken at 0-0.1m
			0.40m ES 0.50m				0.30m Silty CLAY: medium to high plasticity, red-brown, trace fine to medium ironstone gravel	w<PL	St to VSt	×	RESIDUAL SOIL 0.40: HP =240 kPa 0.40: PID<5
			0.90m ES 1.00m	0.5		CI-CH	0.90m EXCAVATION AEC30TP11 TERMINATED AT 0.90 m Target depth			×	0.90: HP =210 kPa 0.90: PID<5
				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 : AEC30TP12
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Sydney Metro Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : Lansdowne Road - Orchard Hills

POSITION : E: 291896.7, N: 6258586.6 (56 MGA2020)	SURFACE ELEVATION : 35.60 (mAHD)	
EQUIPMENT TYPE : 8 tonne Excavator	METHOD : 800mm bucket	
DATE EXCAVATED : 15/12/22	LOGGED BY : PJ	CHECKED BY : MB
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 kPa (100, 200, 300, 400)	STRUCTURE & Other Observations
		Not Observed	ES 0.10m	0.0			FILL: silty SAND: brown, fine to medium grained sand, low to medium plasticity silt, trace rootlets, wire, timber and fine to medium gravel	D			FILL 0.00: PID<5
			0.40m ES 0.50m	0.5		CI-CH	0.35m Silty CLAY: medium to high plasticity, red-brown, trace fine to medium ironstone gravel	w<PL	St to VSt	×	RESIDUAL SOIL 0.40: HP =200 kPa 0.40: PID<5
			0.80m ES 0.90m				0.90m EXCAVATION AEC30TP12 TERMINATED AT 0.90 m Target depth			×	0.80: HP =240 kPa 0.80: PID<5
				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 : AEC30TP13
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Sydney Metro Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : Lansdowne Road - Orchard Hills

POSITION : E: 291911.9, N: 6258588.2 (56 MGA2020)	SURFACE ELEVATION : 35.50 (mAHD)	
EQUIPMENT TYPE : 8 tonne Excavator	METHOD : 800mm bucket	
DATE EXCAVATED : 15/12/22	LOGGED BY : PJ	CHECKED BY : MB
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	0.0			FILL: silty SAND: fine to medium grained sand, low to medium plasticity silt, trace red-brown clay, rootlets and fine to medium gravel	D			FILL 0.00: PID<5
			0.40m ES 0.50m	0.35m			Silty CLAY: medium to high plasticity, red-brown, trace fine to medium ironstone gravel	w<PL	St to VSt	×	RESIDUAL SOIL 0.40: HP =200 kPa 0.40: PID<5
			0.80m ES 0.90m	0.90m			EXCAVATION AEC30TP13 TERMINATED AT 0.90 m Target depth			×	0.80: HP =190 kPa 0.80: PID<5
				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 : AEC30TP14
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Sydney Metro Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : Lansdowne Road - Orchard Hills

POSITION : E: 291933.4, N: 6258585.8 (56 MGA2020)	SURFACE ELEVATION : 35.10 (mAHD)	
EQUIPMENT TYPE : 8 tonne Excavator	METHOD : 800mm bucket	
DATE EXCAVATED : 15/12/22	LOGGED BY : PJ	CHECKED BY : MB
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 100 200 300 400	STRUCTURE & Other Observations
		Not Observed	ES 0.25m	0.0			FILL: silty CLAY: medium to high plasticity, red-brown and brown, trace fine to medium ironstone gravel, rootlets and wire	w<PL			FILL 0.00: PID<5
			ES 0.60m	0.5			0.25m FILL: silty SAND: brown, fine to medium grained sand, low to medium plasticity silt, trace fine to medium gravel	M			0.30: PID<5
			ES 1.10m	1.0		CI-CH	0.60m CLAY: medium to high plasticity, red-brown to orange-brown, trace fine to medium ironstone gravel	w<PL	St to VSt	× 210 kPa × 230 kPa	RESIDUAL SOIL 0.60: HP =210 kPa 0.60: PID<5 1.00: HP =230 kPa 1.00: PID<5
				1.5			1.10m EXCAVATION AEC30TP14 TERMINATED AT 1.10 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 : AEC30TP16
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Sydney Metro Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : Lansdowne Road - Orchard Hills

POSITION : E: 291924.5, N: 6258597.3 (56 MGA2020)	SURFACE ELEVATION : 35.60 (mAHD)	
EQUIPMENT TYPE : 8 tonne Excavator	METHOD : 800mm bucket	
DATE EXCAVATED : 15/12/22	LOGGED BY : PJ	CHECKED BY : MB
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 100 200 300 400	STRUCTURE & Other Observations
		Not Observed	ES 0.10m	0.0			FILL: silty CLAY: medium to high plasticity, red-brown and brown, trace fine to medium ironstone gravel, fine to coarse sand and rootlets	w<PL			FILL 0.00: PID<5
			0.40m ES 0.50m	0.5			0.30m FILL: silty SAND: brown, fine to medium grained sand, low to medium plasticity silt, trace fine to medium gravel	D			0.40: PID<5
			0.80m ES 0.90m	1.0		CI-CH	0.80m Silty CLAY: medium to high plasticity, red-brown, trace fine to medium ironstone gravel	w<PL	St to VSt	×	RESIDUAL SOIL 0.80: HP =200 kPa 0.80: PID<5
			1.20m ES 1.30m				1.30m EXCAVATION AEC30TP16 TERMINATED AT 1.30 m Target depth			×	1.20: HP =240 kPa 1.20: PID<5
				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 : AEC30TP17
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Sydney Metro Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : Lansdowne Road - Orchard Hills

POSITION : E: 291944.0, N: 6258601.7 (56 MGA2020)	SURFACE ELEVATION : 35.30 (mAHD)	
EQUIPMENT TYPE : 8 tonne Excavator	METHOD : 800mm bucket	
DATE EXCAVATED : 15/12/22	LOGGED BY : PJ	CHECKED BY : MB
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: silty SAND: brown, fine to medium grained sand, low to medium plasticity silt, trace rootlets and red-brown clay	D			FILL 0.00: PID<5
			0.40m ES 0.50m	0.30m			Silty CLAY: medium to high plasticity, red-brown, trace fine to medium ironstone gravel	w<PL	St to VSt	×	RESIDUAL SOIL 0.40: HP =210 kPa 0.40: PID<5
			0.80m ES 0.90m	0.5		CI-CH				×	0.80: HP =230 kPa 0.80: PID<5
				0.90m			EXCAVATION AEC30TP17 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 : AEC30TP20
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Sydney Metro Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : Lansdowne Road - Orchard Hills

POSITION : E: 291946.3, N: 6258619.3 (56 MGA2020)	SURFACE ELEVATION : 35.80 (mAHD)	
EQUIPMENT TYPE : 8 tonne Excavator	METHOD : 800mm bucket	
DATE EXCAVATED : 15/12/22	LOGGED BY : PJ	CHECKED BY : MB
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 kPa	STRUCTURE & Other Observations
		Not Observed	ES 0.10m	0.0			FILL: silty SAND: brown, fine to medium grained sand, low to medium plasticity silt, trace red-brown clay, rootlets and fine to medium ironstone gravel	D			FILL 0.00: PID<5 Field Replicate BD5/20221215 taken at 0-0.1m
			0.50m ES 0.60m	0.5			0.50m Silty CLAY: medium to high plasticity, red-brown, trace fine to medium ironstone gravel	w<PL	St to VSt	×	RESIDUAL SOIL 0.50: HP =190 kPa 0.50: PID<5
			1.00m ES 1.10m	1.0		CI-CH	1.10m EXCAVATION AEC30TP20 TERMINATED AT 1.10 m Target depth			×	1.00: HP =210 kPa 1.00: PID<5
				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 : AEC30TP21
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Sydney Metro Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : Lansdowne Road - Orchard Hills

POSITION : E: 291953.0, N: 6258639.0 (56 MGA2020)	SURFACE ELEVATION : 36.10 (mAHD)	
EQUIPMENT TYPE : 8 tonne Excavator	METHOD : 800mm bucket	
DATE EXCAVATED : 15/12/22	LOGGED BY : PJ	CHECKED BY : MB
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	0.0			FILL: silty SAND: brown, fine to medium grained sand, low to medium plasticity silt, trace rootlets and fine to medium gravel	D			FILL 0.00: PID<5
			0.30m ES 0.40m	0.25m			Silty CLAY: medium to high plasticity, red-brown, trace fine to coarse ironstone gravel	w<PL	St to VSt	×	RESIDUAL SOIL 0.30: HP =200 kPa 0.30: PID<5
			0.80m ES 0.90m	0.5		CI-CH	At 0.7m: grading to dark red-brown			×	0.80: HP =180 kPa 0.80: PID<5
				1.00m 1.0			EXCAVATION AEC30TP21 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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PIEZOMETER CONSTRUCTION

HOLE NO : AEC30-BH01

FILE / JOB NO : 204814.01

SHEET : 1 OF 1

PROJECT : Sydney Metro Western Sydney Airport - Surface and Civil Alignment Works

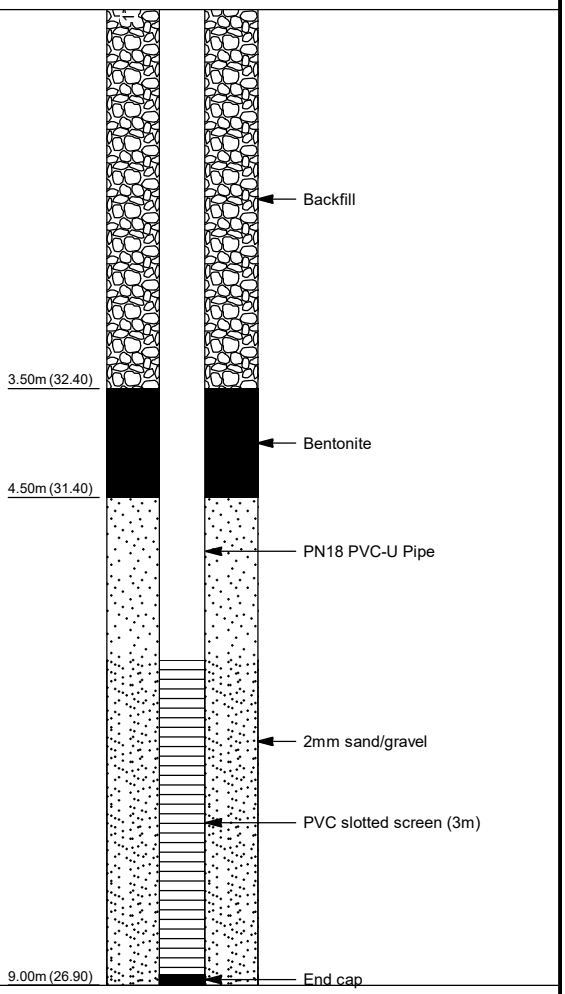
LOCATION : Lansdowne Road - Orchard Hills

POSITION : E: 291904.6, N: 6258597.3 (56 MGA2020) SURFACE ELEVATION : 35.90 (mAHD) ANGLE FROM HORIZONTAL : 90°

RIG TYPE : HANJIN DB8 MOUNTING : Track CONTRACTOR : Rockwell

DATE STARTED : 08/02/23 DATE COMPLETED : 09/02/23 DATE LOGGED : 09/02/23 LOGGED BY : JS 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		15 hours after augering	0.0			0.20m FILL: silty CLAY: low to medium plasticity, grey and brown, with rootlets, trace fine igneous gravel	ID 1 Type Standpipe Piezometer; Stick Up & RL; Tip Depth & RL 9.00 m 26.90 mAHD; Installation Date; Static Water Level
					CI-CH	Silty CLAY: medium to high plasticity, brown mottled red-brown	
			1.0			1.00m	
					CI-CH	Silty CLAY: medium to high plasticity, pale grey and pale brown mottled red-brown	
			2.0			2.00m	
					CI-CH	Silty CLAY: medium to high plasticity, pale grey mottled pale brown	
						3.00m	
					CI-CH	Silty CLAY: medium to high plasticity, pale grey and brown, with ironstone gravel	
			4.0			4.00m	
						SILTSTONE: grey and brown, apparently very low to low strength	
						5.00m	
						SILTSTONE: grey, apparently low to medium strength	
			6.0				
			8.0				
						9.00m AEC30-BH01 TERMINATED AT 9.00 m Target depth	
			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 : AEC30-BH02
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Sydney Metro Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : Lansdowne Road - Orchard Hills

POSITION : E: 291911.2, N: 6258508.3 (56 MGA2020) SURFACE ELEVATION : 33.30 (mAHD) ANGLE FROM HORIZONTAL : 90°

RIG TYPE : HANJIN DB8 MOUNTING : Track CONTRACTOR : Rockwell

DATE STARTED : 09/02/23 DATE COMPLETED : 09/02/23 DATE LOGGED : 09/02/23 LOGGED BY : JS 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)	ID 1 Type: Standpipe Piezometer; Stick Up & RL; Tip Depth & RL: 15.00 m 18.30 mAHD; Installation Date; Static Water Level
AD/T			0.0		CI-CH	0.05m Silty CLAY: medium to high plasticity, brown, with rootlets and grass cover	Backfill
					CI-CH	Silty CLAY: medium to high plasticity, brown, with fine ironstone gravel	
						0.70m Silty CLAY: medium to high plasticity, brown, pale grey and red-brown	1.00m (32.30)
			2.0		CI-CH		Bentonite
							2.50m (30.80)
							PN18 PVC-U Pipe
						3.50m Silty CLAY: medium to high plasticity, grey and brown, with ironstone gravel	
			4.0		CI-CH		
						4.50m SILTSTONE: grey and brown, apparently very low to low strength	
						6.00m SILTSTONE: grey, apparently medium strength with high strength beds	
WB			6.0				
			8.0				2mm sand/gravel
							PVC slotted screen (3m)
			10.0				
			12.0				
			14.0				
						AEC30-BH02 TERMINATED AT 15.00 m	End cap
						15.00m Target depth	15.00m (18.30)

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 : AEC30-BH03
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Sydney Metro Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : Lansdowne Road - Orchard Hills

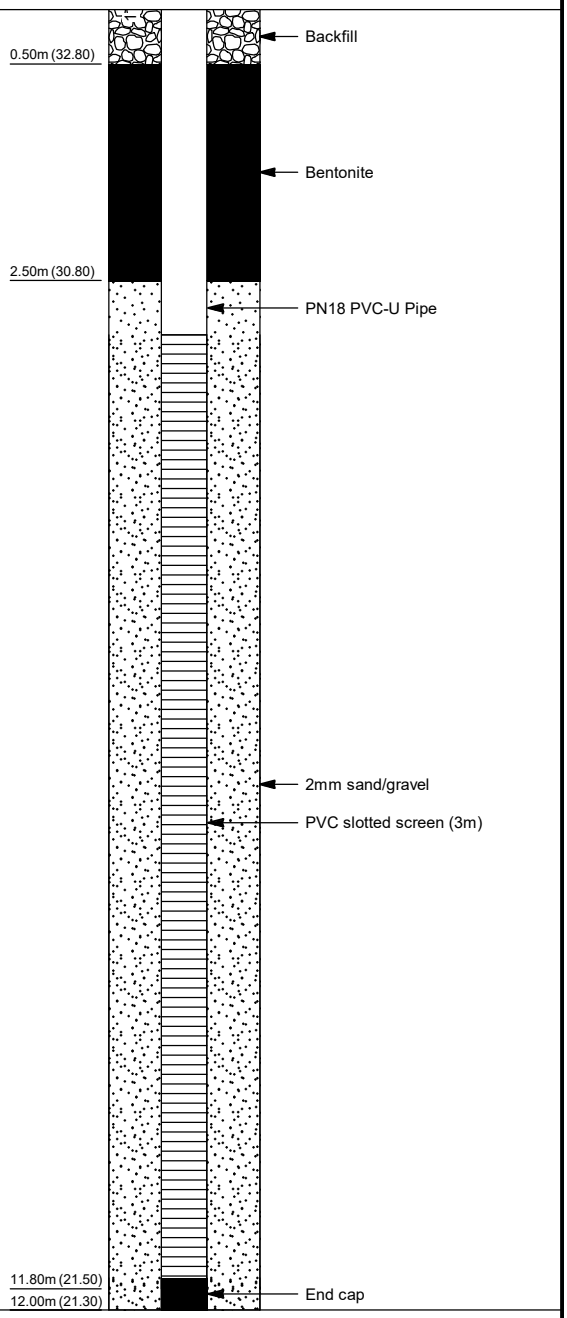
POSITION : E: 291870.5, N: 6258516.1 (56 MGA2020) SURFACE ELEVATION : 33.30 (mAHD) ANGLE FROM HORIZONTAL : 90°

RIG TYPE : HANJIN DB8 MOUNTING : Track CONTRACTOR : Rockwell

DATE STARTED : 09/02/23 DATE COMPLETED : 09/02/23 DATE LOGGED : 09/02/23 LOGGED BY : JS 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			0.0		CI-CH	Silty CLAY: medium to high plasticity, brown, with fine ironstone gravel
			0.40m			
					CI-CH	Silty CLAY: medium to high plasticity, brown and pale grey mottled red-brown, with fine ironstone gravel
			2.0			
			2.00m			
					CI-CH	Silty CLAY: medium to high plasticity, pale grey, trace fine to medium ironstone gravel
			3.00m			
					CI-CH	Silty CLAY: medium to high plasticity, grey and brown, with ironstone gravel
			4.00m			
			4.0			SILTSTONE: grey and brown, apparently veryt low strength
			5.50m			
			6.0			SILTSTONE: grey, apparently medium strength with low and high strength beds
			8.0			
			10.0			
			12.0			
			12.00m			AEC30-BH03 TERMINATED AT 12.00 m Target depth
			14.0			

ID 1 — Type: Standpipe Piezometer — Stick Up & RL — Tip Depth & RL: 11.80 m 21.50 mAHD — Installation Date — Static Water Level



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Appendix H

Field Sheets and Calibration Records

Multi Parameter Water Meter

Instrument **YSI Quatro Pro Plus**
Serial No. **12D100011**

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		386467	pH 6.99
2. pH 4.00		pH 4.00		399527	pH 4.14
3. mV		237.6mV		39557/395763	237.7mV
4. EC		2.76mS		396172	2.762mS
6. D.O		0.0%		391223	0.1%
7. Temp		21.7°C		MultiTherm	21.4°C

Calibrated by: **Lebelle Chee**

Calibration date: **18/01/2023**

Next calibration due: **18/02/2023**

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Groundwater Field Sheet

Project and Bore Installation Details	
Bore / Standpipe ID:	AEL30BH01
Project Name:	SCALU
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:	10/12/23
Purged By:	PJ
GW Level (pre-purge):	2.0 m bgl
Observed Well Depth:	~~7.67~~ m bgl 7.67
PSH observed:	Yes / No (interface / visual). Thickness if observed:
Estimated Bore Volume:	11 L
Total Volume Purged:	35 L (target: no drill mud, min 3 well vol. or dry)
GW Level (post-purge):	DRY m bgl
Equipment:	Twister Pump

Micropurge and Sampling Details	
Date/Time:	15/12/23
Sampled By:	PJ
Weather Conditions:	Cloudy
GW Level (pre-purge):	3.67 m bgl
Observed Well Depth:	7.67 m bgl
PSH observed:	Yes / No (interface / visual). Thickness if observed:
Estimated Bore Volume:	8 L
GW Level (post sample):	5.51 m bgl
Total Volume Purged:	6 L
Equipment:	Peri Pump

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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
1 0.5	20.4	2.38	47000	6.35		108.6
2 1.0	20.3	1.73	46620	6.27		112.9
3 1.5	20.3	1.43	46596	6.23		118.4
4 2.0	20.3	1.34	46671	6.19		120.4
5 2.5	20.3	1.38	46681	6.18		121.6
6 3.0	20.3	1.38	46686	6.18		121.9
Additional Readings Following stabilisation:	DO % Sat	SPC	TDS			
	20.7	34830	22640			

Sample Details

Sampling Depth (rationale):	6 m bgl, mid screen
Sample Appearance (e.g. colour, siltiness, odour):	Clear/transparent, slightly cloudy, low turbidity no odour
Sample ID:	AEL30BH01
QA/QC Samples:	-
Sampling Containers and filtration:	
Comments / Observations:	Development: D.brown, high turbidity, v.silty, no odour

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Groundwater Field Sheet

Project and Bore Installation Details

Bore / Standpipe ID:	AEL50BH02
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:	10/12/23
Purged By:	PJ
GW Level (pre-purge):	0.93 m bgl
Observed Well Depth:	15.12 m bgl
PSH observed:	Yes / (No) / interface / visual). Thickness if observed:
Estimated Bore Volume:	22 L
Total Volume Purged:	100L (target: no drill mud, min 3 well vol. or dry)
GW Level (post-purge):	DRY m bgl DRY
Equipment:	Twister Pump

95
1.88
16.14

Micropurge and Sampling Details

Date/Time:	15/12/23
Sampled By:	PJ
Weather Conditions:	Cloudy
GW Level (pre-purge):	4.05 m bgl
Observed Well Depth:	15.19 m bgl
PSH observed:	Yes / (No) / interface / visual). Thickness if observed:
Estimated Bore Volume:	22 L
GW Level (post sample):	7.17 m bgl
Total Volume Purged:	11 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
1 0.5	20.4	1.20	34169	6.49		39.7
2 1.0	20.3	0.80	33964	6.44		40.5
3 1.5	20.3	0.62	33875	6.40		40.1
4 2.0	20.3	0.50	33666	6.38		39.7
5 2.5	20.3	0.50	33566	6.38		39.6
6 3.0	20.3	0.50	33641	6.38		39.9
Additional Readings Following stabilisation:	DO % Sat	SPC	TDS			
	4.6	25141	16342			

Sample Details

Sampling Depth (rationale):	8 m bgl, mid screen
Sample Appearance (e.g. colour, siltiness, odour):	Clear / transparent, v. low turbidity, no odour
Sample ID:	AEL50BH02
QA/QC Samples:	BD2/20230215
Sampling Containers and filtration:	
Comments / Observations:	development: V. brown, V. silty, high turbidity, no odour

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Groundwater Field Sheet

Project and Bore Installation Details	
Bore / Standpipe ID:	AEL30BH03
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:	10/12/23
Purged By:	PJ
GW Level (pre-purge):	10.87 m bgl
Observed Well Depth:	11.62 m bgl
PSH observed:	Yes / No (interface / visual). Thickness if observed:
Estimated Bore Volume:	1.5 L
Total Volume Purged:	1.5 L (target: no drill mud, min 3 well vol. or dry)
GW Level (post-purge):	DRY m bgl
Equipment:	Twister Pump

Micropurge and Sampling Details	
Date/Time:	15/12/23
Sampled By:	PJ
Weather Conditions:	Cloudy
GW Level (pre-purge):	6.27 m bgl
Observed Well Depth:	11.62 m bgl
PSH observed:	Yes / No (interface / visual). Thickness if observed:
Estimated Bore Volume:	11 L
GW Level (post sample):	7.29 m bgl
Total Volume Purged:	11 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
1 0.5	20.1	1.52	33142	6.67		13.8
2 1.0	20.2	1.12	33006	6.63		13.8
3 1.5	20.2	0.97	32886	6.61		13.0
4 2.0	20.2	0.87	32875	6.60		12.1
5 2.5	20.2	0.86	32860	6.60		11.9
6 3.0	20.2	0.86	32866	6.60		11.8
Additional Readings Following stabilisation:	DO % Sat	SPC	TDS			
	8.7	24659	16029			

Sample Details

Sampling Depth (rationale):	8	m bgl,	mid screen
Sample Appearance (e.g. colour, siltiness, odour):	clear/transparent, v. low turbidity, no odour		
Sample ID:	AEL30BH03		
QA/QC Samples:	AD3/20230215		
Sampling Containers and filtration:			
Comments / Observations:	development: Pale brown, low turbidity, no odour		

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RECORD OF ASBESTOS SAMPLES

Project: WSA SCAW Tender Design	**Project Number:** 204814.01
Client: CPB Contractors Pty Limited & United Infrastructure Pty Limited (CPBUIJV)	**Date:** 15/12/22
Location: Elizabeth Drive, Luddenham	**Field Staff:** PT

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)
AEC30TP12	Soil	0.0-0.1	15474	-	-	-	-
AEC30TP13	Soil	0.0-0.1	14968	-	-	-	-
AEC30TP16	Soil	0.0-0.1	16049	-	-	-	-
AEC30SP1	Soil	0.3	14844	-	-	-	-
AEC30SP2	Soil	0.3	15002	-	-	-	-

PID Calibration Certificate

Instrument PhoCheck Tiger
Serial No. T-108801

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	High	TWA	STEL
	Settings	✓	50ppm	100ppm		
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	Calibration gas and concentration	Certified	Gas bottle No		Instrument Reading
PID Lamp		94ppm Isobutylene	NATA	SY506		94.3ppm

Calibrated by: Alex Buist

Calibration date: 4/11/2022

Next calibration due: 6/05/2023

Appendix I

Summary of Results

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Table I1: Summary of Laboratory Results – Metals, TRH, BTEX, PAH, Phenol, OCP, OPP, PCB, Asbestos

			Metals								TRH						BTEX					PAH			Phenol
			Arsenic	Cadmium	Total Chromium	Copper	Lead	Mercury (inorganic)	Nickel	Zinc	TRH C6 - C10	TRH >C10-C16	F1 ((C6-C10)-BTEX)	F2 (>C10-C16 less Naphthalene)	F3 (>C16-C34)	F4 (>C34-C40)	Benzene	Toluene	Ethylbenzene	Total Xylenes	Naphthalene [b]	Benzo(a)pyrene (BaP)	Benzo(a)pyrene TEQ	Total PAHs	Phenol
		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	5
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
AEC30TP01	0 - 0.05 m	15/12/2022	7	<0.4	34	8	19	<0.1	5	10	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5
			300 100 90 - 300 190 17000 190 600 1100 80 - 1200 140 30000 450 - - - 120 NL 180 NL - - 300 - 2800 NL 50 NL 85 NL 70 NL 105 NL 170 - 0.7 3 - 300 - 120 -																						
BD1/20221215	0 m	15/12/22	7	<0.4	33	6	17	<0.1	4	10	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5
			300 100 90 - 300 190 17000 190 600 1100 80 - 1200 140 30000 450 - - - 120 NL 180 NL - - 300 - 2800 NL 50 NL 85 NL 70 NL 105 NL 170 - 0.7 3 - 300 - 120 -																						
AEC30TP02	0 - 0.05 m	15/12/22	4	<0.4	23	8	15	<0.1	5	8	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5
			300 100 90 - 300 190 17000 190 600 1100 80 - 1200 140 30000 450 - - - 120 NL 180 NL - - 300 - 2800 NL 50 NL 85 NL 70 NL 105 NL 170 - 0.7 3 - 300 - 120 -																						
AEC30TP02	0.1 - 0.2 m	15/12/22	4	<0.4	21	7	11	<0.1	4	5	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5
			300 100 90 - 300 190 17000 190 600 1100 80 - 1200 140 30000 450 - - - 120 NL 180 NL - - 300 - 2800 NL 50 NL 85 NL 70 NL 105 NL 170 - 0.7 3 - 300 - 120 -																						
AEC30TP03	0 - 0.05 m	15/12/22	5	<0.4	21	10	12	<0.1	4	11	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5
			300 100 90 - 300 190 17000 190 600 1100 80 - 1200 140 30000 450 - - - 120 NL 180 NL - - 300 - 2800 NL 50 NL 85 NL 70 NL 105 NL 170 - 0.7 3 - 300 - 120 -																						
AEC30TP03	0.2 - 0.3 m	15/12/22	<4	<0.4	17	10	12	<0.1	2	8	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5
			300 100 90 - 300 190 17000 190 600 1100 80 - 1200 140 30000 450 - - - 120 NL 180 NL - - 300 - 2800 NL 50 NL 85 NL 70 NL 105 NL 170 - 0.7 3 - 300 - 120 -																						
AEC30TP04	0 - 0.05 m	15/12/22	6	<0.4	34	6	14	<0.1	4	8	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5
			300 100 90 - 300 190 17000 190 600 1100 80 - 1200 140 30000 450 - - - 120 NL 180 NL - - 300 - 2800 NL 50 NL 85 NL 70 NL 105 NL 170 - 0.7 3 - 300 - 120 -																						
BD2/20221215	0 m	15/12/22	7	<0.4	27	7	16	<0.1	4	11	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5
			300 100 90 - 300 190 17000 190 600 1100 80 - 1200 140 30000 450 - - - 120 NL 180 NL - - 300 - 2800 NL 50 NL 85 NL 70 NL 105 NL 170 - 0.7 3 - 300 - 120 -																						
AEC30TP04	0.1 - 0.2 m	15/12/22	7	<0.4	25	10	16	<0.1	3	7	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5
			300 100 90 - 300 190 17000 190 600 1100 80 - 1200 140 30000 450 - - - 120 NL 180 NL - - 300 - 2800 NL 50 NL 85 NL 70 NL 105 NL 170 - 0.7 3 - 300 - 120 -																						
AEC30TP05	0 - 0.05 m	15/12/2022	7	<0.4	33	7	15	<0.1	4	8	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5
			300 100 90 - 300 190 17000 190 600 1100 80 - 1200 140 30000 450 - - - 120 NL 180 NL - - 300 - 2800 NL 50 NL 85 NL 70 NL 105 NL 170 - 0.7 3 - 300 - 120 -																						
AEC30TP06	0 - 0.1 m	15/12/22	6	<0.4	12	25	15	<0.1	7	32	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5
			300 100 90 - 300 190 17000 190 600 1100 80 - 1200 140 30000 450 - - - 120 NL 180 NL - - 300 - 2800 NL 50 NL 85 NL 70 NL 105 NL 170 - 0.7 3 - 300 - 120 -																						
AEC30TP07	0 - 0.1 m	15/12/22	6	<0.4	29	4	14	<0.1	2	6	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5
			300 100 90 - 300 190 17000 190 600 1100 80 - 1200 140 30000 450 - - - 120 NL 180 NL - - 300 - 2800 NL 50 NL 85 NL 70 NL 105 NL 170 - 0.7 3 - 300 - 120 -																						
AEC30TP08	0 - 0.1 m	15/12/22	9	<0.4	32	5	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	<5
			300 100 90 - 300 190 17000 190 600 1100 80 - 1200 140 30000 450 - - - 120 NL 180 NL - - 300 - 2800 NL 50 NL 85 NL 70 NL 105 NL 170 - 0.7 3 - 300 - 120 -																						
AEC30TP09	0 - 0.1 m	15/12/22	7	<0.4	18	11	15	<0.1	4	13	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5
			300 100 90 - 300 190 17000 190 600 1100 80 - 1200 140 30000 450 - - - 120 NL 180 NL - - 300 - 2800 NL 50 NL 85 NL 70 NL 105 NL 170 - 0.7 3 - 300 - 120 -																						
AEC30TP10	0 - 0.1 m	15/12/22	7	<0.4	19	7	15	<0.1	3	8	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5
			300 100 90 - 300 190 17000 190 600 1100 80 - 1200 140 30000 450 - - - 120 NL 180 NL - - 300 - 2800 NL 50 NL 85 NL 70 NL 105 NL 170 - 0.7 3 - 300 - 120 -																						
AEC30TP11	0 - 0.1 m	15/12/22	5	<0.4	17	7	13	<0.1	4	8	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5
			300 100 90 - 300 190 17000 190 600 1100 80 - 1200 140 30000 450 - - - 120 NL 180 NL - - 300 - 2800 NL 50 NL 85 NL 70 NL 105 NL 170 - 0.7 3 - 300 - 120 -																						
AEC30TP11	0.4 - 0.5 m	15/12/22	<4	<0.4	15	10	6	<0.1	5	10	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5
			300 100 90 - 300 190 17000 190 600 1100 80 - 1200 140 30000 450 - - - 120 NL 180 NL - - 300 - 2800 NL 50 NL 85 NL 70 NL 105 NL 170 - 0.7 3 - 300 - 120 -																						
AEC30TP12	0 - 0.1 m	15/12/22	10	<0.4	24	8	20	<0.1	3	8	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5
			300 100 90 - 300 190 17000 190 600 1100 80 - 1200 140 30000 450 - - - 120 NL 180 NL - - 300 - 2800 NL 50 NL 85 NL 70 NL 105 NL 170 - 0.7 3 - 300 - 120 -																						
AEC30TP12	0.4 - 0.5 m	15/12/22	5	<0.4	19	13	9	<0.1	3	6	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5
			300 100 90 - 300 190 17000 190 600 1100 80 - 1200 140 30000 450 - - - 120 NL 180 NL - - 300 - 2800 NL 50 NL 85 NL 70 NL 105 NL 170 - 0.7 3 - 300 - 120 -																						
AEC30TP13	0 - 0.1 m	15/12/22	8	<0.4	25	8	15	<0.1	4	8	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5
			300 100 90 - 300 190 17000 190 600 1100 80 - 1200 140 30000 450 - - - 120 NL 180 NL - - 300 - 2800 NL 50 NL 85 NL 70 NL 105 NL 170 - 0.7 3 - 300 - 120 -																						
AEC30TP14	0 - 0.1 m	15/12/22	6	<0.4	16	19	13	<0.1	6	22	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5
			300 100 90 - 300 190 17000 190 600 1100 80 - 1200 140 30000 450 - - - 120 NL 180 NL - - 300 - 2800 NL 50 NL 85 NL 70 NL 105 NL 170 - 0.7 3 - 300 - 120 -																						
AEC30TP14	0.3 - 0.4 m	15/12/22	7	<0.4	21	10	18	<0.1	4	12	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5
			300 100 90 - 300 190 17000 190 600 1100 80 - 1200 140 30000 450 - - - 120 NL 180 NL - - 300 - 2800 NL 50 NL 85 NL 70 NL 105 NL 170 - 0.7 3 - 300 - 120 -																						
AEC30TP16	0 - 0.1 m	15/12/22	23	<0.4	10	22	15	<0.1	9	41	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5
			300 100 90 - 300 190 17000 190 600 1100 80 - 1200 140 30000 450 - - - 120 NL 180 NL - - 300 - 2800 NL 50 NL 85 NL 70 NL 105 NL 170 - 0.7 3 - 300 - 120 -																						
AEC30TP16	0.4 - 0.5 m	15/12/22	8	<0.4	26	6	14	<0.1	3	6	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5
			300 100 90 - 300 190 17000 190 600 1100 80 - 1200 140 30000 450 - - - 120 NL 180 NL - - 300 - 2800 NL 50 NL 85 NL 70 NL 105 NL 170 - 0.7 3 - 300 - 120 -																						
AEC30TP17	0 - 0.1 m	15/12/22	9	<0.4	25	7	15	<0.1	3	6	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5
			300 100 90 - 300 190 17000 190 600 1100 80 - 1200 140 30000 450 - - - 120 NL 180 NL - - 300 - 2800 NL 50 NL 85 NL 70 NL 105 NL 170 - 0.7 3 - 300 - 120 -																						
AEC30TP20	0 - 0.1 m	15/12/22	6	<0.4	24	7	13	<0.1	3	8	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5
			300 100 90 - 300 190 17000 190 600 1100 80 - 1200 140 30000 450 - - - 120 NL 180 NL - - 300 - 2800 NL 50 NL 85 NL 70 NL 105 NL 170 - 0.7 3 - 300 - 120 -																						
AEC30TP20	0.5 - 0.6 m	15/12/22	4	<0.4	20	10	10	<0.1	2	4	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5
			300 100 90 - 300 190 17000 190 600 1100 80 - 1200 140 30000 450 - - - 120 NL 180 NL - - 300 - 2800 NL 50 NL 85 NL 70 NL 105 NL 170 - 0.7 3 - 300 - 120 -																						
AEC30TP21	0 - 0.1 m	15/12/22	8	<0.4	29	16	25	<0.1	3	46	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5
			300 100 90 - 300 190 17000 190 600 1100 80 - 1200 140 30000 450 - - - 120 NL 180 NL - - 300 - 2800 NL 50 NL 85 NL 70 NL 105 NL 170 - 0.7 3 - 300 - 120 -																						
AEC30SP1	0 m	15/12/22	<4	<0.4	6	6	11	<0.1	3	21	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5
			300 100 90 - 300 190 17000 190 600 1100 80 - 1200 140 30000 450 - - - 120 NL 180 NL - - 300 - 2800 NL 50 NL 85 NL 70 NL 105 NL 170 - 0.7 3 - 300 - 120 -																						
AEC30SP1A	0 m	17/01/2023	<4	<0.4	6	6	14	<0.1	3	23	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5
			300 100 90 - 300 190 17000 190 600 1100 80 - 1200 140 30000 450 - - - 120 NL 180 NL - - 300 - 2800 NL 50 NL 85 NL 70 NL 105 NL 170 - 0.7 3 - 300 - 120 -																						
AEC30SP1B	0 m	17/01/2023	<4	<0.4	6	6	14	<0.1	3	25	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5
			300 100 90 - 300 190 17000 190 600 1100 80 - 1200 140 30000 450 - - - 120 NL 180 NL - - 300 - 2800 NL 50 NL 85 NL 70 NL 105 NL 170 - 0.7 3 - 300 - 120 -																						
			300 100 90 - 300 190 17000 190 600 1100 80 - 1200 140 30000 450 - - - 120 NL 180 NL - - 300 - 2800 NL 50 NL 85 NL 70 NL 105 NL 170 - 0.7 3 - 300 - 120 -																						

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

HIL C Recreational / Open Space (NEPC, 2013)

HSL C Recreational / Open Space (vapour intrusion) (NEPC, 2013)

DC HSL C Direct contact HSL C Recreational /Open space (direct contact) (CRC CARE, 2011)

EIL/ESL UR/POS Urban Residential and Public Open Space (NEPC, 2013)

ML R/P/POS Residential, Parkland and Public Open Space (NEPC, 2013)

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Table I1: Summary of Laboratory Results –

			OCP											OPP	PCB								Asbestos						
			DDD	DDT+DDE+DDD c	DDE	DDT	Aldrin & Dieldrin	Total Chlordane	Endrin	Total Endosulfan	Heptachlor	Hexachlorobenzene	Methoxychlor	Chlorpyriphos	Arochlor 1016	Total PCB	Arochlor 1221	Arochlor 1232	Arochlor 1242	Arochlor 1248	Arochlor 1254	Aroclor 1260	Asbestos ID in soil >0.1g/kg	Trace Analysis	Asbestos ID in soil <0.1g/kg	ACM >7mm Estimation	FA and AF Estimation	FA and AF Estimation	Asbestos (500 ml)
		PQL	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1						<0.001	0.001
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	-	-	-	g	g	%(w/w)	-
AEC30TP01	0 - 0.05 m	15/12/2022	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD	NT	NT	-	<0.001
			- / -	400 / 180	- / -	- / 180	10 / -	70 / -	20 / -	340 / -	10 / -	10 / -	400 / -	250 / -	- / -	1 / -	- / -	- / -	- / -	- / -	- / -	- / -							
BD1/20221215	0 m	15/12/22	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-
			- / -	400 / 180	- / -	- / 180	10 / -	70 / -	20 / -	340 / -	10 / -	10 / -	400 / -	250 / -	- / -	1 / -	- / -	- / -	- / -	- / -	- / -	- / -							
AEC30TP02	0 - 0.05 m	15/12/22	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD	NT	NT	-	<0.001
			- / -	400 / 180	- / -	- / 180	10 / -	70 / -	20 / -	340 / -	10 / -	10 / -	400 / -	250 / -	- / -	1 / -	- / -	- / -	- / -	- / -	- / -	- / -							
AEC30TP02	0.1 - 0.2 m	15/12/22	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-
			- / -	400 / 180	- / -	- / 180	10 / -	70 / -	20 / -	340 / -	10 / -	10 / -	400 / -	250 / -	- / -	1 / -	- / -	- / -	- / -	- / -	- / -	- / -							
AEC30TP03	0 - 0.05 m	15/12/22	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD	NT	NT	-	<0.001
			- / -	400 / 180	- / -	- / 180	10 / -	70 / -	20 / -	340 / -	10 / -	10 / -	400 / -	250 / -	- / -	1 / -	- / -	- / -	- / -	- / -	- / -	- / -							
AEC30TP03	0.2 - 0.3 m	15/12/22	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD	NT	NT	-	<0.001
			- / -	400 / 180	- / -	- / 180	10 / -	70 / -	20 / -	340 / -	10 / -	10 / -	400 / -	250 / -	- / -	1 / -	- / -	- / -	- / -	- / -	- / -	- / -							
AEC30TP04	0 - 0.05 m	15/12/22	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD	NT	NT	-	<0.001
			- / -	400 / 180	- / -	- / 180	10 / -	70 / -	20 / -	340 / -	10 / -	10 / -	400 / -	250 / -	- / -	1 / -	- / -	- / -	- / -	- / -	- / -	- / -							
BD2/20221215	0 m	15/12/22	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-
			- / -	400 / 180	- / -	- / 180	10 / -	70 / -	20 / -	340 / -	10 / -	10 / -	400 / -	250 / -	- / -	1 / -	- / -	- / -	- / -	- / -	- / -	- / -							
AEC30TP04	0.1 - 0.2 m	15/12/22	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-
			- / -	400 / 180	- / -	- / 180	10 / -	70 / -	20 / -	340 / -	10 / -	10 / -	400 / -	250 / -	- / -	1 / -	- / -	- / -	- / -	- / -	- / -	- / -							
AEC30TP05	0 - 0.05 m	15/12/2022	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD	NT	NT	-	<0.001
			- / -	400 / 180	- / -	- / 180	10 / -	70 / -	20 / -	340 / -	10 / -	10 / -	400 / -	250 / -	- / -	1 / -	- / -	- / -	- / -	- / -	- / -	- / -							
AEC30TP06	0 - 0.1 m	15/12/22	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD	NT	NT	-	<0.001
			- / -	400 / 180	- / -	- / 180	10 / -	70 / -	20 / -	340 / -	10 / -	10 / -	400 / -	250 / -	- / -	1 / -	- / -	- / -	- / -	- / -	- / -	- / -							
AEC30TP07	0 - 0.1 m	15/12/22	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD	NT	NT	-	<0.001
			- / -	400 / 180	- / -	- / 180	10 / -	70 / -	20 / -	340 / -	10 / -	10 / -	400 / -	250 / -	- / -	1 / -	- / -	- / -	- / -	- / -	- / -	- / -							
AEC30TP08	0 - 0.1 m	15/12/22	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD	NT	NT	-	<0.001
			- / -	400 / 180	- / -	- / 180	10 / -	70 / -	20 / -	340 / -	10 / -	10 / -	400 / -	250 / -	- / -	1 / -	- / -	- / -	- / -	- / -	- / -	- / -							
AEC30TP09	0 - 0.1 m	15/12/22	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD	NT	NT	-	<0.001
			- / -	400 / 180	- / -	- / 180	10 / -	70 / -	20 / -	340 / -	10 / -	10 / -	400 / -	250 / -	- / -	1 / -	- / -	- / -	- / -	- / -	- / -	- / -							
AEC30TP10	0 - 0.1 m	15/12/22	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD	NT	NT	-	<0.001
			- / -	400 / 180	- / -	- / 180	10 / -	70 / -	20 / -	340 / -	10 / -	10 / -	400 / -	250 / -	- / -	1 / -	- / -	- / -	- / -	- / -	- / -	- / -							
AEC30TP11	0 - 0.1 m	15/12/22	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD	NT	NT	-	<0.001
			- / -	400 / 180	- / -	- / 180	10 / -	70 / -	20 / -	340 / -	10 / -	10 / -	400 / -	250 / -	- / -	1 / -	- / -	- / -	- / -	- / -	- / -	- / -							
AEC30TP11	0.4 - 0.5 m	15/12/22	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-
			- / -	400 / 180	- / -	- / 180	10 / -	70 / -	20 / -	340 / -	10 / -	10 / -	400 / -	250 / -	- / -	1 / -	- / -	- / -	- / -	- / -	- / -	- / -							
AEC30TP12	0 - 0.1 m	15/12/22	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD	NT	NT	-	<0.001
			- / -	400 / 180	- / -	- / 180	10 / -	70 / -	20 / -	340 / -	10 / -	10 / -	400 / -	250 / -	- / -	1 / -	- / -	- / -	- / -	- / -	- / -	- / -							
AEC30TP12	0.4 - 0.5 m	15/12/22	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-
			- / -	400 / 180	- / -	- / 180	10 / -	70 / -	20 / -	340 / -	10 / -	10 / -	400 / -	250 / -	- / -	1 / -	- / -	- / -	- / -	- / -	- / -	- / -							
AEC30TP13	0 - 0.1 m	15/12/22	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD	NT	NT	-	<0.001
			- / -	400 / 180	- / -	- / 180	10 / -	70 / -	20 / -	340 / -	10 / -	10 / -	400 / -	250 / -	- / -	1 / -	- / -	- / -	- / -	- / -	- / -	- / -							
AEC30TP14	0 - 0.1 m	15/12/22	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD	NT	NT	-	<0.001
			- / -	400 / 180	- / -	- / 180	10 / -	70 / -	20 / -	340 / -	10 / -	10 / -	400 / -	250 / -	- / -	1 / -	- / -	- / -	- / -	- / -	- / -	- / -							
AEC30TP14	0.3 - 0.4 m	15/12/22	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD	NT	NT	-	<0.001
			- / -	400 / 180	- / -	- / 180	10 / -	70 / -	20 / -	340 / -	10 / -	10 / -	400 / -	250 / -	- / -	1 / -	- / -	- / -	- / -	- / -	- / -	- / -							
AEC30TP16	0 - 0.1 m	15/12/22	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD	NT	NT	-	<0.001
			- / -	400 / 180	- / -	- / 180	10 / -	70 / -	20 / -	340 / -	10 / -	10 / -	400 / -	250 / -	- / -	1 / -	- / -	- / -	- / -	- / -	- / -	- / -							
AEC30TP16	0.4 - 0.5 m	15/12/22	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD	NT	NT	-	<0.001
			- / -	400 / 180	- / -	- / 180	10 / -	70 / -	20 / -	340 / -	10 / -	10 / -	400 / -	250 / -	- / -	1 / -	- / -	- / -	- / -	- / -	- / -	- / -							
AEC30TP17	0 - 0.1 m	15/12/22	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD	NT	NT	-	<0.001
			- / -	400 / 180	- / -	- / 180	10 / -	70 / -	20 / -	340 / -	10 / -	10 / -	400 / -	250 / -	- / -	1 / -	- / -	- / -	- / -	- / -	- / -	- / -							
AEC30TP20	0 - 0.1 m	15/12/22	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD	NT	NT	-	<0.001
			- / -	400 / 180	- / -	- / 180	10 / -	70 / -	20 / -	340 / -	10 / -	10 / -	400 / -	250 / -	- / -	1 / -	- / -	- / -	- / -	- / -	- / -	- / -							
AEC30TP20	0.5 - 0.6 m	15/12/22	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-
			- / -	400 / 180	- / -	- / 180	10 / -	70 / -	20 / -	340 / -	10 / -	10 / -	400 / -	250 / -	- / -	1 / -	- / -	- / -	- / -	- / -	- / -	- / -							
AEC30TP21	0 - 0.1 m	15/12/22	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD	NT	NT	-	<0.001
			- / -	400 / 180	- / -	- / 180	10 / -	70 / -	20 / -	340 / -	10 / -	10 / -	400 / -	250 / -	- / -	1 / -	- / -	- / -	- / -	- / -	- / -	- / -							
AEC30SP1	0 m	15/12/22	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD	NT	NT	-	<0.001
			- / -	400 / 180	- / -	- / 180	10 / -	70 / -	20 / -	340 / -	10 / -	10 / -	400 / -	250 / -	- / -	1 / -	- / -	- / -	- / -	- / -	- / -	- / -							
AEC30SP1A	0 m	17/01/2023	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD	NT	NT	-	<0.001
			- / -	400 / 180	- / -	- / 180	10 / -	70 / -	20 / -	340 / -	10 / -	10 / -	400 / -	250 / -	- / -	1 / -	- / -	- / -	- / -	- / -	- / -	- / -							
AEC30SP1B	0 m	17/01/2023	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD	NT	NT	-	<0.001
			- / -	400 / 180	- / -	- / 180	10 / -	70 / -	20 / -	340 / -	10 / -	10 / -	400 / -	250 / -	- / -	1 / -	- / -	- / -	- / -	- / -	- / -	- / -							
AEC30SP2	0 m	15/12/22	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1																		-	<0.001
			- / -	400 / 180	- / -	- / 180	10 / -	70 / -	20 / -	340 / -	10 / -	10 / -	400 / -	250 / -	- / -	1 / -	- / -	- / -	- / -	- / -	- / -	- / -							

Lab result

HIL/HSL value   EIL/ESL value

Notes:

a   QA/QC replicate of sample listed directly

b   Reported naphthalene laboratory result o

c   Criteria applies to DDT only

Site Assessment Criteria (SAC):

Refer to the SAC section of report for information of SAC source

SAC based on generic land use threshold

HIL C	Recreational / Open
HSL C	Recreational / Open
DC HSL C	Direct contact HSL C
EIL/ESL UR/POS	Urban Residential ar
ML R/P/POS	Residential, Parklan

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

Metals (dissolved)

Sample Location / Identification (Borehole or Replicate)	Sample Date	Arsenic	Cadmium	Chromium (III + VI)	Copper	Lead	Mercury	Nickel	Zinc
AEC30BH01	15/02/2023	1	0.7	<1	<1	<1	**0.06**	59	44
AEC30BH02	15/02/2023	2	<0.1	<1	<1	<1	<0.05	3	16
BD2/20230215	15/02/2023	2	<0.1	<1	<1	<1	<0.05	3	17
AEC30BH03	15/02/2023	2	<0.1	<1	<1	<1	<0.05	9	8
Assessment Criteria									
Freshwater DGV		24 for As(III) 13 for As(V)	15.1	177.3 for Cr(III) 1.0 for Cr(VI)	1.4	1627	0.06	684	497
Guidelines for Recreational Water	**Health**	100	20	500 for Cr(VI)	20000	100	10	200	-
Guidelines for Recreational Water	**Aesthetic**	-	-	-	1000	-	-	-	3000
HSL D for Vapour Intrusion, Clay (depth 2 m to <4 m)		-	-	-	-	-	-	-	-

Polycylic Aromatic Hydrocarbons

Sample Location / Identification (Borehole or Replicate)	Sample Date	Naphthalene	Anthracene	Fluoranthene	Benzo(a)pyrene	Fluorine	Phenanthrene	Other PAH
AEC30BH01	15/02/2023	<0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<PQL
AEC30BH02	15/02/2023	0.05	<0.01	<0.01	<0.01	0.01	<0.01	<PQL
BD2/20230215	15/02/2023	0.03	<0.01	<0.01	<0.01	<0.01	<0.01	<PQL
AEC30BH03	15/02/2023	0.08	<0.01	<0.01	<0.01	<0.01	<0.01	<PQL
Assessment Criteria								
Freshwater DGV		16	0.01	1	0.1		0.6	-
Guidelines for Recreational Water	**Health**	-	-	-	0.1		-	-
Guidelines for Recreational Water	**Aesthetic**	-	-	-	-		-	-
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	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
AEC30BH01	15/02/2023	<10	<50	<10	<50	<100	<100	<1	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	-	<PQL
AEC30BH02	15/02/2023	<10	<50	<10	<50	<100	<100	<1	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	-	<PQL
BD2/20230215	15/02/2023	<10	<50	<10	<50	<100	<100	<1	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	-	<PQL
AEC30BH03	15/02/2023	<10	<50	<10	<50	<100	<100	<1	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	-	<PQL
Assessment Criteria																																											
Freshwater DGV		-	-	-	-	-	-	950	180	80	350	75 for m-xylene 200 for p-xylene	30	700	-	-	-		100	70	330	3	85	160	260	60	55	400	270	6500	1900	240	370	-	-	-	900	1100	-	-	20	-	-
Guidelines for Recreational Water	**Health**	-	-	-	-	-	-	10	8000	3000	6000		-	300	600		1000		3	500	-	300		15000	-	400	3000	-	-	-	30	30	2500				-	-	300	7	-	40	-
Guidelines for Recreational Water	**Aesthetic**	-	-	-	-	-	-	-	25	3	20		-	-	-		-		-	-	-	5		1	20	0.3	10	-	-	-	-	-	-				-	-	4	-	-	-	-
HSL D for Vapour Intrusion, Clay (depth 2 m to <4 m)		NL	NL	-	-	-	-	30000	NL	NL	NL		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

PQL	Practical Quantitation Limit
-	not defined/ not analysed/ not applicable
NL	Not Limiting
BD2/20230215	Blind replicate from AEC30BH03
(green)	Exceedance of DGV
(blue)	Exceedance of Drinking Water Guideline

Douglas Partners

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											
		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	Aroclor 1242	Aroclor 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
AEC30BH01	15/02/2023	<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
AEC30BH02	15/02/2023	<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
BD2/20230215	15/02/2023	<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
AEC30BH03	15/02/2023	<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
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	-
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	-	-
HSL D for Vapour Intrusion, Clay (depth 2 m to <4 m)		-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

PQL	Practical Quantitation Limit
-	not defined/ not analysed/ not applicable
BD2/20230215	Blind replicate from AEC30BH03
	Exceedance of DGV and Drinking Water Guideline
	Exceedance of Drinking Water Guidelkine

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

				Metals										TRH		BTEX				PAH		Phenol	OCP		OPP	PCB	Asbestos	pH
				Arsenic	TCLP Arsenic	Cadmium	Total Chromium	Total Chromium	Copper	Lead	Mercury (inorganic)	Nickel	Zinc	TRH C6 - C9	C10-C36 Fraction (sum of total recoverable hydrocarbons)	Benzene	Toluene	Ethylbenzene	Xylenes (total)	Benzo(a)pyrene (BaP)	Total PAHs	Phenol	Total Endosulfan	Total Analysed OCP	Total Analysed OPP	Total PCB	Total Asbestos	
		PQL		4		0.4	1		1	1	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		
Sample ID	Depth	Sample Date		mg/kg	mg/L	mg/kg	mg/kg	mg/L	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	-	pH units
AEC30TP01	0 - 0.05 m	15/12/2022	Fill	7	-	<0.4	34	-	8	19	<0.1	5	10	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	<5	<0.1	<0.1	<0.1	<0.1	NAD	
BD1/20221215	0 m	15/12/22	Fill	7	-	<0.4	33	-	6	17	<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	-	
AEC30TP02	0 - 0.05 m	15/12/22	Fill	4	-	<0.4	23	-	8	15	<0.1	5	8	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	<5	<0.1	<0.1	<0.1	<0.1	NAD	
AEC30TP02	0.1 - 0.2 m	15/12/22	Fill	4	-	<0.4	21	-	7	11	<0.1	4	5	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	<5	<0.1	<0.1	<0.1	<0.1	-	
AEC30TP03	0 - 0.05 m	15/12/22	Fill	5	-	<0.4	21	-	10	12	<0.1	4	11	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	<5	<0.1	<0.1	<0.1	<0.1	NAD	
AEC30TP03	0.2 - 0.3 m	15/12/22	Fill	<4	-	<0.4	17	-	10	12	<0.1	2	8	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	<5	<0.1	<0.1	<0.1	<0.1	NAD	
AEC30TP04	0 - 0.05 m	15/12/22	Fill	6	-	<0.4	34	-	6	14	<0.1	4	8	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	<5	<0.1	<0.1	<0.1	<0.1	NAD	
BD2/20221215	0 m	15/12/22	Fill	7	-	<0.4	27	-	7	16	<0.1	4	11	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	<5	<0.1	<0.1	<0.1	<0.1	-	
AEC30TP04	0.1 - 0.2 m	15/12/22	Fill	7	-	<0.4	25	-	10	16	<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	-	
AEC30TP05	0 - 0.05 m	15/12/2022	Fill	7	-	<0.4	33	-	7	15	<0.1	4	8	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	<5	<0.1	<0.1	<0.1	<0.1	NAD	
AEC30TP06	0 - 0.1 m	15/12/22	Fill	6	-	<0.4	12	-	25	15	<0.1	7	32	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	<5	<0.1	<0.1	<0.1	<0.1	NAD	
AEC30TP07	0 - 0.1 m	15/12/22	Fill	6	-	<0.4	29	-	4	14	<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	NAD	
AEC30TP08	0 - 0.1 m	15/12/22	Fill	9	-	<0.4	32	-	5	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	NAD	
AEC30TP09	0 - 0.1 m	15/12/22	Fill	7	-	<0.4	18	-	11	15	<0.1	4	13	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	<5	<0.1	<0.1	<0.1	<0.1	NAD	
AEC30TP10	0 - 0.1 m	15/12/22	Fill	7	-	<0.4	19	-	7	15	<0.1	3	8	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	<5	<0.1	<0.1	<0.1	<0.1	NAD	
AEC30TP11	0 - 0.1 m	15/12/22	Fill	5	-	<0.4	17	-	7	13	<0.1	4	8	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	<5	<0.1	<0.1	<0.1	<0.1	NAD	
AEC30TP11	0.4 - 0.5 m	15/12/22	Natural	<4	-	<0.4	15	-	10	6	<0.1	5	10	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	<5	<0.1	<0.1	<0.1	<0.1	-	
AEC30TP12	0 - 0.1 m	15/12/22	Fill	10	-	<0.4	24	-	8	20	<0.1	3	8	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	<5	<0.1	<0.1	<0.1	<0.1	NAD	
AEC30TP12	0.4 - 0.5 m	15/12/22	Natural	5	-	<0.4	19	-	13	9	<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	-	
AEC30TP13	0 - 0.1 m	15/12/22	Fill	8	-	<0.4	25	-	8	15	<0.1	4	8	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	<5	<0.1	<0.1	<0.1	<0.1	NAD	
AEC30TP14	0 - 0.1 m	15/12/22	Fill	6	-	<0.4	16	-	19	13	<0.1	6	22	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	<5	<0.1	<0.1	<0.1	<0.1	NAD	
AEC30TP14	0.3 - 0.4 m	15/12/22	Fill	7	-	<0.4	21	-	10	18	<0.1	4	12	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	<5	<0.1	<0.1	<0.1	<0.1	NAD	
AEC30TP16	0 - 0.1 m	15/12/22	Fill	**23**	-	<0.4	10	-	22	15	<0.1	9	41	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	<5	<0.1	<0.1	<0.1	<0.1	NAD	
AEC30TP16	0.4 - 0.5 m	15/12/22	Fill	8	-	<0.4	26	-	6	14	<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	NAD	
AEC30TP17	0 - 0.1 m	15/12/22	Fill	9	-	<0.4	25	-	7	15	<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	NAD	
AEC30TP20	0 - 0.1 m	15/12/22	Fill	6	-	<0.4	24	-	7	13	<0.1	3	8	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	<5	<0.1	<0.1	<0.1	<0.1	NAD	
BD5/20221215	0 m	15/12/22	Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
AEC30TP20	0.5 - 0.6 m	15/12/22	Natural	4	-	<0.4	20	-	10	10	<0.1	2	4	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	<5	<0.1	<0.1	<0.1	<0.1	-	
AEC30TP21	0 - 0.1 m	15/12/22	Fill	8	-	<0.4	29	-	16	25	<0.1	3	46	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	<5	<0.1	<0.1	<0.1	<0.1	NAD	
AEC30SP1	0 m	15/12/22	Fill	<4	-	<0.4	6	-	6	11	<0.1	3	21	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	<5	<0.1	<0.1	<0.1	<0.1	NAD	
AEC30SP1A	0 m	17/01/2023	Fill	<4	-	<0.4	6	-	6	14	<0.1	3	23	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	<5	<0.1	<0.1	<0.1	<0.1	NAD	
AEC30SP1B	0 m	17/01/2023	Fill	<4	-	<0.4	6	-	6	14	<0.1	3	25	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	<5	<0.1	<0.1	<0.1	<0.1	NAD	
AEC30SP2	0 m	15/12/22	Fill	**300**	2.1	<0.4	**130**	<0.01	370	19	<0.1	6	220	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	<5	<0.1	<0.1	<0.1	<0.1	NAD	
														Waste Classification Criteria [f]														
	CT1			100	-	20	100	-	NC	100	4	40	NC	650	10000	10	288	600	1000	0.8	200	288	60	<50	4	<50	NC	
	SCC1			500	-	100	1900	-	NC	1500	50	1050	NC	650	10000	18	518	1080	1800	10	200	518	108	<50	7.5	<50	NC	
	TCLP1			N/A	5	N/A	N/A	1	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	NC	
	CT2			400	-	80	400	-	NC	400	16	160	NC	2600	40000	40	1152	2400	4000	3.2	800	1152	240	<50	16	<50	NC	
	SCC2			2000	-	400	7600	-	NC	6000	200	4200	NC	2600	40000	72	2073	4320	7200	23	800	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	NC	

ENM

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

Site Photographs

Photograph 1 - Stockpile AEC30SP1 (15 December 2022)

Photograph 2 - Stockpile AEC30SP2 (15 December 2022)

Douglas Partners Geotechnics / Environment / Groundwater	**Site Photographs - AEC 30** **Sydney Metro Western Sydney Airport - SCAW, Elizabeth Drive, Badgerys Creek**	PROJECT: 204814.01 PLATE No: 1 REV: 0
	CLIENT: CPBUI JV	DATE: 17-Jan-23

Photograph 3 - Stockpile AEC30SP2 (17 January 2023)

Photograph 4 - Stockpile AEC30SP2 (17 January 2023)

Douglas Partners Geotechnics / Environment / Groundwater	**Site Photographs - AEC 30** **Sydney Metro Western Sydney Airport - SCAW, Elizabeth Drive, Badgerys Creek**	PROJECT: 204814.01 PLATE No: 2 REV: 0
	CLIENT: CPBUI JV	DATE: 17-Jan-23

Appendix K

Data Quality Assurance and Quality Control

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Table QA1: Relative Percentage Difference Results for Soil

		Metals								TRH				BTEX				PAH				Phenols	OCP																OPP		PCB
		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	Total Xylenes	Naphthalene	Benzo(a)pyrene (BaP)	Benzo(a)pyrene TEQ	Total PAHs	Total Phenols	DDD	DDT+DDE+DDD	DDE	DDT	Aldrin	Dieldrin	Aldrin & Dieldrin	Endosulfan I	Total Chlordane	Endosulfan II	Endosulfan Sulphate	Endrin	Total Endosulfan	Heptachlor	Hexachlorobenzene	Methoxychlor	Other OCP	Chlorpyriphos	Other OPP	Total PCB
Sample ID	Depth	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	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Intra-laboratory Duplicates																																										
AEC30TP01	0 - 0.05 m	7	<0.4	34	8	19	<0.1	5	10	<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	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1
BD1/20221215	0	7	<0.4	33	6	17	<0.1	4	10	<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	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1
		0	0	1	2	2	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	0
		0	0	3	29%	11%	0%	22%	11%	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%
AEC30TP04	0 - 0.05 m	6	<0.4	34	6	14	<0.1	4	8	<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	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1
BD2/20221215	0	7	<0.4	27	7	16	<0.1	4	11	<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	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1
		1	0	7	1	2	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	0	0	0	0
		15%	0%	**23%**	15%	13%	0%	0%	32%	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%
Inter-laboratory (Eurofins)																																										
AEC30TP07	0 - 0.05 m	6	<0.4	29	4	14	<0.1	2	6	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<PQL	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<PQL	<0.2	<PQL	<0.1
BD3/20221215	0	19	<0.4	70	12	29	<0.1	<5	18	<25	<50	<100	<100	<0.1	<0.1	<0.1	<0.3	<0.05	<0.5	<0.5	<0.5	<PQL	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		<0.05	<0.05	<0.05		<0.05	<0.05	<0.05	<PQL	<0.2	<PQL	<0.1
		13	0	41	8	15	0	3	12	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
		104%	0	**83%**	**100%**	**70%**	0	**86%**	**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%

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

Sample ID	Benzene	Toluene	Ethylbenzene	o-Xylene	m+p-Xylene
TB-141222	<0.2	<0.5	<1	<1	<2
TB-151222	<0.2	<0.5	<1	<1	<2

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Table QA3: Trip Spike Results - Soils (mg/kg)

Sample ID	Benzene	Toluene	Ethylbenzene	total xylenes
TS-141222	96	97	99	197
TS-151222	104	95	99	197

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Table QA4: Relative Percentage Difference Results for Groundwater

	Metals								TRH				BTEX					PAH						Phenols												OCP									
	Arsenic	Cadmium	Chromium (III + VI)	Copper	Lead	Mercury	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	Chlordanes total	pp-DDT	Endosulfan I	Endosulfan II	Endrin	Heptachlor
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
Intra-laboratory Duplicate																																												
BD2/20230215	2	<0.1	<1	<1	<1	<0.05	3	16	<10	<50	<100	<100	<1	<1	<1	<1	<2	0.03	<0.01	<0.01	<0.01	<0.01	<PQL	<1	<1	<20	<20	<1	-	<5	<1	<1	<1	<1	<PQL	<0.01	<0.01	<0.01	<0.01	-	<0.006	<0.01	<0.01	<0.01	<0.01
AEC30BH02	2	<0.1	<1	<1	<1	<0.05	3	17	<10	<50	<100	<100	<1	<1	<1	<1	<2	0.05	<0.01	<0.01	<0.01	<0.01	<PQL	<1	<1	<20	<20	<1	-	<5	<1	<1	<1	<1	<PQL	<0.01	<0.01	<0.01	<0.01	-	<0.006	<0.01	<0.01	<0.01	<0.01
	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0.02	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%	0%	0%	0%	0%	0%	0%	0%	0%	0%	**50%**	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%
Inter-laboratory Duplicate																																												
BD3/20230215	1	<0.2	<1	<1	<1	<0.01	10	15	<20	<50	<100	<100	<1	<1	<1	<1	<2	<0.02	<0.01	<0.01	<0.01	<0.01	<PQL	<3	<10	<3	<3	-	<30	<10	<3	<30	<3	<3	<PQL	<0.01	<0.01	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
AEC30BH03	2	<0.1	<1	<1	<1	<0.05	9	8	<10	<50	<100	<100	<1	<1	<1	<1	<2	0.08	<0.01	<0.01	<0.01	<0.01	<PQL	<1	<1	<20	<20	<1	-	<5	<1	<1	<1	<1	<PQL	<0.01	<0.01	<0.01	<0.01	-	<0.006	<0.01	<0.01	<0.01	<0.01
	1	0	0	0	0	0	1	7	0	0	0	0	0	0	0	0	0	0.06	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
	67%	0%	0%	0%	0%	0%	11%	**61%**	0%	0%	0%	0%	0%	0%	0%	0%	0%	**120%**	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%

Table QA4: Relative Percentage Difference Results for Groundwater

			OPP												PCB		
	Methoxychlor	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	µg/L
Intra-laboratory D																	
BD2/20230215	<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
AEC30BH02	<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
	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%
Inter-laboratory D																	
BD3/20230215	<0.01	<PQL	<1	-	<1	<1	<1	<1	<1	<1	<1	-	<1	<PQL	<1	<1	<1
AEC30BH03	<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
	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%

	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	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
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
Intra-laboratory D																													
BD2/20230215	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<PQL
AEC30BH02	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<PQL
	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%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Inter-laboratory D																													
BD3/20230215	<1	<1	<1	<1	<1	<1	<5	<1	<1	-	-	<1	<1	<1	<1	<1	<1	<1	<1	<1	<5	<1	<1	<1	<1	<1	<1	-	<PQL
AEC30BH03	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<PQL
	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%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

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

Sample ID	Benzene	Toluene	Ethylbenzene	o-Xylene	m+p-Xylene
TB150223	<1	<1	<1	<1	<2

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

Sample ID	Benzene	Toluene	Ethylbenzene	o-Xylene	m+p-Xylene
TS150223	104%	107%	112%	107%	110%

Data Quality Assurance and Quality Control Report for DSI for AEC30

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

1.0 Field and Laboratory Data Quality Assurance and Quality Control for Soil

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	C
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	C
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)	C
Control Samples	1 per lab batch; 70-130% recovery (inorganics); 60-140% recovery (organics)	C
Standard Operating Procedures (SOP)	Adopting SOP for all aspects of the sampling field work	C

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

Laboratory analysis for soil was undertaken with recommended holding times[TW1].

As noted in laboratory certificate 313366, the PFAS: Matrix spike recovery for 10:2-FTS for sample 4 is outside acceptance criteria (60-140%), however an acceptable recovery was obtained for the LCS. PFAS was not tested in the AEC30 samples so this exceedance was not considered relevant to this DSI.

Also in laboratory certificate 313366, percentage recovery of metals is not possible to report due to the inhomogeneous nature of the element/s in the sample/s. However, an acceptable recovery was obtained for the LCS.

Asbestos-ID in soil: NEPM
As noted in laboratory certificate 313366, the laboratory report was consistent with the reporting recommendations in the National Environment Protection (Assessment of Site Contamination) Measure, Schedule B1, May 2013. This is reported outside our scope of NATA accreditation.

As noted in laboratory certificate 316721, percent recovery of ion balance in water samples was not applicable due to the high concentration of the element/s in the sample/s. However, an acceptable recovery was obtained for the LCS.

As noted in laboratory certificate 316721,
dissolved Metals: no filtered, nitric acid preserved sample was received, therefore the unpreserved sample from the 250 mL Amber bottles was filtered through 0.45µm filter at the lab. Note: there is a possibility some elements may be underestimated.

The RPD results for soil were within the acceptable range with the exception of a small number of the results for metals analysis (chromium, copper, nickel and zinc for replicate BD3/20221215 and AEC31TP07). The exceedances are not, however, considered to be of concern given low actual differences in the concentrations between the primary and replicate samples and both results being well below the SAC.

The RPD results for groundwater samples were within the acceptable range with the exception of a arsenic, cadmium, zinc and naphthalene for AEC30BH03 (ELS) and inter-laboratory sample (Eurofins) replicate BD3/20230215. The exceedances were not, however, considered to be of concern given low actual differences in the concentrations between the primary and replicate samples and both results being well below the SAC.

For soil [TW2][PM3]sampling, to avoid the need for decontaminating sampling equipment, disposable nitrile gloves were changed between each sampling event and used for sample collection. Rinsate test results were all less than the practical quantitation limits.

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.

Trip spikes and trip blanks were subject to the same conditions in the field as collected soil 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 and analysed within holding times.
	Samples were analysed in accordance with the COC.
Precision	Field staff followed standard operating procedures.
	Acceptable RPD between original samples and replicates.
	Satisfactory results for all other field and laboratory QC samples.
Accuracy	Field staff followed standard operating procedures.
	Satisfactory results for all field and laboratory QC samples.

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

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.

Douglas Partners Pty Ltd

Site Auditor - Interim Audit Advice No. 2: AEC30, 22-26 Lansdowne Road, Orchard Hills dated 11 May 2023	**DP Response**
Section 2. Confirm the site owner.	Sydney Metro - added to Table 1
Section 4.	
Discuss surface water flow across the site and likely flow offsite.	added to Table 2
Please confirm if the drainage channel through the southern portion of the site was present during the walkover (as shown in Drawing 1 of the SAQP), and if any sampling locations targeted this channel.	A drainage channel through the southern portion of the site was not evident at the time of fieldwork (December 2022). It was potentially covered by long grass
Discuss in detail the current site condition, including former shed, potential workshop, circular depression, and laydown and demolition waste storage areas, and confirm potential sources of contamination within the site or off-site at AEC 30.	Text added to Section 4
Section 6.3	
Stockpile samples referred to as AEC30SP1A and AEC30SP2A here, but in the analytical tables they are AEC30SP1A and AEC30SP1B. Please confirm sample IDs of the stockpile samples and update this section or the analytical tables in Appendix I.	Sample IDs are correct in analytical tables. Text has been amended.
Section 9	
Please close out any potential impacts within the drainage channel.	A drainage channel through the southern portion of the site was not evident at the time of fieldwork (December 2022). It was potentially covered by long grass
Provide comment on very different depth to groundwater between well development and sampling events.	Text added to Section 9.4
Section 9.2	
Please include numbers and depths of samples taken from the stockpiles.	added to Section 9.2
Confirm no potential asbestos containing material was observed.	added to Sections 9.1 and 9.2
If known, confirm the likely sources of the stockpiles.	source not known - text added to Section 9.2.
Appendix A	
Provide a survey plan of the site boundary.	geographical locations (eastings and northings) added to Drawing 1
Include an outline showing the extent of targeted areas i.e., the former shed, potential workshop, circular depression, and laydown and demolition waste areas.	Drawing 1 updated. No evidence of the potenial workshop and potential lay down area were observed on the site
Please also include outline of the drainage channel and the unnamed creek.	No drainage channel evident - possibly hidden by long grass.
Include locations of samples taken from the stockpiles.	Drawing 1 updated
Remove investigation locations not included in this site investigation (located at AEC 31a).	Drawing 1 amended
Appendix I	
Groundwater results for AEC30BH01 on page 2 are partially hidden, please update.	Amended
It is noted that the DSI states that 'soil to raise ground levels is likely to be sourced from off-site'. The sampling regime to be applied are not specified in the SAQP and cannot be commented upon by the auditor. It is understood that material reuse criteria in the SAQP was derived from the Human Health and Ecological Risk Assessment (HHERA) prepared to facilitate the re-use of spoil along the Sydney Metro alignment. At this stage we cannot comment on the material reuse criteria stated in the SAQP until approval to the HHERA has been received (if required).	Noted.