



REPORT TO
WOOLWORTHS GROUP LIMITED

ON
REMEDIATION ACTION PLAN

FOR
**PROPOSED DISTRIBUTION CENTRE
DEVELOPMENT**

AT
250 VICTORIA STREET, WETHERILL PARK, NSW

Date: 30 March 2021
Ref: E31888BRrptRev1-RAP

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Executive Summary

Woolworths Group Limited ('the client') commissioned JK Environments (JKE) to prepare a Remediation Action Plan (RAP) for the proposed distribution centre development at 250 Victoria Street, Wetherill Park, NSW. For the purpose of this RAP, 'the site' includes Lots 1 to 4 in DP 781975 as shown on Figures 1 and 2 in Appendix A.

Previous investigation at the site have identified fibre cement fragment (FCF) containing asbestos (ACM) at the site surface and groundwater impacted by mid fraction (TRH F2) hydrocarbons. At least one underground Storage Tank (UST) was also previously in use around the 1980-1990s and it is believed the UST/s remains beneath the pavement in the south-western section of the site. A summary of previous investigations and site information is included in Section 2.

This RAP has been prepared to support the lodgement of a State Significant Development Application (SSDA) and address Standard Secretary Environmental Assessment Requirements (SEARs). The remediation and validation will be audited by Louise Walkden (Ramboll Australia Pty Ltd), NSW EPA accredited site auditor with regards to the Contaminated Land Management (CLM) Act (1997).

The proposed development includes the construction of a high-bay distribution centre over the majority of the site, and includes major earthworks (cut/fill) over the majority of the site to achieve the development levels. The early works DA plans indicate four building pads will be constructed, with bulk excavation levels ranging from RL 33.20m Australian Heights Datum (AHD) to 41.30mAHD. The maximum cut is anticipated to be approximately 7m below ground level (BGL). Selected plans issued to JKE are attached in the appendices.

The goal of the remediation is to render the site suitable for the proposed development from a contamination viewpoint. The primary aim of the remediation at the site is to reduce the human health and environmental risks posed by site contamination to an acceptable level.

The primary objectives of the RAP are to:

- Summarise previous investigations and historical contamination data;
- Provide a methodology to remediate and validate the site;
- Provide a contingency plan and unexpected finds protocol for the remediation works; and
- Outline site management procedures to be implemented during remediation.

For the purpose of the RAP, the extent of remediation includes the entire site and to the cadastral boundaries. The vertical extent for remediation of any identified surficial ACM will be to a depth of approximately 100mm below existing surface levels. The extent of remediation (horizontal and vertical) associated with the UST/s and associated infrastructure will be guided by the validation. It is anticipated that the tank pit could be approximately 2-3m deep. The extent for remediation of groundwater (if required) will be based on the findings of the data gap investigation outlined in Section 4.

Based on the information available, hydrocarbons (specifically total recoverable hydrocarbons - TRH F2) within the groundwater may present a risk to future site users and may require long-term management. Additional investigation is required to delineate the impacts and better assess the risks posed by TRH F2 in groundwater in order to determine the appropriate management measures (if required). Following the additional investigation, a Human Health Risk Assessment (HHRA) should be undertaken to assess the potential for health risks associated with the TRH. In the event the HHRA indicates there is a risk to human health, long-term management of groundwater may be required.

The preferred option for remediation of surficial ACM is on-site treatment (Option 1 of Table 5-1). The preferred option for remediation of the UST, UST backfill and associated infrastructure is removal of the material to an appropriate facility (Option 4). The preferred option for groundwater is considered to be long-term management and monitoring natural attenuation (MNA) (Option 3 of Table 5-2). This will be addressed in the amended RAP based on the results of the HHRA.

The preferred options for remediation are considered to be appropriate on the basis that:

- The ACM impacts identified have been limited to the site surface (localised to a small area);
- Considerable earthworks (cut/fill) are required to achieve design levels;
- The potential hydrocarbon impacts associated with the UST and associated infrastructure are anticipated to be localised;



- The UST and associated infrastructure will be removed from site, removing a potential source of hydrocarbon impacts; and
- The strategies are sustainable, economically viable, commensurate with the level of risk posed by the contaminants and technically achievable to implement concurrently with the proposed development works.

The RAP includes a methodology to remediate and validate the site. A contingency plan for remediation is included together with site management procedures and an unexpected find protocol (UFP) to be implemented during remediation.

A site validation report is to be prepared on completion of remediation activities and submitted to the determining authority (SSDA/planner/council) to demonstrate that the site is suitable for the proposed development.

The conclusions and recommendations should be read in conjunction with the limitations presented in the body of this report.



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Appendix D: Example Waste Tracking Record
Appendix E: Guidelines and Reference Documents



Abbreviations

Ambient Background Concentrations	ABC
Asphaltic Concrete	AC
Australian Business Number	ABN
Added Contaminant Limits	ACL
Asbestos Containing Material	ACM
Additional Site Investigation	ASI
Australian Company Number	CAN
Area of Environmental Concern	AEC
Australian Height Datum	AHD
Acid Sulfate Soil	ASS
Below Ground Level	BGL
Benzo(a)pyrene Toxicity Equivalent Factor	BaP TEQ
Bureau of Meteorology	BOM
Benzene, Toluene, Ethylbenzene, Xylene	BTEX
Cation Exchange Capacity	CEC
Construction Environment Management Plan	CEMP
Contaminated Land Management	CLM
Chain of Custody	COC
Conceptual Site Model	CSM
Development Application	DA
Data Quality Indicator	DQI
Data Quality Objective	DQO
Ecological Investigation Level	EIL
Environmental Investigation Services	EIS
Ecological Screening Level	ESL
Environmental Management Plan	EMP
Excavated Natural Material	ENM
Environment Protection Authority	EPA
Environment Protection Licence	EPL
Environmental Site Assessment	ESA
Ecological Screening Level	ESL
Excavated Natural Material	ENM
Human Health Risk Assessment	HHRA
Health Investigation Level	HILs
Health Screening Level	HSL
Intermediate Bulk Container	IBC
JK Environments	JKE
Light non-Aqueous Phase Liquids	LNAPL
Long Term EMP	LTEMP
Map Grid of Australia	MGA
Monitored Natural Attenuation	MNA
National Association of Testing Authorities	NATA
National Environmental Protection Measure	NEPM
Organochlorine Pesticides	OCP
Organophosphate Pesticides	OPP
Polycyclic Aromatic Hydrocarbons	PAH
Polychlorinated Biphenyls	PCBs
Photo-ionisation Detector	PID
Protection of the Environment Operations	POEO
Practical Quantitation Limit	PQL
Quality Assurance	QA
Quality Control	QC
Remediation Action Plan	RAP
Relative Percentage Difference	RPD



Remediation Works Plan	RWP
Site Assessment Criteria	SAC
Sampling, Analysis and Quality Plan	SAQP
Secretary Environmental Assessment Requirements	SEARs
Source, Pathway, Receptor	SPR
State Significant Development Application	SSDA
Standing Water Level	SWL
Total Recoverable Hydrocarbons	TRH
Upper Confidence Limit	UCL
United States Environmental Protection Agency	USEPA
Underground Storage Tank	UST
Validation Assessment Criteria	VAC
Virgin Excavated Natural Material	VENM
Work Health and Safety	WHS
Units	
Litres	L
Metres BGL	mBGL
Metres	m
Millilitres	ml or mL
Milligrams per Kilogram	mg/kg
Percentage	%
Percentage weight for weight	%w/w

1 INTRODUCTION

Woolworths Group Limited ('the client') commissioned JK Environments (JKE) to prepare a Remediation Action Plan (RAP) for the proposed distribution centre development at 250 Victoria Street, Wetherill Park, NSW. For the purpose of this RAP, 'the site' includes Lots 1 to 4 in DP 781975 as shown on Figures 1 and 2 in Appendix A.

Previous investigation at the site have identified Asbestos Containing Material (ACM) at the site surface localised to a small section, and groundwater impacted by mid fraction total recoverable hydrocarbons (TRH) F2 hydrocarbons. At least one underground Storage Tank (UST) was also previously in use around the 1980-1990s and it is believed the UST/s remains beneath the pavement in the south-western section of the site. A summary of previous investigations and site information is included in Section 2.

The RAP has been prepared to support the lodgement of a State Significant Development Application (SSDA) and address Standard Secretary Environmental Assessment Requirements (SEARs). The remediation and validation will be audited by Louise Walkden (Ramboll Australia Pty Ltd), NSW EPA accredited site auditor with regards to the Contaminated Land Management (CLM) Act (1997)¹.

1.1 Proposed Development Details

The proposed development includes the construction of a high-bay distribution centre over the majority of the site, and includes major earthworks (cut/fill) over the majority of the site to achieve the development levels. The early works DA plans indicate four building pads will be constructed, with bulk excavation levels ranging from RL 33.20m Australian Heights Datum (AHD) to 41.30mAHD. The maximum cut is anticipated to be approximately 7m below ground level (BGL). Selected plans issued to JKE are attached in the appendices.

1.2 Remediation Goal, Aims and Objectives

The goal of the remediation is to render the site suitable for the proposed development from a contamination viewpoint. The primary aim of the remediation at the site is to reduce the human health and environmental risks posed by site contamination to an acceptable level.

The primary objectives of the RAP are to:

- Summarise previous investigations and historical contamination data;
- Provide a methodology to remediate and validate the site;
- Provide a contingency plan and unexpected finds protocol for the remediation works; and
- Outline site management procedures to be implemented during remediation.

¹ Contaminated Land Management Act 1997 (NSW) (referred to as CLM Act 1997)

1.3 Scope of Work

The RAP was prepared generally in accordance with a JKE proposal (Ref: EP53311B) of 7 January 2021 and written acceptance from the client of 1 March 2021. The scope of work included consultation with the client, a review of previous reports and Conceptual Site Model (CSM), and preparation of the RAP.

The scope of work was undertaken with reference to the National Environmental Protection (Assessment of Site Contamination) Measure 1999 as amended (2013)², State Environmental Planning Policy No.55 – Remediation of Land (1998)³ and other guidelines made under or with regards to the CLM Act 1997, including the Consultants Reporting on Contaminated Land (2020)⁴ guidelines.

A list of reference documents/guidelines is included in the appendices.

² National Environment Protection Council (NEPC), (2013). *National Environmental Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013)*. (referred to as NEPM 2013)

³ *State Environmental Planning Policy No. 55 – Remediation of Land 1998* (NSW) (referred to as SEPP55)

⁴ NSW EPA, (2020). *Consultants reporting on contaminated land, Contaminated Land Guidelines*. (referred to as Consultants Reporting Guidelines)

2 SITE INFORMATION

2.1 Background / Summary of Site History

2.1.1 Preliminary Stage 2 Environmental Site Assessment (ESA)

A preliminary Stage 2 ESA was previously undertaken by EIS in 2018⁵. The ESA included a review of site information, site history information, a site inspection and soil sampling from 29 locations throughout the site and two samples from a soil stockpile. The sampling locations are shown on the attached Figure 2 in Appendix A.

The site history information identified that the site was used for agricultural purposes until Circa c1977, after which the site was developed for industrial land uses. Between 1977 and 2010, the site was used for vehicle storage (holding yard) and for vehicle repairs. From 2010, the site history information indicated the site was used for the distribution of paper products, such as tissues.

The site inspection identified the following sources of site contamination/areas of environmental concern (AEC):

- Historical filling of the site;
- Historical agricultural use;
- Industrial/commercial activities on-site; and
- Hazardous building materials in current and former structures.

The ESA identified copper concentrations in one location and nickel concentrations in two locations above the ecological site assessment criteria (SAC). The report considered the elevated concentrations did not pose a risk to environmental receptors, as the exceedances were located in areas sealed with pavements, the site history did not indicate any ecological or environmental sensitive receptors at the site, and the site was proposed for on-going commercial/industrial land uses with limited landscaping. All results were below the respective human health SAC.

The ESA concluded that the site was suitable for on-going commercial/industrial land use. To assess the site suitability for future development, the report recommended the following:

- Undertake a data gap assessment, including additional soil and groundwater sampling and analysis; and
- Prepare a RAP if the data gap assessment identified any contamination issues.

2.1.2 Additional Site Investigation (ASI)

An Additional Site Investigation (ASI) was previously undertaken by JKE in 2021⁶. The ASI included a review of site information and site history information (including the EIS 2018 report and SafeWork NSW records),

⁵ Environmental Investigation Services, (2018). *Report to Fabco Pty Ltd on Preliminary Stage 2 Environmental Site Assessment for Due Diligence, Proposed Highbay Distribution Warehouse at 250 Victoria Street, Wetherill Park, NSW.* (Ref: E31888KD) (referred to as EIS 2018)

⁶ JK Environments, (2021). *Report to Woolworths Group Limited on Additional Site Investigation for Proposed Distribution Centre Development at 2510 Victoria Street, Wetherill Park, NSW.* (Ref: E31888BRrpt2) (Referred to as ASI)

soil sampling from 46 locations throughout the site and groundwater sampling from eight monitoring wells installed on-site.

The review of SafeWork NSW records for the storage of dangerous goods at the site identified several licences/applications for the storage of dangerous goods between 1978 and 1998. The records indicated that above-ground storage tanks (ASTs) and cabinets were used on-site for the storage of petroleum, liquified petroleum gas (LPG), kerosene and diesel products. The ASTs and cabinets ranged in capacity from 126kg to 2,200L. USTs were also identified and were used to store unleaded and leaded (super) petroleum, and ranged in capacity from 10,000L to 28,000L. The ASTs and USTs were considered to represent potential sources of site contamination. The approximate locations of these tanks are shown on Figure 2 attached in the appendices.

The site history information and the site inspection confirmed the potential sources of site contamination/AEC identified in the EIS 2018 report, and identified several current and former automotive services and spray-painting businesses up-gradient of the site which may represent potential off-site sources of contamination.

The ASI identified asbestos within a FCF located at the surface within the south-west of the site. The FCF was visually assessed to be in good condition and was considered to be bonded (i.e. non-friable asbestos) ACM. The ACM was removed from site (for analysis) and no other FCF were visibly observed at the site surface. However, JKE noted that localised impacts may be present. Due to the bonded condition of the ACM and the lack of other identified FCF, JKE considered it unlikely that a complete SPR linkage to asbestos fibres existed in the current site configuration and use. Though the risk of exposure to asbestos in ground was considered low, interim measures were recommended so that potential risks remained low.

The site inspection identified at least one UST within the south-west of the site. The UST/s, associated infrastructure and surrounding area were considered to potential sources of hydrocarbon contamination however, JKE noted that the borehole observations and soil analysis results indicated the potential for extensive impacts from the UST/s was relatively low. Localised impacts may be encountered in the vicinity of the UST and associated infrastructure.

The ASI identified heavy metals in groundwater at concentrations above the ecological SAC. The concentrations of heavy metals within the soils indicated the site was unlikely to be the source of the heavy metals within the groundwater. JKE were of the opinion that the concentrations were likely a regional issue and noted that the concentrations did not pose a risk to on-site receptors in the context of the proposed development.

The ASI identified TRH F2 in groundwater collected from MW106 and MW128 at concentrations above the human health SAC. The concentrations in MW106 were considered likely associated with the UST/s in the vicinity, whilst the concentrations in MW128 were considered likely associated with a localised spill/release of fuel. Given the shallow groundwater depth in comparison to the elevations of the proposed development, JKE were of the opinion that a complete SPR linkage may exist.

The ASI identified benzene in groundwater collected from MW123 at concentrations above the human health (recreational) SAC. Traces of light fraction (TRH F1) and toluene were also detected at concentrations below the SAC. These concentrations indicated a localised spill of petroleum product may have occurred in the vicinity of MW123 which could have seeped into the sub-surface. The risk posed by the benzene concentrations related to incidental contact/recreational use. Considering the proposed development does not include the use of groundwater as a resource and the provided plans indicated the groundwater would be at least 4m below the bulk excavation level in this area, JKE were of the opinion that a complete SPR linkage did not exist.

The ASI concluded that further investigation was required to assess the impact and risk of hydrocarbon concentrations to inform the CSM and the RAP.

Based on the findings of the investigation, the report concluded that the site could be made suitable for the proposed development, subject to the implementation of the following recommendations:

- A suitably qualified/licensed contractor should carry out an 'emu pick' to remove all visible FCF from the areas of the site with exposed soils. A surface clearance certificate should be issued by a Licensed Asbestos Assessor;
- Prepare a RAP to address the contamination issues identified at the site.
- Undertake a data gap investigation; and
- Undertake a validation assessment documenting the remediation works.

2.2 Site Identification

Table 2-1: Site Identification

Current Site Owner:	Woolworths Group Limited
Site Address:	250 Victoria Street, Wetherill Park, NSW
Lot & Deposited Plan:	Lots 1 to 4 DP781975
Current Land Use:	Trucking Yard, Masonry Distribution and Carpark
Proposed Land Use:	Distribution Warehouse
Local Government Authority:	Fairfield City Council
Current Zoning:	IN1 – General Industrial
Site Area (m²) (approx.):	85,000
RL (AHD in m) (approx.):	31-43
Geographical Location (decimal degrees) (approx. south-eastern corner boundary):	Latitude: -33.84795 Longitude: 151.917456
Site Location Plan:	Figure 1

Site Features Plan:	Figure 2

2.3 Site Condition and Surrounding Environment

2.3.1 Location and Regional Setting

The site is located in a predominantly commercial and industrial area of Wetherill Park and is bound by Redfern Street to the North and Victoria Street to the South. The site is located approximately 590m to the south-west of Prospect Creek. A concrete lined stormwater drain is located approximately 30m to the east of the site.

2.3.2 Topography

The regional topography is characterised by an east/north-east facing hillside that falls towards Prospect Creek. The site is located towards the middle of the hillside and has a gentle slope towards the east at approximately 5° and to the south at approximately 1°. Parts of the site appear to have been levelled to account for the slope and accommodate the existing development.

2.3.3 Site Inspection

A walkover inspection of the site was undertaken by JKE on 5 February 2021 as a component of the ASI. At the time of the inspection, the site was predominantly used as a distribution centre for masonry products and for heavy vehicle parking/storage. Four buildings (1-2 storey buildings and a large warehouse) were located within the south of the site. The buildings appeared in fair to good condition.

Asphaltic concrete (AC) and concrete pavements were located in the eastern and southern portions of the site. The AC pavements appeared in fair to poor condition, with visible evidence of cracking and heaving. The concrete pavements appeared in fair condition with minor cracking. The western section of the site was predominantly unsealed.

The site was fenced on all sides with chain-link fencing and upper barbed-wire strands. The site was accessible via two driveways in the south (from Victoria Street) and one driveway in the north-east (from Redfern Street). Steel gates were located at each driveway to secure the site. No visible evidence of erosion was observed at the site perimeters. A depression trending in a north/south orientation was observed within the centre of the site.

Several intermediate bulk containers (IBCs) were located in the north-west of the site. The labels on the IBCs indicated they were previously used for the storage of cleaning solvents and acids, though the current contents were not confirmed. Another IBC was located centrally within the north the site. The IBC appeared to contain waste oil products. The protective cage of the IBC was damaged and residue was visible near the outlet. Several drums (244L) were stored within the south-west of the site. The drums appeared to contain oils and lubricants associated with vehicle/machinery maintenance. Several discarded vehicle components (brake shoes, drums and rotors) were located to the north of the drums. Two suspected USTs were located

in the south-west of the site. A 35,500L diesel tank was located within a shipping container to the south of the suspected UST/s, and was self-contained. A second containerised diesel tank (approx. 10,000L capacity) was located within the east of the site, north of the warehouse building.

Two stockpiles of debris (steel, plastic, timber pallets) were located to the north-east of the warehouse, and one stockpile of soil was located to the south-east of the warehouse.

An electrical substation kiosk, gas manifold and water mains manifold were located within the south of the site. A hydrant standpipe was located within the south-west of the site, adjacent to the western boundary. Local water, lighting and power connections were observed throughout the site, with services conduits above and below ground. The lighting within the north-eastern carpark appeared solar powered, though may have included electrical back-up connections.

Sensitive environments such as wetlands, ponds, creeks or extensive areas of natural vegetation were not identified on site or in the immediate surrounds. Exotic grasses and trees were located in the east and south of the site, and within formed gardens in the north-east. The vegetation within the north-east and south appeared in good condition (though overgrown in sections) based on a cursory inspection. The vegetation adjacent to the eastern boundary appeared in poor condition, with patches of bare earth. The condition of the vegetation appeared related to a lack of upkeep/maintenance rather than an indication of significant contamination.

2.3.4 Surrounding Land Use

During the JKE inspection, the following land uses were identified in the immediate surrounds:

- North – Redfern Street, with hardware design and manufacturing warehouse (Alchin Long Group) and tissue manufacturing (ABC Tissue Products);
- South – Victoria Street, with Wetherill Park TAFE and residential beyond;
- East – Heavy vehicle inspection station (RMS); and
- West – light industrial complexes. Tenancies include: automotive repairers and tuners; auto electricians; joinery and ceiling panel manufacturer; pool maintenance contractors; information technology (IT) offices; and a horticultural chemical wholesaler (Colin Campbell (Chemicals) Pty Ltd).

2.3.5 Climatic Conditions

Weather conditions were fine and sunny at the time of the JKE ASI inspection, though had been overcast and rainy in the days prior. Key meteorological data for Prospect Reservoir weather station available on the Bureau of Meteorology (BOM)⁷ indicated that:

- The highest mean rainfall occurs in February, with a total of 99.2mm;
- The lowest mean rainfall occurs in September, with a total of 46.4mm; and
- In the week lead up to the JKE soil sampling event, a total of 24mm of rainfall was recorded. Approximately 50mm of rainfall was recorded during the soil sampling event; and

⁷ http://www.bom.gov.au/jsp/ncc/cdio/weatherData/av?p_nccObsCode=136&p_display_type=dailyDataFile&p_startYear=&p_c=&p_stn_num=067019 visited on 2 March 2021

- In the week lead up to the JKE groundwater sampling event, a total of 32mm of rainfall was recorded. Approximately 26mm of rainfall was recorded during the groundwater sampling event.

2.4 Summary of Geology, Soils and Hydrogeology

2.4.1 Regional Geology

Regional geological information included in the ASI report indicated that the site is underlain by Bringelly Shale of the Wianamatta Group, which typically consists of shale, carbonaceous claystone, claystone, laminite, fine to medium grained lithic sandstone, rare coal and tuff.

Soil landscape information presented in the ASI report indicated the site is located within the Blacktown soils landscape, which is typically of residual origins.

A summary of the subsurface conditions encountered in the ASI boreholes is provided below:

Table 2-2: ASI Summary - Subsurface Conditions

Profile	Description
Pavement	AC and concrete pavements were encountered at the surface in BH105, BH106, BH107, BH108, BH111, BH116, BH119, BH128, BH129, BH138, BH139 and BH140 and ranged in thickness from 30mm to 500mm.
Fill	Fill was encountered at the surface or beneath the pavement in all boreholes and extended to depths of approximately 0.2m below ground level (BGL) (BH108) to 3.6mBGL (BH146). BH141 was terminated in the fill at a maximum depth of approximately 0.6mBGL. The fill typically comprised silty clay, silty gravelly sand and silty sand with inclusions of igneous, ironstone, sandstone and siltstone gravel, ash, slag, root fibres and building rubble (asphalt, bricks, concrete, glass, ceramic, tile and plastic fragments). Organic odours were encountered in BH106 at a depth of approximately 0.5mBGL to 0.8mBGL.
Natural Soil	Residual silty clay was encountered beneath the fill in BH/TP101 to BH/TP118, BH/TP120 to BH/TP140 and BH/TP142 to BH/TP144 at depths of approximately 0.2mBGL (BH108) to 2.8mBGL (BH129).
Bedrock	Siltstone/sandstone bedrock was encountered beneath the fill in BH119, BH145 and BH146, and beneath the residual silty clay in BH103, BH106, BH107, BH109, BH111, BH116, BH118, BH123, TP124, TP126, BH128, BH134, BH138 to BH140 and BH143 at depths of approximately 0.4mBGL (BH119) to 3.6mBGL (BH146).
Groundwater	Groundwater seepage was encountered in the boreholes BH106, BH107, TP125, BH129 and BH146 at depths of approximately 1.0mBGL to 4.0mBGL. The remaining boreholes and test pits were dry during and a short time after completion of drilling and/or excavation.

2.4.2 Acid Sulfate Soil (ASS) Risk and Planning

Acid sulfate soil (ASS) information presented in the ASI report indicated the site is not located in an ASS risk area. The site is classed as having extremely low probability of ASS occurrence.

2.4.3 Hydrogeology

hydrogeological information included in the ASI report indicated that:

- The subsurface conditions at the site are expected to consist of relatively low permeability (residual) soils overlying shallow bedrock. The potential for viable groundwater abstraction and use of groundwater under these conditions is considered to be low. There is a reticulated water supply in the area and consumption of groundwater is not expected to occur. Use of groundwater is not proposed as part of the development; and
- The site location and regional topography indicates that surface water flows through the site are expected to eventuate in the on-site stormwater drainage system, which likely discharge into the stormwater culvert to the east of the site, which in turn flows into Prospect Creek. This water body is considered to be the closest potential ecological receptor.

A summary of the field screening results during groundwater sampling in the ASI is presented in the following table:

Table 2-3: ASI Summary - Groundwater Field Screening

Aspect	Details
Groundwater Depth & Flow	SWLs measured in the monitoring wells installed at the site ranged from 1.5mBGL to 5.13mBGL. Groundwater RLs calculated on these measurements ranged from approximately 39mAHD to 27.4mAHD. The groundwater RLs indicate that excavation for the proposed basement may intercept groundwater. PMW2 recorded a SWL of 0.32mBGL. PMW2 was considered a component of the UST infrastructure (likely a cathodic protection measure) and may not be indicative of the groundwater conditions.
Groundwater Field Parameters	Field measurements recorded during sampling were as follows: - pH ranged from 5.90 to 7.17; - EC ranged from 6628µS/cm to 23668µS/cm; - Eh ranged from -23.1mV to -52.4mV; and - DO ranged from 0.3ppm to 5.7ppm.
Light non-aqueous phase liquids (LNAPL) e.g. petroleum hydrocarbons	Phase separated product (i.e. LNAPL) were not detected using the interphase probe during groundwater sampling. No sheens were visibly observed using dedicated bailers.

2.4.4 Receiving Water Bodies

Information included in the ASI report indicated that the receiving water bodies included the stormwater channel to the east of the site, and Prospect Creek. Surface water would be anticipated to eventuate in stormwater drainage and discharge into the stormwater channel to the east of site, and ultimately discharge to Prospect Creek. Some surface water infiltration would be expected within the unsealed areas, particularly within the west of the site.

3 SITE CHARACTERISATION AND CONCEPTUAL SITE MODEL

NEPM (2013) defines a CSM as a representation of site related information regarding contamination sources, receptors and exposure pathways between those sources and receptors. The CSM for the site is presented in the following sub-sections and is based on the previous investigation data, site history and site information presented in Section 2.

3.1 Summary of Contamination (Site Characterisation)

A copy of the soil and groundwater data summary tables and borehole logs from the ASI report is included in Appendix B. The SAC exceedances are shown on Figure 4 in Appendix A. The following exceedances of the SAC were reported during the ASI:

- Non-friable asbestos in the form of ACM in the south-west of the site;
- Concentrations of heavy metals (arsenic, cadmium, chromium, copper, mercury, nickel, and/or zinc) above the ecological SAC in MW103, MW106, MW111, MW123, MW128, MW134, MW139 and MW143;
- Concentrations of TRH F2 of 100µg/L and 85µg/L above the human health-based (vapour-intrusion) SAC in groundwater samples collected from MW106 and MW128; and
- A concentration of benzene (66µg/L) above the human health-based (recreational) SAC in a groundwater sample collected from MW123.

The UST/s and associated infrastructure were also considered potential source/s of localised hydrocarbon impacts.

3.2 CSM

The table below includes a review of the CSM which has been used to design the remediation strategy. The CSM will require further review if additional site data becomes available.

Table 3-1: CSM

Contaminant source(s) and contaminants of concern	Contamination sources: historically imported fill soil; USTs and associated infrastructure; hazardous building materials; historic industrial/commercial uses; and off-site commercial/industrial land uses. Contaminants of concern for the RAP include: Heavy metals, asbestos in the form of surficial ACM; TRHs; BTEX; and PAHs. The Contamination of Potential Concern (CoPC) for the ASI included: heavy metals, BTEX, TRH, PAHs, organochlorine pesticides (OCPs), organophosphorus pesticides (OPPs), polychlorinated biphenyls (PCBs) and asbestos. The ASI included analysis of groundwater samples for PFAS.
Affected media	Soil (ACM in fill surface), groundwater and soil vapour. The groundwater has been impacted by heavy metals and TRH/BTEX. The heavy metal concentrations were considered likely a regional/background issue. The source of the TRH/BTEX was considered likely to be associated with the UST and indicative of a potential groundwater plume which requires further investigation.

	This is discussed in Section 4. Based on the results of the data gap investigation, consideration should be made for assessing soil vapour conditions.
Receptor identification	Human receptors include construction workers, intrusive maintenance workers and future site users. The risk of TRH/BTEX to future site users (including accumulating in confined spaces and buildings) should be addressed in relation to the proposed development. The ASI did not identify any contaminant of potential concern that pose a risk to ecological receptors at the site. Considering the proposal development will include major earthworks at the site, following development the risks posed by soil contamination to ecological receptors is considered to be low.
Exposure pathways and mechanisms	Potential exposure pathways relevant to the human receptors include primary contact and inhalation of asbestos dust and TRH/BTEX vapours. The potential for exposure would typically be associated with the construction and excavation works, and future use of the site. Exposure during future site use could occur via direct contact with asbestos (dust and incidental contact) during development works, inhalation, accumulation of soil vapour within confined spaces such as buildings. The following have been identified as potential exposure mechanisms for site contamination: • Vapour intrusion into confined spaces including service trenches; • Vapour intrusion into buildings; and • Contact (dermal or inhalation) exposure to ACM.
Evaluation of data gaps	The ASI recommended further investigation to assess soil conditions beneath existing structures and additional groundwater monitoring as outlined in Section 4.

3.3 Remediation Extent

For the purpose of the RAP, the extent of remediation includes the entire site and to the cadastral boundaries. The vertical extent for remediation of any identified surficial ACM will be to a depth of approximately 100mm below existing surface levels.

The extent of remediation (horizontal and vertical) associated with the USTs and associated infrastructure will be guided by the validation. It is anticipated that the tank pits could be approximately 2-3m deep.

The groundwater has been impacted by petroleum hydrocarbons. The ASI identified that the groundwater at the site generally flow towards the east/south-east. The ASI did not identify the source of the hydrocarbon however, the data indicated a local plume of contamination may exist beneath the site. It is noted that groundwater monitoring wells were not installed in down-gradient locations in the vicinity of the UST and truck wash bay due to access constraints. Additional investigation of groundwater conditions is required in order to confirm the extent of groundwater impacted by petroleum hydrocarbons and assist to identify the potential source/s.

Following the additional investigation, a Human Health Risk Assessment (HHRA) should be undertaken to assess the potential for health risks associated with the TRH. In the event the HHRA indicates there is a risk to human health, long-term management of groundwater may be required. Potential options for the remediation and management of groundwater are discussed in Section 5.2.

4 DATA GAP INVESTIGATION

The ASI recommended further investigation to close out the identified data gaps. The data gaps included that soil sampling was undertaken at approximately 75% of the minimum sampling density recommended in the NSW EPA Contaminated Sites Sampling Design Guidelines (1995)⁸ and that the sampling plan did not target potential point sources of contamination on-site. It is noted that the additional investigation should also delineate the extent of groundwater impacts detected. The data gap investigation is to be undertaken post-demolition of the existing structures.

To close out the data gaps, the investigation will include soil sampling from 38 sampling locations (as a minimum) as nominated on Figure 6 in Appendix A (BH/TP201 to BH/TP238 inclusive). Monitoring wells are also to be installed in six of the locations (BH203, BH204, BH212, BH225, BH230 and BH238). Additional samples are also to be collected if any visual or olfactory indicators of potential contamination are observed in other areas. The rationale for the selection of the locations is as follows:

- 201 to 202, 214 to 215, 218, 222 to 224, 226 to 229 and 231 to 237 – general site coverage;
- 203, 204 and 238 – down-gradient of the UST and former ASTs in the south-west of the site;
- 205 to 213, 216 and 219 to 221 – building footprints;
- 217 – down-gradient of truck wash bay; and
- 225 and 230 – down-gradient of potential hydrocarbon plume in groundwater.

Soil sampling is to be undertaken from test pits using an excavator (where possible). The use of a drill rig and/or hand tools may be necessary due to access in some areas (i.e. sloping ground). The monitoring well locations (BH203, BH212, BH225, BH230 and BH238) are to be drilled using a drill rig to a minimum depth of approximately 8mBGL considering the depth of earthworks and occurrence of groundwater. The wells are to be constructed as follows:

- 50mm diameter Class 18 PVC (machine slotted screen) is to be installed in the lower section of the well to intersect the groundwater;
- 50mm diameter Class 18 PVC casing is to be installed in the upper section of the well (screw-fixed);
- The rubber O-rings located within the screw-fixed joints (if present) are to be removed;
- A 2mm sand filter pack will be placed around the screen section for groundwater infiltration;
- A hydrated bentonite seal/plug is to be used on top of the sand pack to seal; and
- The well is to be finished with a concreted gatic cover, monument or similar to limit the inflow of surface water.

One soil sample per fill profile encountered (at each location) is to be analysed for heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc), TRH/BTEX, PAHs, OCPs, OPPs and asbestos (500mL quantification sample). A bulk (10L) sample (to the extent achievable based on sample return) from each fill profile encountered (at each location) is to be screened in the field for the presence of ACM.

One sample of the natural profile is to be collected from each sampling location. A selection of the samples (approximately 10 to 14 samples) is to be analysed for heavy metals, TRH/BTEX and PAHs for waste classification purposes. The samples are to be selected based on the results of the fill soil analysis and field

⁸ NSW EPA, (1995). *Contaminated Sites Sampling Design Guidelines*. (referred to as EPA Sampling Design Guidelines 1995)

observations. One groundwater sample per monitoring well (new and existing) are to be analysed for heavy metals, TRH/BTEX and PAHs. In the event that the existing groundwater monitoring wells cannot be located or are unserviceable (i.e. compromised, destroyed) after demolition works, replacement monitoring wells are to be installed in accordance with the above methodology within close proximity (i.e. 5m) from the existing wells. All monitoring wells are to be surveyed to determine the groundwater flow directions. QA/QC samples are to be obtained to meet the NEPM 2013 requirements (outlined in Section 7.3).

A record of any additional USTs and/or potential point source/s of contamination identified after demolition is to be maintained. After removal of the infrastructure/point source, the USTs and/or point source/s of contamination are to be assessed in accordance with the validation plan outlined in Section 7.1.

On completion of the data gap investigation, a stand-alone report should be prepared in accordance with the Consultants Reporting Guidelines. Based on the findings of the data gap investigation, a HHRA may be prepared to better assess the risks posed by the groundwater and outline specific remediation measures to be implemented during the proposed development in order to mitigate the risk posed to site receptors (if required). A stand-alone amended RAP is to be prepared to confirm the remedial approach in consideration of the data gap investigation and HHRA (if required).

5 REMEDIATION OPTIONS

5.1 Soil Remediation

The NSW EPA follows the hierarchy set out in NEPM 2013 for the remediation of contaminated sites. The preferred order for soil remediation and management is as follows:

1. On-site treatment of soil so that the contaminant is either destroyed or the associated hazard is reduced to an acceptable level;
2. Off-site treatment of excavated material so that the contaminant is either destroyed or the associated hazard is reduced to an acceptable level, after which the soil is returned to the site;

Or if the above are not practicable:

3. Consolidation and isolation of the soil by on-site containment within a properly designed barrier; and
4. Removal of contaminated material to an approved site or facility, followed where necessary by replacement with clean material; or
5. Where the assessment indicates that remediation would have no net environmental benefit or would have a net adverse environmental effect, implementation of an appropriate management strategy.

For simplicity herein, the above hierarchy are respectively referred to as Option 1, Option 2, Option 3 etc.

The NEPM 2013 and Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia (2009)⁹ prefer the following asbestos remediation hierarchy:

1. Minimisation of public risk;
2. Minimisation of contaminated soil disturbance; and
3. Minimisation of contaminated material/soil moved to landfill.

The NSW EPA Contaminated Land Management Guidelines for the NSW Site Auditor Scheme (3rd Edition) (2017)¹⁰ provides the following additional requirements to be taken into consideration:

- Remediation should not proceed in the event that it is likely to cause a greater adverse effect than leaving the site undisturbed; and
- Where there are large quantities of soil with low levels of contamination, alternative strategies should be considered or developed.

The table below discusses and assesses a range of soil remediation options:

Table 5-1: Consideration of Soil Remediation Options

Option	Discussion	Assessment/Applicability
Option 1 On-site treatment of contaminated soil	On-site treatment can provide a mechanism to reuse the processed material, and in some instances, avoid the need for large scale earthworks. Treatment options are contaminant-specific and can include bio-remediation, soil washing, air sparging and soil vapour extraction,	Potentially applicable for the contaminants of concern associated with the USTs. However, treatment is unlikely to be viable on such a small scale

⁹ Western Australian (WA) Department of Health (DoH), (2009). Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia. (referred to as WA DoH 2009)

¹⁰ NSW EPA, (2017). *Contaminated land Management, Guidelines for the NSW Site Auditor Scheme (3rd ed.)*. (referred to as Site Auditor Guidelines 2017)

Option	Discussion	Assessment/Applicability
	thermal desorption and physical removal of bonded ACM fragments. Depending on the treatment option, licences may be necessary for specific individual waste streams due to the potential for air pollution and the formation of harmful by-products during incineration processes. Licences for re-use of treated material/waste may also be required.	and would not be the preferred option due to the extent of earthworks proposed. Physical removal of bonded ACM fragments is technically feasible and economically viable. Due to the limited identified impacts, this is the preferred method for remediation of the bonded ACM.
<u>Option 2</u> Off-site treatment of contaminated soil	Contaminated soils are excavated, transported to an approved/licensed treatment facility, treated to remove/stabilise the contaminants then returned to the subject site, transported to an alternative site or disposed to an approved landfill facility. This option is also contaminant-specific. The cost per tonne for transport to and from the site and for treatment is considered to be relatively high. The material would also have to be assessed in terms of suitability for reuse as part of the proposed development works under the waste and resource recovery regulatory framework.	Not feasible option for the treatment of ACM.
<u>Option 3</u> Consolidation and isolation of impacted soil by cap and containment	This would include the consolidation of ACM-impacted and/or hydrocarbon impacted soil within an appropriately designed cell, followed by the placement of an appropriate barrier over the material to reduce the potential for future disturbance. The capping and/or containment must be appropriate for the specific contaminants of concern. Depending on the concentrations of contaminants being encapsulated, an ongoing environmental management plan (EMP) will be required and will need to be publicly notified and made to be legally enforceable (e.g. via listings in the Section 10.7 planning certificate and on the land title).	Technically feasible however given the likely small-scale of ACM-impacted and/or hydrocarbon impacted soil, this would not be the preferred option due to the ongoing liabilities associated with complying with the EMP.
<u>Option 4</u> Removal of contaminated material to an appropriate facility and reinstatement with clean material	Contaminated soils would be classified in accordance with NSW EPA guidelines for waste disposal, excavated and disposed of off-site to a licensed landfill. The material would have to meet the requirements for landfill disposal. Landfill gate fees (which may be significant) would apply in addition to transport costs.	This option is the most applicable for the remediation of the USTs/infrastructure as it: aligns with the construction work (i.e. bulk excavation is required in the vicinity of the UST); is technically feasible; and economically viable. Physical removal of bonded ACM is considered viable under this option.

Option	Discussion	Assessment/Applicability
Option 5 Implementation of management strategy	Contaminated soils would be managed in such a way to reduce risks to the receptors and monitor the conditions over time so that there is an on-going minimisation of risk. This may occur via the implementation of monitoring programs.	Not applicable given the extent of the proposed development.

5.2 Groundwater Remediation

The preferred order for the remediation and management of contaminated groundwater presented in the NSW EPA Contaminated Sites Guidelines for the Assessment and Management of Groundwater Contamination (2007)¹¹ is outlined below:

1. Clean-up so that the natural background water quality is restored;
2. Clean-up to protect the environmental, human and ecological health; and
3. Clean-up to the extent practicable.

The remediation options for consideration are outlined in the following table:

Table 5-2: Consideration of Groundwater Remediation Options

Option	Discussion	Assessment/Applicability
Option 1 In-Situ Treatment	In-situ treatment options may include: <u>Bio-remediation</u>: Addition of oxygen and nutrient compounds to accelerate the natural process of organic compound decay within the environment. <u>Chemical Oxidation</u>: Addition of chemical compounds to oxidise the hydrocarbons in groundwater into compounds that are less harmful to the environment. <u>Air Sparging and Extraction</u>: Air is forced through the contaminated groundwater system to volatilise organic compounds. The air is then extracted and captured for treatment leaving reduced contaminant concentrations within the sub-strata.	Bio-remediation and air sparging is feasible for the treatment of the hydrocarbon impacted water, as the data indicates the impacts are generally light to mid-fraction hydrocarbons, which would volatilise more readily. The set-up and on-going costs and licencing requirements would need further consideration to assess the viability of these options.

¹¹ NSW EPA, (2007). *Contaminated Sites Guidelines for the Assessment and Management of Groundwater Contamination*. (referred to as Groundwater Contamination Guidelines 2007)

Option	Discussion	Assessment/Applicability
Option 2 Ex-Situ Treatment	Ex-situ treatment options may include: <u>Washing:</u> Groundwater is stripped of contaminants via a leaching process, with the concentrated contaminated liquid product retained for disposal or additional treatment. <u>Bioreactors:</u> Groundwater is pumped into an above-ground tank and treated with inorganic nutrients. Oxygen is introduced into the tank by sparging. Hydrocarbons are broken down by naturally occurring bacteria. <u>Off-site Treatment:</u> Contaminated groundwater is transported to an approved/licensed treatment facility, treated to remove/stabilise the contaminants then returned to the subject site or transported to an alternative facility for disposal.	As above. The costs involved in transporting of contaminated groundwater off-site for treatment and/or disposal would be expensive and likely not viable for this project.
Option 3 On-going Management & Monitoring	Measures to manage groundwater contamination may include: • Notifying appropriate government agencies, owners of subsurface facilities and any other appropriate parties of the presence of groundwater contamination; • Plume containment; • Active or passive clean-up of contaminated groundwater; • Ongoing monitoring of natural attenuation; • Implementing management or contingency plans to reduce risks; and • Restricting groundwater use in and down-gradient of the contaminated plume.	This option would require the implementation of a legally enforceable long-term environmental management plan (LTEMP). The implementation of an LTEMP is technically feasible, sustainable, economically viable and commensurate with the risks posed by the contaminants in the context of the proposed development. This option would likely be the preferred remediation approach.

5.3 Rationale for the Preferred Option for Remediation

The preferred soil remediation approach is Option 1 which includes on-site treatment of ACM and Option 4 which includes excavation and off-site disposal of the UST and the associated infrastructure including any backfill and ACM identified in other parts of the site surface. The preferred groundwater remediation approach (if required) is likely to be Option 3 which includes on-going management and monitoring.

The preferred options for remediation are considered to be appropriate on the basis that:

- The ACM impacts identified have been limited to the site surface;
- The potential hydrocarbon impacts associated with the UST and associated infrastructure are anticipated to be localised;
- The UST and associated infrastructure will be removed from site, removing a potential source of hydrocarbon impacts; and

- The strategies are sustainable, economically viable, commensurate with the level of risk posed by the contaminants and technically achievable to implement concurrently with the proposed development works.

6 REMEDIATION DETAILS

6.1 Roles and Responsibilities

Table 6-1: Roles and Responsibilities

Role	Responsibility
Client / Developer	Woolworths Group Limited Contact: Thomas Stock The client/developer is required to appoint the project team for the remediation and must provide all investigation reports including this RAP to the project manager, remediation contractor, consent authority and any other relevant parties involved in the project.
Project Manager	To be appointed. The project manager is required to review all documents prepared for the project and manage the implementation of the procedures outlined in this RAP. The project manager is to take reasonable steps so that the remediation contractor and others have understood the RAP and will implement it in its totality. The project manager will review the RAP and other documents and will update the parties involved of any changes to the development or remediation sequence (in consultation with the validation consultant).
Remediation Contractor	To be appointed. The remediation contractor is required to review all documents prepared for the project, apply for any relevant removal licences or permits and implement the remediation requirements outlined in this RAP. The remediation contractor may also be the construction contractor. The remediation contractor is required to collect all necessary documentation associated with the remediation activities and forward this documentation onto the client, project manager and validation consultant as they become available. The remediation contractor is required to advise the validation consultant at key points in the remediation and validation program, and implement various aspects of the validation plan assigned to them.
Validation Consultant	JKE – Subject to formal engagement Contact: Vittal Boggaram The validation consultant¹² provides consulting advice and validation services in relation to the remediation, and prepares the site validation report, and any other associated documentation such as the Asbestos Management Plan (AMP). The validation is required to review any deviation to this RAP or in the event of unexpected finds if and when encountered during the site work. It is recommended that the validation consultant has a Licensed Asbestos Assessor on staff. The validation consultant is required to liaise with the client, project manager and remediation contractor on all matters pertaining to the site contamination, remediation and validation, carry out the required site inspections during capping, and collect validation samples for imported materials.

¹² It is recommended that the consultant be a certified practitioner (specialising in site contamination), under one of the NSW EPA endorsed certification schemes

Role	Responsibility
Site Auditor	Louise Walkden (Ramboll Australia) The site auditor would review the information provided by the validation consultant, including (but not limited to) the site validation report. The auditor is to be engaged to review the RAP prior to commencement of the remediation. The developer, project manager and validation consultant are to consult with the auditor in the event of unexpected finds and/or deviations to the RAP.

6.2 Pre-commencement

The project team is to have a pre-commencement meeting to discuss the sequence of remediation, and the remediation and validation tasks. The site management plan for remediation works (see Section 9) should be reviewed by the project manager and remediation contractor, and appropriate steps are to be taken to ensure the adequate implementation of the plan.

6.3 Remediation and Associated Tasks

The following general sequence of works is anticipated:

- Preparation of Asbestos Management Plan (AMP) for the proposed development;
- Site establishment and demolition;
- **Hold Point** – A site inspection should be completed by the validation consultant on completion of demolition to identify any additional sources of contamination such as ACM, USTs etc. Any such areas identified should be targeted as part of the data gap investigation;
- Completion of the data gap investigation as outlined in Section 4;
- Completion of the HHRA for TRH/BTEX in groundwater, if required;
- Preparation of an amended RAP based on the data gap investigation and HHRA (if required);
- Remediation of ACM-impacted surficial areas;
- Decommissioning and removal of the USTs, backfill and associated infrastructure, followed by excavation and off-site disposal of soils associated with the tank pit and other impacted areas; and
- Remediation and/or management of contaminated groundwater.

Validation of the works would occur progressively throughout the remediation program.

Details in relation to the above are outlined in the following subsections:

6.3.1 Site Establishment and Demolition

The remediation contractor is to establish on site as required to facilitate the remediation. Consideration must be given to the work sequence and extent of remediation so that the site establishment (e.g. site sheds, fencing, access points etc) does not inhibit the remediation works.

Any hazardous building materials in the existing structures should be assessed prior to the commencement of demolition, demolished in accordance with the relevant codes and standards. A clearance certificate is to

be obtained by the demolition contractor following the removal of any hazardous materials. The concrete slabs should be inspected for potential ACM post-demolition by an Asbestos Assessor.

All waste from the demolition is to be disposed to facilities that are licenced by the NSW EPA to accept the waste. The demolition contractor is to maintain adequate records and retain all documentation for such activities including:

- A summary register including details such as waste disposal dates, waste materials descriptions, disposal locations (i.e. facility details) and reconciliation of this information with waste disposal docket numbers;
- Waste tracking records and transport certificates (where waste is required to be tracked/transported in accordance with the regulations); and
- Disposal dockets for the waste. Legible dockets are to be provided for all waste materials so they can be reconciled with the register.

The above information is to be supplied to the validation consultant for assessment and inclusion in the site validation report.

6.3.2 Asbestos Management Plan (AMP)

An AMP should be prepared for the site by a licensed asbestos assessor and implemented for the site remediation and development works. The AMP should include the minimum PPE, WHS and other requirements outlined in the documents published by Safe Work Australia, WorkCover Authority of NSW, National Occupational Health and Safety Commission, and other relevant authorities as applicable.

6.3.3 Remediation of ACM

The procedure for the remediation of ACM is outlined below:

Table 6-2: Remediation Details – ACM impacted areas

Step	Primary Role/Responsibility	Procedure
1.	Remediation contractor	A surface clearance should be undertaken by a SafeWork NSW licensed asbestos assessor across the entirety of the site. The clearance should be undertaken following demolition but prior to removal of the slabs and commencement of earthworks. Any identified ACM should be identified, recovered, weighed and its source location noted. The ACM should then be disposed of to an appropriate NSW EPA licensed facility (i.e. licensed to accept asbestos waste).
2.	Remediation contractor	<u>Remediation of surficial ACM:</u> • Engage a Class A/B licensed asbestos removal contractor for the remediation works. Undertake raking of the top 100mm of fill soil via multi-directional raking. The raking should be undertaken with a manual or mechanical rake capable of probing to the remediation depth of 100mmBGL. Raking should turn over and disturb the soil identified by the asbestos assessor to be impacted by ACM; • Raking should occur in a north-south direction, then an east-west direction, on a 1m transect across the site. A minimum of three passes is required, with zero fragments of ACM encountered on the last pass;

Step	Primary Role/Responsibility	Procedure
		- Raking in one direction (e.g. north-south) will be considered as one “pass” for the purpose of validation. Therefore, raking the impacted area along the north-south and east-west transects will be two passes; - During raking, any visible fragments of ACM should be picked and placed in a plastic bag. The bag should be sealed upon completion of remediation, “double-bagged” and placed in a nominated storage container; - The bagged ACM should be disposed of to an appropriate NSW EPA licensed waste facility (i.e. licensed to accept asbestos waste); - The removal of ACM should be completed in accordance with the Code of Practice; How to Manage and Control Asbestos in the Workplace (2019)¹³; and - All documents including landfill dockets should be retained and forwarded to the client and validation consultant for inclusion into the validation report.
3.	Validation consultant	- The raking and picking process will be documented and validated in accordance with Table 7-1; and - The impacted area treated by raking should be inspected and cleared by an asbestos assessor.

6.3.4 UST Remediation

The USTs and associated infrastructure (i.e. underground pipe work, vent pipes etc) are to be removed from the site in accordance with the Protection of the Environment Operations (Underground Petroleum Storage Systems) Regulation (2019)¹⁴, Guidelines for the Implementation of the Protection of the Environment Operations (Underground Petroleum Storage Systems) Regulation 2019 (2020)¹⁵ and the Australian Standard for The Removal and Disposal of Underground Petroleum Storage Tanks (AS4976-2008)¹⁶. Reference is also to be made to the UPSS Technical Note: Decommissioning, Abandonment and Removal of UPSS (2010)¹⁷ and the UPSS Technical Note: Site Validation Reporting (2010)¹⁸.

It is noted that various guidelines are outdated and/or are currently being updated to reflect the UPSS Regulation 2019. The remediation is to occur in accordance with the current regulation and best practice guidelines available when the remediation commences.

¹³ SafeWork NSW, (2019). *Code of Practice: How to Manage and Control Asbestos in the Workplace*

¹⁴ *Protection of the Environment Operations (Underground Petroleum Storage Systems) Regulation 2019* (NSW). (referred to as UPSS Regulation 2019)

¹⁵ NSW EPA, (2020). *Guidelines for the Implementation of the Protection of the Environment Operations (Underground Petroleum Storage Systems) Regulation 2019*. (referred to as UPSS Guidelines 2020)

¹⁶ Standards Australia, (2008). *The Removal and Disposal of Underground Petroleum Storage Tanks*. (referred to as AS4976-2008)

¹⁷ NSW DECCW, (2010). *UPSS Technical Note: Decommissioning, Abandonment and Removal of UPSS*

¹⁸ NSW DECCW, (2010). *UPSS Technical Note: Site Validation Reporting*

Table 6-3: Remediation – UST and Associated Infrastructure

Step	Primary Role/ Responsibility	Procedure
1.	Remediation contractor	<u>Address Stability Issues and Underground Services:</u> Geotechnical advice should be sought regarding the stability of the adjacent structures and/or adjacent areas prior to commencing remediation (as required). Stability issues should be addressed to the satisfaction of a suitably qualified geotechnical engineer. This may require the installation of temporary shoring. All underground services are to be appropriately disconnected or rerouted to facilitate the works.
2.	Remediation contractor (or their nominated sub-contractor) Validation consultant	<u>Additional Groundwater Screening:</u> A groundwater monitoring well should be installed as part of the data gap investigation in the vicinity of the UST to better assess the groundwater quality conditions. The groundwater should be sampled by the validation consultant and analysed for the contaminants of concern identified in the CSM in Section 3.2.
3.	Remediation contractor (or their nominated sub-contractor)	<u>Initial Preparation:</u> The pavement in the remediation area should be cut and removed with care using an excavator, or similar. An experienced contractor should be engaged for the removal of the UST. Liquid and/or sludge within the USTs and associated pipe work should be pumped out and disposed of lawfully by a licensed liquid waste operator.
4.	Remediation contractor (or their nominated sub-contractor) and validation consultant	<u>Removal of the USTs/infrastructure, impacted soils, followed by validation:</u> The UST and associated infrastructure is to be removed by an appropriately licensed contractor in accordance with AS4976-2008 and with regards to the Work Health and Safety Regulation (2017)¹⁹. Following removal, remediation of the area will be undertaken as follows: • The backfill soils (most likely to be sandy fill) surrounding the USTs should be excavated and stockpiled separately (all stockpiles should be placed on the adjacent hardstand with appropriate silt control). This material is to be validated by the validation consultant (for waste classification purposes) as outlined in Section 7.1; • Submit an application to dispose of the backfill soil (in accordance with the assigned waste classification) to a facility that is appropriately licensed to receive the waste, and obtain authorisation to dispose; • Load the backfill soil onto trucks and dispose in accordance with the assigned waste classification; • Depending on the contamination status of the backfill, excavation of additional material at the base and walls of the tank pits may be required. This should initially involve excavation of material to extend the pits (say 0.5m initially) in the direction of the suspected impact. The validation consultant should be present during the excavation to provide advice on the potential extent of contamination based on visual and olfactory indicators, and PID screening results; • Stockpile the excavated material separately (to the backfill that was initially excavated) and undertake a waste classification outlined above, then load the soil onto trucks and dispose in accordance with the assigned waste classification; • The validation consultant is to obtain validation samples from the walls and base of the excavation (see the Validation Plan in Section 7). Based on the findings of the ASI, groundwater may be encountered at the base of the remedial excavation;

¹⁹ Work Health and Safety Regulation 2017 (NSW). (Referred to as WHS regulation 2017)

Step	Primary Role/ Responsibility	Procedure
		- The groundwater seepage should be sampled and tested for contaminants (see Section 7). A liquid waste contractor should be engaged to pump out the seepage from the tank pit; and - Subject to successful validation, backfill or (preferably) isolate the remedial excavation. All documents including landfill disposal dockets, UST disposal/destruction dockets, liquid waste disposal etc. should be retained by the remediation contractor and forwarded to the client and validation consultant. This documentation forms a key part of the validation process and is to be included in the validation report.
5.	Validation consultant	Validation sampling of the tank pit, waste classification sampling of stockpiled backfill and any groundwater seepage as outlined in Section 7. Review of documentation issued by the remediation contractor and inclusion into validation report.

The detailed validation plan relevant to the above items is provided in Section 7.

6.4 Remediation of Contaminated Groundwater

The procedure for the remediation of contaminated groundwater is outlined below:

Table 6-4: Remediation – Contaminated Groundwater

Step	Primary Role/ Responsibility	Procedure
1.	Validation Consultant	<u>Identify the Extent of Contamination:</u> Additional testing of groundwater will be required in order to confirm the extent of groundwater contamination. The additional testing will be undertaken as part of the data gap investigation, as discussed in Section 4.
2.	Validation Consultant (and risk assessor, as required)	<u>Assessment of Remediation Options:</u> Based on the findings of the additional investigation, a HHRA may be prepared to better assess the risks posed by the contamination, and identify appropriate remediation options (if required). Potential remediation approaches are outlined in Section 5.2, however the data gap investigation and HHRA will refine the remediation approach. An amended RAP will be prepared to outline the remediation and/or management approach for contaminated groundwater.
3.	Remediation contractor (or their nominated sub-contractor)	<u>Implementation of the amended RAP:</u> The remediation contractor is responsible for completing the remediation in accordance with the conditions and requirements specified in the amended RAP.
4.	Validation consultant	Validation sampling of the groundwater, as outlined in the amended RAP. Review of documentation issued by the remediation contractor and inclusion into validation report. Preparation of a LTEMP for the management of groundwater if required.

6.5 Remediation Documentation

The remediation contractor must retain all documentation associated with the remediation, including but not limited to:

- Waste register (see below);
- Asbestos management documentation, including all relevant notifications and monitoring reports;
- Photographs of remediation works;
- Waste tracking documentation (where applicable);
- Survey information; and
- Imported materials documentation from suppliers, including any routine analysis reports, product specifications and dockets for imported materials.

Copies of these documents must be forwarded to the project manager and the validation consultant on completion of the remediation for inclusion in the validation report.

6.5.1 Waste Register

All waste removed from the site is to be appropriately tracked and managed in accordance with the relevant regulations. The remediation contractor (and/or their nominated construction contractor) is to maintain adequate records and retain all documentation for waste disposal activities including:

- A summary register including details such as waste disposal dates, waste materials descriptions, disposal locations (i.e. facility details) and reconciliation of this information with waste disposal docket numbers; and
- Waste tracking records and transport certificates (where waste is required to be tracked/transported in accordance with the regulations); and
- Disposal dockets for the waste. Legible dockets are to be provided for all waste materials so they can be reconciled with the register.

Any soil waste classification documentation is to be prepared in accordance with the reporting requirements specified by the NSW EPA. Reports are to include:

- The full name, address, Australian Company Number (ACN) or Australian Business Number (ABN) of the organisation and person(s) providing the waste classification;
- Location of the site where the waste was generated, including the source site address;
- History of the material and the processes and activities that have taken place to produce the waste;
- Potential contaminating activities that may have occurred at the site where the waste was generated;
- Description of the waste, including photographs, visible signs of contamination, such as discolouration, staining, odours, etc;
- Quantity of the waste;
- Number of samples collected and analysed;
- Sampling method including pattern, depth, locations, sampling devices, procedures, and photos of the sample locations and samples;
- Contaminants tested;
- Laboratory documentation – chain-of-custody (COC), sample receipt, laboratory report;

- All results regardless of whether they are not used in the classification process;
- Results of sample mean, sample standard deviation and the 95% upper confidence limit (UCL) where relevant;
- Brief summary of findings including discussion of results; and
- A clear statement of the classification of the waste as at the time of the report.

A soil volume analysis should be undertaken on completion of remediation and reconciled with the quantities shown on the soil disposal dockets. This information is to be reviewed by the validation consultant on completion of the works and an assessment of the quantities of soil disposed off-site (e.g. comparison with the estimated and actual volumes) is to be included in the validation report. A review of the disposal facility's licence issued under the Protection of the Environment Operations (POEO) Act (1997)²⁰ should also be undertaken to assess whether the facility is appropriately licensed to receive the waste.

6.5.2 Imported Materials Register

The remediation contractor (and/or their nominated construction contractor) is to maintain for the duration of the project an imported material register. This must include a register (preferably in Microsoft Excel format) with details of each imported material type, supplier details, summary record of where the imported materials were placed on site, and importation docket numbers and a tally of quantities (separated for each import stream). Legible dockets for imported materials are to be provided electronically so these can be reconciled with the register.

The above information is to be provided to the validation consultant for inclusion in the validation report. It is recommended that the register be set up at the beginning of the project and provided to the validation consultant regularly (say on a monthly or two-monthly basis) so the details can be checked and any rectification of the record keeping process can occur in a timely manner.

²⁰NSW Government, (1997)). *Protection of Environment Operations Act*. (referred to as POEO Act 1997)

7 VALIDATION PLAN

Validation is necessary to demonstrate that remedial measures described in the RAP have been successful and that the site is suitable for the intended land use. The sampling program for the validation is outlined in Section 7.1. This is the minimum requirement based on the remedial strategies provided. Additional validation sampling may be required based on observations made during remediation or in the event of an unexpected find.

7.1 Validation Sampling and Documentation

The table below outlines the validation requirements for the site:

Table 7-1: Validation Requirements

Aspect	Sampling	Analysis	Observations and Documentation
Surficial ACM			
Surface ACM	Bulk sample (10L field screening) of one sample per 20m x 20m grid for ACM. Sampling will be confined to the ACM impacted areas identified by the asbestos assessor. The aim of the sampling is to demonstrate that the ACM has not impacted the underlying fill soil.	Bulk asbestos quantification in field i.e. sieving of 10L sample. Analysis of representative fill soil sample for asbestos quantification (500mL).	Field records to be maintained documenting the following: • Surface clearance inspection results showing impacted areas requiring raking; • The number of raked passes and the number of ACM fragments identified during each pass (clearly showing at least three passes were completed, and two consecutive passes, perpendicular to each other, occurred with no ACM encountered); • Presence/absence of ACM; and • Photographic log of remediation and clearances to be maintained. Disposal dockets to be retained and forwarded to validation consultant for inclusion in the validation report. Asbestos assessor surface clearance certificate/s (for ACM) to be provided following completion of raking.
UST, Associated Infrastructure and impacted Soils/Bedrock			
UST backfill	One sample per 25m³, collected using hand equipment.	Heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc), TRHs, BTEX, PAHs and asbestos. TCLP testing may be required for waste classification.	Samples to be screened using photo-ionisation detection (PID) meter. Observations of staining and odour to be recorded. Photographs to be taken. Disposal dockets to be retained.

Aspect	Sampling	Analysis	Observations and Documentation
UST pit chase out spoil (if required)	One sample per 25m ³ , collected using hand equipment.	As above. Other analytes to be considered based on remediation failures.	As above.
UST pit – excavation base UST pit – excavation walls	Minimum of two samples per UST to be collected using the excavator after removal of the tank. One sample per excavation wall and per vertical metre. Additional sampling is also to target obvious indicators of contamination and changes in soil profile.	Lead, TRH/BTEXN	Samples to be screened using PID. Observations of staining and odour to be recorded. Photographs to be taken.
Pipe trenches	One sample per 5m lineal, obtained from the base of the trench. Additional samples to target any areas of staining or odours.	As above.	As above.
UST Bowser	One sample from the base of the bowser. Additional samples to target any areas of staining or odours.	As above.	As above.
Groundwater			
Groundwater	To be determined based on the amended RAP.	To be determined based on the amended RAP.	To be determined based on the amended RAP.
Imported Materials – validation of imported materials is required for any materials imported onto the site during the remediation and to the point in time that the site validation report is prepared (e.g. general fill to raise the site levels or reinstate remedial excavations, imported materials to create piling platform, gravels for site preparation, material used for capping layers etc).			
Imported VENM backfill (if required)	Minimum of three samples per source	Heavy metals (as above), TRHs, BTEX, PAHs, OCPs, PCBs and asbestos (500ml). Additional analysis may be required depending on the site history	Remediation contractor to supply existing VENM documentation/report (report to be prepared in accordance with the NSW EPA waste classification reporting requirements).

Aspect	Sampling	Analysis	Observations and Documentation
Imported garden mix/topsoil and mulches	Minimum of three samples per source	of the source property. Analysis for CoPC outlined above.	A hold point remains until the validation consultant approves the material for importation or advises on the next steps. Material is to be inspected upon importation by the validation consultant and samples obtained for analysis. Material to be inspected during sampling to confirm it is free of visible/olfactory indicators of contamination and is consistent with documentation. Photographic documentation and an inspection log are to be maintained. Where check sampling occurs by the validation consultant due to deficiencies or irregularities in existing VENM documentation, the following is required: - Date of sampling and description of material sampled; - An estimate of the volume of material imported at the time of sampling; - Sample location plan; and - Analytical reports and tabulated results with comparison to the Validation Assessment Criteria (VAC).
Imported engineering materials such as recycled aggregate, road base etc or Excavated Natural Material (ENM)	Minimum of three samples per source/material type. Additional testing may be required for ENM to meet the specification within the ENM Order.	Heavy metals (as above), TRHs, BTEX, PAHs, OCPs, PCBs and asbestos (500ml quantification). Additional testing may be required for ENM (e.g. foreign materials, pH and electrical conductivity) depending on available documentation.	Remediation contractor to provide product specification and documentation to confirm the material has been classified with reference to a relevant Resource Recovery Order/Exemption. A hold point remains until the validation consultant approves the material for importation or advises on the next steps. Review of the facility's Environment Protection Licence (EPL). Material is to be inspected by the validation consultant upon importation to confirm it is free of visible/olfactory indicators of contamination and is consistent with documentation. Where check sampling occurs by the validation consultant due to deficiencies or irregularities in existing documentation, the following is required: - Date of sampling and description of material sampled; - An estimate of the volume of material imported at the time of sampling; - Sample location plan; and

Aspect	Sampling	Analysis	Observations and Documentation
			- Analytical reports and tabulated results with comparison to the VAC.
Imported engineering materials comprising only natural quarried products.	At the validation consultant's discretion based on robustness of supplier documentation.	At the validation consultant's discretion based on robustness of supplier documentation.	Remediation contractor to provide documentation from the supplier confirming the material is a product comprising only VENM (i.e. natural quarried product). A hold point remains until the validation consultant approves the material for importation or advises on the next steps. Review of the quarry's EPL. Material is to be inspected by the validation consultant upon importation to confirm it is free of anthropogenic materials, visible and olfactory indicators of contamination, and is consistent with documentation. Where check sampling occurs by the validation consultant due to deficiencies or irregularities in existing documentation, the following is required: - Date of sampling and description of material sampled; - An estimate of the volume of material imported at the time of sampling; - Sample location plan; and - Analytical reports and tabulated results with comparison to the VAC.

7.2 Validation Assessment Criteria and Data Assessment

The VAC to be adopted for the validation assessment are outlined in the table below:

Table 7-2: VAC

Validation Aspect	VAC
Soil validation	<u>Areas Impacted by ACM:</u> - Asbestos/ACM absent in the top 100mm of fill following at least three passes, with the final two passes (perpendicular to each other) demonstrating no ACM; - ACM visually absent in 10L screened soil validation sample; and - ACM not observed during surface clearance. <u>UST/infrastructure:</u> - TRH/BTEX = HSLs for commercial/industrial land use; - Lead = HIL for commercial/industrial land use; and - Free of staining and odours The presence of odours or exceedances of the VAC may compromise the VENM classification. However, from a risk perspective in the context of the proposed land use, such traces are unlikely to result in an unacceptable risk to future site users. In the event that persistent traces of TRH/BTEXN are reported above the VAC, these concentrations can be assessed in the context of human health risks, in accordance with Schedule B1 of NEPM (2013) and an alternative classification (other than VENM) would need to be pursued for this material if it is to be disposed off-site.
Waste classification (backfill/chase out soils associated with remediation of USTs, and supplementary waste classification of fill)	In accordance with the procedures and criteria outlined in Part 1 of the Waste Classification Guidelines 2014 and any other exemptions/approvals as required.
Groundwater validation criteria	Groundwater data will be compared to relevant Tier 1 screening criteria in accordance with NEPM (2013), following an assessment of environmental values in accordance with the Guidelines for the Assessment and Management of Groundwater Contamination (2007). Environmental values include aquatic ecosystems, and human-health risks in non-use scenarios. The following validation criteria will be used: - HSLs for a 'commercial/industrial' exposure scenario (HSL-D). HSLs calculated based on the soil type and the observed depth to groundwater; - Site-specific assessment (SSA) for the Tier 1 screening of human health risks posed by volatile contaminants in groundwater; and - Groundwater Investigation Levels (GILs) for 95% protection of freshwater species were adopted based on the Default Guideline Values in the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2018).
Imported materials	Material imported as general fill must only be VENM or ENM. VENM is defined in the POEO Act 1997 as material: - That has been excavated or quarried from areas that are not contaminated with manufactured chemicals, or with process residues, as a result of industrial, commercial mining or agricultural activities; - That does not contain sulfidic ores or other waste; and - Includes excavated natural material that meets such criteria for virgin excavated natural material as may be approved from time to time by a notice published in the NSW Government Gazette.

Validation Aspect	VAC
	ENM and recycled materials are to meet the criteria of the relevant exemption/order under which they are produced. Analytical results for VENM and other imported materials will need to be consistent with expectations for those materials. For VENM, it is expected that: - Heavy metal concentrations are to be less than the most conservative Added Contaminant Limit (ACL) concentrations for an urban residential and public open space (URPOS) exposure setting presented in Schedule B1 of the NEPM 2013; and - Organic compounds are to be less than the laboratory PQLs and asbestos to be absent. All materials imported onto the site must also be adequately assessed as being appropriate for the final use of the site, including ecological considerations. A risk-based assessment approach is to be adopted with regards to the tier 1 screening criteria presented in Schedule B1 of NEPM 2013. Aesthetics: all imported materials are to be free of staining and odours.

Data should initially be assessed as above or below the VAC. Statistical analysis may be applied if deemed appropriate by the validation consultant and undertaken in accordance with the NEPM 2013.

7.3 Validation Sampling, Analysis and Quality Plan (SAQP)

Appropriate QA/QC samples should be obtained during the validation (where applicable) and analysed for the same suite of contaminants as the primary samples. As a minimum, QA/QC sampling should include duplicates (5% inter-laboratory and 5% intra-laboratory), trip spikes and trip blanks. Rinsate samples should be obtained if re-usable sampling equipment is utilised.

Data Quality Objectives (DQOs) and Data Quality Indicators (DQIs) should be clearly outlined and assessed as part of the validation process. A framework for the DQO and DQI process is outlined below and should be reflected in the validation report.

DQOs have been broadly established for the validation with regards to the seven-step process outlined NEPM (2013). The seven steps include the following which are detailed further in the following subsections:

- State the problem;
- Identify the decisions/goal of the study;
- Identify information inputs;
- Define the study boundary;
- Develop the analytical approach/decision rule;
- Specify the performance/acceptance criteria; and
- Optimise the design for obtaining the data.

DQIs are to be assessed based on field and laboratory considerations for precision, accuracy, representativeness, completeness and comparability.

7.3.1 Step 1 - State the Problem

Validation data is required to demonstrate that the remediation is successful and that the site is suitable for the proposed land use described in Section 1.1.

7.3.2 Step 2 - Identify the Decisions of the Study

The remediation goal, aims and objectives are defined in Section 1.2. The decisions to be made reflect these objectives and are as follows:

- Was the remediation undertaken in accordance with the RAP?
- If there were any deviations, what were these and how do they impact the outcome of the validation?
- Are any of the validation results above the VAC?
- Is the site suitable for the proposed development from a contamination viewpoint?

7.3.3 Step 3 - Identify Information Inputs

The primary information inputs required to address the decisions outlined in Step 2 include the following:

- Existing relevant data from previous reports;
- Site information, including site observations, inspections, survey information, as-built drawings, waste and imported materials registers;
- Validation sampling of imported materials; and
- Field and laboratory QA/QC data.

7.3.4 Step 4 - Define the Study Boundary

The remediation and validation will be confined to the site boundaries as shown in Figure 2 in Appendix A and will be limited vertically to the surficial soils (approximately 100mm) for the remediation and validation of ACM impacts. The validation will guide the horizontal and vertical extent of the remediation associated with the UST, though it is anticipated to be approximately 2m to 3m deep.

The supplementary waste classification will be confined to the site boundaries as shown in Figure 2 in Appendix A and will be limited vertically to the base of the fill, anticipated to range from 0.2mBGL to 3.6mBGL.

The data gap investigation and HHRA, as discussed in Section 4, will guide the remediation extent of groundwater, if required.

7.3.5 Step 5 - Develop an Analytical Approach (or Decision Rule)

7.3.5.1 VAC

The validation data will be assessed in accordance with the requirements outlined in Section 7.2.

7.3.5.2 Field and Laboratory QA/QC

Field QA/QC is to include analysis of inter-laboratory duplicates (5% frequency), intra-laboratory duplicates (5% frequency), trip spike, trip blank and rinsate samples (one each for the assessment to demonstrate adequacy of standard sampling/handling procedures). Field QA/QC samples are to be analysed for the contaminants of concern, except asbestos. The trip spike will only be analysed for BTEX as BTEX will be considered a surrogate to assess potential loss of volatiles from TRH (F2).

DQIs for field and laboratory QA/QC samples are defined below:

Field Duplicates

Acceptable targets for precision of field duplicates will be 30% or less, consistent with NEPM (2013). RPD failures will be considered qualitatively on a case-by-case basis taking into account factors such as the concentrations used to calculate the RPD (i.e. RPD exceedance where concentrations are close to the PQL are typically not as significant as those where concentrations are reported at least five or 10 times the PQL), sample type, collection methods and the specific analyte where the RPD exceedance was reported.

Trip Blanks

Acceptable targets for trip blank samples will be less than the PQL for organic analytes. Metals will be considered on a case-by-case basis with regards to the reference material used as the blank medium.

Trip Spikes

Acceptable targets for trip spike samples will be 70% to 130%.

Laboratory QA/QC

The suitability of the laboratory data will be assessed against the laboratory QA/QC criteria. These criteria are developed and implemented in accordance with the laboratory's NATA accreditation and align with the acceptable limits for QA/QC samples as outlined in NEPM (2013) and other relevant guidelines.

A summary of the typical limits is provided below:

RPDs

- Results that are <5 times the PQL, any RPD is acceptable; and
- Results >5 times the PQL, RPDs between 0-50% are acceptable.

Laboratory Control Samples (LCS) and Matrix Spikes

- 70-130% recovery acceptable for metals and inorganics; and
- 60-140% recovery acceptable for organics.

Surrogate Spikes

- 60-140% recovery acceptable for general organics.

Method Blanks

- All results less than PQL.

In the event that acceptable limits are not met by the laboratory analysis, other lines of evidence will be reviewed (e.g. field observations of samples, preservation, handling etc) and, where required, consultation with the laboratory is to be undertaken in an effort to establish the cause of the non-conformance. Where uncertainty exists, the validation consultant is to adopt the most conservative concentration reported.

7.3.5.3 Appropriateness of PQLs

The PQLs of the analytical methods are to be considered in relation to the VAC to confirm that the PQLs are less than the VAC. In cases where the PQLs are greater than the VAC, a discussion of this is to be provided.

7.3.6 Step 6 – Specify Limits on Decision Errors

To limit the potential for decision errors, a range of quality assurance processes are adopted. A quantitative assessment of the potential for false positives and false negatives in the analytical results is to be undertaken with reference to Schedule B(3) of NEPM (2013) using the data quality assurance information collected.

7.3.7 Step 7 - Optimise the Design for Obtaining Data

The design is to be optimised via the collection of validation data to demonstrate the success of the key aspects of the remediation. Data collection will be via various methods including inspections and sampling.

7.3.8 Sampling Plan

The proposed sampling plan for the validation of imported materials is described in Section 7.1.

7.4 Validation Report and LTEMP

As part of the site validation process, a validation report will be prepared by the validation consultant. The report will present the results of the validation assessment and will be prepared in accordance with the Consultants Reporting Guidelines.

Based on the preferred remediation strategy, a long-term environmental management plan (LTEMP) may be required for the management of groundwater impacted by TRH/BTEX. This will be assessed based on the results of the data gap investigation and HHRA.

8 CONTINGENCY PLAN

A review of the proposed remediation works has indicated that the greatest risks that may affect the success of the remediation include unexpected finds. A contingency plan for the remediation is provided below:

8.1 Unexpected Finds

Residual hazards that may exist at the site would generally be expected to be detectable through visual or olfactory means. The procedure to be followed in the event of an unexpected find is presented below:

- In the event of an unexpected find, all work in the immediate vicinity should cease and the remediation contractor should contact the validation consultant and the project manager;
- Temporary barricades should be erected to isolate the area from access to workers;
- The validation consultant is to attend the site, adequately characterise the contamination and provide advice in relation to site management and remediation. In the event that remediation differs from the procedures outlined in this RAP, an addendum RAP or RWP must be prepared in consultation with the project stakeholders and submitted to the site auditor and consent authority; and
- Contamination should be remediated and validated in accordance with the advice provided, and the results should be included in the validation report.

8.2 Importation Failure for VENM or other Imported Materials

Where material to be imported onto the site does not meet the importation VAC detailed in Section 7.2, the material should not be imported. Alternative material must be sourced that meets the importation requirements.

8.3 Contingency for Failure of Remediation Strategy

8.3.1 Repeated ACM Remediation Failures

In the unexpected event that repeated failures of ACM remediation occur, or areas of considerable impact are identified, an amended remediation strategy, including excavation and off-site disposal, will be required. The process is outlined in the following table:

Table 8-1: Remediation – Repeated ACM Failures

Step	Primary Role/Responsibility	Procedure
1.	Remediation contractor (or their nominated sub-contractor)	<u>Removal of contaminated fill:</u> Excavation of the remediation area will be undertaken as follows: • Submit an application to dispose the fill (in accordance with the assigned waste classification) to a landfill licensed by the NSW EPA to receive the waste and obtain authorisation to dispose; • A water system will need to be in place to spray the excavated soil during excavation/ remediation works and to decontaminate trucks entering the work area. The general site area should be kept damp during remediation works to minimise the generation of dust; • The remediation area should be excavated to the lateral extent of the grid (i.e. 20m x 20m) to a depth of 100mm below the surface;

Step	Primary Role/Responsibility	Procedure
		- Load the contaminated fill onto trucks and dispose in accordance with the assigned waste classification, noting the inclusion of special waste (asbestos waste), to an appropriately licensed landfill facility; - A clearance certificate is to be issued by a licensed asbestos assessor; and - All documents including landfill dockets should be retained and forwarded to the client and validation consultant for inclusion into the validation report.
2.	Remediation contractor (or their nominated sub-contractor) and validation consultant	<u>Validation of Excavation Base:</u> - Once the contaminated fill is removed, the base of the excavation should be validated (by the validation consultant) in accordance with Section 7.1.; and - If the validation fails, the contaminated area should be chased out until the validation is successful. <u>Validation of Excavation walls:</u> Once the contaminated fill is removed, the walls of the resulting excavation should be validated (by the validation consultant), as follows: - One bulk (10L) sample per 10m lineal wall length, per wall, sieved in the field for asbestos quantification. This is to be done by the validation consultant; - One 500mL sample per 10m lineal wall length, per wall, for laboratory quantification of asbestos; and - If the validation fails, the contaminated area should be chased out in the direction of the validation failure until the validation is successful. If persistent ACM impacts are identified, these concentrations can be assessed in the context of human health risks, in accordance with Schedule B1 of NEPM (2013).

8.3.2 Hydrocarbon Impacted Soil Remaining On-site

In the unexpected event that 'pockets' of hydrocarbon impacted soil/bedrock cannot be excavated and disposed off-site, this material must be validated to assess its suitability to remain on-site and the potential risks posed by this soil in the context of the future land use.

In the event that the soils present a potentially unacceptable risk, there may be a need to implement a 'cap and contain' strategy or other mitigation measures. The strategy would need to be documented in an addendum RAP and submitted to the auditor and consent authority. It is noted that this would result in a long-term EMP for the site to manage the contamination.

Alternatively, a site-specific human health risk assessment could be considered to establish whether the risks warrant long-term management via an EMP.

8.3.3 Contaminated Groundwater Remaining Beneath the Site

In the unexpected event that contaminated groundwater remains beneath the site, additional mitigation and/or management measures may be required. The initial response should include undertaking a HHRA to account for the additional data and refine the risk-based scenarios. Additional investigation, such as soil vapour, may be necessary for the refinement of the HHRA, and should be discussed with the risk assessor at the outset.



A remediation works plan (RWP) will be prepared (if required) based on the findings of the additional HHRA. It is noted that the RWP would form part of the overall remedial strategy and must be approved by the site auditor/consent authority.

In the event the contamination does not pose an unacceptable risk, a LTEMP or Groundwater Management Plan (GMP) will be prepared for the site.

9 SITE MANAGEMENT PLAN FOR REMEDIATION WORKS

The information outlined in this section of the RAP is for the remediation work only. The client should make reference to the development consent for specific site management requirements for the overall development of the site.

9.1 Asbestos Management Plan (AMP)

Prior to the commencement of any works in the remediation areas, an AMP is to be prepared by the validation consultant to document the asbestos-related management requirements for the remediation. The AMP is to be implemented by the remediation contractor (and their nominated subcontractors where relevant) throughout the remediation.

9.2 Project Contacts

Emergency procedures and contact telephone numbers should be displayed in a prominent position at the site entrance gate and within the main site working areas. The available contact details are summarised in the following table:

Table 9-1: Project Contacts

Role	Company	Contact Details
Client/developer	Woolworths Group Pty Limited	Thomas Stock tstock@woolworths.com.au
Project Manager	To be appointed	-
Remediation Contractor	To be appointed	-
Validation Consultant	JKE – subject to formal engagement	Vittal Boggaram vboggaram@jkenvironments.com.au 02 9888 5000
Certifier	To be appointed	-
NSW EPA	Pollution Line	131 555
NSW EPA Site Auditor	Louise Walkden (Ramboll Australia)	Louise Walkden lwalkden@ramboll.com
Emergency Services	Ambulance, Police, Fire	000

9.3 Security

Appropriate fencing should be installed as required to secure the site. Warning signs should be erected, which outline the personal protective equipment (PPE) required for remediation work.

9.4 Timing and Sequencing of Remediation Works

The anticipated sequence of remediation works is outlined in Section 6.3. Remediation will occur concurrently with the development works as the built form of the development and the landscaping forms part of the capping requirements.

9.5 Site Soil and Water Management Plan

The remediation contractor should prepare a detailed soil and water management plan prior to the commencement of site works and this should consider the requirements of the AMP. Silt fences should be used to control the surface water runoff at all appropriate locations of the site and appropriate measures are to be implemented to manage soil/water disturbance to the satisfaction of the regulator/determining authority. Reference should be made to the consent conditions for further details.

All stockpiled materials should be placed within an erosion containment boundary with silt fences and sandbags employed to limit sediment movement. The containment area should be located away from drainage lines/low-points, gutters, stormwater pits and inlets and the site boundary. No liquid waste or runoff should be discharged to the stormwater or sewerage system without the approval of the appropriate authorities.

9.6 Noise and Vibration Control Plan

The guidelines for minimisation of noise on construction sites outlined in AS-2460 (2002)²¹ should be adopted. Other measures specified in the consent conditions should also be complied with. Noise producing machinery and equipment should only be operated between the hours approved by the determining authority (refer to consent documents).

All practicable measures should be taken to reduce the generation of noise and vibration to within acceptable limits. In the event that short-term noisy operations are necessary, and where these are likely to affect residences, notifications should be provided to the relevant authorities and the residents by the project manager, specifying the expected duration of the noisy works.

9.7 Dust Control Plan

All practicable measures should be taken to reduce dust emanating from the site. Factors that contribute to dust production are:

- Wind over a cleared surface;
- Wind over stockpiled material; and
- Movement of machinery in unpaved areas.

Visible dust should not be present at the site boundary. Measures to minimise the potential for dust generation include:

²¹ Australian Standard, (2002). *AS2460: Acoustics - Measurement of the Reverberation Time in Rooms*.

- Use of water sprays on unsealed or exposed soil surfaces;
- Covering of stockpiled materials and excavation faces (particularly during periods of site inactivity and/or during windy conditions) or alternatively the erection of hessian fences around stockpiled soil or large exposed areas of soil;
- Establishment of dust screens consisting of a 2m high shade cloth or similar material secured to a chain wire fence;
- Maintenance of dust control measures to keep the facilities in good operating condition;
- Stopping work during strong winds;
- Loading or unloading of dry soil as close as possible to stockpiles to prevent spreading of loose material around the development area; and
- Geofabric/geotextile could be placed over exposed soils in the event that excavation is staged.

If stockpiles are to remain on-site or soil remains exposed for a period of longer than several days, dust monitoring should be undertaken at the site. If excessive dust is generated all site activities should cease until either wind conditions are more acceptable or a revised method of excavation/remediation is developed. Reference is also to be made to the AMP in this regard.

Dust is also produced during the transfer of material to and from the site. All material should be covered during transport and should be properly disposed of on delivery. No material is to be left in an exposed, un-monitored condition.

All equipment and machinery should be brushed or washed down before leaving the site to limit dust and sediment movement off-site. In the event of prolonged rain and lack of paved areas all vehicles should be washed down prior to exit from the site, and any soil or dirt on the wheels of the vehicles removed. Water used to clean the vehicles should be collected and tested prior to appropriate disposal under the relevant waste classification guidelines.

9.8 Dewatering

Temporary dewatering may be required as part of the remediation works. The additional groundwater monitoring will provide additional information relating to the depth to groundwater in relation to bulk excavation levels. Based on the information presented in the ASI, minor treatment of seepage water may be required during the development. The seepage water should be managed appropriately on site in accordance with the remediation contractor's soil and water management plan, and the validation plan in Section 7. This water should not be pumped to stormwater or sewer unless a prior application is made and this is approved by the relevant authorities.

9.9 Air Monitoring

Reference is to be made to the AMP for details regarding asbestos air fibre monitoring. Air monitoring must only be carried out by personnel registered and accredited by NATA (National Association of Testing Authorities). Filter analysis must only be carried out within a NATA certified laboratory. The monitoring

results must conform to the requirements of the NOHSC Guidance note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres 2nd Edition [NOHSC:3003 (2005)].

A monitoring program will be used to assess whether the control procedures being applied are satisfactory and that criteria for airborne asbestos fibre levels are not being exceeded. The following levels will be used as action criteria during the air monitoring:

- <0.01 Fibres/ml: Work procedures deemed to be successful;
- 0.01 to 0.02 Fibres/ml: Inspection of the site and review of procedures; and
- >0.02 Fibres/ml: Stop work, inspection of the site, review of procedures, clean-up, rectification works where required and notify the relevant regulator.

9.10 Odour Control Plan

All activities undertaken at the site should be completed in a manner that minimises emissions of smoke, fumes and vapour into the atmosphere and any odours arising from the works or stockpiled material should be controlled. Control measures may include:

- Maintenance of construction equipment so that exhaust emissions comply with the Clean Air Regulations issued under the POEO Act 1997;
- Demolition materials and other combustible waste should not be burnt on site;
- The spraying of a suitable proprietary product to suppress any odours that may be generated by excavated materials; and
- Use of protective covers (e.g. builder's plastic).

All practicable measures should be taken to reduce fugitive emissions emanating from the site so that associated odours do not constitute a nuisance and that the ambient air quality is not adversely impacted.

The following odour management plan should be implemented to limit the exposure of site personnel and surrounding residents to unpleasant odours:

- Excavation and stockpiling of material should be scheduled during periods with low winds if possible;
- A suitable proprietary product could be sprayed on material during excavation and following stockpiling to reduce odours (subject to an appropriate assessment of the product by the validation consultant);
- All complaints from workers and neighbours should be logged and a response provided. Work should be rescheduled as necessary to minimise odour problems;
- The site foreman should consider the following odour control measures:
 - reduce the exposed surface of the odorous materials;
 - time excavation activities to reduce off-site nuisance (particularly during strong winds); and
 - cover exposed excavation faces overnight or during periods of low excavation activity.
- If continued complaints are received, alternative odour management strategies should be considered and implemented.

9.11 Work Health and Safety (WHS) Plan

A site specific WHS plan should be prepared by the remediation contractor for all work to be undertaken at the site. The WHS plan should meet all the requirements outlined in SafeWork NSW WHS regulations.

As a minimum requirement, personnel must wear appropriate protective clothing, including long sleeve shirts, long trousers, steel cap boots and hard hats. Additional asbestos-related PPE will be required and this will be specified in the AMP. Washroom and lunchroom facilities should also be provided to allow workers to remove potential contamination from their hands and clothing prior to eating or drinking.

9.12 Waste Management

Prior to commencement of remedial works and excavation for the proposed development, the remediation contractor should develop a waste management or recycling plan to minimise the amount of waste produced by the site. Consideration should be given to re-use material wherever possible.

9.13 Incident Management Contingency

The validation consultant should be contacted if any unexpected conditions are encountered at the site. This should enable the scope of remedial/validation works to be adjusted as required. Similarly, if any incident occurs at the site, the validation consultant should be advised to assess potential impacts on contamination conditions and the remediation/validation timetable.

9.14 Hours of Operation

Hours of operation should be between those approved by the determining authority under the development approval process.

9.15 Community Consultation and Complaints

The remediation contractor should provide details for managing community consultation and complaints within their construction environment management plan (CEMP).

10 CONCLUSIONS

Previous investigations by JKE have identified surficial ACM. The source of the asbestos is considered likely to be associated with demolition of former structures, and to a lesser extent, impacted fill historically imported to the site. The previous investigations also identified at least one UST and associated infrastructure on-site. The investigations concluded the potential for extensive impacts from hydrocarbons associated with the UST/s and infrastructure was low. However, localised impacts may be encountered in the vicinity of the UST/s and associated infrastructure. The UST/s and infrastructure will be removed during the remediation process, and the residual risks assessed by the validation process.

The groundwater has been impacted by heavy metals, BTEX and TRH. The heavy metal impacts were considered likely a regional/background issue. Further investigation is required to assess the potential risks associated with BTEX and TRH in groundwater.

The remediation strategy for soil includes the on-site treatment of ACM and off-site disposal of the UST/s, UST backfill and associated infrastructure. The remediation strategy for groundwater will likely involve ongoing monitoring and management, though this will be determined based on the findings of the further investigation and HHRA.

The remediation methods outlined in the RAP are assessed to be sustainable, economically viable, commensurate with the level of risk posed by the contaminants and technically achievable to implement concurrently with the proposed development works. On this basis, JKE are of the opinion that the site can be made suitable for the proposed development provided this RAP (and any addendums or revisions) and any requirements under a RWP is implemented should a RWP be prepared.

A site validation report is to be prepared on completion of remediation activities and submitted to the determining authority to demonstrate that the site is suitable for the proposed development. Any LTEMP or GMP prepared for the site will require appropriate public notification.

The RAP has met the objectives outlined in Section 1.2.

10.1 Regulatory Requirements

The regulatory requirements applicable for the remediation are discussed in the following table:

Table 10-1: Regulatory Requirement

Guideline / Legislation / Policy	Applicability
SEPP55	Prior notice of Category 2 remediation work is to be provided in accordance with Clause 16 of SEPP55. Under Clause 17 of SEPP55, a notice of completion of remediation work is to be given to council within 30 days of completion of the work. The notice of completion of remediation works must be in accordance with Clause 18 of SEPP55.
POEO Act 1997	Section 143 of the POEO Act 1997 states that if waste is transported to a place that cannot lawfully be used as a waste facility for that waste, then the transporter and owner of the waste are each guilty of an offence. The transporter and owner of the waste have a duty to ensure that the waste is disposed of in an appropriate manner. Appropriate waste tracking is required for all waste that is disposed off-site. Activities should be carried out in a manner which does not result in the pollution of waters.
POEO (Waste) Regulation 2014	Part 7 of the POEO Waste Regulation 2014 set outs the requirements for the transportation and management of asbestos waste and Clause 79 of the POEO Waste Regulation requires waste transporters to provide information to the NSW EPA regarding the movement of any load in NSW of more than 10 square meters of asbestos sheeting, or 100 kilograms of asbestos waste. To fulfil these legal obligations, asbestos waste transporters must use WasteLocate.
SafeWork NSW Code of Practice: How to manage and control asbestos in the workplace (2019)	Sites with asbestos become a 'workplace' when work is carried out there and require a register and AMP. Appropriate SafeWork NSW notification will be required for licensed (e.g. Class A) asbestos removal works or handling.

11 LIMITATIONS

The report limitations are outlined below:

- JKE accepts no responsibility for any unidentified contamination issues at the site. Any unexpected problems/subsurface features that may be encountered during development works should be inspected by an environmental consultant as soon as possible;
- Previous use of this site may have involved excavation for the foundations of buildings, services, and similar facilities. In addition, unrecorded excavation and burial of material may have occurred on the site. Backfilling of excavations could have been undertaken with potentially contaminated material that may be discovered in discrete, isolated locations across the site during construction work;
- This report has been prepared based on site conditions which existed at the time of the investigation; scope of work and limitation outlined in the JKE proposal; and terms of contract between JKE and the client (as applicable);
- The conclusions presented in this report are based on investigation of conditions at specific locations, chosen to be as representative as possible under the given circumstances, visual observations of the site and immediate surrounds and documents reviewed as described in the report;
- Subsurface soil and rock conditions encountered between investigation locations may be found to be different from those expected. Groundwater conditions may also vary, especially after climatic changes;
- The investigation and preparation of this report have been undertaken in accordance with accepted practice for environmental consultants, with reference to applicable environmental regulatory authority and industry standards, guidelines and the assessment criteria outlined in the report;
- Where information has been provided by third parties, JKE has not undertaken any verification process, except where specifically stated in the report;
- JKE has not undertaken any assessment of off-site areas that may be potential contamination sources or may have been impacted by site contamination, except where specifically stated in the report;
- JKE accept no responsibility for potentially asbestos containing materials that may exist at the site. These materials may be associated with demolition of pre-1990 constructed buildings or fill material at the site;
- JKE have not and will not make any determination regarding finances associated with the site;
- Additional investigation work may be required in the event of changes to the proposed development or land use. JKE should be contacted immediately in such circumstances;
- Material considered to be suitable from a geotechnical point of view may be unsatisfactory from a soil contamination viewpoint, and vice versa; and
- This report has been prepared for the particular project described and no responsibility is accepted for the use of any part of this report in any other context or for any other purpose.



Important Information About This Report

These notes have been prepared by JKE to assist with the assessment and interpretation of this report.

The Report is based on a Unique Set of Project Specific Factors

This report has been prepared in response to specific project requirements as stated in the JKE proposal document which may have been limited by instructions from the client. This report should be reviewed, and if necessary, revised if any of the following occur:

- The proposed land use is altered;
- The defined subject site is increased or sub-divided;
- The proposed development details including size, configuration, location, orientation of the structures or landscaped areas are modified;
- The proposed development levels are altered, eg addition of basement levels; or
- Ownership of the site changes.

JKE will not accept any responsibility whatsoever for situations where one or more of the above factors have changed since completion of the assessment. If the subject site is sold, ownership of the assessment report should be transferred by JKE to the new site owners who will be informed of the conditions and limitations under which the assessment was undertaken. No person should apply an assessment for any purpose other than that originally intended without first conferring with the consultant.

Changes in Subsurface Conditions

Subsurface conditions are influenced by natural geological and hydrogeological process and human activities. Groundwater conditions are likely to vary over time with changes in climatic conditions and human activities within the catchment (e.g. water extraction for irrigation or industrial uses, subsurface waste water disposal, construction related dewatering). Soil and groundwater contaminant concentrations may also vary over time through contaminant migration, natural attenuation of organic contaminants, ongoing contaminating activities and placement or removal of fill material. The conclusions of an assessment report may have been affected by the above factors if a significant period of time has elapsed prior to commencement of the proposed development.

This Report is based on Professional Interpretations of Factual Data

Site assessments identify actual subsurface conditions at the actual sampling locations at the time of the investigation. Data obtained from the sampling and subsequent laboratory analyses, available site history information and published regional information is interpreted by geologists, engineers or environmental scientists and opinions are drawn about the overall subsurface conditions, the nature and extent of contamination, the likely impact on the proposed development and appropriate remediation measures.

Actual conditions may differ from those inferred, because no professional, no matter how qualified, and no subsurface exploration program, no matter how comprehensive, can reveal what is hidden by earth, rock and time. The actual interface between materials may be far more gradual or abrupt than an assessment indicates. Actual conditions in areas not sampled may differ from predictions. Nothing can be done to prevent the unanticipated, but steps can be taken to help minimise the impact. For this reason, site owners should retain the services of their consultants throughout the development stage of the project, to identify variances, conduct additional tests which may be needed, and to recommend solutions to problems encountered on site.

Assessment Limitations

Although information provided by a site assessment can reduce exposure to the risk of the presence of contamination, no environmental site assessment can eliminate the risk. Even a rigorous professional assessment may not detect all contamination on a site. Contaminants may be present in areas that were not surveyed or sampled, or may migrate to areas which showed no signs of contamination when sampled. Contaminant analysis cannot possibly cover every type of contaminant which may occur; only the most likely contaminants are screened.

Misinterpretation of Site Assessments by Design Professionals

Costly problems can occur when other design professionals develop plans based on misinterpretation of an assessment report. To minimise problems associated with misinterpretations, the environmental consultant should be retained to work with appropriate professionals to explain relevant findings and to review the adequacy of plans and specifications relevant to contamination issues.

Logs Should not be Separated from the Assessment Report

Borehole and test pit logs are prepared by environmental scientists, engineers or geologists based upon interpretation of field conditions and laboratory evaluation of field samples. Logs are normally provided in our reports and these should not be re-drawn for inclusion in site remediation or other design drawings, as subtle but significant drafting errors or omissions may occur in the transfer process. Photographic reproduction can eliminate this problem, however contractors can still misinterpret the logs during bid preparation if separated from the text of the assessment. If this occurs, delays, disputes and unanticipated costs may result. In all cases it is necessary to refer to the rest of the report to obtain a proper understanding of the assessment. Please note that logs with the 'Environmental Log' header are not suitable for geotechnical purposes as they have not been peer reviewed by a Senior Geotechnical Engineer.

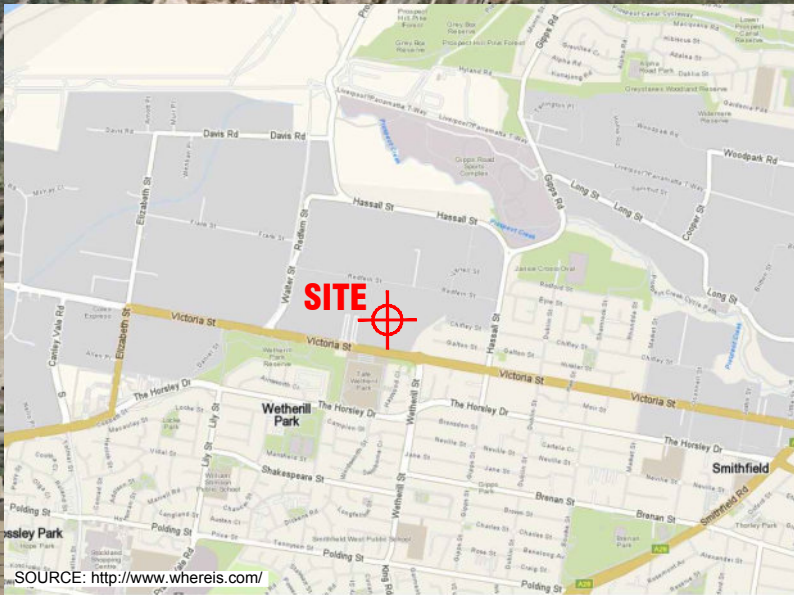
To reduce the likelihood of borehole and test pit log misinterpretation, the complete assessment should be available to persons or organisations involved in the project, such as contractors, for their use. Denial of such access and disclaiming responsibility for the accuracy of subsurface information does not insulate an owner from the attendant liability. It is critical that the site owner provides all available site information to persons and organisations such as contractors.

Read Responsibility Clauses Closely

Because an environmental site assessment is based extensively on judgement and opinion, it is necessarily less exact than other disciplines. This situation has resulted in wholly unwarranted claims being lodged against consultants. To help prevent this problem, model clauses have been developed for use in written transmittals. These are definitive clauses designed to indicate consultant responsibility. Their use helps all parties involved recognise individual responsibilities and formulate appropriate action. Some of these definitive clauses are likely to appear in the environmental site assessment, and you are encouraged to read them closely. Your consultant will be pleased to give full and frank answers to any questions.



Appendix A: Report Figures



AERIAL IMAGE SOURCE: MAPS.AU.NEARMAP.COM

Title:

SITE LOCATION PLAN

Location:

250 VICTORIA STREET
WETHERILL PARK, NSW

Project No:

E31888BR

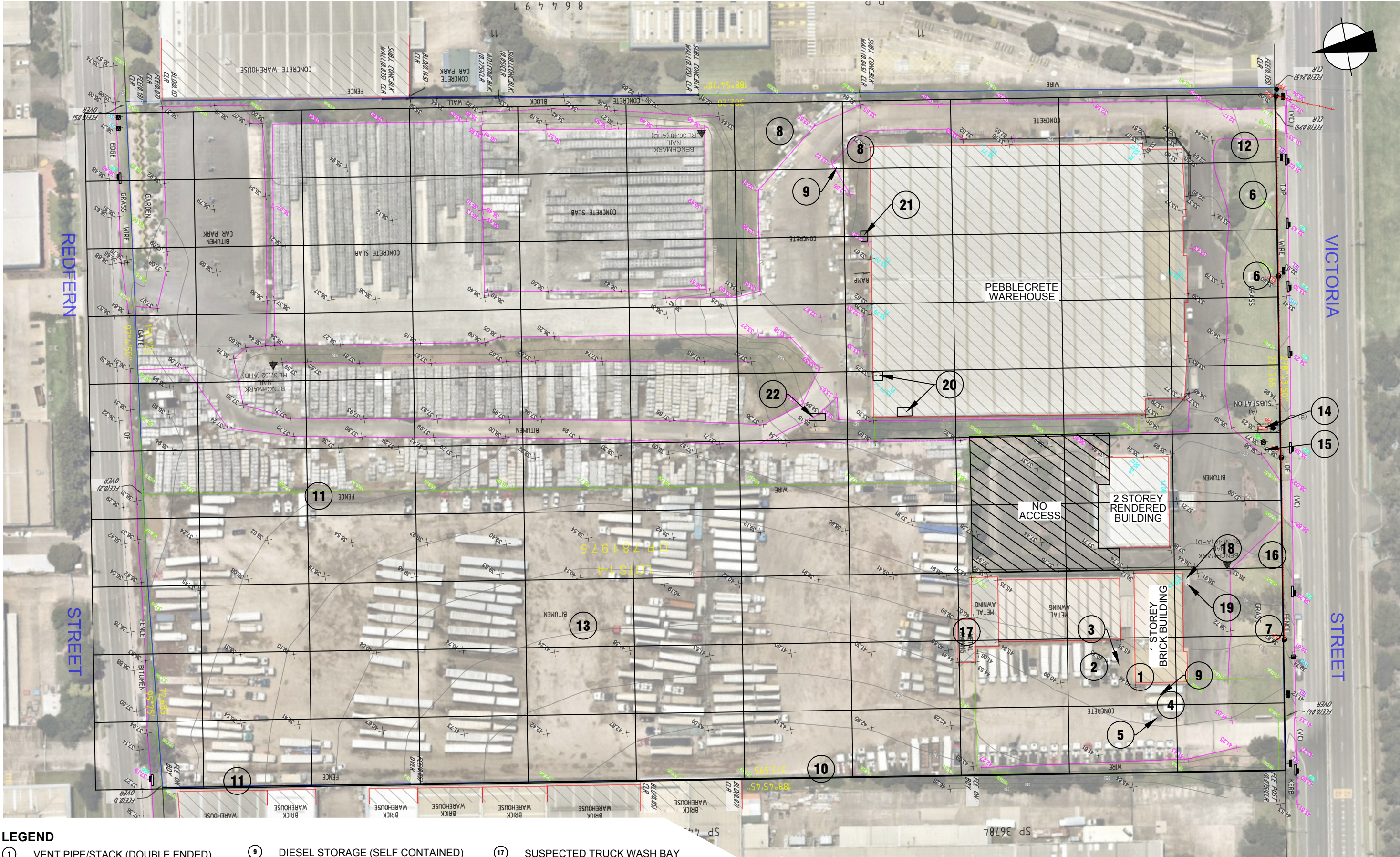
Figure No:

1

This plan should be read in conjunction with the Environmental report.

JKEnvironments





LEGEND

1	VENT PIPE/STACK (DOUBLE ENDED)	9	DIESEL STORAGE (SELF CONTAINED)	17	SUSPECTED TRUCK WASH BAY
2	10,000L UST (PETROL)	10	HYDRANT	18	500L KEROSENE AST (FORMER)
3	FEED LINES	11	IBC	19	500L DIESEL AST (FORMER)
4	SHIPPING CONTAINERS	12	SOIL STOCKPILE	20	250L EACH, PETROL CABINETS (FORMER)
5	FORMER BOWSER PLINTH	13	CONCRETE SLAB SEGMENTS	21	LPG CYLINDER STORAGE (FORMER)
6	FORMER SIGNAGE/LIGHTING	14	SUBSTATION KIOSK	22	2,200L LPG TANK AST (FORMER)
7	SUSPECTED FCF	15	GAS MANIFOLD		
8	STOCKPILE OF DEBRIS	16	WATER HYDRANT/MAINS		

AERIAL IMAGE SOURCE: MAPS.AU.NEARMAP.COM

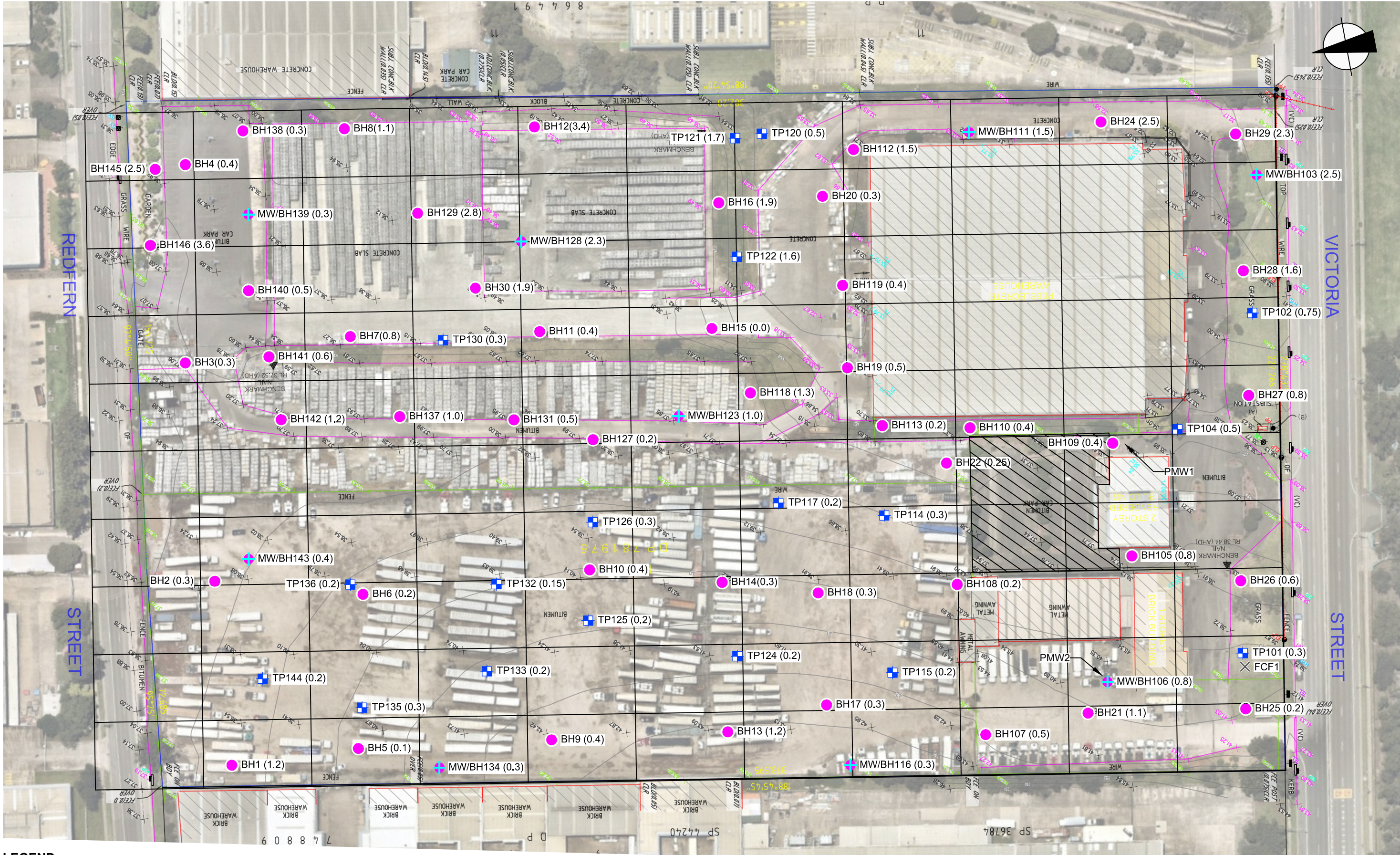
0 12 24 36 48 60
SCALE 1:1200 @A3 METRES

This plan should be read in conjunction with the Environmental report.

Title: SITE FEATURES PLAN	
Location: 250 VICTORIA STREET WETHERILL PARK, NSW	
Report No: E31888BR	Figure No: 2

JKEnvironments

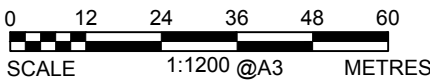




LEGEND

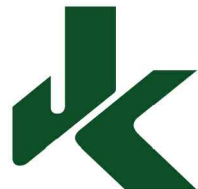
- APPROXIMATE SITE BOUNDARY
- BH(Fill Depth) BOREHOLE LOCATION, NUMBER AND DEPTH OF FILL (m)
- ⊕ BH/MW(Fill Depth) BOREHOLE AND GROUNDWATER MONITORING WELL LOCATION, NUMBER AND DEPTH OF FILL (m)
- ⊞ TP(Fill Depth) TEST PIT LOCATION, NUMBER AND DEPTH OF FILL (m)
- PMW PREVIOUS MONITORING WELL LOCATION
- × FCF(Surface) FIBRE CEMENT FRAGMENT LOCATION, NUMBER AND DEPTH (Surface/m)

AERIAL IMAGE SOURCE: MAPS.AU.NEARMAP.COM

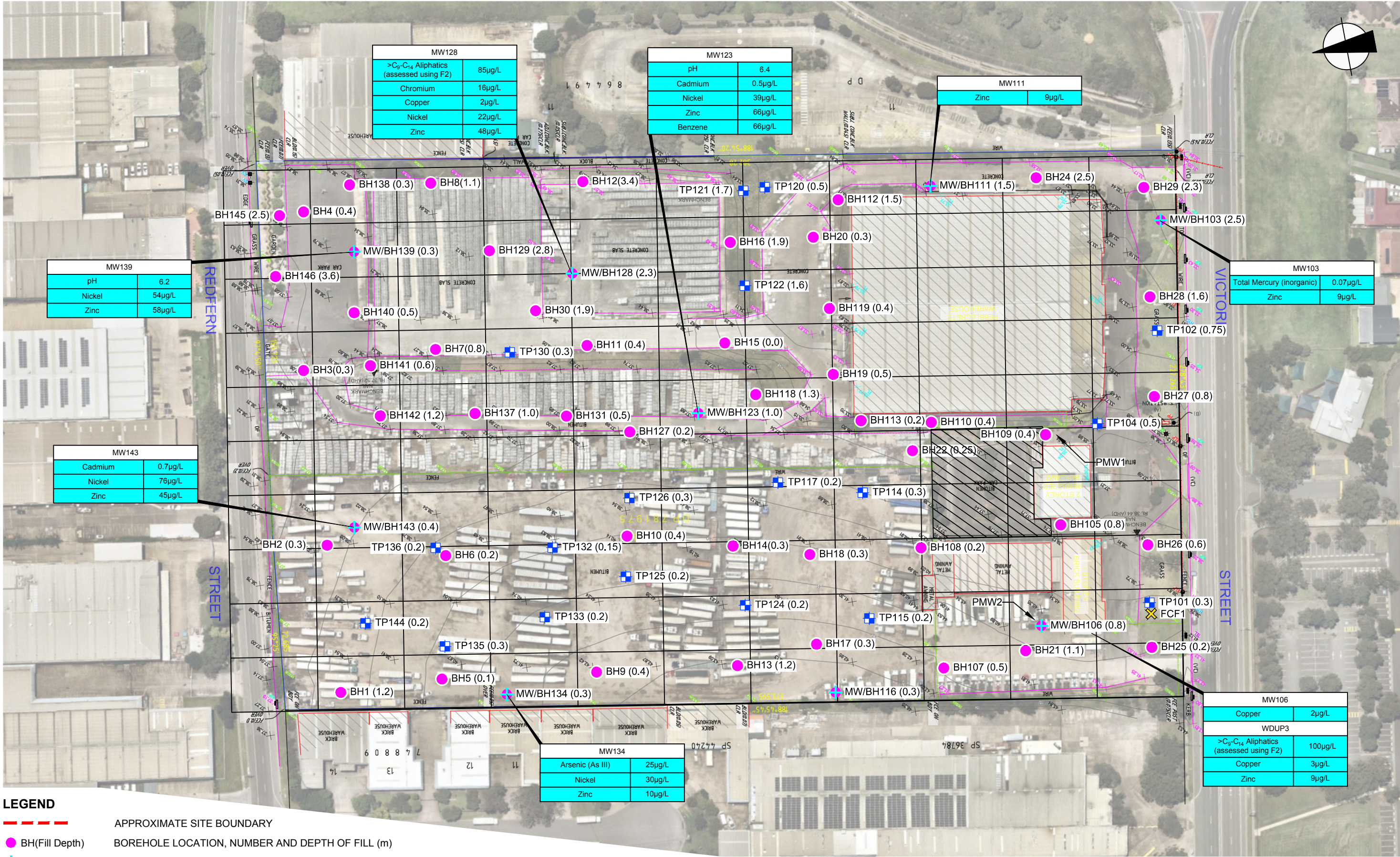


This plan should be read in conjunction with the Environmental report.

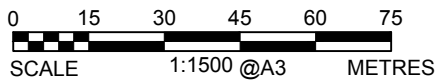
Title: SAMPLE LOCATION PLAN	
Location: 250 VICTORIA STREET WETHERILL PARK, NSW	
Report No: E31888BR	Figure No: 3
JKEnvironments	



PLOT DATE: 26/02/2021 2:38:34 PM DWG FILE: Z:\6 EIS\50 EIS JOBS\31000\31000\SIE31888\KOD WETHERILL PARK\CAD\IE31888BR.DWG



AERIAL IMAGE SOURCE: MAPS.AU.NEARMAP.COM



This plan should be read in conjunction with the Environmental report.

Title:

CONTAMINATION LOCATION PLAN

Location:

250 VICTORIA STREET
WETHERILL PARK, NSW

Report No:

E31888BR

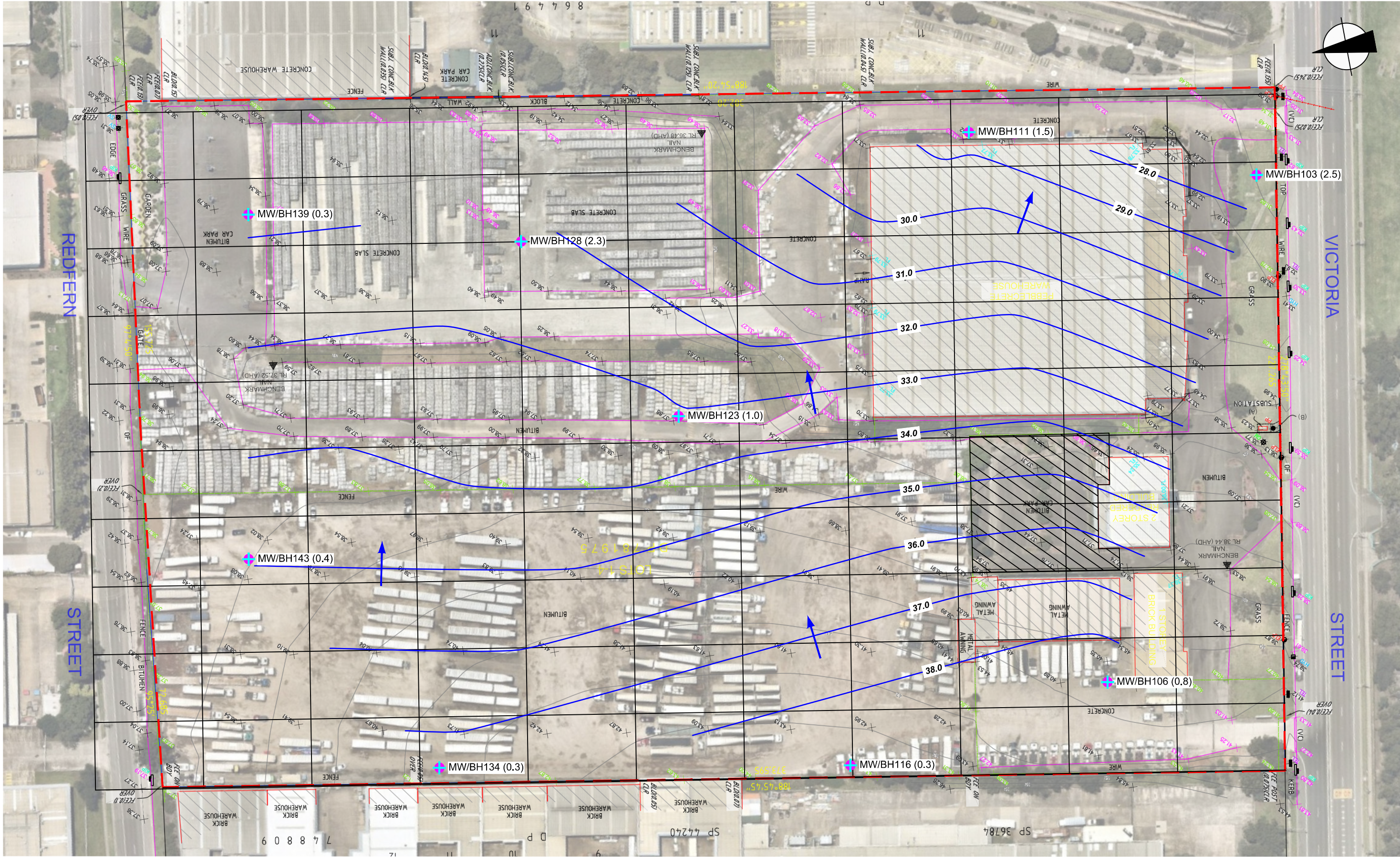
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4

JKEnvironments

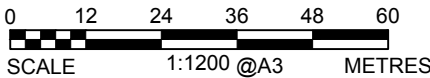


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LEGEND	
	APPROXIMATE SITE BOUNDARY
	BOREHOLE AND GROUNDWATER MONITORING WELL LOCATION, NUMBER AND DEPTH OF FILL (m)
	GROUNDWATER CONTOUR INTERVALS (mAHd)
	INFERRED GROUNDWATER FLOW DIRECTION

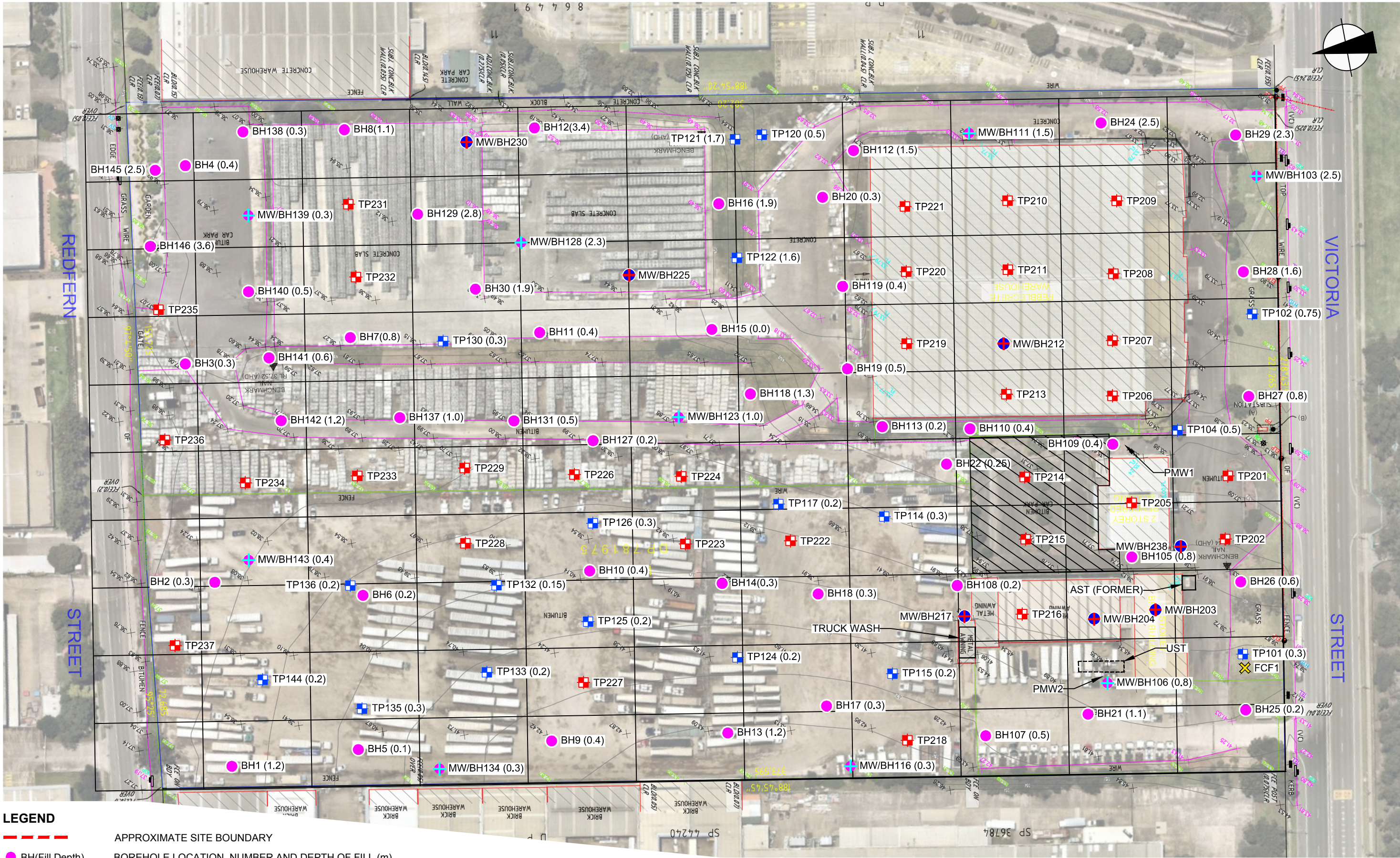
AERIAL IMAGE SOURCE: MAPS.AU.NEARMAP.COM



This plan should be read in conjunction with the Environmental report.

Title: GROUNDWATER CONTOUR PLAN	
Location: 250 VICTORIA STREET WETHERILL PARK, NSW	
Report No: E31888BR	Figure No: 5
JKEnvironments	

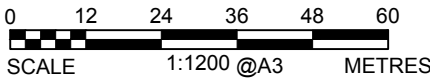




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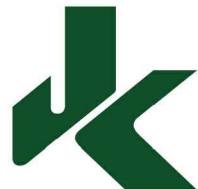
- APPROXIMATE SITE BOUNDARY
- BH(Fill Depth) BOREHOLE LOCATION, NUMBER AND DEPTH OF FILL (m)
- BH/MW(Fill Depth) BOREHOLE AND GROUNDWATER MONITORING WELL LOCATION, NUMBER AND DEPTH OF FILL (m)
- TP(Fill Depth) TEST PIT LOCATION, NUMBER AND DEPTH OF FILL (m)
- PMW PREVIOUS MONITORING WELL LOCATION
- ✕ FCF(Surface) FIBRE CEMENT FRAGMENT LOCATION, NUMBER AND DEPTH (Surface/m)
- TP PROPOSED TEST PIT LOCATION AND NUMBER
- BH/MW212 PROPOSED BOREHOLE AND GROUNDWATER MONITORING WELL LOCATION AND NUMBER

AERIAL IMAGE SOURCE: MAPS.AU.NEARMAP.COM



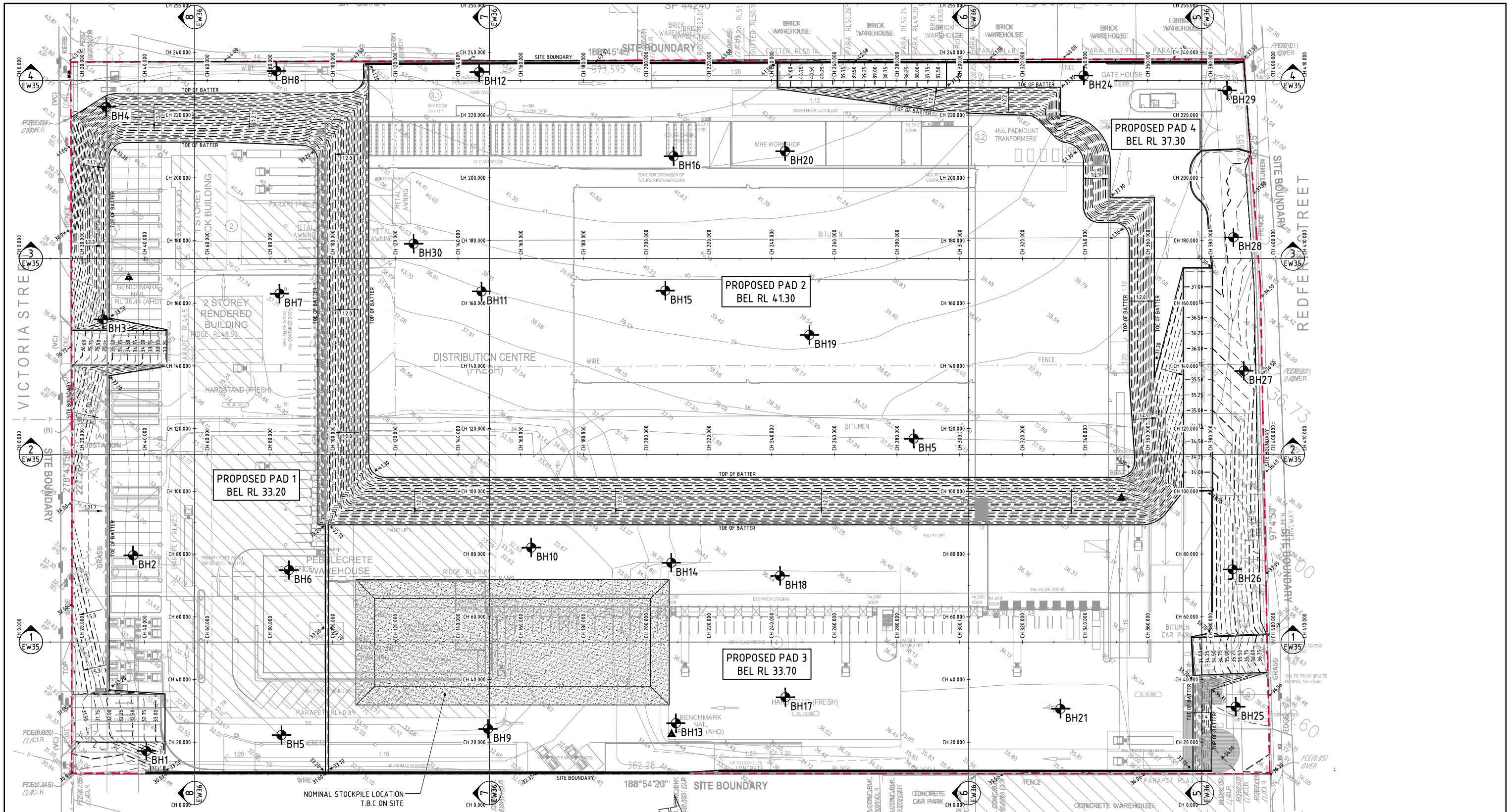
This plan should be read in conjunction with the Environmental report.

Title: PROPOSED DATA GAP SAMPLE LOCATION PLAN	
Location: 250 VICTORIA STREET WETHERILL PARK, NSW	
Report No: E31888BR	Figure No: 6
JKEnvironments	





Appendix B: Selected Development Plans



SUMMARY NOTES

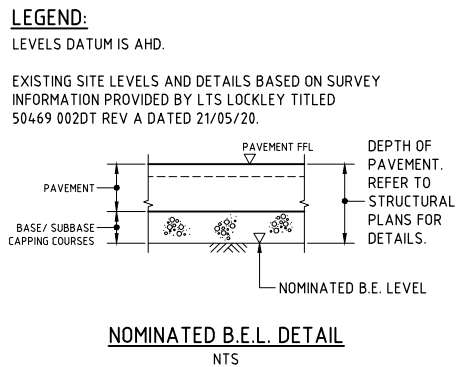
BULK EARTHWORKS VOLUMES:
SITE AREA = 8.6 Ha

TOPSOIL STRIP (200mm OVER 8.6 Ha) = (-17,200m³)

CUT MATERIAL = - 95,070m³
FILL MATERIAL = + 83,340m³

BALANCE = - 11,730m³ (STOCKPILED)

NOTE:
EARTHWORK VOLUMES ARE APPROXIMATE ONLY.
NO ALLOWANCE HAS BEEN MADE FOR DELETERIOUS MATERIAL, EROSION AND SEDIMENT CONTROL OR BULKING OR COMPACTION OF FILLED SOILS. CONTRACTOR TO ALLOW FOR THESE ITEMS AS REQUIRED



LEGEND:
LEVELS DATUM IS AHD.

EXISTING SITE LEVELS AND DETAILS BASED ON SURVEY INFORMATION PROVIDED BY LTS LOCKLEY TITLED 50469 002DT REV A DATED 21/05/19.

— 50.00 — - EXISTING CONTOUR (1.0m INTERVAL)
— 50.00 — - B.E.L. CONTOUR (MAJOR 1.0m)
— 50.10 — - B.E.L. CONTOUR (MINOR 0.25m)
* 50.00 - B.E.L. SPOT LEVEL
+ BH1 - BOREHOLE LOCATION

BULK EARTHWORKS PLAN
SCALE 1:500

BOREHOLE NOTE:
REFER TO GEOTECHNICAL REPORT PROVIDED BY JK GEOTECHNICS 31888Ahrp REV 0 DATED 18/10/2018 FOR TOP OF ROCK RL.

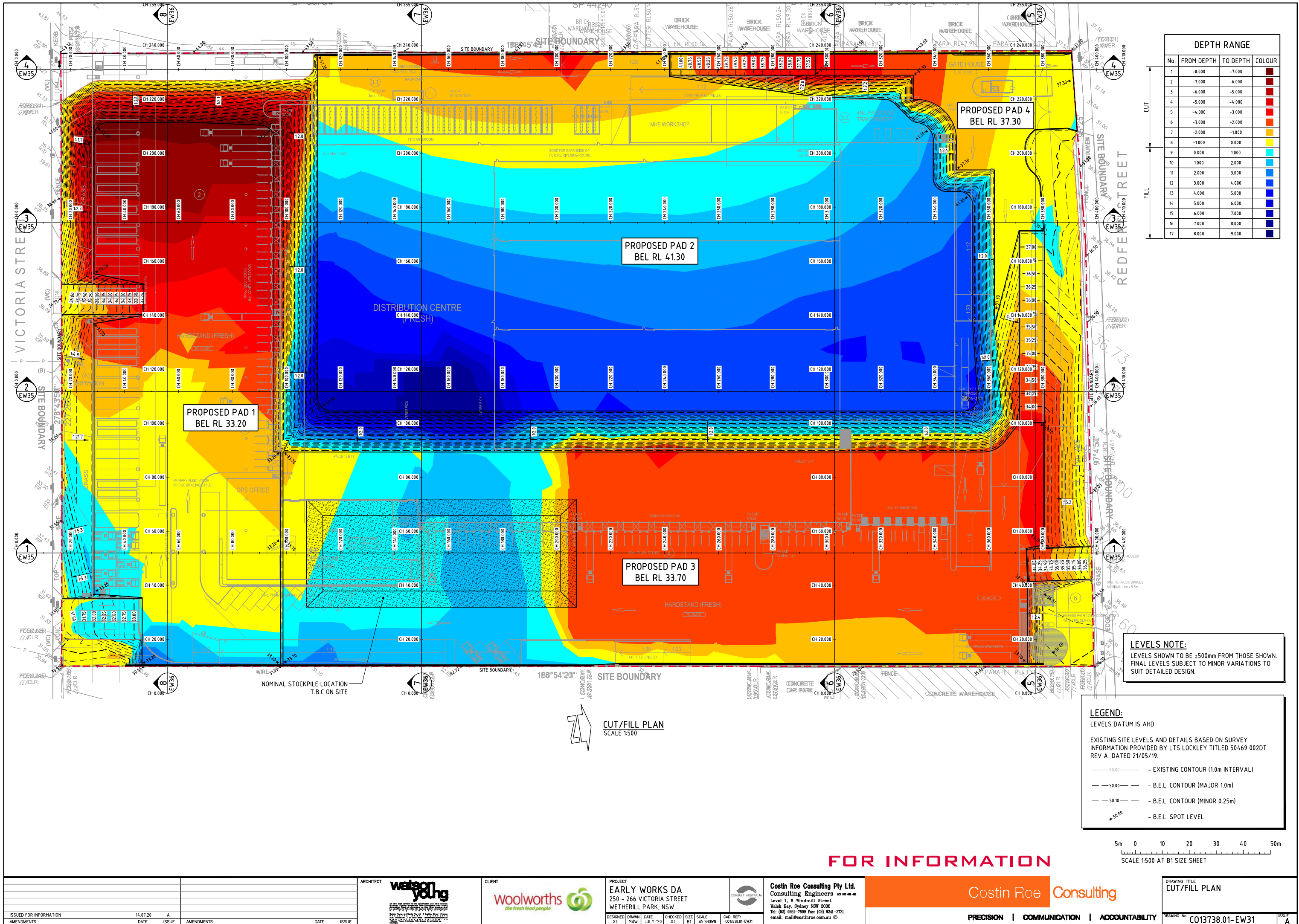
LEVELS NOTE:
LEVELS SHOWN TO BE ±500mm FROM THOSE SHOWN. FINAL LEVELS SUBJECT TO MINOR VARIATIONS TO SUIT DETAILED DESIGN.

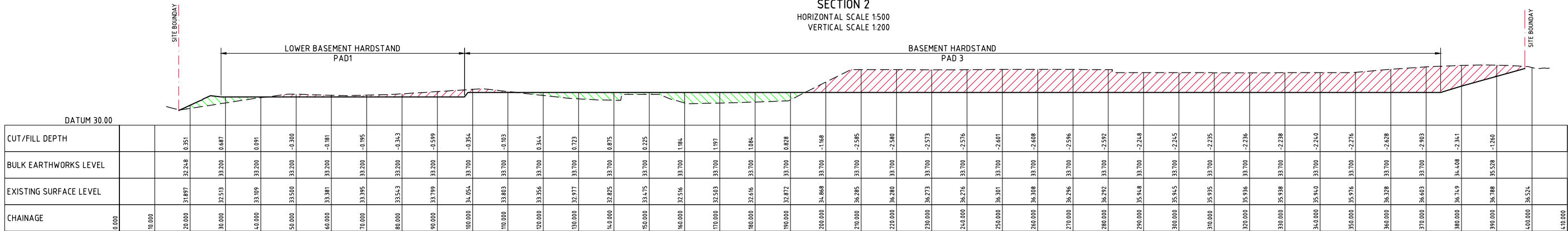
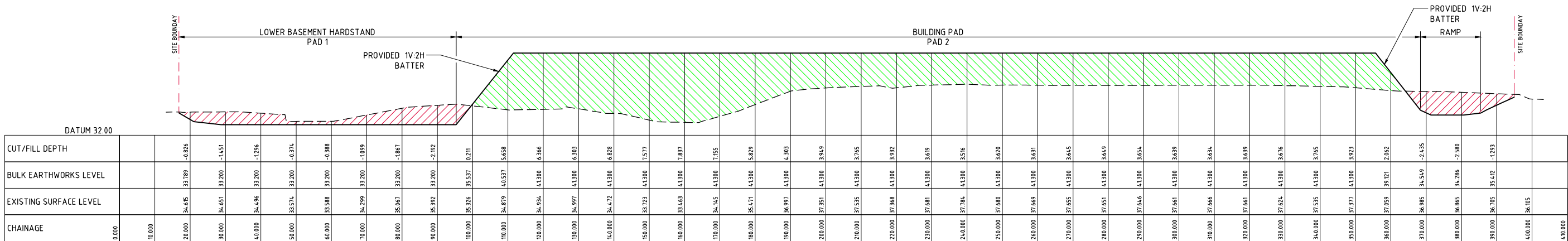
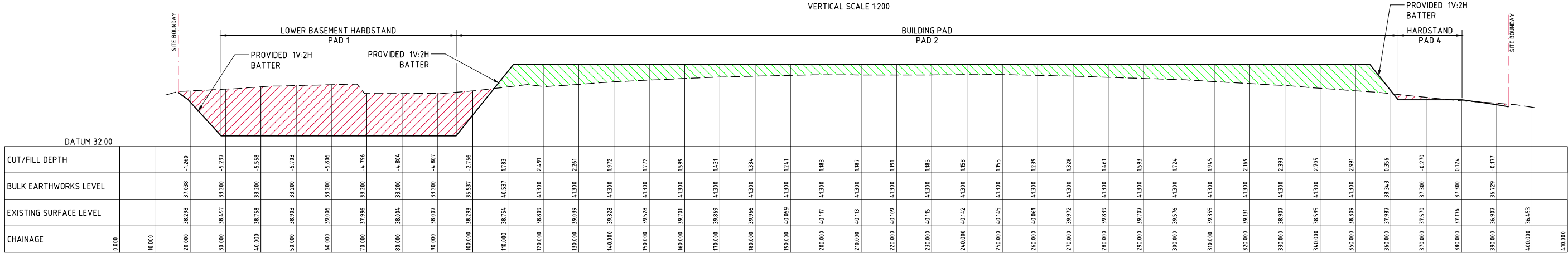
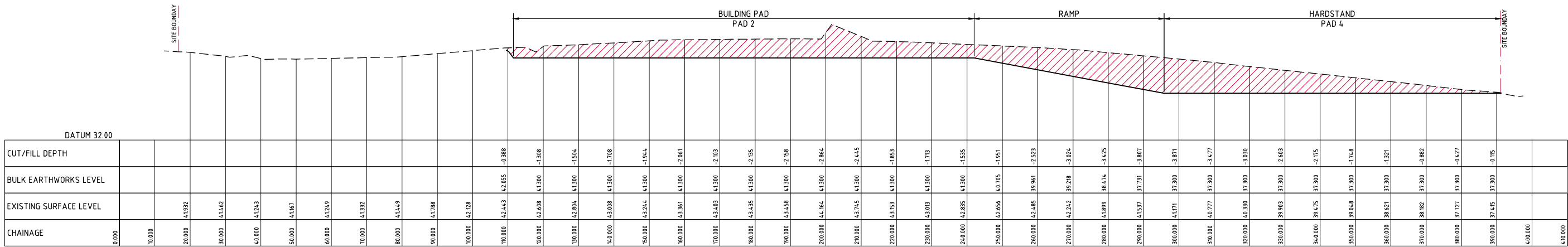
NOTE:

1. TOPSOIL AND EXISTING PAVEMENT MAY BE REUSED ON SITE SUBJECT TO GEOTECHNICAL ADVICE DURING DETAILED DESIGN.
2. REFER TO DRAWING EW20 & EW21 FOR ESC MEASURE THROUGHOUT WORKS.

5m 0 10 20 30 40 50m
SCALE 1:500 AT B1 SIZE SHEET

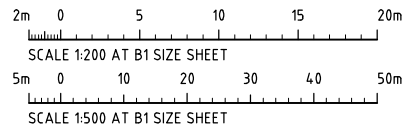
FOR INFORMATION





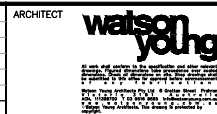
LEGEND:

- DENOTES BULK EARTHWORKS SURFACE
- DENOTES EXISTING SURFACE LEVEL
- DENOTES AREA IN CUT
- DENOTES AREA IN FILL

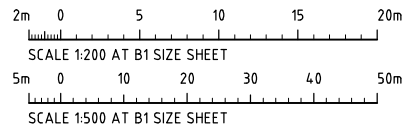
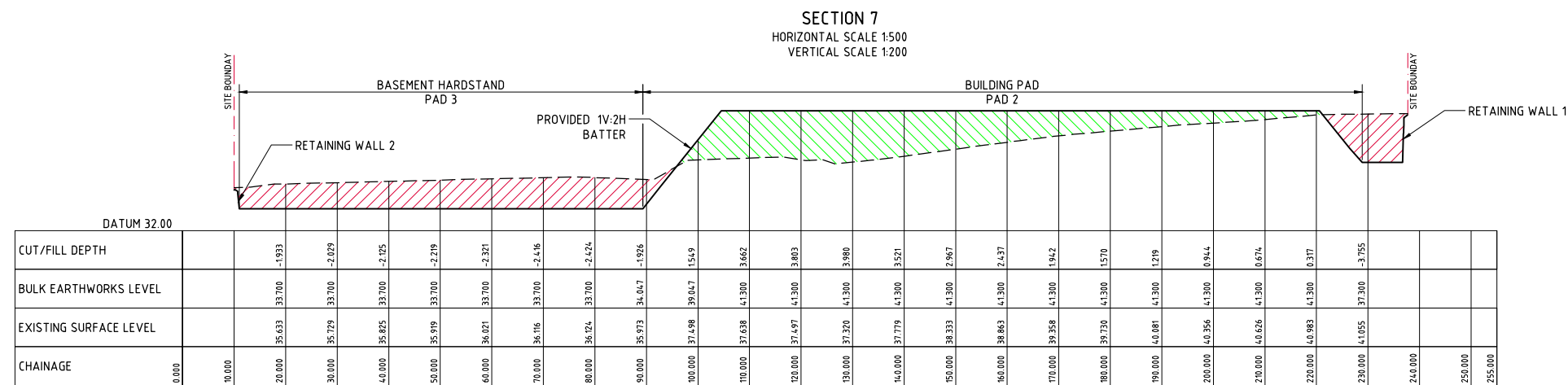
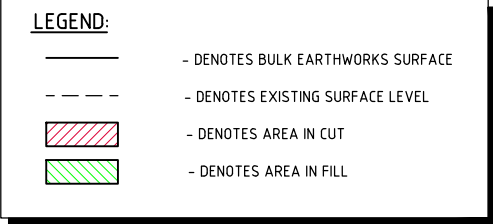


FOR INFORMATION

ISSUED FOR INFORMATION	14.07.20	A
AMENDMENTS	DATE	ISSUE
AMENDMENTS	DATE	ISSUE



DRAWING TITLE	BULK EARTHWORKS SECTIONS SHEET 1
DRAWING No	C013738.01-EW35
ISSUE	A



FOR INFORMATION

			ARCHITECT 			CLIENT 			PROJECT EARLY WORKS DA 250 - 266 VICTORIA STREET WETHERILL PARK, NSW			 Costin Roe Consulting Pty Ltd. Consulting Engineers Level 1, 8 Windmill Street Wahsh Bay, Sydney NSW 2000 Tel: (02) 8251-7689 Fax: (02) 8241-3731 email: mail@costinroe.com.au ©						DRAWING TITLE BULK EARTHWORKS SECTIONS SHEET 2											
ISSUED FOR INFORMATION			14.07.20			A												DRAWING No			C013738.01-EW36			ISSUE			A		
AMENDMENTS			DATE			ISSUE			AMENDMENTS			DATE			ISSUE														



Appendix C: Data Summary Tables and Borehole Logs



ASI Data Summary Tables

ABBREVIATIONS AND EXPLANATIONS

Abbreviations used in the Tables:

ABC:	Ambient Background Concentration	PCBs:	Polychlorinated Biphenyls
ACM:	Asbestos Containing Material	PCE:	Perchloroethylene (Tetrachloroethylene or Tetrachloroethene)
ADWG:	Australian Drinking Water Guidelines	pH_{KCL}:	pH of filtered 1:20, 1M KCL extract, shaken overnight
AF:	Asbestos Fines	pH_{ox}:	pH of filtered 1:20 1M KCL after peroxide digestion
ANZG:	Australian and New Zealand Guidelines	PQL:	Practical Quantitation Limit
B(a)P:	Benzo(a)pyrene	RS:	Rinsate Sample
CEC:	Cation Exchange Capacity	RSL:	Regional Screening Levels
CRC:	Cooperative Research Centre	RSW:	Restricted Solid Waste
CT:	Contaminant Threshold	SAC:	Site Assessment Criteria
EILs:	Ecological Investigation Levels	SCC:	Specific Contaminant Concentration
ESLs:	Ecological Screening Levels	S_{Cr}:	Chromium reducible sulfur
FA:	Fibrous Asbestos	S_{POS}:	Peroxide oxidisable Sulfur
GIL:	Groundwater Investigation Levels	SSA:	Site Specific Assessment
GSW:	General Solid Waste	SSHSLs:	Site Specific Health Screening Levels
HILs:	Health Investigation Levels	TAA:	Total Actual Acidity in 1M KCL extract titrated to pH6.5
HSLs:	Health Screening Levels	TB:	Trip Blank
HSL-SSA:	Health Screening Level-Site Specific Assessment	TCA:	1,1,1 Trichloroethane (methyl chloroform)
kg/L	kilograms per litre	TCE:	Trichloroethylene (Trichloroethene)
NA:	Not Analysed	TCLP:	Toxicity Characteristics Leaching Procedure
NC:	Not Calculated	TPA:	Total Potential Acidity, 1M KCL peroxide digest
NEPM:	National Environmental Protection Measure	TS:	Trip Spike
NHMRC:	National Health and Medical Research Council	TRH:	Total Recoverable Hydrocarbons
NL:	Not Limiting	TSA:	Total Sulfide Acidity (TPA-TAA)
NSL:	No Set Limit	UCL:	Upper Level Confidence Limit on Mean Value
OCP:	Organochlorine Pesticides	USEPA	United States Environmental Protection Agency
OPP:	Organophosphorus Pesticides	VOCC:	Volatile Organic Chlorinated Compounds
PAHs:	Polycyclic Aromatic Hydrocarbons	WHO:	World Health Organisation
%w/w:	weight per weight		
ppm:	Parts per million		

Table Specific Explanations:

HIL Tables:

- The chromium results are for Total Chromium which includes Chromium III and VI. For initial screening purposes, we have assumed that the samples contain only Chromium VI unless demonstrated otherwise by additional analysis.
- Carcinogenic PAHs is a toxicity weighted sum of analyte concentrations for a specific list of PAH compounds relative to B(a)P. It is also referred to as the B(a)P Toxic Equivalence Quotient (TEQ).
- Statistical calculations are undertaken using ProUCL (USEPA). Statistical calculation is usually undertaken using data from fill samples.

EIL/ESL Table:

- ABC Values for selected metals have been adopted from the published background concentrations presented in Olszowy et. al., (1995), Trace Element Concentrations in Soils from Rural and Urban New South Wales (the 25th percentile values for old suburbs with high traffic have been quoted).

Waste Classification and TCLP Table:

- Data assessed using the NSW EPA Waste Classification Guidelines, Part 1: Classifying Waste (2014).
- The assessment of Total Moderately Harmful pesticides includes: Dichlorovos, Dimethoate, Fenitrothion, Ethion, Malathion and Parathion.
- Assessment of Total Scheduled pesticides include: HBC, alpha-BHC, gamma-BHC, beta-BHC, Heptachlor, Aldrin, Heptachlor Epoxide, gamma-Chlordane, alpha-chlordane, pp-DDE, Dieldrin, Endrin, pp-DDD, pp-DDT, Endrin Aldehyde.

QA/QC Table:

- Field blank, Inter and Intra laboratory duplicate results are reported in mg/kg.
- Trip spike results are reported as percentage recovery.
- Field rinsate results are reported in µg/L.

TABLE 51
SOIL LABORATORY RESULTS COMPARED TO NEPM 2013.
HL-D: "Commercial/Industrial"

All data in mg/kg unless stated otherwise			HEAVY METALS								PAHs		ORGANOCHLORINE PESTICIDES (OCPs)								OP PESTICIDES (OPPs)		TOTAL PCBs	Phenol	ASBESTOS FIBRES
			Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc	Total PAHs	Carcinogenic PAHs	HCB	Endosulfan	Methoxychlor	Aldrin & Dieldrin	Chlordane	DDT, DDD & DDE	Heptachlor	Chlorpyrifos					
PQL - Envirolab Services			4	0.4	1	1	1	0.1	1	1	-	0.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	5	100	
Site Assessment Criteria (SAC)			3000	900	3600	240000	1500	730	6000	400000	4000	40	80	2000	2500	45	530	3600	50	2000	7	240000	Detected/Not Detected		
Sample Reference	Sample Depth	Sample Description																							
TP101	0-0.3	Fill: Silty Clay	18	<0.4	19	20	20	<0.1	11	45	0.2	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected	
TP102	0-0.25	Fill: Silty Clay	14	<0.4	22	14	22	<0.1	7	39	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	<5	NA		
TP102-[LAB_DUP]	0-0.25	Fill: Silty Clay	13	<0.4	23	16	26	<0.1	7	47	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	<5	NA		
TP102	0.3-0.5	Fill: Silty Clay	8	<0.4	15	14	12	<0.1	5	18	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected		
BH103	0-0.2	Fill: Silty Clay	6	<0.4	14	17	24	<0.1	7	74	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		
BH103	0.4-0.8	Fill: Silty Clay	9	<0.4	12	20	14	<0.1	7	34	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected		
TP104	0-0.1	Fill: Silty Sand	<4	<0.4	95	23	17	<0.1	11	74	0.2	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	<5	NA		
TP104	0.2-0.4	Fill: Silty Clayey Sand	<4	<0.4	13	24	3	<0.1	56	26	0.1	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		
BH105	0.03-0.3	Fill: Silty Sandy Gravel	<4	<0.4	10	41	<1	<0.1	130	35	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		
BH106	0.19-0.4	Fill: Silty Sand	<4	<0.4	2	3	2	<0.1	3	10	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	<5	Not Detected		
BH106	0.8-0.95	Silty Clay	6	<0.4	3	12	4	<0.1	1	15	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		
BH107	0.22-0.5	Fill: Silty Clay	4	<0.4	8	22	11	<0.1	12	46	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	<5	Not Detected		
BH108	0.03-0.2	Fill: Silty Gravelly Sand	<4	<0.4	7	37	1	<0.1	84	26	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	<5	Not Detected		
BH108-[LAB_DUP]	0.03-0.2	Fill: Silty Gravelly Sand	<4	<0.4	10	45	2	<0.1	95	31	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	NA	NA		
BH109	0-0.2	Fill: Silty Sand	<4	<0.4	7	14	10	<0.1	8	69	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected		
BH110	0-0.2	Fill: Silty Clay	<4	<0.4	21	26	16	<0.1	38	79	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	<5	Not Detected		
BH111	0.2-0.5	Fill: Silty Clay	<4	<0.4	29	33	3	<0.1	130	42	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		
BH111	0.5-0.95	Fill: Silty Clay	9	<0.4	19	18	16	<0.1	9	29	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	<5	Not Detected		
BH112	0-0.2	Fill: Silty Clay	24	<0.4	20	19	27	<0.1	12	65	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	<5	Not Detected		
BH112	0.4-0.5	Fill: Silty Clay	6	<0.4	14	13	11	<0.1	10	33	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		
BH113	0-0.2	Fill: Silty Clay	6	<0.4	12	15	14	<0.1	11	64	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		
TP114	0-0.2	Fill: Silty Sand	<4	<0.4	18	25	7	<0.1	23	150	0.57	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected		
TP115	0-0.2	Fill: Silty Sand	<4	<0.4	21	15	2	<0.1	31	22	0.3	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		
BH116	0.03-0.3	Fill: Silty Clay	<4	<0.4	26	19	4	<0.1	38	33	0.58	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	<5	Not Detected		
BH116-[LAB_DUP]	0.03-0.3	Fill: Silty Clay	<4	<0.4	25	23	4	<0.1	39	34	1.2	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	NA	NA		
BH116	0.3-0.5	Silty Clay	6	<0.4	15	12	11	<0.1	5	11	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		
TP117	0-0.2	Fill: Silty Sand	<4	<0.4	3	55	3	<0.1	5	15	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		
BH118	0-0.2	Fill: Silty Gravelly Clay	<4	<0.4	4	4	6	<0.1	3	11	0.94	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected		
BH118	0.2-0.4	Fill: Silty Clay	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected		
BH119	0.16-0.3	Fill: Silty Gravelly Clay	<4	<0.4	6	19	2	<0.1	65	25	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	<5	Not Detected		
TP120	0-0.2	Fill: Silty Sand	<4	<0.4	5	13	12	<0.1	22	24	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected		
TP121	0-0.2	Fill: Silty Clay	6	<0.4	6	10	7	<0.1	5	22	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected		
TP122	0-0.2	Fill: Silty Clay	<4	<0.4	6	13	6	<0.1	12	31	0.54	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	<5	NA		
TP122-[LAB_DUP]	0-0.2	Fill: Silty Clay	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<5	NA		
TP122	0.6-0.8	Fill: Silty Clay	<4	<0.4	6	19	6	<0.1	23	40	1.9	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected		
BH123	0-0.2	Fill: Silty Gravelly Sand	<4	<0.4	20	5	2	<0.1	3	10	0.74	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	<5	Not Detected		
TP124	0-0.2	Fill: Silty Sand	<4	<0.4	11	8	5	<0.1	10	16	0.1	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected		
TP125	0-0.2	Fill: Silty Sand	<4	<0.4	22	20	5	<0.1	24	26	0.4	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	<5	Not Detected		
TP125-[LAB_DUP]	0-0.2	Fill: Silty Sand	<4	<0.4	20	19	4	<0.1	23	29	0.2	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	NA	NA		
TP126	0-0.2	Fill: Silty Sand	<4	<0.4	17	12	5	<0.1	19	19	0.2	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected		
BH127	0-0.2	Fill: Silty Sandy Gravel	<4	<0.4	5	7	6	<0.1	2	7	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		
BH128	0-0.2	Fill: Silty Sandy Gravel	<4	<0.4	5	7	7	<0.1	4	12	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	<5	Not Detected		
BH128	1.3-1.5	Fill: Silty Clay	<4	<0.4	10	11	7	<0.1	15	22	0.4	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected		
BH129	0.5-0.7	Fill: Silty Sandy Gravel	<4	<0.4	2	7	4	<0.1	3	14	0.4	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected		
TP130	0-0.2	Fill: Silty Clay	4	<0.4	10	61	39	<0.1	21	130	2.9	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		
BH131	0-0.2	Fill: Silty Gravelly Sand	<4	<0.4	3	5	3	<0.1	2	10	0.4	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected		
TP132	0-0.15	Fill: Silty Sand	<4	<0.4	10	11	7	<0.1	6	31	0.3	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	NA	NA		
TP132-[LAB_DUP]	0-0.15	Fill: Silty Sand	<4	<0.4	7	8	6	<0.1	3	16	0.1	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	NA	NA		
TP132-[TRIPLICATE]	0-0.15	Fill: Silty Sand	<4	<0.4	9	9	5	<0.1	7	27	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		
TP133	0-0.2	Fill: Silty Sand	<4	<0.4	23	23	4	<0.1	27	38	0.2	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected		
BH134	0-0.2	Fill: Silty Sandy Gravel	<4	<0.4	8	52	2	<0.1	130	37	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	<5	NA		
TP135																									

TABLE S2 SOIL LABORATORY RESULTS COMPARED TO HSLs All data in mg/kg unless stated otherwise												
POL - Envirolab Services				C _u -C ₁₀ (F1)	ΣC ₁₀ -C ₂₀ (F2)	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene	Field PO Measurement	
NEPM 2013 HSL Land Use Category				25	50	0.2	0.5	1	1	1	ppm	
Sample Reference	Sample Category	Sample Depth	Sample Description	Depth Category	Soil Category	HSL-D: COMMERCIAL/INDUSTRIAL						
TP101	0-0.3	Fill: Silty Clay	0m to <1m	Sand	<25	130	<0.2	<0.5	<1	<3	<1	0
TP102	0-0.25	Fill: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
TP102 - [LAB_DUP]	0-0.25	Fill: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
TP103	0.3-0.5	Fill: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH103	0-0.2	Fill: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH103	0.4-0.8	Fill: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0.1
TP104	0-0.1	Fill: Silty Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
TP104	0.2-0.4	Fill: Silty Clayey Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH105	0.03-0.3	Fill: Silty Sandy Gravel	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH106	0.19-0.4	Fill: Silty Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH106	0.8-0.95	Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH107	0.22-0.5	Fill: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH108	0.03-0.2	Fill: Silty Gravelly Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH108 - [LAB_DUP]	0.03-0.2	Fill: Silty Gravelly Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH109	0-0.2	Fill: Silty Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH110	0-0.2	Fill: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH111	0.2-0.5	Fill: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH111	0.5-0.95	Fill: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH112	0-0.2	Fill: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH112	0.4-0.5	Fill: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH113	0-0.2	Fill: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
TP114	0-0.2	Fill: Silty Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
TP115	0-0.2	Fill: Silty Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH116	0.03-0.3	Fill: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH116 - [LAB_DUP]	0.03-0.3	Fill: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH116	0.3-0.5	Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
TP117	0-0.2	Fill: Silty Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH118	0-0.2	Fill: Silty Gravelly Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH119	0.16-0.3	Fill: Silty Gravelly Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
TP120	0-0.2	Fill: Sandy Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
TP121	0-0.2	Fill: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
TP122	0-0.2	Fill: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
TP122	0.6-0.8	Fill: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH123	0-0.2	Fill: Silty Gravelly Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
TP124	0-0.2	Fill: Silty Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
TP125	0-0.2	Fill: Silty Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
TP125 - [LAB_DUP]	0-0.2	Fill: Silty Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
TP126	0-0.2	Fill: Silty Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH127	0-0.2	Fill: Silty Sandy Gravel	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH128	0-0.2	Fill: Silty Sandy Gravel	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH128	1.3-1.5	Fill: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH129	0.5-0.7	Fill: Silty Sandy Gravel	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
TP130	0-0.2	Fill: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH131	0-0.2	Fill: Silty Gravelly Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH132	0-0.15	Fill: Silty Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
TP132 - [LAB_DUP]	0-0.15	Fill: Silty Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
TP133	0-0.2	Fill: Silty Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH134	0-0.2	Fill: Silty Sandy Gravel	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
TP135	0-0.2	Fill: Silty Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
TP136	0-0.2	Fill: Silty Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH137	0-0.3	Fill: Silty Gravelly Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH138	0.05-0.3	Fill: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH139	0.05-0.3	Fill: Silty Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH140	0.05-0.3	Fill: Silty Gravelly Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH140 - [LAB_DUP]	0.05-0.3	Fill: Silty Gravelly Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH140	0.3-0.5	Fill: Silty Gravelly Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH141	0-0.2	Fill: Silty Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH142	0-0.2	Fill: Silty Gravelly Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH143	0-0.2	Fill: Silty Sandy Gravel	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
TP144	0-0.2	Fill: Silty Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH145	0-0.2	Fill: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH145	0.5-0.95	Fill: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH146	0-0.2	Fill: Silty Sandy Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH146	1.3-1.5	Fill: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
SDUP1	-	Fill: Silty Sandy Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
SDUP4	-	Fill: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
SDUP7	-	Fill: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
SDUP7 - [LAB_DUP]	-	Fill: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
SDUP10	-	Fill: Silty Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
SDUP102	-	Fill: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
SDUP103	-	Fill: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
SDUP101 - [LAB_DUP]	-	Fill: Silty Clay	0m to <1m	Sand	<25	NA	<0.2	<0.5	<1	<3	<1	0
SDUP102	-	Fill: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
SDUP102 - [LAB_DUP]	-	Fill: Silty Clay	0m to <1m	Sand	NA	<50	NA	NA	NA	NA	NA	0
SDUP103	-	Fill: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
SDUP111	-	Fill: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
Total Number of Samples				74	74	74	74	74	74	74	74	74
Maximum Value				<PQL	130	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	0.1
Concentration above the SAC												VALUE
Concentration above the PQL												Bold
The guideline corresponding to the concentration above the SAC is highlighted in grey in the Site Assessment Criteria Table below												

HSL SOIL ASSESSMENT CRITERIA											
Sample Reference	Sample Depth	Sample Description	Depth Category	Soil Category	C _u -C ₁₀ (F1)	ΣC ₁₀ -C ₂₀ (F2)	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene
TP101	0-0.3	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP102	0-0.25	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP102 - [LAB_DUP]	0-0.25	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP102	0.3-0.5	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH103	0-0.2	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH103	0.4-0.8	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP104	0-0.1	Fill: Silty Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP104	0.2-0.4	Fill: Silty Clayey Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH105	0.03-0.3	Fill: Silty Sandy Gravel	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH106	0.15-0.4	Fill: Silty Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH106	0.8-0.95	Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH107	0.22-0.5	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH108	0.03-0.2	Fill: Silty Gravelly Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH108 - [LAB_DUP]	0.03-0.2	Fill: Silty Gravelly Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH109	0-0.2	Fill: Silty Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH110	0-0.2	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH111	0.2-0.5	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH111	0.5-0.95	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH112	0-0.2	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH112	0.4-0.5	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH113	0-0.2	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP114	0-0.2	Fill: Silty Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP115	0-0.2	Fill: Silty Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP116	0.03-0.3	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH116 - [LAB_DUP]	0.03-0.3	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH117	0.3-0.5	Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP116	0-0.2	Fill: Silty Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH118	0-0.2	Fill: Silty Gravelly Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH118	0.16-0.3	Fill: Silty Gravelly Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP120	0-0.2	Fill: Sandy Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP121	0-0.2	Fill: Silty Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP122	0-0.2	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP123	0-0.2	Fill: Silty Gravelly Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP124	0-0.2	Fill: Silty Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH118 - [LAB_DUP]	0-0.2	Fill: Silty Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP126	0-0.2	Fill: Silty Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP127	0-0.2	Fill: Silty Sandy Gravel	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP127	0-0.2	Fill: Silty Sandy Gravel	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH128	1.3-1.5	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH129	0.5-0.7	Fill: Silty Sandy Gravel	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP130	0-0.2	Fill: Silty Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP131	0-0.2	Fill: Silty Gravelly Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH132	0-0.15	Fill: Silty Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP132 - [LAB_DUP]	0-0.15	Fill: Silty Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP133	0-0.2	Fill: Silty Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH134	0-0.2	Fill: Silty Sandy Gravel	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP135	0-0.2	Fill: Silty Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP136	0-0.2	Fill: Silty Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH137	0.3-0.6	Fill: Silty Gravelly Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH139	0.05-0.3	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH140	0.05-0.3	Fill: Silty Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH140	0.05-0.3	Fill: Silty Gravelly Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH140 - [LAB_DUP]	0.05-0.3	Fill: Silty Gravelly Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH141	0.3-0.5	Fill: Silty Gravelly Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH141	0-0.2	Fill: Silty Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP142	0-0.2	Fill: Silty Gravelly Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH143	0-0.2	Fill: Silty Sandy Gravel	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH144	0-0.2	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH145	0.5-0.95	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH146	0-0.2	Fill: Silty Sandy Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH146	1.3-1.5	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SOU19	-	Fill: Silty Sandy Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SOU19A	-	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SOU19 - [LAB_DUP]	-	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SOU19D	-	Fill: Silty Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SOU19E	-	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SOU19E - [LAB_DUP]	-	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SOU19H	-	Fill: Silty Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SOU19I	-	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SOU19I - [LAB_DUP]	-	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SOU19J	-	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SOU19K	-	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SOU19L	-	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SOU19L - [LAB_DUP]	-	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SOU19M	-	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SOU19M - [LAB_DUP]	-	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SOU19N	-	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SOU19N - [LAB_DUP]	-	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SOU19O	-	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SOU19O - [LAB_DUP]	-	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SOU19P	-	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SOU19P - [LAB_DUP]	-	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SOU19Q	-	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SOU19Q - [LAB_DUP]	-	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SOU19R	-	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SOU19R - [LAB_DUP]	-	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SOU19S	-	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SOU19S - [LAB_DUP]	-	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SOU19T	-	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SOU19T - [LAB_DUP]	-	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SOU19U	-	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SOU19U - [LAB_DUP]	-	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SOU19V	-	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SOU19V - [LAB_DUP]	-	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SOU19W	-	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SOU19W - [LAB_DUP]	-	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SOU19X	-	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SOU19X - [LAB_DUP]	-	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SOU19Y	-	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SOU19Y - [LAB_DUP]	-	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SOU19Z	-	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SOU19Z - [LAB_DUP]	-	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SOU19AA	-	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SOU19AA - [LAB_DUP]	-	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SOU19AB	-	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SOU19AB - [LAB_DUP]	-	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SOU19AC	-	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SOU19AC - [LAB_DUP]	-	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SOU19AD	-	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SOU19AD - [LAB_DUP]	-	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SOU19AE	-	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SOU19AE - [LAB_DUP]	-	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SOU19AF	-	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SOU19AF - [LAB_DUP]	-	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SOU19AG	-	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SOU19AG - [LAB_DUP]	-	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SOU19AH	-	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SOU19AH - [LAB_DUP]	-	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SOU19AI	-	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SOU19AI - [LAB_DUP]	-	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SOU19AJ	-	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SOU19AJ - [LAB_DUP]	-	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SOU19AK	-	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SOU19AK - [LAB_DUP]	-	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SOU19AL	-	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SOU19AL - [LAB_D											

TABLE 53 SQL LABORATORY RESULTS COMPARED TO MANAGEMENT LIMITS All data in mg/kg unless stated otherwise					
		C _u -C ₁₀ (F1) plus BTEX	>C ₁₀ -C ₁₀ (F2) plus naphthalene	>C ₁₀ -C ₁₀ (F3)	>C ₁₀ -C ₁₀ (F4)
PQL - Envirolab Services		25	50	100	100
NEPM 2013 Land Use Category					
Sample Reference	Sample Depth	Soil Texture	COMMERCIAL/INDUSTRIAL		
TP101	0-0.3	Coarse	<25	130	<100
TP102	0-0.25	Coarse	<25	<50	<100
TP102 - [LAB_DUP]	0-0.25	Coarse	<25	<50	<100
TP102	0.3-0.5	Coarse	<25	<50	<100
BH103	0-0.2	Coarse	<25	<50	<100
BH103	0.4-0.8	Coarse	<25	<50	<100
TP104	0-0.1	Coarse	<25	<50	180
TP104	0.2-0.4	Coarse	<25	<50	<100
BH105	0.03-0.3	Coarse	<25	<50	160 240
BH106	0.19-0.4	Coarse	<25	<50	<100
BH106	0.8-0.95	Fine	<25	<50	<100
BH107	0.22-0.5	Coarse	<25	<50	<100
BH108	0.03-0.2	Coarse	<25	<50	210 330
BH108 - [LAB_DUP]	0.03-0.2	Coarse	<25	<50	120 190
BH109	0-0.2	Coarse	<25	<50	140
BH110	0-0.2	Coarse	<25	<50	<100
BH111	0.2-0.5	Coarse	<25	<50	<100
BH111	0.5-0.95	Coarse	<25	<50	<100
BH112	0-0.2	Coarse	<25	<50	<100
BH112	0.4-0.5	Coarse	<25	<50	<100
BH113	0-0.2	Coarse	<25	<50	140 110
TP114	0-0.2	Coarse	<25	<50	460 520
TP115	0-0.2	Coarse	<25	<50	<100
BH116	0.03-0.3	Coarse	<25	<50	<100
BH116 - [LAB_DUP]	0.03-0.3	Coarse	<25	<50	<100
BH116	0.3-0.5	Fine	<25	<50	<100
TP117	0-0.1	Coarse	<25	<50	290 340
BH118	0-0.2	Coarse	<25	<50	<100
BH119	0.16-0.3	Coarse	<25	<50	<100
TP120	0-0.1	Coarse	<25	<50	<100
TP121	0-0.2	Coarse	<25	<50	<100
TP122	0-0.2	Coarse	<25	<50	<100
TP122	0.6-0.8	Coarse	<25	<50	160 220
BH123	0-0.1	Coarse	<25	<50	<100
TP124	0-0.2	Coarse	<25	<50	200
TP125	0-0.2	Coarse	<25	<50	340 320
TP125 - [LAB_DUP]	0-0.2	Coarse	<25	<50	330 360
TP126	0-0.2	Coarse	<25	<50	200 300
BH127	0-0.2	Coarse	<25	<50	<100
BH128	0-0.2	Coarse	<25	<50	<100
BH128	1.3-1.5	Coarse	<25	<50	<100
BH129	0.5-0.7	Coarse	<25	<50	<100
TP130	0-0.2	Coarse	<25	<50	270 280
BH131	0-0.2	Coarse	<25	<50	<100
TP132	0-0.15	Coarse	<25	<50	320 300
TP132 - [LAB_DUP]	0-0.15	Coarse	<25	<50	330 360
TP133	0-0.2	Coarse	<25	<50	400 360
BH134	0-0.2	Coarse	<25	<50	<100
TP135	0-0.2	Coarse	<25	<50	<100
TP136	0-0.1	Coarse	<25	<50	220 270
BH137	0-0.3	Coarse	<25	<50	180 220
BH138	0.05-0.3	Coarse	<25	<50	<100
BH139	0.05-0.3	Coarse	<25	<50	<100
BH140	0.05-0.3	Coarse	<25	<50	190 270
BH140 - [LAB_DUP]	0.05-0.3	Coarse	<25	<50	190 290
BH140	0.3-0.5	Coarse	<25	<50	<100
BH141	0-0.2	Coarse	<25	<50	<100
BH142	0-0.2	Coarse	<25	<50	<100
BH143	0-0.2	Coarse	<25	<50	<100
TP144	0-0.1	Coarse	<25	<50	420 390
BH145	0-0.2	Coarse	<25	<50	<100
BH145	0.5-0.95	Coarse	<25	<50	<100
BH146	0-0.2	Coarse	<25	<50	<100
BH146	1.3-1.5	Coarse	<25	<50	<100
SDUP1	-	Coarse	<25	<50	<100
SDUP4	-	Coarse	<25	<50	<100
SDUP7	-	Coarse	<25	<50	<100
SDUP7 - [LAB_DUP]	-	Coarse	<25	<50	<100
SDUP10	-	Coarse	<25	<50	<100
SDUP101	-	Coarse	<25	<50	<100
SDUP101 - [LAB_DUP]	-	Coarse	<25	NA	NA
SDUP102	-	Coarse	<25	<50	<100
SDUP102 - [LAB_DUP]	-	Coarse	<25	NA	<100
SDUP103	-	Coarse	<25	<50	<100
SDUP111	-	Coarse	<25	<50	<100
Total Number of Samples		74	74	74	74
Maximum Value		<PQL	130	460	540
Concentration above the SAC		VALUE			
Concentration above the PQL		Bold			

MANAGEMENT LIMIT ASSESSMENT CRITERIA						
Sample Reference	Sample Depth	Soil Texture	C _u -C ₁₀ (F1) plus BTEX	>C ₁₀ -C ₁₀ (F2) plus naphthalene	>C ₁₀ -C ₁₀ (F3)	>C ₁₀ -C ₁₀ (F4)
TP101	0-0.3	Coarse	700	1000	3500	10000
TP102	0-0.25	Coarse	700	1000	3500	10000
TP102 - [LAB_DUP]	0-0.25	Coarse	700	1000	3500	10000
TP102	0.3-0.5	Coarse	700	1000	3500	10000
BH103	0-0.2	Coarse	700	1000	3500	10000
BH103	0.4-0.8	Coarse	700	1000	3500	10000
TP104	0-0.1	Coarse	700	1000	3500	10000
TP104	0.2-0.4	Coarse	700	1000	3500	10000
BH105	0.03-0.3	Coarse	700	1000	3500	10000
BH106	0.19-0.4	Coarse	700	1000	3500	10000
BH106	0.8-0.95	Fine	800	1000	5000	10000
BH107	0.22-0.5	Coarse	700	1000	3500	10000
BH108	0.03-0.2	Coarse	700	1000	3500	10000
BH108 - [LAB_DUP]	0.03-0.2	Coarse	700	1000	3500	10000
BH109	0-0.2	Coarse	700	1000	3500	10000
BH110	0-0.2	Coarse	700	1000	3500	10000
BH111	0.2-0.5	Coarse	700	1000	3500	10000
BH111	0.5-0.95	Coarse	700	1000	3500	10000
BH112	0-0.2	Coarse	700	1000	3500	10000
BH112	0.4-0.5	Coarse	700	1000	3500	10000
BH113	0-0.2	Coarse	700	1000	3500	10000
TP114	0-0.2	Coarse	700	1000	3500	10000
TP115	0-0.2	Coarse	700	1000	3500	10000
BH116	0.03-0.3	Coarse	700	1000	3500	10000
BH116 - [LAB_DUP]	0.03-0.3	Coarse	700	1000	3500	10000
BH116	0.3-0.5	Fine	800	1000	5000	10000
TP117	0-0.1	Coarse	700	1000	3500	10000
BH118	0-0.2	Coarse	700	1000	3500	10000
BH119	0.16-0.3	Coarse	700	1000	3500	10000
TP120	0-0.2	Coarse	700	1000	3500	10000
TP121	0-0.2	Coarse	700	1000	3500	10000
TP122	0-0.2	Coarse	700	1000	3500	10000
TP122	0.6-0.8	Coarse	700	1000	3500	10000
BH123	0-0.2	Coarse	700	1000	3500	10000
TP124	0-0.2	Coarse	700	1000	3500	10000
TP125	0-0.2	Coarse	700	1000	3500	10000
TP125 - [LAB_DUP]	0-0.2	Coarse	700	1000	3500	10000
TP126	0-0.2	Coarse	700	1000	3500	10000
BH127	0-0.2	Coarse	700	1000	3500	10000
BH128	0-0.2	Coarse	700	1000	3500	10000
BH128	1.3-1.5	Coarse	700	1000	3500	10000
BH129	0.5-0.7	Coarse	700	1000	3500	10000
TP130	0-0.2	Coarse	700	1000	3500	10000
BH131	0-0.2	Coarse	700	1000	3500	10000
TP132	0-0.15	Coarse	700	1000	3500	10000
TP132 - [LAB_DUP]	0-0.15	Coarse	700	1000	3500	10000
TP133	0-0.2	Coarse	700	1000	3500	10000
BH134	0-0.2	Coarse	700	1000	3500	10000
TP135	0-0.2	Coarse	700	1000	3500	10000
TP136	0-0.2	Coarse	700	1000	3500	10000
BH137	0-0.3	Coarse	700	1000	3500	10000
BH138	0.05-0.3	Coarse	700	1000	3500	10000
BH139	0.05-0.3	Coarse	700	1000	3500	10000
BH140	0.05-0.3	Coarse	700	1000	3500	10000
BH140 - [LAB_DUP]	0.05-0.3	Coarse	700	1000	3500	10000
BH140	0.3-0.5	Coarse	700	1000	3500	10000
BH141	0-0.2	Coarse	700	1000	3500	10000
BH142	0-0.2	Coarse	700	1000	3500	10000
BH143	0-0.2	Coarse	700	1000	3500	10000
TP144	0-0.2	Coarse	700	1000	3500	10000
BH145	0-0.2	Coarse	700	1000	3500	10000
BH145	0.5-0.95	Coarse	700	1000	3500	10000
BH146	0-0.2	Coarse	700	1000	3500	10000
BH146	1.3-1.5	Coarse	700	1000	3500	10000
SDUP1	-	Coarse	700	1000	3500	10000
SDUP4	-	Coarse	700	1000	3500	10000
SDUP7	-	Coarse	700	1000	3500	10000
SDUP7 - [LAB_DUP]	-	Coarse	700	1000	3500	10000
SDUP10	-	Coarse	700	1000	3500	10000
SDUP101	-	Coarse	700	1000	3500	10000
SDUP101 - [LAB_DUP]	-	Coarse	700	NA	NA	NA
SDUP102	-	Coarse	700	1000	3500	10000
SDUP102 - [LAB_DUP]	-	Coarse	700	NA	3500	10000
SDUP103	-	Coarse	700	1000	3500	10000
SDUP111	-	Coarse	700	1000	3500	10000

TABLE S4 SOIL LABORATORY RESULTS COMPARED TO DIRECT CONTACT CRITERIA All data in mg/kg unless stated otherwise											
Analyte	C ₆ -C ₁₀	>C ₁₀ -C ₁₆	>C ₁₆ -C ₃₄	>C ₃₄ -C ₄₀	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene	PID	
PQL - Envirolab Services	25	50	100	100	0.2	0.5	1	1	1		
CRC 2011 -Direct contact Criteria	26,000	20,000	27,000	38,000	430	99,000	27,000	81,000	11,000		
Site Use	COMMERCIAL/INDUSTRIAL - DIRECT SOIL CONTACT										
Sample Reference	Sample Depth										
TP101	0-0.3	<25	130	290	<100	<0.2	<0.5	<1	<3	<1	0
TP102	0-0.25	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
TP102 - [LAB_DUP]	0-0.25	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
TP102	0.3-0.5	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH103	0-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH103	0.4-0.8	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0.1
TP104	0-0.1	<25	<50	340	180	<0.2	<0.5	<1	<3	<1	0
TP104	0.2-0.4	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH105	0.03-0.3	<25	<50	160	240	<0.2	<0.5	<1	<3	<1	0
BH106	0.19-0.4	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH106	0.8-0.95	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH107	0.22-0.5	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH108	0.03-0.2	<25	<50	210	330	<0.2	<0.5	<1	<3	<1	0
BH108 - [LAB_DUP]	0.03-0.2	<25	<50	120	190	<0.2	<0.5	<1	<3	<1	0
BH109	0-0.2	<25	<50	140	<100	<0.2	<0.5	<1	<3	<1	0
BH110	0-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH111	0.2-0.5	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH111	0.5-0.95	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH112	0-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH112	0.4-0.5	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH113	0-0.2	<25	<50	140	110	<0.2	<0.5	<1	<3	<1	0
TP114	0-0.2	<25	<50	460	520	<0.2	<0.5	<1	<3	<1	0
TP115	0-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH116	0.03-0.3	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH116 - [LAB_DUP]	0.03-0.3	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH116	0.3-0.5	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
TP117	0-0.2	<25	<50	290	540	<0.2	<0.5	<1	<3	<1	0
BH118	0-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH119	0.16-0.3	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
TP120	0-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
TP121	0-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
TP122	0-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
TP122	0.6-0.8	<25	<50	160	220	<0.2	<0.5	<1	<3	<1	0
BH123	0-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
TP124	0-0.2	<25	<50	200	<100	<0.2	<0.5	<1	<3	<1	0
TP125	0-0.2	<25	<50	340	320	<0.2	<0.5	<1	<3	<1	0
TP125 - [LAB_DUP]	0-0.2	<25	<50	330	360	<0.2	<0.5	<1	<3	<1	0
TP126	0-0.2	<25	<50	200	300	<0.2	<0.5	<1	<3	<1	0
BH127	0-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH128	0-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH128	1.3-1.5	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH129	0.5-0.7	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
TP130	0-0.2	<25	<50	270	280	<0.2	<0.5	<1	<3	<1	0
BH131	0-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
TP132	0-0.15	<25	<50	320	300	<0.2	<0.5	<1	<3	<1	0
TP132 - [LAB_DUP]	0-0.15	<25	<50	330	330	<0.2	<0.5	<1	<3	<1	0
TP133	0-0.2	<25	<50	400	360	<0.2	<0.5	<1	<3	<1	0
BH134	0-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
TP135	0-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
TP136	0-0.2	<25	<50	220	270	<0.2	<0.5	<1	<3	<1	0
BH137	0-0.3	<25	<50	180	220	<0.2	<0.5	<1	<3	<1	0
BH138	0.05-0.3	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH139	0.05-0.3	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH140	0.05-0.3	<25	<50	190	270	<0.2	<0.5	<1	<3	<1	0
BH140 - [LAB_DUP]	0.05-0.3	<25	<50	190	290	<0.2	<0.5	<1	<3	<1	0
BH140	0.3-0.5	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH141	0-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH142	0-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH143	0-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
TP144	0-0.2	<25	<50	420	390	<0.2	<0.5	<1	<3	<1	0
BH145	0-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH145	0.5-0.95	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH146	0-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH146	1.3-1.5	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
SDUP1	-	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	-
SDUP4	-	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
SDUP7	-	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
SDUP7 - [LAB_DUP]	-	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
SDUP10	-	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
SDUP101	-	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
SDUP101 - [LAB_DUP]	-	<25	NA	NA	NA	<0.2	<0.5	<1	<3	<1	0
SDUP102	-	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
SDUP102 - [LAB_DUP]	-	NA	<50	<100	<100	NA	NA	NA	NA	NA	0
SDUP103	-	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
SDUP111	-	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
Total Number of Samples		74	74	74	74	74	74	74	74	74	74
Maximum Value		<PQL	130	460	540	<PQL	<PQL	<PQL	<PQL	<PQL	0.1
Concentration above the SAC		VALUE									
Concentration above the PQL		Bold									

TABLE S5
ASBESTOS QUANTIFICATION - FIELD OBSERVATIONS AND LABORATORY RESULTS
HIL-D:Commercial/Industrial

FIELD DATA													LABORATORY DATA												
Date Sampled	Sample reference	Sample Depth	Visible ACM in top 100mm	Soil Mass (g)	Mass ACM (g)	Mass Asbestos in ACM (g)	[Asbestos from ACM in soil] (%w/w)	Mass ACM <7mm (g)	Mass Asbestos in ACM <7mm (g)	[Asbestos from ACM <7mm in soil] (%w/w)	Mass FA (g)	Mass Asbestos in FA (g)	[Asbestos from FA in soil] (%w/w)	Lab Report Number	Sample reference	Sample Depth	Sample Mass (g)	Asbestos ID in soil (A54964) >0.1g/kg	Trace Analysis	Total Asbestos (g/kg)	Asbestos ID in soil <0.1g/kg	ACM >7mm Estimation (g)	FA and AF Estimation (g)	ACM >7mm Estimation % (w/w)	FA and AF Estimation % (w/w)
SAC		No		0.05				0.001				0.001													
3.2.21	TP101	0-0.3	No	10,700	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	261320	TP101	0-0.3	538.32	No asbestos detected at reporting limit of 0.1g/kg; Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	--	--	0.05	<0.001
3.2.21	TP102	0-0.25	No	15,600	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3.2.21	TP102	0.25-0.75	NA	12,400	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	261320	TP102	0.3-0.5	545.62	No asbestos detected at reporting limit of 0.1g/kg; Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	--	--	<0.01	<0.001
2.2.21	BH103	0-0.4	No	1,800	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2.2.21	BH103	0.4-1.4	NA	9,800	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	261320	BH103	0.4-0.8	720.98	No asbestos detected at reporting limit of 0.1g/kg; Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	--	--	<0.01	<0.001
2.2.21	BH103	1.8-2.5	NA	4,300	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3.2.21	BH104	0-0.1	No	8,900	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3.2.21	BH104	0.1-0.5	NA	16,700	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5.2.21	BH105	0.03-0.8	No	12,500	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4.2.21	BH106	0.19-0.8	NA	8,600	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	261320	BH106	0.19-0.4	710.64	No asbestos detected at reporting limit of 0.1g/kg; Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	--	--	<0.01	<0.001
--	--	--	--	--	--	--	--	--	--	--	--	--	--	261320	BH107	0.22-0.5	482.11	No asbestos detected at reporting limit of 0.1g/kg; Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	--	--	<0.01	<0.001
4.2.21	BH108	0.03-0.2	No	3,400	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	261320	BH108	0.03-0.2	751.21	No asbestos detected at reporting limit of 0.1g/kg; Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	--	--	<0.01	<0.001
2.2.21	BH109	0-0.4	No	7,800	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	261320	BH109	0-0.2	303.44	No asbestos detected at reporting limit of 0.1g/kg; Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	--	--	<0.01	<0.001
5.2.21	BH110	0-0.4	No	10,200	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	261320	BH110	0-0.2	392.04	No asbestos detected at reporting limit of 0.1g/kg; Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	--	--	<0.01	<0.001
2.2.21	BH111	0.5-1.5	NA	9,500	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	261320	BH111	0.5-0.95	531.35	No asbestos detected at reporting limit of 0.1g/kg; Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	--	--	<0.01	<0.001
2.2.21	BH112	0-0.4	No	9,300	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	261320	BH112	0-0.2	556.22	No asbestos detected at reporting limit of 0.1g/kg; Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	--	--	<0.01	<0.001
2.2.21	BH112	0.4-1.4	NA	8,700	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5.2.21	BH113	0-0.2	No	11,200	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4.2.21	TP114	0-0.3	No	16,600	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	261320	TP114	0-0.2	889.05	No asbestos detected at reporting limit of 0.1g/kg; Organic fibres detected; Synthetic mineral fibres detected	No asbestos detected	<0.1	No visible asbestos detected	--	--	<0.01	<0.001
4.2.21	TP115	0-0.2	No	13,400	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4.2.21	BH116	0.03-0.3	No	4,900	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	261320	BH116	0.03-0.3	876.24	No asbestos detected at reporting limit of 0.1g/kg; Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	--	--	<0.01	<0.001
4.2.21	TP117	0-0.2	No	15,200	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3.2.21	BH118	0-0.3	No	3,500	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	261320	BH118	0-0.2	868.87	No asbestos detected at reporting limit of 0.1g/kg; Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	--	--	<0.01	<0.001
3.2.21	BH118	0.3-1.3	NA	11,600	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	261320	BH118	0.2-0.4	643.21	No asbestos detected at reporting limit of 0.1g/kg; Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	--	--	<0.01	<0.001
2.2.21	BH119	0.16-0.4	No	3,000	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	261320	BH119	0.16-0.3	935.55	No asbestos detected at reporting limit of 0.1g/kg; Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	--	--	<0.01	<0.001
3.2.21	TP120	0-0.2	No	13,300	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	261320	TP120	0-0.2	671.59	No asbestos detected at reporting limit of 0.1g/kg; Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	--	--	<0.01	<0.001
3.2.21	TP120	0.2-0.5	NA	12,700	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3.2.21	TP121	0-0.5	No	14,600	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	261320	TP121	0-0.2	459.34	No asbestos detected at reporting limit of 0.1g/kg; Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	--	--	<0.01	<0.001
3.2.21	TP121	0.5-1.1	NA	13,800	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3.2.21	TP121	1.1-1.7	NA	12,900	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3.2.21	TP122	0-0.6	No	14,900	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3.2.21	TP122	0.6-1.4	NA	13,600	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	261320	TP122	0.6-0.8	613.32	No asbestos detected at reporting limit of 0.1g/kg; Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	--	--	<0.01	<0.001
3.2.21	TP122	1.4-1.9	NA	1,900	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3.2.21	BH123	0-0.3	No	5,400	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	261320	BH123	0-0.2	745.88	No asbestos detected at reporting limit of 0.1g/kg; Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	--	--	<0.01	<0.001
3.2.21	BH123	0.3-1.0	NA	10,600	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4.2.21	TP124	0-0.2	No	15,200	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	261320	TP124	0-0.2	955.5	No asbestos detected at reporting limit of 0.1g/kg; Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	--	--	<0.01	<0.001
4.2.21	TP125	0-0.2	No	14,900	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	261320	TP125	0-0.2	917.15	No asbestos detected at reporting limit of 0.1g/kg; Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	--	--	<0.01	<0.001
4.2.21	TP126	0-0.3	No	14,800	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	261320	TP126	0-0.2	973.16	No asbestos detected at reporting limit of 0.1g/kg; Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	--	--	<0.01	<0.001
3.2.21	BH127	0-0.2	No	10,900	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--	--	--	261320	BH128	0-0.2	638.2	No asbestos detected at reporting limit of 0.1g/kg; Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	--	--	<0.01	<0.001
1.2.21	BH128	0.2-0.4	No	4,400	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1.2.21	BH128	0.4-1.3	NA	10,400	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1.2.21	BH128	1.3-2.1	NA	4,800	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	261320	BH128	1.3-1.5	691.5	No asbestos detected at reporting limit of 0.1g/kg; Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	--	--	<0.01	<0.001
1.2.21	BH129	0.5-1.0	No	2,100	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	261320	BH129	0.5-0.7	714.71	No asbestos detected at reporting limit of 0.1g/kg; Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	--	--	<0.01	<0.001
1.2.21	BH129	1.0-2.0	NA	12,300	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1.2.21	BH129	2.0-2.8	NA	11,400	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3.2.21	TP130	0-0.3	No	12,700	No ACM observed	--																			

TABLE 55
SOIL LABORATORY RESULTS COMPARED TO NEMP 2013 EILs AND ESIs
All data in mg/kg unless stated otherwise

Land Use Category				AGED HEAVY METALS EILs										COMMERCIAL/INDUSTRIAL										EILs									
				pH		CEC (cmol/kg)		Clay Content (%)		Arsenic	Chromium	Copper	Lead	Nickel	Zinc	Naphthalene	DDT	C ₁₀ -C ₁₄ (F1)	ΣC ₁₀ -C ₁₄ (F2) plus naphthalene	ΣC ₁₀ -C ₁₄ (F3)	ΣC ₁₀ -C ₁₄ (F4)	Benzene	Toluene	Ethylbenzene	Total Xylenes	Bis(P)							
POL - Enrolment Services				-	1	-	-	-	4	1	1	1	1	1	1	1	0.1	25	50	100	100	0.2	0.5	1	1	0.05							
Ambient Background Concentration (ABC)				-	-	-	-	-	NSL	13	28	163	5	122	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL						
Sample Reference	Sample Depth	Sample Description	Soil Texture																														
TP101	0-0.3	Fil: Silty Clay	Coarse	NA	NA	NA	18	19	20	20	11	45	<1	NA	<25	130	290	<100	<0.2	<0.5	<1	<3	0.08										
TP102	0-0.25	Fil: Silty Clay	Coarse	NA	NA	NA	14	22	14	22	7	39	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05										
TP102	0.4-0.5	Fil: Silty Clay	Coarse	NA	NA	NA	13	23	16	26	7	47	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05										
BH101	0.1-0.5	Fil: Silty Clay	Coarse	NA	NA	NA	8	15	14	12	5	18	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05										
BH103	0-0.2	Fil: Silty Clay	Coarse	NA	NA	NA	6	14	17	24	7	74	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05										
BH103	0.4-0.8	Fil: Silty Clay	Coarse	NA	NA	NA	9	12	20	14	7	34	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05										
TP104	0-0.1	Fil: Silty Sand	Coarse	NA	NA	NA	<4	95	29	17	11	74	<1	<0.1	<25	<50	340	180	<0.2	<0.5	<1	<3	<0.05										
TP104	0.2-0.4	Fil: Silty Clayey Sand	Coarse	NA	NA	NA	<4	13	24	3	56	26	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05										
BH105	0.03-0.3	Fil: Silty Sandy Gravel	Coarse	NA	20	NA	<4	10	41	<1	130	35	<1	NA	<25	<50	160	240	<0.2	<0.5	<1	<3	<0.05										
BH106	0.19-0.4	Fil: Silty Sand	Coarse	NA	NA	NA	<4	2	3	2	3	10	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05										
BH106	0.8-0.95	Silty Clay	Fine	NA	NA	NA	6	3	12	4	1	15	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05										
BH107	0.22-0.5	Fil: Silty Clay	Coarse	NA	NA	NA	4	8	22	11	12	46	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05										
BH108	0.03-0.2	Fil: Silty Gravelly Sand	Coarse	NA	28	NA	<4	7	37	1	84	26	<1	<0.1	<25	<50	210	330	<0.2	<0.5	<1	<3	<0.05										
BH108 - [LAB_DUP]	0.03-0.2	Fil: Silty Gravelly Sand	Coarse	NA	28	NA	<4	10	46	2	95	31	<1	<0.1	<25	<50	120	190	<0.2	<0.5	<1	<3	<0.05										
BH109	0-0.2	Fil: Silty Sand	Coarse	NA	NA	NA	<4	7	14	10	8	69	<1	NA	<25	<50	140	130	<0.2	<0.5	<1	<3	<0.05										
BH110	0-0.2	Fil: Silty Clay	Coarse	NA	NA	NA	<4	21	26	16	38	79	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05										
BH111	0.2-0.5	Fil: Silty Clay	Coarse	NA	16	NA	<4	29	33	3	130	42	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05										
BH111	0.5-0.95	Fil: Silty Clay	Coarse	NA	NA	NA	9	19	18	16	9	29	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05										
BH112	0-0.2	Fil: Silty Clay	Coarse	NA	NA	NA	24	20	19	27	12	65	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05										
BH112	0.4-0.5	Fil: Silty Clay	Coarse	NA	NA	NA	6	14	13	11	10	33	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05										
BH113	0-0.2	Fil: Silty Clay	Coarse	NA	NA	NA	6	12	15	14	11	64	<1	NA	<25	<50	140	130	<0.2	<0.5	<1	<3	<0.05										
TP114	0-0.2	Fil: Silty Sand	Coarse	NA	NA	NA	<4	18	25	7	23	150	<1	NA	<25	<50	460	520	<0.2	<0.5	<1	<3	<0.05										
TP115	0-0.2	Fil: Silty Sand	Coarse	NA	NA	NA	<4	21	15	2	31	22	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05										
BH116	0.03-0.3	Fil: Silty Clay	Coarse	NA	NA	NA	<4	26	19	4	38	13	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05										
BH116 - [LAB_DUP]	0.03-0.3	Fil: Silty Clay	Coarse	NA	NA	NA	<4	25	19	4	39	14	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05										
BH116	0.3-0.5	Silty Clay	Fine	NA	NA	NA	6	15	12	11	5	11	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05										
TP117	0-0.2	Fil: Silty Sand	Coarse	NA	NA	NA	<4	3	11	3	5	15	<1	NA	<25	<50	290	340	<0.2	<0.5	<1	<3	<0.05										
BH118	0-0.2	Fil: Silty Gravelly Clay	Coarse	NA	NA	NA	<4	4	6	3	11	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<3	0.1											
BH119	0.16-0.3	Fil: Silty Gravelly Clay	Coarse	NA	35	NA	<4	6	19	2	60	25	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05										
TP120	0-0.2	Fil: Silty Sand	Coarse	NA	NA	NA	<4	5	13	12	22	24	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05										
TP121	0-0.2	Fil: Silty Clay	Coarse	NA	NA	NA	6	10	7	5	5	12	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05										
TP122	0-0.2	Fil: Silty Clay	Coarse	NA	NA	NA	<4	13	12	1	6	12	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	0.1										
TP122	0.6-0.8	Fil: Silty Clay	Coarse	NA	NA	NA	<4	6	19	6	23	40	<1	NA	<25	<50	160	220	<0.2	<0.5	<1	<3	0.2										
BH123	0-0.2	Fil: Silty Gravelly Sand	Coarse	NA	NA	NA	<4	20	5	2	3	10	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	0.08										
TP124	0-0.2	Fil: Silty Sand	Coarse	NA	NA	NA	<4	11	8	5	10	16	<1	NA	<25	<50	200	100	<0.2	<0.5	<1	<3	<0.05										
TP125	0-0.2	Fil: Silty Sand	Coarse	NA	NA	NA	<4	22	20	5	24	26	<1	<0.1	<25	<50	340	320	<0.2	<0.5	<1	<3	0.07										
TP125 - [LAB_DUP]	0-0.2	Fil: Silty Sand	Coarse	NA	NA	NA	<4	20	19	4	23	29	<1	<0.1	<25	<50	380	360	<0.2	<0.5	<1	<3	<0.05										
TP126	0-0.2	Fil: Silty Sand	Coarse	NA	NA	NA	<4	17	12	5	19	19	<1	NA	<25	<50	200	300	<0.2	<0.5	<1	<3	<0.05										
BH127	0-0.2	Fil: Silty Sandy Gravel	Coarse	NA	NA	NA	<4	5	7	6	2	7	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05										
BH128	0-0.2	Fil: Silty Sandy Gravel	Coarse	NA	NA	NA	<4	5	7	7	4	12	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05										
BH129	1.3-1.5	Fil: Silty Clay	Coarse	NA	NA	NA	<4	10	11	7	15	22	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<3	0.07										
BH129	0.5-0.7	Fil: Silty Gravelly Sand	Coarse	NA	NA	NA	<4	2	7	4	3	14	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<3	0.05										
TP130	0-0.2	Fil: Silty Clay	Coarse	NA	NA	NA	4	10	61	39	21	130	<1	NA	<25	<50	270	280	<0.2	<0.5	<1	<3	0.2										
BH131	0-0.2	Fil: Silty Gravelly Sand	Coarse	NA	NA	NA	<4	3	5	3	2	10	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<3	0.09										
TP132	0-0.15	Fil: Silty Sand	Coarse	NA	NA	NA	<4	10	11	7	6	31	<1	<0.1	<25	<50	320	300	<0.2	<0.5	<1	<3	<0.05										
TP132 - [LAB_DUP]	0-0.15	Fil: Silty Sand	Coarse	NA	NA	NA	<4	7	8	6	3	16	<1	<0.1	<25	<50	330	330	<0.2	<0.5	<1	<3	<0.05										
TP132 - [TRIPPLICATE]	0-0.15	Fil: Silty Sand	Coarse	NA	NA	NA	<4	9	9	5	7	27	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA								
TP133	0-0.2	Fil: Silty Sand	Coarse	NA	NA	NA	<4	23	23	4	27	38	<1	NA	<25	<50	400	360	<0.2	<0.5	<1	<3	<0.05										
BH134	0-0.2	Fil: Silty Sandy Gravel	Coarse	NA	34	NA	<4	8	52	2	130	37	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05										
TP135	0-0.2	Fil: Silty Sand	Coarse	NA	NA	NA	<4	20	10	4	19	27	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05										
TP136	0-0.2	Fil: Silty Sand	Coarse	NA	NA	NA	<4	21	11	5	24	28	<1	NA	<25	<50	220	270	<0.2	<0.5	<1	<3	<0.05										
BH137	0-0.3	Fil: Silty Gravelly Sand	Coarse	NA	NA	NA	<4	2	1	1	5	<1	NA	<25	<50	180	220	<0.2	<0.5	<1	<3	0.09											
BH138	0.05-0.3	Fil: Silty Clay	Coarse	NA																													

TABLE S7 SOIL LABORATORY RESULTS COMPARED TO WASTE CLASSIFICATION GUIDELINES All data in mg/kg unless stated otherwise																											
			HEAVY METALS							PAHs		OC/OP PESTICIDES				Total PCBs	TRH					BTEX COMPOUNDS				ASBESTOS FIBRES	
			Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc	Total PAHs	B(a)P	Total Endosulfans	Chloropyrifos	Total Moderately Harmful		Total Scheduled	C ₆ -C ₉	C ₁₀ -C ₁₄	C ₁₅ -C ₂₈	C ₂₉ -C ₃₆	Total C ₁₀ -C ₃₆	Benzene	Toluene	Ethyl benzene		Total Xylenes
PQL - Envirolab Services			4	0.4	1	1	1	0.1	1	1	-	0.05	0.1	0.1	0.1	0.1	25	50	100	100	50	0.2	0.5	1	1	100	
General Solid Waste CT1			100	20	100	NSL	100	4	40	NSL	200	0.8	60	4	250	50	50	650	NSL	NSL	10,000	10	288	600	1,000	-	
General Solid Waste SCC1			500	100	1900	NSL	1500	50	1050	NSL	200	10	108	7.5	250	50	50	650	NSL	NSL	10,000	18	518	1,080	1,800	-	
Restricted Solid Waste CT2			400	80	400	NSL	400	16	160	NSL	800	3.2	240	16	1000	50	50	2600	NSL	NSL	40,000	40	1,152	2,400	4,000	-	
Restricted Solid Waste SCC2			2000	400	7600	NSL	6000	200	4200	NSL	800	23	432	30	1000	50	50	2600	NSL	NSL	40,000	72	2,073	4,320	7,200	-	
Sample Reference	Sample Depth	Sample Description	18	<0.4	19	20	20	<0.1	11	45	0.2	0.08	NA	NA	NA	NA	NA	<25	120	200	150	470	<0.2	<0.5	<1	<3	Not Detected
TP101	0-0.3	Fill: Silty Clay	14	<0.4	22	14	22	<0.1	7	39	<0.05	<0.05	<0.1	NA	NA	NA	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	NA
TP102	0-0.25	Fill: Silty Clay	13	<0.4	23	16	26	<0.1	7	47	<0.05	<0.05	<0.1	NA	NA	NA	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	NA
TP102 - [LAB_DUP]	0-0.25	Fill: Silty Clay	8	<0.4	15	14	12	<0.1	5	18	<0.05	<0.05	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	Not Detected	
BH103	0.3-0.5	Fill: Silty Clay	6	<0.4	14	17	24	<0.1	7	74	<0.05	<0.05	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	NA	
BH103	0-0.2	Fill: Silty Clay	9	<0.4	12	20	14	<0.1	7	34	<0.05	<0.05	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	Not Detected	
BH103	0.4-0.8	Fill: Silty Clay	6	<0.4	12	20	14	<0.1	7	74	<0.05	<0.05	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	NA	
TP104	0-0.1	Fill: Silty Sand	<4	<0.4	95	23	17	<0.1	11	74	0.2	<0.05	<0.1	NA	NA	NA	<0.1	<25	<50	180	230	410	<0.2	<0.5	<1	<3	NA
TP104	0.2-0.4	Fill: Silty Clayey Sand	<4	<0.4	13	24	3	<0.1	56	26	0.1	<0.05	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	NA	
BH105	0.03-0.3	Fill: Silty Sandy Gravel	<4	<0.4	10	41	<1	<0.1	130	35	<0.05	<0.05	NA	NA	NA	NA	<25	<50	<100	180	180	<0.2	<0.5	<1	<3	NA	
BH106	0.19-0.4	Fill: Silty Sand	<4	<0.4	2	3	2	<0.1	3	10	<0.05	<0.05	<0.1	NA	NA	NA	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	Not Detected
BH106	0.8-0.95	Silty Clay	6	<0.4	3	12	4	<0.1	1	15	<0.05	<0.05	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	NA	
BH107	0.22-0.5	Fill: Silty Clay	4	<0.4	8	22	11	<0.1	12	46	<0.05	<0.05	<0.1	NA	NA	NA	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	Not Detected
BH108	0.03-0.2	Fill: Silty Gravelly Sand	<4	<0.4	7	37	1	<0.1	84	26	<0.05	<0.05	<0.1	NA	NA	NA	<0.1	<25	<50	<100	240	240	<0.2	<0.5	<1	<3	Not Detected
BH108 - [LAB_DUP]	0.03-0.2	Fill: Silty Gravelly Sand	<4	<0.4	10	45	2	<0.1	95	31	<0.05	<0.05	<0.1	NA	NA	NA	<0.1	<25	<50	<100	140	140	<0.2	<0.5	<1	<3	NA
BH109	0-0.2	Fill: Silty Sand	<4	<0.4	7	14	10	<0.1	8	69	<0.05	<0.05	NA	NA	NA	NA	<25	<50	<100	140	140	<0.2	<0.5	<1	<3	Not Detected	
BH110	0-0.2	Fill: Silty Clay	<4	<0.4	21	26	16	<0.1	38	79	<0.05	<0.05	<0.1	NA	NA	NA	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	Not Detected
BH111	0.2-0.5	Fill: Silty Clay	<4	<0.4	29	33	3	<0.1	130	42	<0.05	<0.05	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	NA	
BH111	0.5-0.95	Fill: Silty Clay	9	<0.4	19	18	16	<0.1	9	29	<0.05	<0.05	<0.1	NA	NA	NA	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	Not Detected
BH112	0-0.2	Fill: Silty Clay	24	<0.4	20	19	27	<0.1	12	65	<0.05	<0.05	<0.1	NA	NA	NA	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	Not Detected
BH112	0.4-0.5	Fill: Silty Clay	6	<0.4	14	13	11	<0.1	10	33	<0.05	<0.05	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	NA	
BH113	0-0.2	Fill: Silty Clay	6	<0.4	12	15	14	<0.1	11	64	<0.05	<0.05	NA	NA	NA	NA	<25	<50	<100	170	170	<0.2	<0.5	<1	<3	NA	
TP114	0-0.2	Fill: Silty Sand	<4	<0.4	18	25	7	<0.1	23	150	0.57	<0.05	NA	NA	NA	NA	<25	<50	<100	210	410	<0.2	<0.5	<1	<3	Not Detected	
TP115	0-0.2	Fill: Silty Sand	<4	<0.4	21	15	2	<0.1	31	22	0.3	<0.05	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	NA	
BH116	0.03-0.3	Fill: Silty Clay	<4	<0.4	26	19	4	<0.1	38	33	0.58	<0.05	<0.1	NA	NA	NA	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	Not Detected
BH116 - [LAB_DUP]	0.03-0.3	Fill: Silty Clay	<4	<0.4	25	23	4	<0.1	39	34	1.2	<0.05	<0.1	NA	NA	NA	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	NA
BH116	0.3-0.5	Silty Clay	6	<0.4	15	12	11	<0.1	5	11	<0.05	<0.05	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	NA	
TP117	0-0.2	Fill: Silty Sand	<4	<0.4	3	55	3	<0.1	5	15	<0.05	<0.05	NA	NA	NA	NA	<25	<50	110	350	460	<0.2	<0.5	<1	<3	NA	
BH118	0-0.2	Fill: Silty Gravelly Clay	<4	<0.4	4	4	6	<0.1	3	11	0.94	0.1	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	Not Detected	
BH118	0.2-0.4	Fill: Silty Clay	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
BH119	0.16-0.3	Fill: Silty Gravelly Clay	<4	<0.4	6	19	2	<0.1	65	25	<0.05	<0.05	<0.1	NA	NA	NA	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	Not Detected
TP120	0-0.2	Fill: Sandy Clay	<4	<0.4	5	13	12	<0.1	22	24	<0.05	<0.05	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	Not Detected	
TP121	0-0.2	Fill: Silty Clay	6	<0.4	6	10	7	<0.1	5	22	<0.05	<0.05	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	Not Detected	
TP122	0-0.2	Fill: Silty Clay	<4	<0.4	6	13	6	<0.1	12	31	0.54	0.1	<0.1	NA	NA	NA	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	NA
TP122	0.6-0.8	Fill: Silty Clay	<4	<0.4	6	19	6	<0.1	23	40	1.9	0.2	NA	NA	NA	NA	<25	<50	<100	180	180	<0.2	<0.5	<1	<3	Not Detected	
BH123	0-0.2	Fill: Silty Gravelly Sand	<4	<0.4	20	5	2	<0.1	3	10	0.74	0.08	<0.1	NA	NA	NA	<0.1	<									

TABLE S8
SOIL LABORATORY TCLP RESULTS
All data in mg/L unless stated otherwise

			Nickel
PQL - Envirolab Services			0.02
TCLP1 - General Solid Waste			2
TCLP2 - Restricted Solid Waste			8
TCLP3 - Hazardous Waste			>8
Sample Reference	Sample Depth	Sample Description	
TP104	0.2-0.4	Fill: Silty Clayey Sand	0.03
BH105	0.03-0.3	Fill: Silty Sandy Gravel	0.3
BH108	0.03-0.2	Fill: Silty Gravelly Sand	0.2
BH111	0.2-0.5	Fill: Silty Clay	0.2
BH119	0.16-0.3	Fill: Silty Gravelly Clay	0.03
BH134	0-0.2	Fill: Silty Sandy Gravel	0.1
Total Number of samples			6
Maximum Value			0.3
General Solid Waste			VALUE
Restricted Solid Waste			VALUE
Hazardous Waste			VALUE
Concentration above PQL			Bold

Result outside of QA/QC acceptance criteria	
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ABBREVIATIONS AND EXPLANATIONS

Abbreviations used in the Tables:

CT:	Contaminant Threshold
FTS:	Fluorotelomer sulfonic acid
NA:	Not Analysed
NC:	Not Calculated
NEMP	National Environmental Management Plan
NSL:	No Set Limit
PFAS	Per- and polyfluoroalkyl substances
PFHxS	Perfluorohexanesulfonic acid
PFOA	Perfluorooctanoic acid
PFOS	Perfluorooctanesulfonic acid
PQL:	Practical Quantitation Limit
RS:	Rinsate Sample
SAC:	Site Assessment Criteria
SCC:	Specific Contaminant Concentration
TB:	Trip Blank
TCLP:	Toxicity Characteristics Leaching Procedure
TS:	Trip Spike
UCL:	Upper Level Confidence Limit on Mean Value

Table Specific Explanations:

Groundwater Ecology Tables:

- 95% refers to a concentration that has been derived to protect 95% of aquatic species
- Statistical calculations are undertaken using ProUCL (USEPA). Statistical calculation is usually undertaken using data from fill samples.

Waste Classification and TCLP Table:

- Data assessed using the Addendum to the NSW EPA Waste Classification Guidelines, Part 1: Classifying Waste (2014) -October 2016

TABLE G1 SUMMARY OF GROUNDWATER LABORATORY RESULTS COMPARED TO ECOLOGICAL GILs SAC All results in µg/L unless stated otherwise.																
	PQL Envirolab Services	ANZG 2018 Fresh Waters	SAMPLES													
			MW103	MW103 - [LAB_DUP]	MW106	MW111	MW123	MW123 - [LAB_DUP]	MW128	MW134	MW139	MW143	PMW1	PMW2	WDUP3	WDUP3 - [LAB_DUP]
Inorganic Compounds and Parameters																
pH		6.5 - 8.5	6.7	6.8	8.3	6.6	6.4	NA	6.9	6.8	6.2	7	NA	NA	NA	NA
Electrical Conductivity (µS/cm)	1	NSL	13000	13000	1500	19000	18000	NA	5500	17000	22000	25000	NA	NA	NA	NA
Turbidity (NTU)		NSL	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals and Metalloids																
Arsenic (As III)	1	24	4	4	1	<1	5	NA	2	25	1	9	NA	NA	1	NA
Cadmium	0.1	0.2	0.1	0.1	<0.1	<0.1	0.5	NA	0.2	<0.1	<0.1	0.7	NA	NA	<0.1	NA
Chromium (SAC for Cr III adopted)	1	3.3	<1	<1	1	1	<1	NA	16	<1	<1	2	NA	NA	1	NA
Copper	1	1.4	<1	<1	2	<1	1	NA	2	<1	<1	<1	NA	NA	3	NA
Lead	1	3.4	<1	<1	<1	<1	<1	NA	<1	<1	<1	<1	NA	NA	<1	NA
Total Mercury (inorganic)	0.05	0.06	0.07	0.07	<0.05	<0.05	<0.05	NA	<0.05	<0.05	<0.05	<0.05	NA	NA	<0.05	NA
Nickel	1	11	11	10	1	3	39	NA	22	30	54	76	NA	NA	1	NA
Zinc	1	8	9	8	7	9	66	NA	48	10	58	45	NA	NA	9	NA
Monocyclic Aromatic Hydrocarbons (BTEX Compounds)																
Benzene	1	950	<1	NA	<1	<1	66	61	<1	<1	<1	<1	<1	<1	<1	<1
Toluene	1	180	<1	NA	<1	<1	4	3	<1	<1	<1	<1	<1	<1	<1	<1
Ethylbenzene	1	80	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
m+p-xylene	2	75	<2	NA	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
o-xylene	1	350	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Total xylenes	2	NSL	<2	NA	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Volatile Organic Compounds (VOCs), including chlorinated VOCs																
Dichlorodifluoromethane	10	NSL	<10	NA	<10	<10	<10	<10	<10	<10	<10	<10	NA	NA	<10	<10
Chloromethane	10	NSL	<10	NA	<10	<10	11	17	<10	<10	<10	<10	NA	NA	<10	<10
Vinyl Chloride	10	100	<10	NA	<10	<10	<10	<10	<10	<10	<10	<10	NA	NA	<10	<10
Bromomethane	10	NSL	<10	NA	<10	<10	<10	<10	<10	<10	<10	<10	NA	NA	<10	<10
Chloroethane	10	NSL	<10	NA	<10	<10	<10	<10	<10	<10	<10	<10	NA	NA	<10	<10
Trichlorofluoromethane	10	NSL	<10	NA	<10	<10	<10	<10	<10	<10	<10	<10	NA	NA	<10	<10
1,1-Dichloroethene	1	700	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
Trans-1,2-dichloroethene	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
1,1-dichloroethane	1	90	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
Cis-1,2-dichloroethene	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
Bromochloromethane	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
Chloroform	1	370	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
2,2-dichloropropane	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
1,2-dichloroethane	1	1900	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
1,1,1-trichloroethane	1	270	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
1,1-dichloropropene	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
Cyclohexane	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
Carbon tetrachloride	1	240	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
Benzene	1	950	<1	NA	<1	<1	66	61	<1	<1	<1	<1	NA	NA	<1	<1
Dibromomethane	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
1,2-dichloropropane	1	900	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
Trichloroethene	1	330	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
Bromodichloromethane	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
trans-1,3-dichloropropene	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
cis-1,3-dichloropropene	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
1,1,2-trichloroethane	1	6500	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
Toluene	1	180	<1	NA	<1	<1	4	3	<1	<1	<1	<1	NA	NA	<1	<1
1,3-dichloropropane	1	1100	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
Dibromochloromethane	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
1,2-dibromoethane	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
Tetrachloroethene	1	70	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
1,1,1,2-tetrachloroethane	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
Chlorobenzene	1	55	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
Ethylbenzene	1	80	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
Bromoform	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
m+p-xylene	2	75	<2	NA	<2	<2	<2	<2	<2	<2	<2	<2	NA	NA	<2	<2
Styrene	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
1,1,2,2-tetrachloroethane	1	400	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
o-xylene	1	350	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
1,2,3-trichloropropane	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
Isopropylbenzene	1	30	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
Bromobenzene	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
n-propyl benzene	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
2-chlorotoluene	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
4-chlorotoluene	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
1,3,5-trimethyl benzene	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1						

TABLE G2 SUMMARY OF GROUNDWATER LABORATORY RESULTS COMPARED TO HUMAN CONTACT GILS All results in µg/L unless stated otherwise.																
	PQL Envirolab Services	Recreational (10 x NHMRC ADWG)	SAMPLES													
			MW103	MW103 - [LAB_DUP]	MW106	MW111	MW123	MW123 - [LAB_DUP]	MW128	MW134	MW139	MW143	PMW1	PMW2	WDUP3	WDUP3 - [LAB_DUP]
Inorganic Compounds and Parameters																
pH		6.5 - 8.5	6.7	6.8	8.3	6.6	6.4	NA	6.9	6.8	6.2	7	NA	NA	NA	NA
Electrical Conductivity (µS/cm)	1	NSL	13000	13000	1500	19000	18000	NA	5500	17000	22000	25000	NA	NA	NA	NA
Turbidity (NTU)		NSL	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals and Metalloids																
Arsenic (As III)	1	100	4	4	1	<1	5	NA	2	25	1	9	NA	NA	1	NA
Cadmium	0.1	20	0.1	0.1	<0.1	<0.1	0.5	NA	0.2	<0.1	<0.1	0.7	NA	NA	<0.1	NA
Chromium (total)	1	500	<1	<1	1	1	<1	NA	16	<1	<1	2	NA	NA	1	NA
Copper	1	20000	<1	<1	2	<1	1	NA	2	<1	<1	<1	NA	NA	3	NA
Lead	1	100	<1	<1	<1	<1	<1	NA	<1	<1	<1	<1	NA	NA	<1	NA
Total Mercury (inorganic)	0.05	10	0.07	0.07	<0.05	<0.05	<0.05	NA	<0.05	<0.05	<0.05	<0.05	NA	NA	<0.05	NA
Nickel	1	200	11	10	1	3	39	NA	22	30	54	76	NA	NA	1	NA
Zinc	1	30000	9	8	7	9	66	NA	48	10	58	45	NA	NA	9	NA
Monocyclic Aromatic Hydrocarbons (BTEX Compounds)																
Benzene	1	10	<1	NA	<1	<1	66	61	<1	<1	<1	<1	<1	<1	<1	<1
Toluene	1	8000	<1	NA	<1	<1	4	3	<1	<1	<1	<1	<1	<1	<1	<1
Ethylbenzene	1	3000	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
m+p-xylene	2	NSL	<2	NA	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
o-xylene	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Total xylenes	2	6000	<2	NA												
Volatile Organic Compounds (VOCs), including chlorinated VOCs																
Dichlorodifluoromethane	10	NSL	<10	NA	<10	<10	<10	<10	<10	<10	<10	<10	NA	NA	<10	<10
Chloromethane	10	NSL	<10	NA	<10	<10	11	17	<10	<10	<10	<10	NA	NA	<10	<10
Vinyl Chloride	10	3	<10	NA	<10	<10	<10	<10	<10	<10	<10	<10	NA	NA	<10	<10
Bromomethane	10	NSL	<10	NA	<10	<10	<10	<10	<10	<10	<10	<10	NA	NA	<10	<10
Chloroethane	10	NSL	<10	NA	<10	<10	<10	<10	<10	<10	<10	<10	NA	NA	<10	<10
Trichlorofluoromethane	10	NSL	<10	NA	<10	<10	<10	<10	<10	<10	<10	<10	NA	NA	<10	<10
1,1-Dichloroethene	1	300	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
Trans-1,2-dichloroethene	1	600	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
1,1-dichloroethane	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
Cis-1,2-dichloroethene	1	600	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
Bromochloromethane	1	2500	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
Chloroform	1		<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1
2,2-dichloropropane	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
1,2-dichloroethane	1	30	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
1,1,1-trichloroethane	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
1,1-dichloropropene	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
Cyclohexane	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
Carbon tetrachloride	1	30	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
Benzene	1	10	<1	NA	<1	<1	66	61	<1	<1	<1	<1	NA	NA	<1	<1
Dibromomethane	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
1,2-dichloropropane	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
Trichloroethene	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
Bromodichloromethane	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
trans-1,3-dichloropropene	1	1000	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
cis-1,3-dichloropropene	1	1000	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
1,1,2-trichloroethane	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
Toluene	1	8000	<1	NA	<1	<1	4	3	<1	<1	<1	<1	NA	NA	<1	<1
1,3-dichloropropane	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
Dibromochloromethane	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
1,2-dibromoethane	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
Tetrachloroethene	1	500	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
1,1,1,2-tetrachloroethane	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
Chlorobenzene	1	3000	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
Ethylbenzene	1	3000	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
Bromoform	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
m+p-xylene	2	NSL	<2	NA	<2	<2	<2	<2	<2	<2	<2	<2	NA	NA	<2	<2
Styrene	1	300	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
1,1,2,2-tetrachloroethane	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
o-xylene	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
1,2,3-trichloropropane	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
Isopropylbenzene	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
Bromobenzene	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
n-propyl benzene	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
2-chlorotoluene	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
4-chlorotoluene	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
1,3,5-trimethyl benzene	1															

TABLE G3
GROUNDWATER LABORATORY RESULTS COMPARED TO HSLs
All data in µg/L unless stated otherwise

				C ₆ -C ₁₀ (F1)	>C ₁₀ -C ₁₆ (F2)	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene	PID
PQL - Envirolab Services				10	50	1	1	1	2	1	
NEPM 2013 - Land Use Category				HSL-D: COMMERCIAL/INDUSTRIAL							
Sample Reference	Water Depth	Depth Category	Soil Category								
MW103	4.78	4m to <8m	Sand	<10	<50	<1	<1	<1	<2	<1	0.5
MW106	1.5	0m to <2m	Sand	<10	<50	<1	<1	<1	<2	<1	0.2
MW111	5.13	4m to <8m	Sand	<10	<50	<1	<1	<1	<2	<1	3.2
MW123	4.77	4m to <8m	Sand	41	60	66	4	<1	<2	<1	1.3
MW123 - [LAB_DUP]	4.77	4m to <8m	Sand	56	NA	61	3	<1	<2	<1	1.3
MW128	4.2	0m to <2m	Sand	<10	85	<1	<1	<1	<2	<1	4.2
MW134	4.25	4m to <8m	Sand	<10	<50	<1	<1	<1	<2	<1	0.3
MW139	4.71	0m to <2m	Sand	<10	<50	<1	<1	<1	<2	<1	0
MW143	3.08	2m to <4m	Sand	<10	<50	<1	<1	<1	<2	<1	0.3
PMW1	3.2	2m to <4m	Sand	<10	<50	<1	<1	<1	<2	<1	0.1
PMW2	0.32	0m to <2m	Sand	<10	<50	<1	<1	<1	<2	<1	0
WDUP3	1.5	0m to <2m	Sand	<10	<50	<1	<1	<1	<2	<1	NA
WDUP3 - [LAB_DUP]	1.5	0m to <2m	Sand	<10	100	<1	<1	<1	<2	<1	NA
Total Number of Samples				13	12	13	13	13	13	13	11
Maximum Value				56	85	66	4	<PQL	<PQL	<PQL	4.2

Concentration above the SAC

VALUE

Site specific assesment (SSA) required

VALUE

Concentration above the PQL

Bold

The guideline corresponding to the elevated value is highlighted in grey in the Groundwater Assessment Criteria Table below

HSL GROUNDWATER ASSESSMENT CRITERIA

Sample Reference	Water Depth	Depth Category	Soil Category	C ₆ -C ₁₀ (F1)	>C ₁₀ -C ₁₆ (F2)	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene
MW103	4.78	4m to <8m	Sand	6000	NL	5000	NL	NL	NL	NL
MW106	1.5	0m to <2m	Sand	SSA	SSA	SSA	SSA	SSA	SSA	SSA
MW111	5.13	4m to <8m	Sand	6000	NL	5000	NL	NL	NL	NL
MW123	4.77	4m to <8m	Sand	6000	NL	5000	NL	NL	NL	NL
MW123 - [LAB_DUP]	4.77	4m to <8m	Sand	6000	NL	5000	NL	NL	NL	NL
MW128	4.2	0m to <2m	Sand	SSA	SSA	SSA	SSA	SSA	SSA	SSA
MW134	4.25	4m to <8m	Sand	6000	NL	5000	NL	NL	NL	NL
MW139	4.71	0m to <2m	Sand	SSA	SSA	SSA	SSA	SSA	SSA	SSA
MW143	3.08	2m to <4m	Sand	6000	NL	5000	NL	NL	NL	NL
PMW1	3.2	2m to <4m	Sand	6000	NL	5000	NL	NL	NL	NL
PMW2	0.32	0m to <2m	Sand	SSA	SSA	SSA	SSA	SSA	SSA	SSA
WDUP3	1.5	0m to <2m	Sand	SSA	SSA	SSA	SSA	SSA	SSA	SSA
WDUP3 - [LAB_DUP]	1.5	0m to <2m	Sand	SSA	SSA	SSA	SSA	SSA	SSA	SSA

TABLE G4 GROUNDWATER LABORATORY RESULTS COMPARED TO SITE SPECIFIC HSLs - RISK ASSESSMENT All results in µg/L unless stated otherwise.											
	PQL	NHMRC	WHO 2008	USEPA RSL							
	Envirolab	ADWG 2011		Tapwater	MW106	MW128	MW139	PMW1	PMW2	WDUP3	WDUP3 - [LAB_DUP]
	Services	(v3.5 2018)		2017							
Total Recoverable Hydrocarbons (TRH)											
C ₆ -C ₉ Aliphatics (assessed using F1)	10	-	15000	-	<10	<10	<10	<10	<10	<10	<10
>C ₉ -C ₁₄ Aliphatics (assessed using F2)	50	-	100	-	<50	85	<50	<50	<50	<50	100
Monocyclic Aromatic Hydrocarbons (BTEX Compounds)											
Benzene	1	1	-	-	<1	<1	<1	<1	<1	<1	<1
Toluene	1	800	-	-	<1	<1	<1	<1	<1	<1	<1
Ethylbenzene	1	300	-	-	<1	<1	<1	<1	<1	<1	<1
Total xylenes	2	600	-	-	<2	<2	<2	<2	<2	<2	<2
Polycyclic Aromatic Hydrocarbons (PAHs)											
Naphthalene	1	-	-	6.1	<1	<1	<1	<1	<1	<1	<1
Volatile Organic Compounds (VOCs), including chlorinated VOCs											
Dichlorodifluoromethane	10	-	-	-	<10	<10	<10	NA	NA	<10	<10
Chloromethane	10	-	-	-	<10	<10	<10	NA	NA	<10	<10
Vinyl Chloride	10	0.3	-	-	<10	<10	<10	NA	NA	<10	<10
Bromomethane	10	-	-	-	<10	<10	<10	NA	NA	<10	<10
Chloroethane	10	-	-	-	<10	<10	<10	NA	NA	<10	<10
Trichlorofluoromethane	10	-	-	-	<10	<10	<10	NA	NA	<10	<10
1,1-Dichloroethene	1	30	-	-	<1	<1	<1	NA	NA	<1	<1
Trans-1,2-dichloroethene	1	60	-	-	<1	<1	<1	NA	NA	<1	<1
1,1-dichloroethane	1	-	-	-	<1	<1	<1	NA	NA	<1	<1
Cis-1,2-dichloroethene	1	60	-	-	<1	<1	<1	NA	NA	<1	<1
Bromochloromethane	1	250	-	-	<1	<1	<1	NA	NA	<1	<1
Chloroform	1		-	-	<1	<1	<1	NA	NA	<1	<1
2,2-dichloropropane	1	-	-	-	<1	<1	<1	NA	NA	<1	<1
1,2-dichloroethane	1	3	-	-	<1	<1	<1	NA	NA	<1	<1
1,1,1-trichloroethane	1	-	-	-	<1	<1	<1	NA	NA	<1	<1
1,1-dichloropropene	1	-	-	-	<1	<1	<1	NA	NA	<1	<1
Cyclohexane	1	-	-	-	<1	<1	<1	NA	NA	<1	<1
Carbon tetrachloride	1	3	-	-	<1	<1	<1	NA	NA	<1	<1
Benzene	1	1	-	-	<1	<1	<1	NA	NA	<1	<1
Dibromomethane	1	-	-	-	<1	<1	<1	NA	NA	<1	<1
1,2-dichloropropane	1	-	-	-	<1	<1	<1	NA	NA	<1	<1
Trichloroethene	1	-	-	-	<1	<1	<1	NA	NA	<1	<1
Bromodichloromethane	1	-	-	-	<1	<1	<1	NA	NA	<1	<1
trans-1,3-dichloropropene	1	100	-	-	<1	<1	<1	NA	NA	<1	<1
cis-1,3-dichloropropene	1	100	-	-	<1	<1	<1	NA	NA	<1	<1
1,1,2-trichloroethane	1	-	-	-	<1	<1	<1	NA	NA	<1	<1
Toluene	1	800	-	-	<1	<1	<1	NA	NA	<1	<1
1,3-dichloropropane	1	-	-	-	<1	<1	<1	NA	NA	<1	<1
Dibromochloromethane	1	-	-	-	<1	<1	<1	NA	NA	<1	<1
1,2-dibromoethane	1	-	-	-	<1	<1	<1	NA	NA	<1	<1
Tetrachloroethene	1	50	-	-	<1	<1	<1	NA	NA	<1	<1
1,1,1,2-tetrachloroethane	1	-	-	-	<1	<1	<1	NA	NA	<1	<1
Chlorobenzene	1	300	-	-	<1	<1	<1	NA	NA	<1	<1
Ethylbenzene	1	300	-	-	<1	<1	<1	NA	NA	<1	<1
Bromoform	1	-	-	-	<1	<1	<1	NA	NA	<1	<1
m+p-xylene	2	-	-	-	<2	<2	<2	NA	NA	<2	<2
Styrene	1	30	-	-	<1	<1	<1	NA	NA	<1	<1
1,1,2,2-tetrachloroethane	1	-	-	-	<1	<1	<1	NA	NA	<1	<1
o-xylene	1	-	-	-	<1	<1	<1	NA	NA	<1	<1
1,2,3-trichloropropane	1	-	-	-	<1	<1	<1	NA	NA	<1	<1
Isopropylbenzene	1	-	-	-	<1	<1	<1	NA	NA	<1	<1
Bromobenzene	1	-	-	-	<1	<1	<1	NA	NA	<1	<1
n-propyl benzene	1	-	-	-	<1	<1	<1	NA	NA	<1	<1
2-chlorotoluene	1	-	-	-	<1	<1	<1	NA	NA	<1	<1
4-chlorotoluene	1	-	-	-	<1	<1	<1	NA	NA	<1	<1
1,3,5-trimethyl benzene	1	-	-	-	<1	<1	<1	NA	NA	<1	<1
Tert-butyl benzene	1	-	-	-	<1	<1	<1	NA	NA	<1	<1
1,2,4-trimethyl benzene	1	-	-	-	<1	<1	<1	NA	NA	<1	<1
1,3-dichlorobenzene	1	20	-	-	<1	<1	<1	NA	NA	<1	<1
Sec-butyl benzene	1	-	-	-	<1	<1	<1	NA	NA	<1	<1
1,4-dichlorobenzene	1	40	-	-	<1	<1	<1	NA	NA	<1	<1
4-isopropyl toluene	1	-	-	-	<1	<1	<1	NA	NA	<1	<1
1,2-dichlorobenzene	1	1500	-	-	<1	<1	<1	NA	NA	<1	<1
n-butyl benzene	1	-	-	-	<1	<1	<1	NA	NA	<1	<1
1,2-dibromo-3-chloropropane	1	-	-	-	<1	<1	<1	NA	NA	<1	<1
1,2,4-trichlorobenzene	1	30	-	-	<1	<1	<1	NA	NA	<1	<1
1,2,3-trichlorobenzene	1		-	-	<1	<1	<1	NA	NA	<1	<1
Hexachlorobutadiene	1	0.7	-	-	<1	<1	<1	NA	NA	<1	<1
Concentration above the SAC											
Concentration above the PQL											
GIL >PQL											

TABLE G5
SUMMARY OF PFAS CONCENTRATIONS IN GROUNDWATER - ECOLOGY
All results in µg/L unless stated otherwise.

	PQL EnviroLab Services	NEMP 2018 95% Freshwater	SAMPLES										
			MW103	MW103 - [LAB_DUP]	MW106	MW111	MW123	MW128	MW134	MW139	MW143	WDUP3	WDUP3 - [LAB_DUP]
PFAS Compound													
Perfluorobutanesulfonic acid	0.0004	NSL	0.001	0.001	0.046	0.0006	0.0004	0.005	0.001	0.001	0.0047	0.049	0.055
Perfluoropentanesulfonic acid	0.001	NSL	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Perfluorohexanesulfonic acid - PFHxS	0.0002	NSL	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroheptanesulfonic acid	0.001	NSL	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Perfluorooctanesulfonic acid PFOS	0.0002	0.13	0.0004	0.0004	0.002	0.0003	0.0003	0.0005	<0.0002	<0.0002	<0.0002	0.002	0.002
Perfluorodecanesulfonic acid	0.002	NSL	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Perfluorobutanoic acid	0.002	NSL	<0.01	<0.01	0.02	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	0.02	0.02
Perfluoropentanoic acid	0.002	NSL	<0.01	<0.01	0.047	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.046	0.046
Perfluorohexanoic acid	0.0004	NSL	<0.0004	<0.0004	0.027	<0.0004	0.004	0.0053	<0.0004	0.002	0.0006	0.022	0.023
Perfluoroheptanoic acid	0.0004	NSL	<0.0004	<0.0004	0.0084	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	0.008	0.007
Perfluorooctanoic acid PFOA	0.0002	220	0.0003	0.0003	0.002	0.0003	0.0002	0.001	<0.0002	0.0003	0.0004	0.002	0.002
Perfluorononanoic acid	0.001	NSL	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Perfluorodecanoic acid	0.002	NSL	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Perfluoroundecanoic acid	0.002	NSL	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Perfluorododecanoic acid	0.005	NSL	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Perfluorotridecanoic acid	0.01	NSL	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluorotetradecanoic acid	0.05	NSL	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
4:2 FTS	0.001	NSL	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
6:2 FTS	0.0004	NSL	<0.0004	<0.0004	0.084	<0.0004	0.003	0.003	0.0006	0.008	0.001	0.041	0.042
8:2 FTS	0.0004	NSL	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
10:2 FTS	0.002	NSL	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Perfluorooctane sulfonamide	0.01	NSL	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
N-Methyl perfluorooctane sulfonamide	0.005	NSL	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
N-Ethyl perfluorooctanesulfonamide	0.01	NSL	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
N-Me perfluorooctanesulfonamid oethanol	0.005	NSL	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
N-Et perfluorooctanesulfonamid oethanol	0.05	NSL	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
MePer uorooctanesulf-amid oacetic acid	0.002	NSL	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
EtPer uorooctanesulf-amid oacetic acid	0.002	NSL	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Total Positive PFHxS & PFOS	0.0002	NSL	0.0004	0.0004	0.002	0.0003	0.0003	0.0006	<0.0002	<0.0002	<0.0002	0.002	0.002
Total Positive PFOS & PFOA	0.0002	NSL	0.0006	0.0007	0.0034	0.0006	0.0005	0.002	<0.0002	0.0003	0.0004	0.0037	0.0034
Total Positive PFAS	0.0002	NSL	0.002	0.002	0.23	0.001	0.0074	0.028	0.002	0.012	0.0068	0.19	0.19
Positive PFAS result PFAS result above the SAC													

TABLE G6
SUMMARY OF PFAS CONCENTRATIONS IN GROUNDWATER - HUMAN HEALTH
All results in µg/L unless stated otherwise.

	PQL Envirolab Services	NEMP 2020 Recreational	SAMPLES										
			MW103	MW103 - [LAB_DUP]	MW106	MW111	MW123	MW128	MW134	MW139	MW143	WDUP3	WDUP3 - [LAB_DUP]
PFAS Compound													
Perfluorobutanesulfonic acid	0.0004	NSL	0.001	0.001	0.046	0.0006	0.0004	0.005	0.001	0.001	0.0047	0.049	0.055
Perfluoropentanesulfonic acid	0.001	NSL	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Perfluorohexanesulfonic acid - PFHxS	0.0002	NSL	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroheptanesulfonic acid	0.001	NSL	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Perfluorooctanesulfonic acid PFOS	0.0002	NSL	0.0004	0.0004	0.002	0.0003	0.0003	0.0005	<0.0002	<0.0002	<0.0002	0.002	0.002
Perfluorodecanesulfonic acid	0.002	NSL	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Perfluorobutanoic acid	0.002	NSL	<0.01	<0.01	0.02	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	0.02	0.02
Perfluoropentanoic acid	0.002	NSL	<0.01	<0.01	0.047	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.046	0.046
Perfluorohexanoic acid	0.0004	NSL	<0.0004	<0.0004	0.027	<0.0004	0.004	0.0053	<0.0004	0.002	0.0006	0.022	0.023
Perfluoroheptanoic acid	0.0004	NSL	<0.0004	<0.0004	0.0084	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	0.008	0.007
Perfluorooctanoic acid PFOA	0.0002	10	0.0003	0.0003	0.002	0.0003	0.0002	0.001	<0.0002	0.0003	0.0004	0.002	0.002
Perfluorononanoic acid	0.001	NSL	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Perfluorodecanoic acid	0.002	NSL	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Perfluoroundecanoic acid	0.002	NSL	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Perfluorododecanoic acid	0.005	NSL	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Perfluorotridecanoic acid	0.01	NSL	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluorotetradecanoic acid	0.05	NSL	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
4:2 FTS	0.001	NSL	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
6:2 FTS	0.0004	NSL	<0.0004	<0.0004	0.084	<0.0004	0.003	0.003	0.0006	0.008	0.001	0.041	0.042
8:2 FTS	0.0004	NSL	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
10:2 FTS	0.002	NSL	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Perfluorooctane sulfonamide	0.01	NSL	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
N-Methyl perfluorooctane sulfonamide	0.005	NSL	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
N-Ethyl perfluorooctanesulfonamide	0.01	NSL	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
N-Me perfluorooctanesulfonamid oethanol	0.005	NSL	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
N-Et perfluorooctanesulfonamid oethanol	0.05	NSL	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
MePer uorooctanesulf-amid oacetic acid	0.002	NSL	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
EtPer uorooctanesulf-amid oacetic acid	0.002	NSL	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Total Positive PFHxS & PFOS	0.0002	2	0.0004	0.0004	0.002	0.0003	0.0003	0.0006	<0.0002	<0.0002	<0.0002	0.002	0.002
Total Positive PFOS & PFOA	0.0002	NSL	0.0006	0.0007	0.0034	0.0006	0.0005	0.002	<0.0002	0.0003	0.0004	0.0037	0.0034
Total Positive PFAS	0.0002	NSL	0.002	0.002	0.23	0.001	0.0074	0.028	0.002	0.012	0.0068	0.19	0.19
Positive PFAS result PFAS result above the SAC													



Preliminary Stage 2 ESA Data Summary Tables

ABBREVIATIONS AND EXPLANATIONS

Abbreviations used in the Tables:

ABC:	Ambient Background Concentration	PCBs:	Polychlorinated Biphenyls
ACM:	Asbestos Containing Material	PCE:	Perchloroethylene (Tetrachloroethylene or Teterachloroethene)
ADWG:	Australian Drinking Water Guidelines	pH_{KCL}:	pH of filtered 1:20, 1M KCL extract, shaken overnight
AF:	Asbestos Fines	pH_{ox}:	pH of filtered 1:20 1M KCL after peroxide digestion
ANZECC:	Australian and New Zealand Environment Conservation Council	PQL:	Practical Quantitation Limit
B(a)P:	Benzo(a)pyrene	RS:	Rinsate Sample
CEC:	Cation Exchange Capacity	RSL:	Regional Screening Levels
CRC:	Cooperative Research Centre	SAC:	Site Assessment Criteria
CT:	Contaminant Threshold	SCC:	Specific Contaminant Concentration
EILs:	Ecological Investigation Levels	S_{Cr}:	Chromium reducible sulfur
ESLs:	Ecological Screening Levels	S_{POS}:	Peroxide oxidisable Sulfur
FA:	Fibrous Asbestos	SSA:	Site Specific Assessment
GIL:	Groundwater Investigation Levels	SSHSLs:	Site Specific Health Screening Levels
HILs:	Health Investigation Levels	TAA:	Total Actual Acidity in 1M KCL extract titrated to pH6.5
HSLs:	Health Screening Levels	TB:	Trip Blank
HSL-SSA:	Health Screening Level-Site Specific Assessment	TCA:	1,1,1 Trichloroethane (methyl chloroform)
NA:	Not Analysed	TCE:	Trichloroethylene (Trichloroethene)
NC:	Not Calculated	TCLP:	Toxicity Characteristics Leaching Procedure
NEPM:	National Environmental Protection Measure	TPA:	Total Potential Acidity, 1M KCL peroxide digest
NHMRC:	National Health and Medical Research Council	TS:	Trip Spike
NL:	Not Limiting	TRH:	Total Recoverable Hydrocarbons
NSL:	No Set Limit	TSA:	Total Sulfide Acidity (TPA-TAA)
OCP:	Organochlorine Pesticides	UCL:	Upper Level Confidence Limit on Mean Value
OPP:	Organophosphorus Pesticides	USEPA:	United States Environmental Protection Agency
PAHs:	Polycyclic Aromatic Hydrocarbons	VOCC:	Volatile Organic Chlorinated Compounds
ppm:	Parts per million	WHO:	World Health Organisation

Table Specific Explanations:

HIL Tables:

- The chromium results are for Total Chromium which includes Chromium III and VI. For initial screening purposes, we have assumed that the samples contain only Chromium VI unless demonstrated otherwise by additional analysis.
- Carcinogenic PAHs is a toxicity weighted sum of analyte concentrations for a specific list of PAH compounds relative to B(a)P. It is also referred to as the B(a)P Toxic Equivalence Quotient (TEQ).
- Statistical calculations are undertaken using ProUCL (USEPA). Statistical calculation is usually undertaken using data from fill samples.

EIL/ESL Table:

- ABC Values for selected metals have been adopted from the published background concentrations presented in Olszowy et. al., (1995), Trace Element Concentrations in Soils from Rural and Urban New South Wales (the 25th percentile values for old suburbs with high traffic have been quoted).

Waste Classification and TCLP Table:

- Data assessed using the NSW EPA Waste Classification Guidelines, Part 1: Classifying Waste (2014).
- The assessment of Total Moderately Harmful pesticides includes: Dichlorovos, Dimethoate, Fenitrothion, Ethion, Malathion and Parathion.
- Assessment of Total Scheduled pesticides include: HBC, alpha-BHC, gamma-BHC, beta-BHC, Heptachlor, Aldrin, Heptachlor Epoxide, gamma-Chlordane, alpha-chlordane, pp-DDE, Dieldrin, Endrin, pp-DDD, pp-DDT, Endrin Aldehyde.

TABLE A SOIL LABORATORY RESULTS COMPARED TO NEPM 2013. HIL-D: 'Commercial/Industrial'																						
All data in mg/kg unless stated otherwise			HEAVY METALS							PAHs		ORGANOCHLORINE PESTICIDES (OCPs)							OP PESTICIDES (OPPs)	TOTAL PCBs	ASBESTOS FIBRES	
			Arsenic	Cadmium	Chromium VI	Copper	Lead	Mercury	Nickel	Zinc	Total PAHs	Carcinogenic PAHs	HCB	Endosulfan	Methoxychlor	Aldrin & Dieldrin	Chlordane	DDT, DDD & DDE	Heptachlor			Chlorpyrifos
PQL - Envirolab Services			4	0.4	1	1	1	0.1	1	1	-	0.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	100	
Site Assessment Criteria (SAC)			3000	900	3600	240000	1500	730	6000	400000	4000	40	80	2000	2500	45	530	3600	50	2000	7	Detected/Not Detected
Sample Reference	Sample Depth	Sample Description																				
BH1	0-0.1	Fill - Gravelly Sand	5	<0.4	22	19	10	<0.1	14	22	2.3	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH2	0-0.2	Fill - Gravelly Silty Sand	<4	<0.4	6	5	9	<0.1	4	37	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH3	0.1-0.2	Fill - Silty Gravelly Sand	<4	<0.4	13	46	31	<0.1	14	52	6	0.6	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH4	0.3-0.4	Fill - Silty Sandy Gravel	4	<0.4	30	28	11	<0.1	30	37	1.2	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH5	0-0.1	Fill - Silty Sand	6	<0.4	24	35	11	<0.1	16	25	0.3	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH6	0-0.1	Fill - Gravelly Silty Sand	<4	<0.4	34	21	7	<0.1	38	37	0.4	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH7	0.3-0.4	Fill - Silty Gravelly Sand	<4	<0.4	21	45	21	<0.1	9	170	2.8	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH7	0.5-0.8	Fill - Silty Clay	7	<0.4	24	19	12	<0.1	19	25	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	
BH8	0.5-0.6	Fill - Silty Gravelly Sand	<4	<0.4	15	170	16	<0.1	19	75	1.8	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH9	0-0.1	Fill - Silty Gravelly Sand	<4	<0.4	6	8	7	<0.1	7	25	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH10	0-0.2	Fill - Gravelly Sand	6	<0.4	15	13	9	<0.1	4	10	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH11	0.3-0.4	Fill - Silty Gravelly Sand	<4	<0.4	14	49	14	<0.1	20	38	4.4	0.6	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH12	0-0.1	Fill - Silty Sandy Gravel	<4	<0.4	15	21	17	<0.1	13	39	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH13	0-0.1	Fill - Silty Gravelly Sand	<4	<0.4	13	25	9	<0.1	29	30	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH14	0-0.1	Fill - Gravelly Sand	7	<0.4	20	13	13	<0.1	10	23	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH15	0.3-0.4	Silty Sandy Clay	5	<0.4	3	12	9	<0.1	2	11	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH16	0-0.1	Fill - Silty Gravelly Sand	4	<0.4	8	26	9	<0.1	26	39	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH16	0.8-0.95	Fill - Silty Clay	6	<0.4	24	33	12	<0.1	32	37	1.3	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	
BH17	0-0.1	Fill - Silty Gravelly Sand	<4	<0.4	27	47	8	<0.1	38	34	0.2	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH18	0-0.1	Fill - Gravelly Sand	7	<0.4	32	18	12	<0.1	22	26	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH19	0.3-0.4	Fill - Silty Gravelly Sand	6	<0.4	12	27	11	<0.1	49	83	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH20	0.5-0.76	Silty Clay	6	<0.4	5	8	6	<0.1	<1	4	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH21	0.1-0.2	Fill - Silty Clay	4	<0.4	8	27	10	<0.1	3	13	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH22	0.1-0.2	Fill - Silty Gravelly Sand	<4	<0.4	6	57	2	<0.1	82	27	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH24	0.2-0.3	Fill - Silty Gravelly Sand	<4	<0.4	11	55	2	<0.1	100	25	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH24	0.5-0.95	Fill - Silty Clay	8	<0.4	18	14	14	<0.1	4	13	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	
BH25	0-0.1	Fill - Silty Sand	11	0.4	20	16	21	<0.1	10	43	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH26	0.1-0.2	Fill - Silty Sand	10	<0.4	19	21	30	<0.1	8	69	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH27	0.1-0.2	Fill - Silty Sand	6	<0.4	16	19	24	<0.1	8	59	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH28	0.1-0.2	Fill - Silty Sand	7	<0.4	19	17	22	<0.1	7	47	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH28	1.6-1.95	Silty Clay	10	<0.4	31	14	19	<0.1	6	17	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	
BH29	0.1-0.2	Fill - Silty Sand	14	<0.4	14	15	16	<0.1	10	32	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH29	1.8-1.95	Fill - Silty Sand	<4	<0.4	10	12	12	<0.1	6	38	0.2	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	
BH29	3-3.2	Silty Clay	8	<0.4	22	9	15	<0.1	5	13	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	
BH30	0.6-0.7	Fill - Silty Gravelly Sand	5	<0.4	14	64	13	<0.1	12	51	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH30	1.5-1.9	Fill - Silty Clay	6	<0.4	28	26	12	<0.1	30	32	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	
DUPMP1	0-0.2	BH10 (0-0.2)	6	<0.4	14	18	10	<0.1	3	10	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	
DUPMP2	0.1-0.2	BH27 (0.1-0.2)	<4	<0.4	33	30	8	<0.1	32	39	1.5	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	
SP1	-	Fill Stockpile Sample	72	<0.4	18	26	14	<0.1	27	47	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
SP2	-	Fill Stockpile Sample	7	<0.4	20	14	17	<0.1	8	35	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	Not Detected	
BH1 - T	0-0.1	Laboratory Triplicate	6	<0.4	22	16	11	<0.1	13	21	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
BH5 - T	0-0.1	Laboratory Triplicate	<4	<0.4	26	52	9	<0.1	24	31	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
DUPMP2 - T	-	Laboratory Triplicate	<4	<0.4	31	31	9	<0.1	30	38	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Total Number of Samples			43	43	43	43	43	43	43	43	40	40	33	33	33	33	33	33	33	33	31	
Maximum Value			72	0.4	34	170	31	<PQL	100	170	6	0.6	<PQL	<PQL	<PQL	<PQL	<PQL	0.1	<PQL	<PQL	NC	
Concentration above the SAC			VALUE																			

TABLE B SOIL LABORATORY RESULTS COMPARED TO HSLs All data in mg/kg unless stated otherwise																							
					C ₆ -C ₁₀ (F1)		>C ₁₀ -C ₁₆ (F2)		Benzene		Toluene		Ethylbenzene		Xylenes		Naphthalene		Field PID Measurement				
PQL - Envirolab Services					25		50		0.2		0.5		1		1		1		ppm				
NEPM 2013 HSL Land Use Category					HSL-D: COMMERCIAL/INDUSTRIAL																		
Sample Reference	Sample Depth	Sample Description	Depth Category	Soil Category																			
BH1	0-0.1	Fill - Gravelly Sand	0m to < 1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	0.1			
BH2	0-0.2	Fill - Gravelly Silty Sand	0m to < 1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	0.2			
BH3	0.1-0.2	Fill - Silty Gravelly Sand	0m to < 1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	0			
BH4	0.3-0.4	Fill - Silty Sandy Gravel	0m to < 1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	0			
BH5	0-0.1	Fill - Silty Sand	0m to < 1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	0			
BH6	0-0.1	Fill - Gravelly Silty Sand	0m to < 1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	0.1			
BH7	0.3-0.4	Fill - Silty Gravelly Sand	0m to < 1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	0.1			
BH7	0.5-0.8	Fill - Silty Clay	0m to < 1m	Clay	<25	<50	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	0.4			
BH8	0.5-0.6	Fill - Silty Gravelly Sand	0m to < 1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	0.8			
BH9	0-0.1	Fill - Silty Gravelly Sand	0m to < 1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	0			
BH10	0-0.2	Fill - Gravelly Sand	0m to < 1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	0.1			
BH11	0.3-0.4	Fill - Silty Gravelly Sand	0m to < 1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	0.1			
BH12	0-0.1	Fill - Silty Sandy Gravel	0m to < 1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	0			
BH13	0-0.1	Fill - Silty Gravelly Sand	0m to < 1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	0.1			
BH14	0-0.1	Fill - Gravelly Sand	0m to < 1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	0.1			
BH15	0.3-0.4	Silty Sandy Clay	0m to < 1m	Clay	<25	<50	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	0.1			
BH16	0-0.1	Fill - Silty Gravelly Sand	0m to < 1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	0			
BH16	0.8-0.95	Fill - Silty Clay	0m to < 1m	Clay	<25	<50	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	0			
BH17	0-0.1	Fill - Silty Gravelly Sand	0m to < 1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	0			
BH18	0-0.1	Fill - Gravelly Sand	0m to < 1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	0			
BH19	0.3-0.4	Fill - Silty Gravelly Sand	0m to < 1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	0			
BH20	0.5-0.76	Silty Clay	0m to < 1m	Clay	<25	<50	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	0			
BH21	0.1-0.2	Fill - Silty Clay	0m to < 1m	Clay	<25	<50	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	0			
BH22	0.1-0.2	Fill - Silty Gravelly Sand	0m to < 1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	0			
BH24	0.2-0.3	Fill - Silty Gravelly Sand	0m to < 1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	0			
BH24	0.5-0.95	Fill - Silty Clay	0m to < 1m	Clay	<25	<50	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	0			
BH25	0-0.1	Fill - Silty Sand	0m to < 1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	0			
BH26	0.1-0.2	Fill - Silty Sand	0m to < 1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	0.1			
BH27	0.1-0.2	Fill - Silty Sand	0m to < 1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	0			
BH28	0.1-0.2	Fill - Silty Sand	0m to < 1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	0.1			
BH28	1.6-1.95	Silty Clay	1m to <2m	Clay	<25	<50	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	0			
BH29	0.1-0.2	Fill - Silty Sand	0m to < 1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	0.1			
BH29	1.8-1.95	Fill - Silty Sand	1m to <2m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	0			
BH29	3-3.2	Silty Clay	0m to < 1m	Clay	<25	<50	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	0			
BH30	0.6-0.7	Fill - Silty Gravelly Sand	0m to < 1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	0.4			
BH30	1.5-1.9	Fill - Silty Clay	1m to <2m	Clay	<25	<50	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	0			
DUPMP1	0-0.2	BH10 (0-0.2)	0m to < 1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-			
DUPMP2	0.1-0.2	BH27 (0.1-0.2)	0m to < 1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-			
SP1	-	Fill Stockpile Sample	0m to < 1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	0			
SP2	-	Fill Stockpile Sample	0m to < 1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	0			
Total Number of Samples					40	40	40	40	40	40	40	40	40	40	40	40	40	40	38				
Maximum Value					<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	0.8				
Concentration above the SAC					VALUE																		
The guideline corresponding to the elevated value is highlighted in grey in the Site Assessment Criteria Table below																							

SITE ASSESSMENT CRITERIA												
					C ₆ -C ₁₀ (F1)	>C ₁₀ -C ₁₆ (F2)	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene	
PQL - Envirolab Services					25	50	0.2	0.5	1	1	1	
NEPM 2013 HSL Land Use Category					HSL-D: COMMERCIAL/INDUSTRIAL							
Sample Reference	Sample Depth	Sample Description	Depth Category	Soil Category								
BH1	0-0.1	Fill - Gravelly Sand	0m to < 1m	Sand	260	NL	3	NL	NL	230	NL	
BH2	0-0.2	Fill - Gravelly Silty Sand	0m to < 1m	Sand	260	NL	3	NL	NL	230	NL	
BH3	0.1-0.2	Fill - Silty Gravelly Sand	0m to < 1m	Sand	260	NL	3	NL	NL	230	NL	
BH4	0.3-0.4	Fill - Silty Sandy Gravel	0m to < 1m	Sand	260	NL	3	NL	NL	230	NL	
BH5	0-0.1	Fill - Silty Sand	0m to < 1m	Sand	260	NL	3	NL	NL	230	NL	
BH6	0-0.1	Fill - Gravelly Silty Sand	0m to < 1m	Sand	260	NL	3	NL	NL	230	NL	
BH7	0.3-0.4	Fill - Silty Gravelly Sand	0m to < 1m	Sand	260	NL	3	NL	NL	230	NL	
BH7	0.5-0.8	Fill - Silty Clay	0m to < 1m	Clay	310	NL	4	NL	NL	NL	NL	
BH8	0.5-0.6	Fill - Silty Gravelly Sand	0m to < 1m	Sand	260	NL	3	NL	NL	230	NL	
BH9	0-0.1	Fill - Silty Gravelly Sand	0m to < 1m	Sand	260	NL	3	NL	NL	230	NL	
BH10	0-0.2	Fill - Gravelly Sand	0m to < 1m	Sand	260	NL	3	NL	NL	230	NL	
BH11	0.3-0.4	Fill - Silty Gravelly Sand	0m to < 1m	Sand	260	NL	3	NL	NL	230	NL	
BH12	0-0.1	Fill - Silty Sandy Gravel	0m to < 1m	Sand	260	NL	3	NL	NL	230	NL	
BH13	0-0.1	Fill - Silty Gravelly Sand	0m to < 1m	Sand	260	NL	3	NL	NL	230	NL	
BH14	0-0.1	Fill - Gravelly Sand	0m to < 1m	Sand	260	NL	3	NL	NL	230	NL	
BH15	0.3-0.4	Silty Sandy Clay	0m to < 1m	Clay	310	NL	4	NL	NL	NL	NL	
BH16	0-0.1	Fill - Silty Gravelly Sand	0m to < 1m	Sand	260	NL	3	NL	NL	230	NL	
BH16	0.8-0.95	Fill - Silty Clay	0m to < 1m	Clay	310	NL	4	NL	NL	NL	NL	
BH17	0-0.1	Fill - Silty Gravelly Sand	0m to < 1m	Sand	260	NL	3	NL	NL	230	NL	
BH18	0-0.1	Fill - Gravelly Sand	0m to < 1m	Sand	260	NL	3	NL	NL	230	NL	
BH19	0.3-0.4	Fill - Silty Gravelly Sand	0m to < 1m	Sand	260	NL	3	NL	NL	230	NL	
BH20	0.5-0.76	Silty Clay	0m to < 1m	Clay	310	NL	4	NL	NL	NL	NL	
BH21	0.1-0.2	Fill - Silty Clay	0m to < 1m	Clay	310	NL	4	NL	NL	NL	NL	
BH22	0.1-0.2	Fill - Silty Gravelly Sand	0m to < 1m	Sand	260	NL	3	NL	NL	230	NL	
BH24	0.2-0.3	Fill - Silty Gravelly Sand	0m to < 1m	Sand	260	NL	3	NL	NL	230	NL	
BH24	0.5-0.95	Fill - Silty Clay	0m to < 1m	Clay	310	NL	4	NL	NL	NL	NL	
BH25	0-0.1	Fill - Silty Sand	0m to < 1m	Sand	260	NL	3	NL	NL	230	NL	
BH26	0.1-0.2	Fill - Silty Sand	0m to < 1m	Sand	260	NL	3	NL	NL	230	NL	
BH27	0.1-0.2	Fill - Silty Sand	0m to < 1m	Sand	260	NL	3	NL	NL	230	NL	
BH28	0.1-0.2	Fill - Silty Sand	0m to < 1m	Sand	260	NL	3	NL	NL	230	NL	
BH28	1.6-1.95	Silty Clay	1m to <2m	Clay	480	NL	6	NL	NL	NL	NL	
BH29	0.1-0.2	Fill - Silty Sand	0m to < 1m	Sand	260	NL	3	NL	NL	230	NL	
BH29	1.8-1.95	Fill - Silty Sand	1m to <2m	Sand	370	NL	3	NL	NL	NL	NL	
BH29	3-3.2	Silty Clay	0m to < 1m	Clay	310	NL	4	NL	NL	NL	NL	
BH30	0.6-0.7	Fill - Silty Gravelly Sand	0m to < 1m	Sand	260	NL	3	NL	NL	230	NL	
BH30	1.5-1.9	Fill - Silty Clay	1m to <2m	Clay	480	NL	6	NL	NL	NL	NL	
DUPMP1	0-0.2	BH10 (0-0.2)	0m to < 1m	Sand	260	NL	3	NL	NL	230	NL	
DUPMP2	0.1-0.2	BH27 (0.1-0.2)	0m to < 1m	Sand	260	NL	3	NL	NL	230	NL	
SP1	-	Fill Stockpile Sample	0m to < 1m	Sand	260	NL	3	NL	NL	230	NL	
SP2	-	Fill Stockpile Sample	0m to < 1m	Sand	260	NL	3	NL	NL	230	NL	

TABLE C-1 SOIL LABORATORY RESULTS COMPARED TO NEPM 2013 EILs AND ESLs All data in mg/kg unless stated otherwise																							
Land Use Category				COMMERCIAL/INDUSTRIAL																			
				pH	CEC (cmol _e /kg)	Clay Content (% clay)	AGED HEAVY METALS-EILs						EILs		ESLs				ESLs				
							Arsenic	Chromium	Copper	Lead	Nickel	Zinc	Naphthalene	DDT	C ₆ -C ₁₀ (F1)	>C ₁₀ -C ₁₆ (F2)	>C ₁₆ -C ₃₄ (F3)	>C ₃₄ -C ₄₀ (F4)	Benzene	Toluene	Ethylbenzene	Total Xylenes	B(a)P
PQL - Envirolab Services				-	1	-	4	1	1	1	1	1	0.1	0.1	25	50	100	100	0.2	0.5	1	3	0.05
Ambient Background Concentration (ABC)				-	-	-	NSL	13	28	163	5	122	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL
Sample Reference	Sample Depth	Sample Description	Soil Texture																				
BH1	0-0.1	Fill - Gravelly Sand	Coarse	NA	NA	NA	5	22	19	10	14	22	<1	<0.1	<25	<50	1200	420	<0.2	<0.5	<1	<1	0.1
BH2	0-0.2	Fill - Gravelly Silty Sand	Coarse	NA	NA	NA	<4	6	5	9	4	37	<1	<0.1	<25	<50	740	<100	<0.2	<0.5	<1	<1	<0.05
BH3	0.1-0.2	Fill - Silty Gravelly Sand	Coarse	NA	NA	NA	<4	13	46	31	14	52	<1	<0.1	<25	<50	<100	140	<0.2	<0.5	<1	<1	0.4
BH4	0.3-0.4	Fill - Silty Sandy Gravel	Coarse	NA	NA	NA	4	30	28	11	30	37	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	0.08
BH5	0-0.1	Fill - Silty Sand	Coarse	NA	NA	NA	6	24	35	11	16	25	<1	<0.1	<25	<50	280	300	<0.2	<0.5	<1	<1	<0.05
BH6	0-0.1	Fill - Gravelly Silty Sand	Coarse	NA	NA	NA	<4	34	21	7	38	37	<1	<0.1	<25	<50	530	290	<0.2	<0.5	<1	<1	<0.05
BH7	0.3-0.4	Fill - Silty Gravelly Sand	Coarse	NA	NA	NA	<4	21	45	21	9	170	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	0.2
BH7	0.5-0.8	Fill - Silty Clay	Fine	NA	NA	NA	7	24	19	12	19	25	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH8	0.5-0.6	Fill - Silty Gravelly Sand	Coarse	NA	NA	NA	<4	15	170	16	19	75	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	0.1
BH9	0-0.1	Fill - Silty Gravelly Sand	Coarse	NA	NA	NA	<4	6	8	7	7	25	<1	<0.1	<25	<50	660	100	<0.2	<0.5	<1	<1	<0.05
BH10	0-0.2	Fill - Gravelly Sand	Coarse	NA	NA	NA	6	15	13	9	4	10	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH11	0.3-0.4	Fill - Silty Gravelly Sand	Coarse	NA	NA	NA	<4	14	49	14	20	38	<1	<0.1	<25	<50	260	290	<0.2	<0.5	<1	<1	0.4
BH12	0-0.1	Fill - Silty Sandy Gravel	Coarse	NA	NA	NA	<4	15	21	17	13	39	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH13	0-0.1	Fill - Silty Gravelly Sand	Coarse	NA	NA	NA	<4	13	25	9	29	30	<1	<0.1	<25	<50	710	320	<0.2	<0.5	<1	<1	<0.05
BH14	0-0.1	Fill - Gravelly Sand	Coarse	NA	NA	NA	7	20	13	13	10	23	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH15	0.3-0.4	Silty Sandy Clay	Fine	NA	NA	NA	5	3	12	9	2	11	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH16	0-0.1	Fill - Silty Gravelly Sand	Coarse	NA	NA	NA	4	8	26	9	26	39	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH16	0.8-0.95	Fill - Silty Clay	Fine	NA	NA	NA	6	24	33	12	32	37	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	0.1
BH17	0-0.1	Fill - Silty Gravelly Sand	Coarse	NA	NA	NA	<4	27	47	8	38	34	<1	<0.1	<25	<50	1600	400	<0.2	<0.5	<1	<1	<0.05
BH18	0-0.1	Fill - Gravelly Sand	Coarse	NA	NA	NA	7	32	18	12	22	26	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
Total Number of Samples				0	0	0	20	20	20	20	20	20	20	18	20	20	20	20	20	20	20	20	20
Maximum Value				<PQL	<PQL	<PQL	7	34	170	31	38	170	<PQL	<PQL	<PQL	<PQL	1600	420	<PQL	<PQL	<PQL	<PQL	0.4
Concentration above the SAC				VALUE																			
The guideline corresponding to the elevated value is highlighted in grey in the EIL and ESL Assessment Criteria Table below																							

EIL AND ESL ASSESSMENT CRITERIA

Land Use Category				COMMERCIAL/INDUSTRIAL																			
				pH	CEC (cmol _e /kg)	Clay Content (% clay)	AGED HEAVY METALS-EILs					EILs		ESLs									
							Arsenic	Chromium	Copper	Lead	Nickel	Zinc	Naphthalene	DDT	C ₆ -C ₁₀ (F1)	>C ₁₀ -C ₁₆ (F2)	>C ₁₆ -C ₃₄ (F3)	>C ₃₄ -C ₄₀ (F4)	Benzene	Toluene	Ethylbenzene	Total Xylenes	B(a)P
PQL - Envirolab Services				-	1	-	4	1	1	1	0.1	0.1	25	50	100	100	0.2	0.5	1	3	0.05		
Ambient Background Concentration (ABC)				-	-	-	NSL	13	28	163	5	122	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL		
Sample Reference	Sample Depth	Sample Description	Soil Texture																				
BH1	0-0.1	Fill - Gravelly Sand	Coarse	NA	NA	NA	160	323	113	1963	60	232	370	640	215	170	1700	3300	75	135	165	180	172
BH2	0-0.2	Fill - Gravelly Silty Sand	Coarse	NA	NA	NA	160	323	113	1963	60	232	370	640	215	170	1700	3300	75	135	165	180	172
BH3	0.1-0.2	Fill - Silty Gravelly Sand	Coarse	NA	NA	NA	160	323	113	1963	60	232	370	640	215	170	1700	3300	75	135	165	180	172
BH4	0.3-0.4	Fill - Silty Sandy Gravel	Coarse	NA	NA	NA	160	323	113	1963	60	232	370	640	215	170	1700	3300	75	135	165	180	172
BH5	0-0.1	Fill - Silty Sand	Coarse	NA	NA	NA	160	323	113	1963	60	232	370	640	215	170	1700	3300	75	135	165	180	172
BH6	0-0.1	Fill - Gravelly Silty Sand	Coarse	NA	NA	NA	160	323	113	1963	60	232	370	640	215	170	1700	3300	75	135	165	180	172
BH7	0.3-0.4	Fill - Silty Gravelly Sand	Coarse	NA	NA	NA	160	323	113	1963	60	232	370	640	215	170	1700	3300	75	135	165	180	172
BH7	0.5-0.8	Fill - Silty Clay	Fine	NA	NA	NA	160	323	113	1963	60	232	370	--	215	170	2500	6600	95	135	185	95	172
BH8	0.5-0.6	Fill - Silty Gravelly Sand	Coarse	NA	NA	NA	160	323	113	1963	60	232	370	640	215	170	1700	3300	75	135	165	180	172
BH9	0-0.1	Fill - Silty Gravelly Sand	Coarse	NA	NA	NA	160	323	113	1963	60	232	370	640	215	170	1700	3300	75	135	165	180	172
BH10	0-0.2	Fill - Gravelly Sand	Coarse	NA	NA	NA	160	323	113	1963	60	232	370	640	215	170	1700	3300	75	135	165	180	172
BH11	0.3-0.4	Fill - Silty Gravelly Sand	Coarse	NA	NA	NA	160	323	113	1963	60	232	370	640	215	170	1700	3300	75	135	165	180	172
BH12	0-0.1	Fill - Silty Sandy Gravel	Coarse	NA	NA	NA	160	323	113	1963	60	232	370	640	215	170	1700	3300	75	135	165	180	172
BH13	0-0.1	Fill - Silty Gravelly Sand	Coarse	NA	NA	NA	160	323	113	1963	60	232	370	640	215	170	1700	3300	75	135	165	180	172
BH14	0-0.1	Fill - Gravelly Sand	Coarse	NA	NA	NA	160	323	113	1963	60	232	370	640	215	170	1700	3300	75	135	165	180	172
BH15	0.3-0.4	Silty Sandy Clay	Fine	NA	NA	NA	160	323	113	1963	60	232	370	640	215	170	2500	6600	95	135	185	95	172
BH16	0-0.1	Fill - Silty Gravelly Sand	Coarse	NA	NA	NA	160	323	113	1963	60	232	370	640	215	170	1700	3300	75	135	165	180	172
BH16	0.8-0.95	Fill - Silty Clay	Fine	NA	NA	NA	160	323	113	1963	60	232	370	--	215	170	2500	6600	95	135	185	95	172
BH17	0-0.1	Fill - Silty Gravelly Sand	Coarse	NA	NA	NA	160	323	113	1963	60	232	370	640	215	170	1700	3300	75	135	165	180	172
BH18	0-0.1	Fill - Gravelly Sand	Coarse	NA	NA	NA	160	323	113	1963	60	232	370	640	215	170	1700	3300	75	135	165	180	172

EIL AND ESL ASSESSMENT CRITERIA

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TABLE D-1
SOIL INTRA-LABORATORY DUPLICATE RESULTS & RPD CALCULATIONS
All results in mg/kg unless stated otherwise

SAMPLE	ANALYSIS	Envirolab PQL	INITIAL	REPEAT	MEAN	RPD %
Sample Ref = BH10 (0-0.2) Dup Ref = DUPMP1 Envirolab Report: 202302	Arsenic	4	6	6	6.0	0
	Cadmium	0.4	<0.4	<0.4	NC	NC
	Chromium	1	15	14	14.5	7
	Copper	1	13	18	15.5	32
	Lead	1	9	10	9.5	11
	Mercury	0.1	<0.1	<0.1	NC	NC
	Nickel	1	4	3	3.5	29
	Zinc	1	10	10	10.0	0
	Naphthalene	0.1	<0.1	<0.1	NC	NC
	Acenaphthylene	0.1	<0.1	<0.1	NC	NC
	Acenaphthene	0.1	<0.1	<0.1	NC	NC
	Fluorene	0.1	<0.1	<0.1	NC	NC
	Phenanthrene	0.1	<0.1	<0.1	NC	NC
	Anthracene	0.1	<0.1	<0.1	NC	NC
	Fluoranthene	0.1	<0.1	<0.1	NC	NC
	Pyrene	0.1	<0.1	<0.1	NC	NC
	Benzo(a)anthracene	0.1	<0.1	<0.1	NC	NC
	Chrysene	0.1	<0.1	<0.1	NC	NC
	Benzo(b,j,k)fluoranthene	0.2	<0.2	<0.2	NC	NC
	Benzo(a)pyrene	0.05	<0.05	<0.05	NC	NC
	Indeno(123-cd)pyrene	0.1	<0.1	<0.1	NC	NC
	Dibenzo(ah)anthracene	0.1	<0.1	<0.1	NC	NC
	Benzo(ghi)perylene	0.1	<0.1	<0.1	NC	NC
	Total OCPs	0.1	<0.1	<0.1	NC	NC
	Total OPPs	0.1	<0.1	<0.1	NC	NC
	Total PCBs	0.1	<0.1	<0.1	NC	NC
	TRH C ₆ -C ₁₀ (F1)	25	<25	<25	NC	NC
	TRH >C ₁₀ -C ₁₆ (F2)	50	<50	<50	NC	NC
	TRH >C ₁₆ -C ₃₄ (F3)	100	<100	<100	NC	NC
	TRH >C ₃₄ -C ₄₀ (F4)	100	<100	<100	NC	NC
	Benzene	0.2	<0.2	<0.2	NC	NC
	Toluene	0.5	<0.5	<0.5	NC	NC
	Ethylbenzene	1	<1	<1	NC	NC
	m+p-xylene	2	<2	<2	NC	NC
	o-xylene	1	<1	<1	NC	NC

Explanation:

The RPD value is calculated as the absolute value of the difference between the initial and repeat results divided by the average value expressed as a percentage. The following acceptance criteria will be used to assess the RPD results:

- Results > 10 times PQL = RPD value <= 50% are acceptable
- Results between 5 & 10 times PQL = RPD value <= 75% are acceptable
- Results < 5 times PQL = RPD value <= 100% are acceptable

If result is LPQL then 50% of the PQL is used for the calculation

RPD Results Above the Acceptance Criteria

VALUE

TABLE D-2
SOIL INTRA-LABORATORY DUPLICATE RESULTS & RPD CALCULATIONS
All results in mg/kg unless stated otherwise

SAMPLE	ANALYSIS	Envirolab PQL	INITIAL	REPEAT	MEAN	RPD %
Sample Ref = BH27 (0.1-0.2) Dup Ref = DUPMP2 Envirolab Report: 202302	Arsenic	4	6	<4	4.0	100
	Cadmium	0.4	<0.4	<0.4	NC	NC
	Chromium	1	16	33	24.5	69
	Copper	1	19	30	24.5	45
	Lead	1	24	8	16.0	100
	Mercury	0.1	<0.1	<0.1	NC	NC
	Nickel	1	8	32	20.0	120
	Zinc	1	59	39	49.0	41
	Naphthalene	0.1	<0.1	<0.1	NC	NC
	Acenaphthylene	0.1	<0.1	<0.1	NC	NC
	Acenaphthene	0.1	<0.1	<0.1	NC	NC
	Fluorene	0.1	<0.1	<0.1	NC	NC
	Phenanthrene	0.1	<0.1	0.2	0.1	120
	Anthracene	0.1	<0.1	<0.1	NC	NC
	Fluoranthene	0.1	<0.1	0.2	0.1	120
	Pyrene	0.1	<0.1	0.2	0.1	120
	Benzo(a)anthracene	0.1	<0.1	<0.1	NC	NC
	Chrysene	0.1	<0.1	0.2	0.1	120
	Benzo(b,j,k)fluoranthene	0.2	<0.2	0.2	0.2	67
	Benzo(a)pyrene	0.05	<0.05	0.1	0.1	120
	Indeno(123-cd)pyrene	0.1	<0.1	0.1	0.1	67
	Dibenzo(ah)anthracene	0.1	<0.1	<0.1	NC	NC
	Benzo(ghi)perylene	0.1	<0.1	0.2	0.1	120
	Total OCPs	0.1	<0.1	<0.1	NC	NC
	Total OPPs	0.1	<0.1	<0.1	NC	NC
	Total PCBs	0.1	<0.1	<0.1	NC	NC
	TRH C6-C10 (F1)	25	<25	<25	NC	NC
	TRH >C10-C16 (F2)	50	<50	<50	NC	NC
	TRH >C16-C34 (F3)	100	<100	240	145.0	131
	TRH >C34-C40 (F4)	100	<100	<100	NC	NC
	Benzene	0.2	<0.2	<0.2	NC	NC
	Toluene	0.5	<0.5	<0.5	NC	NC
	Ethylbenzene	1	<1	<1	NC	NC
	m+p-xylene	2	<2	<2	NC	NC
	o-xylene	1	<1	<1	NC	NC

Explanation:

The RPD value is calculated as the absolute value of the difference between the initial and repeat results divided by the average value expressed as a percentage. The following acceptance criteria will be used to assess the RPD results:

- Results > 10 times PQL = RPD value <= 50% are acceptable
- Results between 5 & 10 times PQL = RPD value <= 75% are acceptable
- Results < 5 times PQL = RPD value <= 100% are acceptable

If result is LPQL then 50% of the PQL is used for the calculation

RPD Results Above the Acceptance Criteria

VALUE

TABLE E-1
SOIL INTER-LABORATORY DUPLICATE RESULTS & RPD CALCULATIONS
All results in mg/kg unless stated otherwise

SAMPLE	ANALYSIS	Envirolab PQL	Envirolab VIC PQL	INITIAL	REPEAT	MEAN	RPD %
Sample Ref = BH1 (0-0.1) Dup Ref = DUPMP2 Envirolab Report: 202302 Envirolab VIC Report: 15035	Arsenic	4	4	5	28	16.5	139
	Cadmium	0.4	0.4	<0.4	<0.4	NC	NC
	Chromium	1	1	22	4	13.0	138
	Copper	1	1	19	14	16.5	30
	Lead	1	1	10	6	8.0	50
	Mercury	0.1	0.1	<0.1	<0.1	NC	NC
	Nickel	1	1	14	2	8.0	150
	Zinc	1	1	22	5	13.5	126
	Naphthalene	0.1	0.1	<0.1	<0.1	NC	NC
	Acenaphthylene	0.1	0.1	<0.1	<0.1	NC	NC
	Acenaphthene	0.1	0.1	<0.1	<0.1	NC	NC
	Fluorene	0.1	0.1	<0.1	<0.1	NC	NC
	Phenanthrene	0.1	0.1	0.4	<0.1	0.2	156
	Anthracene	0.1	0.1	<0.1	<0.1	NC	NC
	Fluoranthene	0.1	0.1	0.5	<0.1	0.3	164
	Pyrene	0.1	0.1	0.4	<0.1	0.2	156
	Benzo(a)anthracene	0.1	0.1	0.1	<0.1	0.1	67
	Chrysene	0.1	0.1	0.2	<0.1	0.1	120
	Benzo(b,j+k)fluoranthene	0.2	0.2	0.3	<0.2	0.2	100
	Benzo(a)pyrene	0.05	0.05	0.1	<0.05	0.1	120
	Indeno(123-cd)pyrene	0.1	0.1	0.1	<0.1	0.1	67
	Dibenzo(ah)anthracene	0.1	0.1	<0.1	<0.1	NC	NC
	Benzo(ghi)perylene	0.1	0.1	0.2	<0.1	0.1	120
	Total OCPs	0.1	0.1	<0.1	<0.1	NC	NC
	Total OPPs	0.1	0.1	<0.1	<0.1	NC	NC
	Total PCBs	0.1	0.1	<0.1	<0.1	NC	NC
	TRH C6-C10 (F1)	25	25	<25	<25	NC	NC
	TRH >C10-C16 (F2)	50	50	<50	<50	NC	NC
	TRH >C16-C34 (F3)	100	100	1200	<100	625.0	184
	TRH >C34-C40 (F4)	100	100	420	<100	235.0	157
	Benzene	0.2	0.2	<0.2	<0.2	NC	NC
	Toluene	0.5	0.5	<0.5	<0.5	NC	NC
	Ethylbenzene	1	1	<1	<1	NC	NC
	m+p-xylene	2	2	<2	<2	NC	NC
	o-xylene	1	1	<1	<1	NC	NC

Explanation:

The RPD value is calculated as the absolute value of the difference between the initial and repeat results divided by the average value expressed as a percentage. The following acceptance criteria will be used to assess the RPD results:

Results > 10 times PQL = RPD value <= 50% are acceptable

Results between 5 & 10 times PQL = RPD value <= 75% are acceptable

Results < 5 times PQL = RPD value <= 100% are acceptable

If result is LPQL then 50% of the PQL is used for the calculation

RPD Results Above the Acceptance Criteria

VALUE

TABLE E-2
SOIL INTER-LABORATORY DUPLICATE RESULTS & RPD CALCULATIONS
All results in mg/kg unless stated otherwise

SAMPLE	ANALYSIS	Envirolab PQL	Envirolab VIC PQL	INITIAL	REPEAT	MEAN	RPD %
Sample Ref = BH3 (0.1-0.2) Dup Ref = DUPMP4 Envirolab Report: 202302 Envirolab VIC Report: 15035	Arsenic	4	4	<4	5	3.5	86
	Cadmium	0.4	0.4	<0.4	<0.4	NC	NC
	Chromium	1	1	13	5	9.0	89
	Copper	1	1	46	8	27.0	141
	Lead	1	1	31	5	18.0	144
	Mercury	0.1	0.1	<0.1	<0.1	NC	NC
	Nickel	1	1	14	<1	7.3	186
	Zinc	1	1	52	6	29.0	159
	Naphthalene	0.1	0.1	0.1	<0.1	0.1	67
	Acenaphthylene	0.1	0.1	<0.1	<0.1	NC	NC
	Acenaphthene	0.1	0.1	<0.1	<0.1	NC	NC
	Fluorene	0.1	0.1	<0.1	<0.1	NC	NC
	Phenanthrene	0.1	0.1	1	<0.1	0.5	181
	Anthracene	0.1	0.1	0.2	<0.1	0.1	120
	Fluoranthene	0.1	0.1	1.2	<0.1	0.6	184
	Pyrene	0.1	0.1	1.1	<0.1	0.6	183
	Benzo(a)anthracene	0.1	0.1	0.5	<0.1	0.3	164
	Chrysene	0.1	0.1	0.4	<0.1	0.2	156
	Benzo(b,j+k)fluoranthene	0.2	0.2	0.6	<0.2	0.4	143
	Benzo(a)pyrene	0.05	0.05	0.4	<0.05	0.2	176
	Indeno(123-cd)pyrene	0.1	0.1	0.2	<0.1	0.1	120
	Dibenzo(ah)anthracene	0.1	0.1	<0.1	<0.1	NC	NC
	Benzo(ghi)perylene	0.1	0.1	0.2	<0.1	0.1	120
	Total OCPs	0.1	0.1	<0.1	<0.1	NC	NC
	Total OPPs	0.1	0.1	<0.1	<0.1	NC	NC
	Total PCBs	0.1	0.1	<0.1	<0.1	NC	NC
	TRH C6-C10 (F1)	25	25	<25	<25	NC	NC
	TRH >C10-C16 (F2)	50	50	<50	<50	NC	NC
	TRH >C16-C34 (F3)	100	100	<100	<100	NC	NC
	TRH >C34-C40 (F4)	100	100	140	<100	95.0	95
	Benzene	0.2	0.2	<0.2	<0.2	NC	NC
	Toluene	0.5	0.5	<0.5	<0.5	NC	NC
	Ethylbenzene	1	1	<1	<1	NC	NC
	m+p-xylene	2	2	<2	<2	NC	NC
	o-xylene	1	1	<1	<1	NC	NC

Explanation:

The RPD value is calculated as the absolute value of the difference between the initial and repeat results divided by the average value expressed as a percentage. The following acceptance criteria will be used to assess the RPD results:

Results > 10 times PQL = RPD value <= 50% are acceptable

Results between 5 & 10 times PQL = RPD value <= 75% are acceptable

Results < 5 times PQL = RPD value <= 100% are acceptable

If result is LPQL then 50% of the PQL is used for the calculation

RPD Results Above the Acceptance Criteria

VALUE

TABLE F
SUMMARY OF FIELD QA/QC RESULTS

ANALYSIS	Envirolab PQL		TB1 ^s	TS1 ^s	TS2 ^s
			27/09/2018	27/09/2018	3/10/2018
	mg/kg	µg/L	mg/kg	% Recovery	% Recovery
TRH C6-C10 (F1)	10	10	<25	NA	NA
Benzene	1	0.2	<0.2	97%	97%
Toluene	1	0.5	<0.5	97%	98%
Ethylbenzene	1	1	<1	98%	97%
m+p-xylene	2	2	<2	98%	96%
o-xylene	1	1	<1	99%	96%

Explanation:

^w Sample type (water)

^s Sample type (sand)

BTEX concentrations in trip spikes are presented as % recovery

Values above PQLs/Acceptance criteria

VALUE



ASI Borehole & Test Pit Logs



ENVIRONMENTAL LOG

Log No.
TP101
1/1
SDUP101: 0-0.3m

Environmental logs are not to be used for geotechnical purposes

Client: WOOLWORTHS GROUP													
Project: ADDITIONAL SITE INVESTIGATION													
Location: 250 VICTORIA STREET, WETHERILL PARK, NSW													
Job No.: E31888BR													
Method: EXCAVATOR													
R.L. Surface: N/A													
Date: 3/2/21													
Datum: -													
Plant Type: JKX													
Logged/Checked by: C.R./V.B.													
Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLE- TION	[Pattern]					0	[Pattern]	CI-CH	FILL: Silty clay, medium to high plasticity, dark brown, trace of igneous gravel and root fibres.	w<PL			GRASS COVER
													Silty CLAY: medium to high plasticity, brown mottled grey.
	[Pattern]					1	[Pattern]		Silty CLAY: medium to high plasticity, grey mottled brown.				
	[Pattern]					2	[Pattern]		END OF TEST PIT AT 2.0m				
						3							
						4							
						5							
						6							
						7							



ENVIRONMENTAL LOG

Log No.
TP102
1/1

Environmental logs are not to be used for geotechnical purposes

Client:WOOLWORTHS GROUP

Project:ADDITIONAL SITE INVESTIGATION

Location:250 VICTORIA STREET, WETHERILL PARK, NSW

Job No.:E31888BR

Method:EXCAVATOR

R.L. Surface:N/A

Date:3/2/21

Datum:-

Plant Type:JKX

Logged/Checked by:C.R./V.B.

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/Weathering	Strength/Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLETION						0			FILL: Silty clay, medium to high plasticity, dark brown, trace of glass, plastic and root fibres.	w<PL			GRASS COVER
								CI-CH	FILL: Silty clay, medium to high plasticity, brown mottled red, orange and grey, trace of ash and root fibres.	w<PL			SCREEN: 15.6kg 0-0.25m NO FCF SCREEN: 12.4kg 0.25-0.75m NO FCF RESIDUAL
						1			Silty CLAY: medium to high plasticity, brown mottled red.				
									END OF TEST PIT AT 0.9m				
						2							
						3							
						4							
						5							
						6							
						7							

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Logged/Checked by: A.M./V.B.

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JKEnvironments

ENVIRONMENTAL LOG



Log No.
BH103
2/2

Environmental logs are not to be used for geotechnical purposes

SDUP4: 0-0.2m

Client: WOOLWORTHS GROUP Project: ADDITIONAL SITE INVESTIGATION Location: 250 VICTORIA STREET, WETHERILL PARK, NSW													
Job No.: E31888BR			Method: SPIRAL AUGER				R.L. Surface: N/A						
Date: 2/2/21			Datum: -										
Plant Type: JKX			Logged/Checked by: A.M./V.B.										
Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
						8			SILTSTONE: grey, with iron indurated bands.	DW			
						8			END OF BOREHOLE AT 8.0m				GROUNDWATER MONITORING WELL INSTALLED TO 8.0m. CLASS 18 MACHINE SLOTTED 50mm DIA. PVC STANDPIPE 8.0m TO 3.0m. CASING 3.0m TO 0m. 2mm SAND FILTER PACK 8.0m TO 2.8m. BENTONITE SEAL 2.8m TO 2.0m. BACKFILLED WITH SAND TO THE SURFACE. COMPLETED WITH A CONCRETED GATIC COVER.
						9							
						10							
						11							
						12							
						13							
						14							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Client: WOOLWORTHS GROUP Project: ADDITIONAL SITE INVESTIGATION Location: 250 VICTORIA STREET, WETHERILL PARK, NSW													
Job No.: E31888BR Method: EXCAVATOR R.L. Surface: N/A													
Date: 3/2/21 Datum: -													
Plant Type: JKX Logged/Checked by: C.R./V.B.													
Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLETION						0			FILL: Silty sand, fine to medium grained, dark brown grey, trace of timber, mulch and root fibres.	D			SCREEN: 8.9kg 0-0.1m NO FCF
						1	CI-CH	FILL: Silty clayey sand, fine to medium grained, dark brown, trace of asphaltic concrete fragments, igneous gravel, roots and root fibres. Silty CLAY: medium to high plasticity, brown mottled grey.	w<PL			SCREEN: 16.7kg 0.1-0.5m NO FCF RESIDUAL	
								Silty CLAY: medium to high plasticity, grey mottled red brown.					
						2			END OF TEST PIT AT 1.8m				TEST PIT TERMINATED DUE TO NEARBY SERVICE
						3							
						4							
						5							
						6							
						7							



ENVIRONMENTAL LOG

Log No.
BH105
1/1

Environmental logs are not to be used for geotechnical purposes

SDUP13: 0-0.3m

Client: WOOLWORTHS GROUP													
Project: ADDITIONAL SITE INVESTIGATION													
Location: 250 VICTORIA STREET, WETHERILL PARK, NSW													
Job No.: E31888BR													
Method: SPIRAL AUGER													
R.L. Surface: N/A													
Date: 5/2/21													
Datum: -													
Plant Type: JK205													
Logged/Checked by: A.M./V.B.													
Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLE- TION						0		-	CONCRETE: 30mm.t FILL: Silty sandy gravel, fine to coarse grained, grey, igneous, sub-angular, fine to medium grained sand.	M			SCREEN: 12.5kg 0.03-0.8m NO FCF
					N > 4 3,4,4/ 100mm REFUSAL	1		CI-CH	Silty CLAY: medium to high platicity, grey, trace of ironstone gravel.	w<PL			RESIDUAL
									END OF BOREHOLE AT 1.5m				
						2							
						3							
						4							
						5							
						6							
						7							

JKEnvironments

ENVIRONMENTAL LOG



Log No.
BH106
1/2

Environmental logs are not to be used for geotechnical purposes

SDUP10: 0.19-0.4m

Client: WOOLWORTHS GROUP Project: ADDITIONAL SITE INVESTIGATION Location: 250 VICTORIA STREET, WETHERILL PARK, NSW													
Job No.: E31888BR Date: 4/2/21 Plant Type: JK205			Method: SPIRAL AUGER Logged/Checked by: A.M./V.B.				R.L. Surface: N/A Datum: -						
Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
			N = 7 2,1,6 N = SPT 20/ 100mm REFUSAL	0		-	CONCRETE: 190mm.t						
				0.19-0.8m			FILL: Silty sand, fine to medium grained, light brown.	M				SCREEN: 8.6kg 0.19-0.8m NO FCF	
				1		CI-CH	Silty CLAY: medium to high plasticity, grey, trace of ironstone gravel.	w<PL			ORGNIC ODOUR RESIDUAL		
				2		-	Extremely Weathered siltstone: silty CLAY, low to medium plasticity, grey.	XW			BRINGELLY SHALE		
				2		-	SILTSTONE: grey brown, with iron indurated bands.	DW			LOW TO MODERATE 'TC' BIT RESISTANCE		
				5									HIGH RESISTANCE
				6									
				7									

JKEnvironments

ENVIRONMENTAL LOG



Log No.
BH106
2/2

Environmental logs are not to be used for geotechnical purposes

SDUP10: 0.19-0.4m

Client: WOOLWORTHS GROUP Project: ADDITIONAL SITE INVESTIGATION Location: 250 VICTORIA STREET, WETHERILL PARK, NSW													
Job No.: E31888BR Date: 4/2/21 Plant Type: JK205			Method: SPIRAL AUGER Logged/Checked by: A.M./V.B.				R.L. Surface: N/A Datum: -						
Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
						8			SILTSTONE: grey brown, with iron indurated bands.	DW			
						8			END OF BOREHOLE AT 8.0m				GROUNDWATER MONITORING WELL INSTALLED TO 7.75m. CLASS 18 MACHINE SLOTTED 50mm DIA. PVC STANDPIPE 7.75m TO 1.75m. CASING 1.75m TO 0m. 2mm SAND FILTER PACK 7.75m TO 1.4m. BENTONITE SEAL 1.4m TO 0.9m. BACKFILLED WITH SAND TO THE SURFACE. COMPLETED WITH A CONCRETED GATIC COVER.
						9							
						10							
						11							
						12							
						13							
						14							

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ENVIRONMENTAL LOG

Log No.
BH108
1/1
SDUP12: 0.03-0.2m

Environmental logs are not to be used for geotechnical purposes

Client: WOOLWORTHS GROUP													
Project: ADDITIONAL SITE INVESTIGATION													
Location: 250 VICTORIA STREET, WETHERILL PARK, NSW													
Job No.: E31888BR													
Method: SPIRAL AUGER													
R.L. Surface: N/A													
Date: 4/2/21													
Datum: -													
Plant Type: JK205													
Logged/Checked by: A.M./V.B.													
Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLE TION						0		-	ASPHALTIC CONCRETE: 30mm.t	D			SCREEN: 3.4kg 0.03-0.2m NO FCF RESIDUAL
								CI-CH	FILL: Silty gravelly sand, fine to medium grained, grey, fine to coarse grained, igneous, sub-angular, trace of brick and tile fragments. Silty CLAY: medium to high plasticity, grey mottled brown.	w<PL			
					N = 8 3,3,5	1			END OF BOREHOLE AT 0.95m				
						2							
						3							
						4							
						5							
						6							
						7							

JKEnvironments

ENVIRONMENTAL LOG



Log No.
BH109
1/1

Environmental logs are not to be used for geotechnical purposes

SDUP5: 0-0.2m

Client:

WOOLWORTHS GROUP

Project:

ADDITIONAL SITE INVESTIGATION

Location:

250 VICTORIA STREET, WETHERILL PARK, NSW

Job No.:

E31888BR

Method:

SPIRAL AUGER

R.L. Surface:

N/A

Date:

2/2/21

Datum:

-

Plant Type:

JK205

Logged/Checked by:

A.M./V.B.



ENVIRONMENTAL LOG

Log No.
BH110
1/1
SDUP111: 0-0.2m

Environmental logs are not to be used for geotechnical purposes

Client: WOOLWORTHS GROUP													
Project: ADDITIONAL SITE INVESTIGATION													
Location: 250 VICTORIA STREET, WETHERILL PARK, NSW													
Job No.: E31888BR													
Method: HAND AUGER													
R.L. Surface: N/A													
Date: 5/2/21													
Datum: -													
Plant Type: -													
Logged/Checked by: C.R./V.B.													
Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLE TION						0			FILL: Silty clay, medium to high plasticity, brown, trace of igneous gravel, asphalt, brick and root fibres.	w<PL			SCREEN: 10.2kg 0-0.4m NO FCF
								CI-CH	Silty CLAY: medium to high plasticity, grey mottled orange brown. END OF BOREHOLE AT 0.55m	w<PL			RESIDUAL HAND AUGER REFUSAL
						1							
						2							
						3							
						4							
						5							
						6							
						7							

JKEnvironments

ENVIRONMENTAL LOG



Log No.
BH111
1/2

Environmental logs are not to be used for geotechnical purposes

Client: WOOLWORTHS GROUP Project: ADDITIONAL SITE INVESTIGATION Location: 250 VICTORIA STREET, WETHERILL PARK, NSW													
Job No.: E31888BR Date: 2/2/21 Plant Type: JK205			Method: SPIRAL AUGER Logged/Checked by: A.M./V.B.				R.L. Surface: N/A Datum: -						
Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLETION						0		-	CONCRETE: 200mm.t				
									FILL: Silty clay, low to medium plasticity, grey, trace of igneous gravel.	w>PL			INSUFFICIENT RETURN FOR BULK SCREEN SCREEN: 9.5kg 0.5-1.5m NO FCF
						1			FILL: Silty clay, medium to high plasticity, red brown and brown, trace of igneous and ironstone gravel, concrete fragments and ash.				
								CI-CH	Silty CLAY: medium to high plasticity, grey mottled brown, trace of ironstone gravel.	w<PL			RESIDUAL
						2							
						3							
						4		-	Extremely Weathered siltstone: silty CLAY, low to medium plasticity. grey.	XW			BRINGELLY SHALE LOW TO MODERATE 'TC' BIT RESISTANCE
									SILTSTONE: grey brown, with iron indurated bands.	DW			
						5							
						6							
						7							

JKEnvironments

ENVIRONMENTAL LOG



Log No.
BH111
2/2

Environmental logs are not to be used for geotechnical purposes

Client: WOOLWORTHS GROUP Project: ADDITIONAL SITE INVESTIGATION Location: 250 VICTORIA STREET, WETHERILL PARK, NSW													
Job No.: E31888BR			Method: SPIRAL AUGER				R.L. Surface: N/A						
Date: 2/2/21			Datum: -										
Plant Type: JK205			Logged/Checked by: A.M./V.B.										
Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
						8			SILTSTONE: grey brown, with iron indurated bands.	DW			
						9			END OF BOREHOLE AT 8.0m				GROUNDWATER MONITORING WELL INSTALLED TO 8.0m. CLASS 18 MACHINE SLOTTED 50mm DIA. PVC STANDPIPE 8.0m TO 2.0m. CASING 2.0m TO 0m. 2mm SAND FILTER PACK 8.0m TO 1.9m. BENTONITE SEAL 1.9m TO 0.5m. BACKFILLED WITH SAND TO THE SURFACE. COMPLETED WITH A CONCRETED GATIC COVER.
						10							
						11							
						12							
						13							
						14							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Client: WOOLWORTHS GROUP Project: ADDITIONAL SITE INVESTIGATION Location: 250 VICTORIA STREET, WETHERILL PARK, NSW													
Job No.: E31888BR Method: SPIRAL AUGER R.L. Surface: N/A Date: 2/2/21 Datum: - Plant Type: JK205 Logged/Checked by: A.M./V.B.													
Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLETION						0			FILL: Silty clay, low to medium plasticity, dark brown, trace of igneous gravel and ash.	w>PL			SCREEN: 9.3kg 0-0.4m NO FCF
						1		FILL: Silty clay, medium to high plasticity, red brown, trace of igneous and ironstone gravel, glass fragments and ash.	SCREEN: 8.7kg 0.4-1.4kg NO FCF				
									CI-CH	Silty CLAY: medium to high plasticity, grey, trace of ironstone gravel.	w<PL		
						2			END OF BOREHOLE AT 2.0m				
						3							
						4							
						5							
						6							
						7							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Client:

WOOLWORTHS GROUP

Project:

ADDITIONAL SITE INVESTIGATION

Location:

250 VICTORIA STREET, WETHERILL PARK, NSW

Job No.:

E31888BR

Method:

HAND AUGER

R.L. Surface:

N/A

Date:

5/2/21

Datum:

-

Plant Type:

-

Logged/Checked by:

C.R./V.B.

Groundwater Record	SAMPLES					Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/Weathering	Strength/Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL	DB									
DRY ON COMPLETION							0		CI-CH	FILL: Silty clay, medium to high plasticity, brown, trace of igneous gravel and root fibres.	w<PL			SCREEN: 11.2kg 0-0.2m NO FCF
										Silty CLAY: medium to high plasticity, grey mottled yellow brown. END OF BOREHOLE AT 0.4m	w<PL			RESIDUAL HAND AUGER REFUSAL
							1							
							2							
							3							
							4							
							5							
							6							
							7							

JKEnvironments

ENVIRONMENTAL LOG



Log No.

TP114

1/1

Environmental logs are not to be used for geotechnical purposes

SDUP104: 0-0.2m

Client:

WOOLWORTHS GROUP

Project:

ADDITIONAL SITE INVESTIGATION

Location:

250 VICTORIA STREET, WETHERILL PARK, NSW

Job No.:

E31888BR

Method:

EXCAVATOR

R.L. Surface:

N/A

Date:

4/2/21

Datum:

-

Plant Type:

JKX

Logged/Checked by:

C.R./V.B.

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/Weathering	Strength/Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLETION						0		CI-CH	FILL: Silty sand, fine to medium grained, dark brown grey, with igneous gravel, trace of plastic, concrete asphaltic concrete and timber fragments.	D			SCREEN: 16.6kg
									Silty CLAY: medium to high plasticity, grey mottled red brown and yellow brown.	w<PL			NO FCF RESIDUAL
						1			END OF TEST PIT AT 0.8m				
						2							
						3							
						4							
						5							
						6							
						7							

JKEnvironments

ENVIRONMENTAL LOG



Log No.
TP115
1/1

Environmental logs are not to be used for geotechnical purposes

SDUP105: 0-0.2m

Client:WOOLWORTHS GROUP

Project:ADDITIONAL SITE INVESTIGATION

Location:250 VICTORIA STREET, WETHERILL PARK, NSW

Job No.:E31888BR

Method:EXCAVATOR

R.L. Surface:N/A

Date:4/2/21

Datum:-

Plant Type:JKX

Logged/Checked by:C.R./V.B.

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/Weathering	Strength/Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLETION						0		CI-CH	FILL: Gravelly sand, fine to medium grained, dark brown grey, fine to coarse grained, igneous gravel, sub-angular, trace of concrete and asphaltic concrete fragments.	D			SCREEN: 13.4kg
									Silty CLAY: medium to high plasticity, red brown mottled grey and brown.	w<PL			NO FCF
									END OF TEST PIT AT 0.6m				RESIDUAL
						1							
						2							
						3							
						4							
						5							
						6							
						7							

JKEnvironments

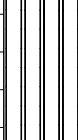
ENVIRONMENTAL LOG



Log No.
BH116
1/2

Environmental logs are not to be used for geotechnical purposes

SDUP111: 0.03-0.3m

Client: WOOLWORTHS GROUP														
Project: ADDITIONAL SITE INVESTIGATION														
Location: 250 VICTORIA STREET, WETHERILL PARK, NSW														
Job No.: E31888BR					Method: SPIRAL AUGER					R.L. Surface: N/A				
Date: 4/2/21					Datum: -									
Plant Type: JK205					Logged/Checked by: A.M./V.B.									
Groundwater Record	SAMPLES					Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL	DB									
DRY ON COMPLETION						N = 8 3,3,5	0		-	ASPHALTIC CONCRETE: 30mm.t	w<PL			SCREEN: 4.9kg
									CI-CH	FILL: Silty clay, low to medium plasticity, grey, with igneous gravel, trace of asphalt fragments. Silty CLAY: medium to high plasticity, red brown mottled grey, trace of ironstone gravel.	w<PL			0.03-0.3m NO FCF RESIDUAL
						N = 21 4,10,11	1		-	Extremely Weathered siltstone: silty CLAY, low to medium plasticity, grey.	XW			BRINGELLY SHALE
								2			SILTSTONE: grey brown, with iron indurated bands.	DW		
							3							
							4							MODERATE TO HIGH RESISTANCE
							5							
							6			END OF BOREHOLE AT 5.6m				'TC' BIT REFUSAL ON HIGH RESISTANCE SILTSTONE
							7							GROUNDWATER MONITORING WELL INSTALLED TO 5.5m. CLASS 18 MACHINE SLOTTED 50mm DIA.

JKEnvironments

ENVIRONMENTAL LOG



Log No.
BH116
2/2

Environmental logs are not to be used for geotechnical purposes

SDUP111: 0.03-0.3m

Client: WOOLWORTHS GROUP													
Project: ADDITIONAL SITE INVESTIGATION													
Location: 250 VICTORIA STREET, WETHERILL PARK, NSW													
Job No.: E31888BR			Method: SPIRAL AUGER				R.L. Surface: N/A						
Date: 4/2/21			Datum: -										
Plant Type: JK205			Logged/Checked by: A.M./V.B.										
Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
						8							PVC STANDPIPE 5.5m TO 2.5m. CASING 2.5m TO 0m. 2mm SAND FILTER PACK 5.5m TO 2.4m. BENTONITE SEAL 2.4m TO 1.4m. BACKFILLED WITH SAND TO THE SURFACE. COMPLETED WITH A CONCRETED GATIC COVER.
						9							
						10							
						11							
						12							
						13							
						14							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Client:WOOLWORTHS GROUP

Project:ADDITIONAL SITE INVESTIGATION

Location:250 VICTORIA STREET, WETHERILL PARK, NSW

Job No.:E31888BR

Method:EXCAVATOR

R.L. Surface:N/A

Date:4/2/21

Datum:-

Plant Type:JKX

Logged/Checked by:M.M.P./V.B.

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/Weathering	Strength/Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLETION						0		CI-CH	FILL: Silty sand, fine to medium grained, dark brown grey, with igneous gravel, trace of concrete and asphaltic concrete fragments and timber.	D			SCREEN: 15.2kg
									Silty CLAY: medium to high plasticity, grey mottled red brown.	w<PL			0-0.2m NO FCF RESIDUAL
						1			END OF TEST PIT AT 0.6m				
						2							
						3							
						4							
						5							
						6							
						7							

JKEnvironments

ENVIRONMENTAL LOG



Log No.
BH118
1/1

Environmental logs are not to be used for geotechnical purposes

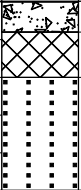
Client: WOOLWORTHS GROUP Project: ADDITIONAL SITE INVESTIGATION Location: 250 VICTORIA STREET, WETHERILL PARK, NSW													
Job No.: E31888BR Date: 3/2/21 Plant Type: JK205			Method: SPIRAL AUGER Logged/Checked by: A.M./V.B.			R.L. Surface: N/A Datum: -							
Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLETION						0			FILL: Silty gravelly clay, low to medium plasticity, grey brown, fine to coarse grained igneous gravel, sub-angular, trace of brick fragments.	w<PL			SCREEN: 3.5kg 0-0.3m NO FCF SCREEN: 11.6kg 0.3-1.3m NO FCF
						1			FILL: Silty clay, low to medium plasticity, brown, trace of igneous, ironstone and siltstone gravel, brick, concrete and plastic fragments and ash.				
					N = 7 3,3,4			CI-CH	Silty CLAY: medium to high plasticity, grey mottled red brown, trace of ironstone gravel.	w<PL			RESIDUAL
					N = 26 4,11,15			-	Extremely Weathered siltstone: silty CLAY, low to medium plasticity, grey brown.	XW			
						2			END OF BOREHOLE AT 2.0m				
						3							
						4							
						5							
						6							
						7							



ENVIRONMENTAL LOG

Log No.
BH119
1/1
SDUP6: 0.16-0.3m

Environmental logs are not to be used for geotechnical purposes

Client: WOOLWORTHS GROUP													
Project: ADDITIONAL SITE INVESTIGATION													
Location: 250 VICTORIA STREET, WETHERILL PARK, NSW													
Job No.: E31888BR													
Method: SPIRAL AUGER													
R.L. Surface: N/A													
Date: 2/2/21													
Datum: -													
Plant Type: JK205													
Logged/Checked by: A.M./V.B.													
Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLE TION						0		-	CONCRETE: 160mm.t				
								-	FILL: Silty gravelly sand, fine to medium grained, grey, fine to coarse grained igneous sub-angular, trace of sandstone gravel.	M			SCREEN: 3.0kg
									-	SANDSTONE: brown grey.	DW		
						1			END OF BOREHOLE AT 1.0m				
						2							
						3							
						4							
						5							
						6							
						7							



ENVIRONMENTAL LOG

Log No.
TP120

1/1

Environmental logs are not to be used for geotechnical purposes

Client: WOOLWORTHS GROUP													
Project: ADDITIONAL SITE INVESTIGATION													
Location: 250 VICTORIA STREET, WETHERILL PARK, NSW													
Job No.: E31888BR				Method: EXCAVATOR				R.L. Surface: N/A					
Date: 3/2/21				Datum: -									
Plant Type: -				Logged/Checked by: M.M.P./V.B.									
Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLE TION						0		CI-CH	FILL: Sandy clay, medium to high plasticity, dark brown, trace of igneous and ironstone gravel, concrete and root fibres.	w<PL			GRASS COVER
									FILL: Silty clay, medium to high plasticity, red brown mottled grey, trace of ironstone gravel and concrete fragments. Silty CLAY: medium to high plasticity, red brown mottled yellow brown, trace of ironstone gravel. END OF TEST PIT AT 0.8m	w<PL			SCREEN: 13.3kg 0-0.2m NO FCF SCREEN: 12.7kg 0.2-0.5m NO FCF RESIDUAL
						1							
						2							
						3							
						4							
						5							
						6							
						7							



ENVIRONMENTAL LOG

Log No.
TP121
1/1

Environmental logs are not to be used for geotechnical purposes

Client: WOOLWORTHS GROUP														
Project: ADDITIONAL SITE INVESTIGATION														
Location: 250 VICTORIA STREET, WETHERILL PARK, NSW														
Job No.: E31888BR			Method: EXCAVATOR				R.L. Surface: N/A							
Date: 3/2/21			Datum: -											
Plant Type: JKX			Logged/Checked by: C.R./V.B.											
Groundwater Record	SAMPLES					Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL	DB									
DRY ON COMPLETION							0			FILL: Silty clay, medium to high plasticity, grey mottled brown and orange brown, trace of igneous gravel, ash and root fibres.	w<PL			GRASS COVER
						1	FILL: Silty clay, medium to high plasticity, brown mottled red brown, trace of igneous and ironstone gravel and ash.		SCREEN: 14.6kg 0-0.5 NO FCF SCREEN: 13.8kg 0.5-1.1m NO FCF					
							FILL: Silty clay, medium to high plasticity, brown mottled red brown, trace of igneous and sandstone gravel and ash.		SCREEN: 12.9kg 1.1-1.7m NO FCF					
						2	CI-CH	Silty CLAY: medium to high plasticity, brown, trace of ironstone gravel.	w<PL		RESIDUAL			
							2			END OF TEST PIT AT 2.0m				
							3							
							4							
							5							
							6							
							7							



ENVIRONMENTAL LOG

Log No.
TP122
1/1
SDUP102: 0-0.2m

Environmental logs are not to be used for geotechnical purposes

Client: WOOLWORTHS GROUP													
Project: ADDITIONAL SITE INVESTIGATION													
Location: 250 VICTORIA STREET, WETHERILL PARK, NSW													
Job No.: E31888BR													
Method: EXCAVATOR													
R.L. Surface: N/A													
Date: 3/2/21													
Datum: -													
Plant Type: JKX													
Logged/Checked by: C.R./V.B.													
Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLE TION						0			FILL: Silty clay, medium to high plasticity, red brown mottled grey, trace of igneous and sandstone gravel, ash and root fibres.	w<PL			GRASS COVER
						1		FILL: Silty clay, medium to high plasticity, red brown mottled grey, trace of igneous and sandstone gravel, ash, ceramic tile and root fibres.			SCREEN: 14.9kg 0-0.6m NO FCF		
								FILL: Silty gravel, fine to medium grained, dark grey brown, igneous, sub-angular, trace of clay nodules.	D		SCREEN: 13.6kg 0.6-1.4m NO FCF		
						2	CI-CH		Silty CLAY: medium to high plasticity, yellow brown mottled grey. END OF TEST PIT AT 2.0m	w<PL			RESIDUAL
						3							
						4							
						5							
						6							
						7							

JKEnvironments

ENVIRONMENTAL LOG



Log No.
BH123

1/2

Environmental logs are not to be used for geotechnical purposes

SDUP9: 0-0.2m

Client:

WOOLWORTHS GROUP

Project:

ADDITIONAL SITE INVESTIGATION

Location:

250 VICTORIA STREET, WETHERILL PARK, NSW

Job No.:

E31888BR

Method:

SPIRAL AUGER

R.L. Surface:

N/A

Date:

3/2/21

Datum:

-

Plant Type:

JK205

Logged/Checked by:

A.M./V.B.

Groundwater Record	SAMPLES					Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL	DB									
DRY ON COMPLETION							0			FILL: Silty gravelly sand, fine to medium grained, grey, fine to coarse grained, igneous, sub-angular, trace of brick fragments.	M			SCREEN: 5.4kg 0-0.3m
										FILL: Silty clay, medium to high plasticity, trace of igneous and ironstone gravel.	w<PL			NO FCF SCREEN: 10.6kg 0.3-1.0m NO FCF
							1		CI-CH	Silty CLAY: medium to high plasticity, re brown, trace of ironstone gravel.	w<PL			RESIDUAL
									-	as above, but grey mottled brown.	XW DW			BRINGELLY SHALE
							2			Extremely Weathered siltstone: silty CLAY, low to medium plasticity, grey with ironstone bands.				LOW TO MODERATE 'TC' BIT RESISTANCE
										SILTSTONE: grey brown, with iron indurated bands.				
							3							
							4							
							5							
							6							
							7							

Logged/Checked by: A.M./V.B.

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ENVIRONMENTAL LOG

Log No.
TP124
1/1

Environmental logs are not to be used for geotechnical purposes

Client: WOOLWORTHS GROUP													
Project: ADDITIONAL SITE INVESTIGATION													
Location: 250 VICTORIA STREET, WETHERILL PARK, NSW													
Job No.: E31888BR													
Method: EXCAVATOR													
R.L. Surface: N/A													
Date: 4/2/21													
Datum: -													
Plant Type: JKX													
Logged/Checked by: C.R./V.B.													
Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLE TION						0		CI-CH	FILL: Silty sand, fine to medium grained, dark brown, grey, trace of igneous gravel, concrete and asphaltic concrete.	D			SCREEN: 15.2kg
						1			Silty CLAY: medium to high plasticity, red brown mottled grey.	w<PL			0-0.2m
									Silty CLAY: medium to high plasticity, grey brown mottled red.				NO FCF RESIDUAL
								-	Extremely Weathered siltstone: silty CLAY, low to medium plasticity, brown.	XW			BRINGELLY SHALE
						2			END OF TEST PIT AT 1.9m				
						3							
						4							
						5							
						6							
						7							



ENVIRONMENTAL LOG

Log No.
TP125
1/1
SDUP106: 0-0.2m

Environmental logs are not to be used for geotechnical purposes

Client: WOOLWORTHS GROUP													
Project: ADDITIONAL SITE INVESTIGATION													
Location: 250 VICTORIA STREET, WETHERILL PARK, NSW													
Job No.: E31888BR			Method: EXCAVATOR				R.L. Surface: N/A						
Date: 4/2/21			Datum: -										
Plant Type: JKX			Logged/Checked by: C.R./V.B.										
Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
						0		CI-CH	FILL: Silty sand, fine to medium grained, dark brown grey, with igneous gravel, trace of concrete and asphaltic concrete fragments. Silty CLAY: medium to high plasticity, red brown mottled grey, trace of siltstone gravel.	D w<PL			SCREEN 14.9kg 0-0.2m NO FCF RESIDUAL
						1			Silty CLAY: medium to high plasticity, grey mottled red and yellow brown.				
									END OF TEST PIT AT 1.2m				
						2							
						3							
						4							
						5							
						6							
						7							

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes



Log No.
TP126
1/1

SDUP107: 0-0.2m

Client:

WOOLWORTHS GROUP

Project:

ADDITIONAL SITE INVESTIGATION

Location:

250 VICTORIA STREET, WETHERILL PARK, NSW

Job No.:

E31888BR

Method:

EXCAVATOR

R.L. Surface:

N/A

Date:

4/2/21

Datum:

-

Plant Type:

JKX

Logged/Checked by:

C.R./V.B.

Groundwater Record	SAMPLES					Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL	DB									
DRY ON COMPLETION							0		CI-CH	FILL: Silty sand, fine to medium grained, dark brown grey, with igneous gravel, trace of asphaltic concrete fragments, concrete and timber.	D			SCREEN: 14.8kg
										Silty CLAY: medium to high plasticity, red brown mottled grey.	w<PL			0-0.3m
										Extremely Weathered siltstone: silty CLAY, low to medium plasticity, grey mottled yellow brown.	XW			NO FCF RESIDUAL
							1			END OF TEST PIT AT 0.95m				
							2							
							3							
							4							
							5							
							6							
							7							

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Client:	WOOLWORTHS GROUP												
Project:	ADDITIONAL SITE INVESTIGATION												
Location:	250 VICTORIA STREET, WETHERILL PARK, NSW												
Job No.:	E31888BR	Method:	SPIRAL AUGER	R.L. Surface:	N/A								
Date:	1/2/21	Datum:	-										
Plant Type:	JK205	Logged/Checked by:	A.M./V.B.										
Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLETION						0		-	CONCRETE: 200mm.t				
									FILL: Silty sandy gravel, fine to coarse grained, sub-angular igneous, grey, fine to medium grained sand.	M			SCREEN: 4.4kg 0.2-0.4m NO FCF
									FILL: Silty clay, medium to high plasticity, red brown and brown, trace of igneous, ironstone and sandstone gravel and ash.	w<PL			SCREEN: 10.4kg 0.4-1.3m NO FCF
						1			FILL: Silty clay, medium to high plasticity, brown, trace of igneous, ironstone and sandstone gravel, concrete, brick and plastic fragments and ash.				SCREEN: 4.8kg 1.3-2.1m NO FCF
									FILL: Silty clay, low to medium plasticity, grey, with ironstone gravel.				INSUFFICIENT RETURN FOR BULK SCREEN
								CI-CH	Silty CLAY: medium to high plasticity, red brown, trace of ironstone gravel, as above, but grey mottled brown.	w<PL			
									as above, but grey mottled red brown.				
						3							
								-	Extremely Weathered siltstone: silty CLAY, low to medium plasticity, brown.	XW			BRINGELLY SHALE
						4			SILTSTONE: brown grey, with iron indurated bands.	DW			LOW 'TC' BIT RESISTANCE
						5							HIGH RESISTANCE
						6							
									END OF BOREHOLE AT 6.1m				'TC' BIT REFUSAL ON HIGH RESISTANCE SILTSTONE
						7							

JKEnvironments

ENVIRONMENTAL LOG



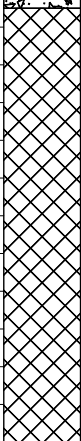
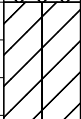
Log No.
BH128
2/2

Environmental logs are not to be used for geotechnical purposes

Client: WOOLWORTHS GROUP Project: ADDITIONAL SITE INVESTIGATION Location: 250 VICTORIA STREET, WETHERILL PARK, NSW													
Job No.: E31888BR Date: 1/2/21 Plant Type: JK205			Method: SPIRAL AUGER Logged/Checked by: A.M./V.B.				R.L. Surface: N/A Datum: -						
Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
ES	ASS	ASB	SAL	DB									
						8							GROUNDWATER MONITORING WELL INSTALLED TO 5.8m. CLASS 18 MACHINE SLOTTED 50mm DIA. PVC STANDPIPE 5.8m TO 2.8m. CASING 2.8m TO 0m. 2mm SAND FILTER PACK 5.8m TO 2.5m. BENTONITE SEAL 2.5m TO 1.5m. BACKFILLED WITH SAND TO THE SURFACE. COMPLETED WITH A CONCRETED GATIC COVER.
						9							
						10							
						11							
						12							
						13							
						14							

Environmental logs are not to be used for geotechnical purposes

SDUP3: 0.5-0.7m

Client:		WOOLWORTHS GROUP											
Project:		ADDITIONAL SITE INVESTIGATION											
Location:		250 VICTORIA STREET, WETHERILL PARK, NSW											
Job No.:		E31888BR		Method:		SPIRAL AUGER		R.L. Surface:		N/A			
Date:		1/2/21		Datum:		-							
Plant Type:		JK205		Logged/Checked by:		A.M./V.B.							
Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL DB									
						0			CONCRETE: 500mm.t				
					N = SPT 8/50mm REFUSAL	1		-	FILL: Silty sandy gravel, fine to coarse grained, grey, igneous, sub-angular, fine to medium grained sand, trace of ironstone gravel and ash. FILL: Silty clay, medium to high plasticity, red brown and brown, trace of igneous and ironstone gravel, and ash.	M			SCREEN: 2.1kg 0.5-1.0m NO FCF
					N = 8 3,4,4	2				w>PL			SCREEN: 12.3kg 1.0-2.0m NO FCF
						3		CI-CH	Silty CLAY: medium to high plasticity, grey mottled red brown.	w<PL			SCREEN: 11.4kg 2.0-2.8m NO FCF
				N = 15 4,7,8		3							RESIDUAL
						4			END OF BOREHOLE AT 3.45m				
						5							
						6							
						7							



ENVIRONMENTAL LOG

Log No.
TP130
1/1

Environmental logs are not to be used for geotechnical purposes

SDUP103: 0-0.2m

Client: WOOLWORTHS GROUP														
Project: ADDITIONAL SITE INVESTIGATION														
Location: 250 VICTORIA STREET, WETHERILL PARK, NSW														
Job No.: E31888BR			Method: EXCAVATOR				R.L. Surface: N/A							
Date: 3/2/21			Datum: -											
Plant Type: JKX			Logged/Checked by: C.R./V.B.											
Groundwater Record	SAMPLES					Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL	DB									
DRY ON COMPLETION							0		CI-CH	FILL: Silty clay, medium to high plasticity, brown, trace of ash, brick fragments, igneous gravel and root fibres.	w<PL			GRASS COVER
							1			Silty CLAY: medium to high plasticity, yellow brown mottled red brown, trace of ironstone gravel.	w<PL			SCREEN: 12.7kg 0-0.3m NO FCF RESIDUAL
										Silty CLAY: medium to high plasticity, dark brown mottled yellow brown.				
							2			Silty CLAY: medium to high plasticity, red brown mottled grey. END OF TEST PIT AT 2.0m				
							3							
							4							
							5							
							6							
							7							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Client:

WOOLWORTHS GROUP

Project:

ADDITIONAL SITE INVESTIGATION

Location:

250 VICTORIA STREET, WETHERILL PARK, NSW

Job No.:

E31888BR

Method:

SPIRAL AUGER

R.L. Surface:

N/A

Date:

3/1/21

Datum:

-

Plant Type:

JK205

Logged/Checked by:

A.M./V.B.

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLETION						0			FILL: Silty gravelly sand, fine to medium grained, grey, fine to coarse grained igneous, sub-angular, trace of brick fragments and slag.	M			SCREEN: 5.3kg
										w>PL			0-0.3m
									FILL: Silty clay, medium to high plasticity, brown, trace of igneous, ironstone and sandstone gravel, brick fragments and ash.	w<PL			NO FCF
					N = 13 3,6,7	1		CI-CH	Silty CLAY: medium to high plasticity, red brown, trace of ironstone gravel.				SCREEN: 2.5kg
									END OF BOREHOLE AT 1.0m				0.3-0.5m
													NO FCF
													RESIDUAL
						2							
						3							
						4							
						5							
						6							
						7							

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ENVIRONMENTAL LOG

Log No.
TP132
1/1

Environmental logs are not to be used for geotechnical purposes

Client: WOOLWORTHS GROUP													
Project: ADDITIONAL SITE INVESTIGATION													
Location: 250 VICTORIA STREET, WETHERILL PARK, NSW													
Job No.: E31888BR													
Method: EXCAVATOR													
R.L. Surface: N/A													
Date: 4/2/21													
Datum: -													
Plant Type: JKX													
Logged/Checked by: C.R./V.B.													
Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLE TION						0		CI-CH	FILL: Silty sand, fine to medium grained, dark brown grey.	D w<PL			SCREEN: 12.9kg 0-0.15m NO FCF RESIDUAL
									Silty CLAY: medium to high plasticity, red brown mottled grey.				
						1			Silty CLAY: medium to high plasticity, grey mottled orange brown.				
									END OF TEST PIT AT 0.95m				
						2							
						3							
						4							
						5							
						6							
						7							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Client:

WOOLWORTHS GROUP

Project:

ADDITIONAL SITE INVESTIGATION

Location:

250 VICTORIA STREET, WETHERILL PARK, NSW

Job No.:

E31888BR

Method:

EXCAVATOR

R.L. Surface:

N/A

Date:

5/2/21

Datum:

-

Plant Type:

JKX

Logged/Checked by:

C.R./V.B.

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/Weathering	Strength/Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLETION						0		CI-CH	FILL: Silty sand, fine to medium grained, with igneous gravel, trace of brick, concrete and asphaltic concrete fragments.	D			SCREEN: 13.9kg
									Silty CLAY: medium to high plasticity, red brown mottled grey.	w<PL			0-0.2m NO FCF RESIDUAL
						1			END OF TEST PIT AT 0.6m				
						2							
						3							
						4							
						5							
						6							
						7							



ENVIRONMENTAL LOG

Log No.
BH134
1/2

Environmental logs are not to be used for geotechnical purposes

SDUP14: 0-0.2m

Client:WOOLWORTHS GROUP

Project:ADDITIONAL SITE INVESTIGATION

Location:250 VICTORIA STREET, WETHERILL PARK, NSW

Job No.:E31888BR

Date:5/2/21

Plant Type:JK205

Method:SPIRAL AUGER

Logged/Checked by:A.M./V.B.

R.L. Surface:N/A

Datum:-

Groundwater Record	SAMPLES					Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/Weathering	Strength/Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL	DB									
DRY ON COMPLETION							0		CI-CH	FILL: Silty sandy gravel, fine to coarse grained, grey, igneous, sub-angular, fine to medium grained sand, trace of ceramic fragments.	D			SCREEN: 5.5kg
										w<PL				0-0.3m
						N = 8 2,3,5	1			Silty CLAY: medium to high plasticity, grey, trace of ironstone gravel.				NO FCF
														RESIDUAL
						N = 30 6,13,17	2		-	Extremely Weathered siltstone: silty CLAY, low to medium plasticity, grey.	XW			BRINGELLY SHALE
										SILTSTONE: grey brown, with iron indurated bands.	DW			LOW 'TC' BIT RESISTANCE
							3							
							4							
						5								
						6								
						7								
														HIGH RESISTANCE

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ENVIRONMENTAL LOG



Log No.
BH134
2/2

Environmental logs are not to be used for geotechnical purposes

SDUP14: 0-0.2m

Client: WOOLWORTHS GROUP Project: ADDITIONAL SITE INVESTIGATION Location: 250 VICTORIA STREET, WETHERILL PARK, NSW													
Job No.: E31888BR Date: 5/2/21 Plant Type: JK205			Method: SPIRAL AUGER Logged/Checked by: A.M./V.B.				R.L. Surface: N/A Datum: -						
Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
						8			SILTSTONE: grey brown, with iron indurated bands.	DW			
						9			END OF BOREHOLE AT 8.0m				GROUNDWATER MONITORING WELL INSTALLED TO 7.8m. CLASS 18 MACHINE SLOTTED 50mm DIA. PVC STANDPIPE 7.8m TO 1.8m. CASING 1.8m TO 0m. 2mm SAND FILTER PACK 7.8m TO 1.3m. BENTONITE SEAL 1.3m TO 0.8m. BACKFILLED WITH SAND TO THE SURFACE. COMPLETED WITH A CONCRETED GATIC COVER.
						10							
						11							
						12							
						13							
						14							



ENVIRONMENTAL LOG

Log No.
TP135
1/1

Environmental logs are not to be used for geotechnical purposes

SDUP108: 0-0.2m

Client: WOOLWORTHS GROUP

Project: ADDITIONAL SITE INVESTIGATION

Location: 250 VICTORIA STREET, WETHERILL PARK, NSW

Job No.: E31888BR

Date: 4/2/21

Plant Type: JKX

Method: EXCAVATOR

Logged/Checked by: C.R./V.B.

R.L. Surface: N/A

Datum: -

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLETION						0		CI-CH	FILL: Silty gravelly sand, fine to medium grained, dark brown, fine to coarse grained igneous gravel, sub-angular, trace of sandstone gravel, asphaltic concrete, brick and concrete fragments.	D			SCREEN: 15.2kg
									Silty CLAY: medium to high plasticity, red brown mottled grey. END OF TEST PIT AT 0.9m	w<PL			NO FCF RESIDUAL
						1							
						2							
						3							
						4							
						5							
						6							
						7							

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes



Log No.
TP136
1/1

SDUP109: 0-0.2m

Client:

WOOLWORTHS GROUP

Project:

ADDITIONAL SITE INVESTIGATION

Location:

250 VICTORIA STREET, WETHERILL PARK, NSW

Job No.:

E31888BR

Method:

EXCAVATOR

R.L. Surface:

N/A

Date:

5/2/21

Datum:

-

Plant Type:

JKX

Logged/Checked by:

C.R./V.B.

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL	DB								
DRY ON COMPLETION						0		CI-CH	FILL: Silty gravelly sand, fine to medium grained, dark grey brown, fine to coarse grained igneous gravel, trace of brick, asphaltic concrete and tile fragments.	w<PL			SCREEN: 13.4kg 0-0.2m NO FCF RESIDUAL
						1			Silty CLAY: medium to high plasticity, red brown mottled grey. END OF TEST PIT AT 0.7m				
						2							
						3							
						4							
						5							
						6							
						7							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Client:WOOLWORTHS GROUP

Project:ADDITIONAL SITE INVESTIGATION

Location:250 VICTORIA STREET, WETHERILL PARK, NSW

Job No.:E31888BR

Date:3/2/21

Plant Type:JK205

Method:SPIRAL AUGER

Logged/Checked by:A.M./V.B.

R.L. Surface:N/A

Datum:-

Groundwater Record	SAMPLES					Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/Weathering	Strength/Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL	DB									
DRY ON COMPLETION							0			FILL: Silty gravelly sand, fine to coarse grained, brown, fine to coarse grained, igneous, sub-angular, trace of tile fragments.	M			SCREEN: 4.9kg 0-0.3m
										FILL: Silty clay, medium to high plasticity, brown, trace of igneous an ironstone gravel, brick fragments and ash.	w<PL			NO FCF SCREEN: 8.6kg 0.3-1.0m NO FCF
							1		CI-CH	Silty CLAY: medium to high plasticity, grey mottled brown, trace of ironstone gravel.	w<PL			RESIDUAL
							2			END OF BOREHOLE AT 2.0m				
							3							
							4							
							5							
							6							
							7							



ENVIRONMENTAL LOG

Log No.
BH138
1/1
SDUP2: 0.05-0.3m

Environmental logs are not to be used for geotechnical purposes

Client:WOOLWORTHS GROUP

Project:ADDITIONAL SITE INVESTIGATION

Location:250 VICTORIA STREET, WETHERILL PARK, NSW

Job No.:E31888BR

Date:1/2/21

Plant Type:JK205

Method:SPIRAL AUGER

Logged/Checked by:A.M./V.B.

R.L. Surface:N/A

Datum:-

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/Weathering	Strength/Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLETION						0		-	CONCRETE: 50mm.t	w<PL			SCREEN: 4.9kg
								CI-CH	FILL: Silty clay, low to medium plasticity, grey, with igneous gravel, trace of tile, ceramic and brick fragments and ash.	w<PL			0.05-0.3m
									Silty CLAY: medium to high plasticity, red brown, trace of ironstone gravel.	XW			NO FCF
									as above, but grey.	DW			RESIDUAL
						1			Extremely Weathered siltstone: silty CLAY, low to medium plasticity, grey, with ironstone bands.				BRINGELLY SHALE
									SILTSTONE: grey, with iron indurated bands.				HIGH 'TC' BIT RESISTANCE
						2			END OF BOREHOLE AT 1.7m				'TC' BIT REFUSAL ON HIGH RESISTANCE SILTSTONE
						3							
						4							
						5							
						6							
						7							



ENVIRONMENTAL LOG

Log No.
BH139
1/1

Environmental logs are not to be used for geotechnical purposes

Client: WOOLWORTHS GROUP													
Project: ADDITIONAL SITE INVESTIGATION													
Location: 250 VICTORIA STREET, WETHERILL PARK, NSW													
Job No.: E31888BR			Method: SPIRAL AUGER				R.L. Surface: N/A						
Date: 1/2/21			Datum: -										
Plant Type: JK205			Logged/Checked by: A.M./V.B.										
Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLETION						0		-	CONCRETE: 50mm.t	D			SCREEN: 1.9kg
								CI-CH	FILL: Silty sand, fine to medium grained, grey, trace of igneous and ironstone gravel, and slag.	w<PL			0.05-0.3m
								-	Silty CLAY: medium to high plasticity grey, trace of ironstone gravel.	XW			NO FCF
								-	Extremely Weathered siltstone: silty CLAY, low to medium plasticity, grey.	DW			RESIDUAL
								-	SILTSTONE: grey.				BRINGELLY SHALE
								-	SILTSTONE: grey, with iron indurated bands.				LOW 'TC' BIT RESISTANCE
								-	SILTSTONE: brown and grey.				
								-					
								-					
								-					
						1							
						2							
						3							
						4							
						5							
						6			SILTSTONE: grey.	SW			HIGH RESISTANCE
						7			END OF BOREHOLE AT 7.0m				

Field Tests

N > 20
4,16/
300mm
REFUSAL

Groundwater Record

DRY ON COMPLETION

Remarks

GROUNDWATER MONITORING WELL INSTALLED TO 7.0m. CLASS 18 MACHINE SLOTTED 50mm DIA. PVC STANDPIPE 7.0m TO 1.0m. CASING 1.0m TO 0m. 2mm SAND FILTER PACK 7.0m TO 1.0m. BENTONITE SEAL 1.0m TO 0.5m. BACKFILLED WITH SAND TO THE SURFACE. COMPLETED WITH A CONCRETED GATIC COVER.

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ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Client:

WOOLWORTHS GROUP

Project:

ADDITIONAL SITE INVESTIGATION

Location:

250 VICTORIA STREET, WETHERILL PARK, NSW

Job No.:

E31888BR

Method:

HAND AUGER

R.L. Surface:

N/A

Date:

5/2/21

Datum:

-

Plant Type:

-

Logged/Checked by:

M.M.P./V.B.

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLE TION						0			FILL: Silty sand, fine to medium grained, brown, with igneous gravel, trace of brick and concrete fragments and root fibres.	D w<PL			SCREEN: 9.8kg 0-0.3m NO FCF
						1			FILL: Silty clay, medium to high plasticity, red brown mottled grey. END OF BOREHOLE AT 0.5m				
						2							
						3							
						4							
						5							
						6							
						7							



ENVIRONMENTAL LOG

Log No.
BH142
1/1

Environmental logs are not to be used for geotechnical purposes

Client: WOOLWORTHS GROUP														
Project: ADDITIONAL SITE INVESTIGATION														
Location: 250 VICTORIA STREET, WETHERILL PARK, NSW														
Job No.: E31888BR														
Method: SPIRAL AUGER														
R.L. Surface: N/A														
Date: 2/2/21														
Datum: -														
Plant Type: JK205														
Logged/Checked by: A.M./V.B.														
Groundwater Record	SAMPLES					Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL	DB									
DRY ON COMPLETION							0			FILL: Silty gravelly clay, low to medium plasticity, brown, fine to coarse grained, igneous, sub-angular, trace of ironstone and sandstone gravel.	w<PL			SCREEN: 5.4kg 0-0.5m NOFCF
						N = 9 3,3,6	1		FILL: Silty clay, medium to high plasticity, brown and grey, trace of igneous, ironstone and sandstone gravel, sand brick fragments.	SCREEN: 8.1kg 0.5-1.2m NO FCF				
							N = 16 3,4,12		CI-CH	Silty CLAY: medium to high plasticity, grey mottled brown, trace of ironstone gravel.	w<PL			RESIDUAL
							2			END OF BOREHOLE AT 2.0m				
							3							
							4							
							5							
							6							
							7							

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[illegible]

SDUP110: 0-0.2m

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ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes



Log No.
BH145
1/1

SDUP7: 0-0.2m

Client: WOOLWORTHS GROUP													
Project: ADDITIONAL SITE INVESTIGATION													
Location: 250 VICTORIA STREET, WETHERILL PARK, NSW													
Job No.: E31888BR			Method: SPIRAL AUGER				R.L. Surface: N/A						
Date: 3/2/21			Datum: -										
Plant Type: JK205			Logged/Checked by: A.M./V.B.										
Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLETION						0			FILL: Silty clay, low to medium plasticity, dark brown, trace of igneous and sandstone gravel.	w<PL			SCREEN: 8.5kg 0-0.5m NO FCF
						1			FILL: Silty clay, medium to high plasticity, brown, trace of igneous and ironstone gravel and ash.	w>PL			SCREEN: 7.3kg 0.5-1.5m NO FCF
						2							SCREEN: 7.5kg 1.5-2.5m NO FCF
						3		-	Extremely Weathered siltstone: silty CLAY, low to medium plasticity, grey, with iron indurated bands.	XW			BRINGELLY SHALE
									END OF BOREHOLE AT 3.05m				
						4							
						5							
						6							
						7							

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes



Log No.
BH146
1/1

SDUP1: 0-0.2m

Client: WOOLWORTHS GROUP													
Project: ADDITIONAL SITE INVESTIGATION													
Location: 250 VICTORIA STREET, WETHERILL PARK, NSW													
Job No.: E31888BR			Method: SPIRAL AUGER				R.L. Surface: N/A						
Date: 1/2/21			Datum: -										
Plant Type: JK205			Logged/Checked by: A.M./V.B.										
Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
						0			FILL: Silty sandy clay, low to medium plasticity, dark brown, fine to medium grained, trace of ironstone gravel, and brick fragments.	w>PL			MULCH COVER
									FILL: Silty clay, medium to high plasticity, brown, trace of igneous, ironstone and sandstone gravel, and ash.	w<PL			SCREEN: 9.3kg 0-0.3m NO FCF
						1				SCREEN: 10.4kg 0.3-1.3m NO FCF			
						2				SCREEN: 9.1kg 1.3-2.3m NO FCF			
						3				SCREEN: 10.3kg 2.3-3.3m NO FCF			
						3.5			w>PL			SPT SUNK UNDER SELF WEIGHT	
						4		-	Extremely Weathered siltstone: silty CLAY, low to medium plasticity, brown grey.	XW			BRINGELLY SHALE
									SILTSTONE: grey, with iron indurated bands.	DW			LOW 'TC' BIT RESISTANCE
						5			END OF BOREHOLE AT 4.5m				
						6							
						7							



ENVIRONMENTAL LOGS EXPLANATION NOTES

INTRODUCTION

These notes have been provided to amplify the environmental report in regard to classification methods, field procedures and certain matters relating to the logging of soil and rock. Not all notes are necessarily relevant to all reports.

Where geotechnical borehole logs are utilised for environmental purpose, reference should also be made to the explanatory notes included in the geotechnical report. Environmental logs are not suitable for geotechnical purposes.

The ground is a product of continuing natural and man-made processes and therefore exhibits a variety of characteristics and properties which vary from place to place and can change with time. Environmental studies include gathering and assimilating limited facts about these characteristics and properties in order to understand or predict the behaviour of the ground on a particular site under certain conditions. This report may contain such facts obtained by inspection, excavation, probing, sampling, testing or other means of investigation. If so, they are directly relevant only to the ground at the place where and time when the investigation was carried out.

DESCRIPTION AND CLASSIFICATION METHODS

The methods of description and classification of soils and rocks used in this report are based on Australian Standard 1726:2017 'Geotechnical Site Investigations'. In general, descriptions cover the following properties – soil or rock type, colour, structure, strength or density, and inclusions. Identification and classification of soil and rock involves judgement and the Company infers accuracy only to the extent that is common in current geoenvironmental practice.

Soil types are described according to the predominating particle size and behaviour as set out in the attached soil classification table qualified by the grading of other particles present (eg. sandy clay) as set out below:

Soil Classification	Particle Size
Clay	< 0.002mm
Silt	0.002 to 0.075mm
Sand	0.075 to 2.36mm
Gravel	2.36 to 63mm
Cobbles	63 to 200mm
Boulders	> 200mm

Non-cohesive soils are classified on the basis of relative density, generally from the results of Standard Penetration Test (SPT) as below:

Relative Density	SPT 'N' Value (blows/300mm)
Very loose (VL)	< 4
Loose (L)	4 to 10
Medium dense (MD)	10 to 30
Dense (D)	30 to 50
Very Dense (VD)	> 50

Cohesive soils are classified on the basis of strength (consistency) either by use of a hand penetrometer, vane shear, laboratory testing and/or tactile engineering examination. The strength terms are defined as follows.

Classification	Unconfined Compressive Strength (kPa)	Indicative Undrained Shear Strength (kPa)
Very Soft (VS)	≤ 25	≤ 12
Soft (S)	> 25 and ≤ 50	> 12 and ≤ 25
Firm (F)	> 50 and ≤ 100	> 25 and ≤ 50
Stiff (St)	> 100 and ≤ 200	> 50 and ≤ 100
Very Stiff (VSt)	> 200 and ≤ 400	> 100 and ≤ 200
Hard (Hd)	> 400	> 200
Friable (Fr)	Strength not attainable – soil crumbles	

Rock types are classified by their geological names, together with descriptive terms regarding weathering, strength, defects, etc. Where relevant, further information regarding rock classification is given in the text of the report. In the Sydney Basin, 'shale' is used to describe fissile mudstone, with a weakness parallel to bedding. Rocks with alternating inter-laminations of different grain size (eg. siltstone/claystone and siltstone/fine grained sandstone) are referred to as 'laminite'.

INVESTIGATION METHODS

The following is a brief summary of investigation methods currently adopted by the Company and some comments on their use and application. All methods except test pits, hand auger drilling and portable Dynamic Cone Penetrometers require the use of a mechanical rig which is commonly mounted on a truck chassis or track base.

Test Pits: These are normally excavated with a backhoe or a tracked excavator, allowing close examination of the insitu soils and 'weaker' bedrock if it is safe to descend into the pit. The depth of penetration is limited to about 3m for a backhoe and up to 6m for a large excavator. Limitations of test pits are the problems associated with disturbance and difficulty of reinstatement and the consequent effects on close-by structures. Care must be taken if construction is to be carried out near test pit locations to either properly recompact the backfill during construction or to design and construct the

structure so as not to be adversely affected by poorly compacted backfill at the test pit location.

Hand Auger Drilling: A borehole of 50mm to 100mm diameter is advanced by manually operated equipment. Refusal of the hand auger can occur on a variety of materials such as obstructions within any fill, tree roots, hard clay, gravel or ironstone, cobbles and boulders, and does not necessarily indicate rock level.

Continuous Spiral Flight Augers: The borehole is advanced using 75mm to 115mm diameter continuous spiral flight augers, which are withdrawn at intervals to allow sampling and insitu testing. This is a relatively economical means of drilling in clays and in sands above the water table. Samples are returned to the surface by the flights or may be collected after withdrawal of the auger flights, but they can be very disturbed and layers may become mixed. Information from the auger sampling (as distinct from specific sampling by SPTs or undisturbed samples) is of limited reliability due to mixing or softening of samples by groundwater, or uncertainties as to the original depth of the samples. Augering below the groundwater table is of even lesser reliability than augering above the water table.

Rock Augering: Use can be made of a Tungsten Carbide (TC) bit for auger drilling into rock to indicate rock quality and continuity by variation in drilling resistance and from examination of recovered rock cuttings. This method of investigation is quick and relatively inexpensive but provides only an indication of the likely rock strength and predicted values may be in error by a strength order. Where rock strengths may have a significant impact on construction feasibility or costs, then further investigation by means of cored boreholes may be warranted.

Wash Boring: The borehole is usually advanced by a rotary bit, with water being pumped down the drill rods and returned up the annulus, carrying the drill cuttings. Only major changes in stratification can be assessed from the cuttings, together with some information from “feel” and rate of penetration.

Mud Stabilised Drilling: Either Wash Boring or Continuous Core Drilling can use drilling mud as a circulating fluid to stabilise the borehole. The term ‘mud’ encompasses a range of products ranging from bentonite to polymers. The mud tends to mask the cuttings and reliable identification is only possible from intermittent intact sampling (eg. from SPT and U50 samples) or from rock coring, etc.

Continuous Core Drilling: A continuous core sample is obtained using a diamond tipped core barrel. Provided full core recovery is achieved (which is not always possible in very low strength rocks and granular soils), this technique provides a very reliable (but relatively expensive) method of investigation. In rocks, NMLC or HQ triple tube core barrels, which give a core of about 50mm and 61mm diameter, respectively, is usually used with water flush. The length of core recovered is compared to the length drilled and any length not recovered is shown as NO CORE. The location of NO CORE recovery is determined on site by the supervising engineer; where the location is uncertain, the loss is placed at the bottom of the drill run.

Standard Penetration Tests: Standard Penetration Tests (SPT) are used mainly in non-cohesive soils, but can also be used in cohesive soils, as a means of indicating density or strength and also of obtaining a relatively undisturbed sample. The test procedure is

described in Australian Standard 1289.6.3.1–2004 (R2016) ‘*Methods of Testing Soils for Engineering Purposes, Soil Strength and Consolidation Tests – Determination of the Penetration Resistance of a Soil – Standard Penetration Test (SPT)*’.

The test is carried out in a borehole by driving a 50mm diameter split sample tube with a tapered shoe, under the impact of a 63.5kg hammer with a free fall of 760mm. It is normal for the tube to be driven in three successive 150mm increments and the ‘N’ value is taken as the number of blows for the last 300mm. In dense sands, very hard clays or weak rock, the full 450mm penetration may not be practicable and the test is discontinued.

The test results are reported in the following form:

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

N = 13
4, 6, 7

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

N > 30
15, 30/40mm

The results of the test can be related empirically to the engineering properties of the soil.

A modification to the SPT is where the same driving system is used with a solid 60° tipped steel cone of the same diameter as the SPT hollow sampler. The solid cone can be continuously driven for some distance in soft clays or loose sands, or may be used where damage would otherwise occur to the SPT. The results of this Solid Cone Penetration Test (SCPT) are shown as ‘N_c’ on the borehole logs, together with the number of blows per 150mm penetration.

LOGS

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

The terms and symbols used in preparation of the logs are defined in the following pages.

Interpretation of the information shown on the logs, and its application to design and construction, should therefore take into account the spacing of boreholes or test pits, the method of drilling or excavation, the frequency of sampling and testing and the possibility of other than ‘straight line’ variations between the boreholes or test pits. Subsurface conditions between boreholes or test pits may vary significantly from conditions encountered at the borehole or test pit locations.

GROUNDWATER

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

- Although groundwater may be present, in low permeability soils it may enter the hole slowly or perhaps not at all during the time it 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 and may not be the same at the time of construction.
- 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 be washed out of the hole or 'reverted' chemically if reliable water observations are to be made.

More reliable measurements can be made by installing standpipes which are read after the groundwater level has stabilised at intervals ranging from several days to 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 perched water tables or surface water.

FILL

The presence of fill materials can often be determined only by the inclusion of foreign objects (eg. bricks, steel, etc) or by distinctly unusual colour, texture or fabric. Identification of the extent of fill materials will also depend on investigation methods and frequency. Where natural soils similar to those at the site are used for fill, it may be difficult with limited testing and sampling to reliably assess the extent of the fill.

The presence of fill materials is usually regarded with caution as the possible variation in density and material type is much greater than with natural soil deposits. Consequently, there is an increased risk of adverse environmental characteristics or behaviour. If the volume and nature of fill is of importance to a project, then frequent test pit excavations are preferable to boreholes.

LABORATORY TESTING

Laboratory testing has not been undertaken to confirm the soil classification and rock strengths indicated on the environmental logs unless noted in the report.

SYMBOL LEGENDS

SOIL



FILL



TOPSOIL



CLAY (CL, CI, CH)



SILT (ML, MH)



SAND (SP, SW)



GRAVEL (GP, GW)



SANDY CLAY (CL, CI, CH)



SILTY CLAY (CL, CI, CH)



CLAYEY SAND (SC)



SILTY SAND (SM)



GRAVELLY CLAY (CL, CI, CH)



CLAYEY GRAVEL (GC)



SANDY SILT (ML, MH)



PEAT AND HIGHLY ORGANIC SOILS (Pt)

ROCK



CONGLOMERATE



SANDSTONE



SHALE/MUDSTONE



SILTSTONE



CLAYSTONE



COAL



LAMINITE



LIMESTONE



PHYLLITE, SCHIST



TUFF



GRANITE, GABBRO



DOLERITE, DIORITE



BASALT, ANDESITE



QUARTZITE

OTHER MATERIALS



BRICKS OR PAVERS



CONCRETE



ASPHALTIC CONCRETE

CLASSIFICATION OF COARSE AND FINE GRAINED SOILS

Major Divisions	Group Symbol	Typical Names	Field Classification of Sand and Gravel	Laboratory Classification
Coarse grained soil (more than 60% of soil excluding oversize fraction is greater than 0.075mm)	GRAVEL (more than half of coarse fraction is larger than 2.36mm)	GW	Gravel and gravel-sand mixtures, little or no fines	Wide range in grain size and substantial amounts of all intermediate sizes, not enough fines to bind coarse grains, no dry strength
		GP	Gravel and gravel-sand mixtures, little or no fines, uniform gravels	Predominantly one size or range of sizes with some intermediate sizes missing, not enough fines to bind coarse grains, no dry strength
		GM	Gravel-silt mixtures and gravel-sand-silt mixtures	'Dirty' materials with excess of non-plastic fines, zero to medium dry strength
		GC	Gravel-clay mixtures and gravel-sand-clay mixtures	'Dirty' materials with excess of plastic fines, medium to high dry strength
	SAND (more than half of coarse fraction is smaller than 2.36mm)	SW	Sand and gravel-sand mixtures, little or no fines	Wide range in grain size and substantial amounts of all intermediate sizes, not enough fines to bind coarse grains, no dry strength
		SP	Sand and gravel-sand mixtures, little or no fines	Predominantly one size or range of sizes with some intermediate sizes missing, not enough fines to bind coarse grains, no dry strength
		SM	Sand-silt mixtures	'Dirty' materials with excess of non-plastic fines, zero to medium dry strength
		SC	Sand-clay mixtures	'Dirty' materials with excess of plastic fines, medium to high dry strength

Laboratory Classification Criteria

A well graded coarse grained soil is one for which the coefficient of uniformity $C_u > 4$ and the coefficient of curvature $1 < C_c < 3$. Otherwise, the soil is poorly graded. These coefficients are given by:

$$C_u = \frac{D_{60}}{D_{10}} \quad \text{and} \quad C_c = \frac{(D_{30})^2}{D_{10} D_{60}}$$

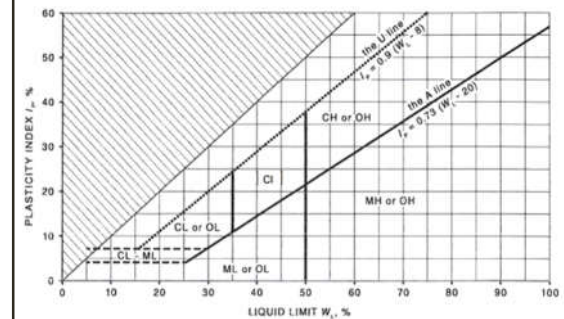
Where D_{10} , D_{30} and D_{60} are those grain sizes for which 10%, 30% and 60% of the soil grains, respectively, are smaller.

NOTES:

- For a coarse grained soil with a fines content between 5% and 12%, the soil is given a dual classification comprising the two group symbols separated by a dash; for example, for a poorly graded gravel with between 5% and 12% silt fines, the classification is GP-GM.
- Where the grading is determined from laboratory tests, it is defined by coefficients of curvature (C_c) and uniformity (C_u) derived from the particle size distribution curve.
- Clay soils with liquid limits $> 35\%$ and $\leq 50\%$ may be classified as being of medium plasticity.
- The U line on the Modified Casagrande Chart is an approximate upper bound for most natural soils.

Major Divisions		Group Symbol	Typical Names	Field Classification of Silt and Clay			Laboratory Classification
				Dry Strength	Dilatancy	Toughness	% < 0.075mm
fine grained soils (more than 35% of soil excluding oversize fraction is less than 0.075mm)	SILT and CLAY (low to medium plasticity)	ML	Inorganic silt and very fine sand, rock flour, silty or clayey fine sand or silt with low plasticity	None to low	Slow to rapid	Low	Below A line
		CL, CI	Inorganic clay of low to medium plasticity, gravelly clay, sandy clay	Medium to high	None to slow	Medium	Above A line
		OL	Organic silt	Low to medium	Slow	Low	Below A line
	SILT and CLAY (high plasticity)	MH	Inorganic silt	Low to medium	None to slow	Low to medium	Below A line
		CH	Inorganic clay of high plasticity	High to very high	None	High	Above A line
		OH	Organic clay of medium to high plasticity, organic silt	Medium to high	None to very slow	Low to medium	Below A line
	Highly organic soil	Pt	Peat, highly organic soil	—	—	—	—

Modified Casagrande Chart for Classifying Silts and Clays according to their Behaviour



LOG SYMBOLS

Log Column	Symbol	Definition																		
Groundwater Record	▼	Standing water level. Time delay following completion of drilling/excavation may be shown.																		
	—C—	Extent of borehole/test pit collapse shortly after drilling/excavation.																		
	▶	Groundwater seepage into borehole or test pit noted during drilling or excavation.																		
Samples	ES	Sample taken over depth indicated, for environmental analysis.																		
	U50	Undisturbed 50mm diameter tube sample taken over depth indicated.																		
	DB	Bulk disturbed sample taken over depth indicated.																		
	DS	Small disturbed bag sample taken over depth indicated.																		
	ASB	Soil sample taken over depth indicated, for asbestos analysis.																		
	ASS	Soil sample taken over depth indicated, for acid sulfate soil analysis.																		
	SAL	Soil sample taken over depth indicated, for salinity analysis.																		
	PFAS	Soil sample taken over depth indicated, for analysis of Per- and Polyfluoroalkyl Substances.																		
Field Tests	N = 17 4, 7, 10	Standard Penetration Test (SPT) performed between depths indicated by lines. Individual figures show blows per 150mm penetration. 'Refusal' refers to apparent hammer refusal within the corresponding 150mm depth increment.																		
	N _c = 5 7 3R	Solid Cone Penetration Test (SCPT) performed between depths indicated by lines. Individual figures show blows per 150mm penetration for 60° solid cone driven by SPT hammer. 'R' refers to apparent hammer refusal within the corresponding 150mm depth increment.																		
	VNS = 25 PID = 100	Vane shear reading in kPa of undrained shear strength. Photoionisation detector reading in ppm (soil sample headspace test).																		
Moisture Condition (Fine Grained Soils) (Coarse Grained Soils)	w > PL	Moisture content estimated to be greater than plastic limit.																		
	w ≈ PL	Moisture content estimated to be approximately equal to plastic limit.																		
	w < PL	Moisture content estimated to be less than plastic limit.																		
	w ≈ LL	Moisture content estimated to be near liquid limit.																		
	w > LL	Moisture content estimated to be wet of liquid limit.																		
	D	DRY – runs freely through fingers.																		
	M	MOIST – does not run freely but no free water visible on soil surface.																		
	W	WET – free water visible on soil surface.																		
Strength (Consistency) Cohesive Soils	VS	VERY SOFT – unconfined compressive strength ≤ 25kPa.																		
	S	SOFT – unconfined compressive strength > 25kPa and ≤ 50kPa.																		
	F	FIRM – unconfined compressive strength > 50kPa and ≤ 100kPa.																		
	St	STIFF – unconfined compressive strength > 100kPa and ≤ 200kPa.																		
	VSt	VERY STIFF – unconfined compressive strength > 200kPa and ≤ 400kPa.																		
	Hd	HARD – unconfined compressive strength > 400kPa.																		
	Fr	FRIABLE – strength not attainable, soil crumbles.																		
	()	Bracketed symbol indicates estimated consistency based on tactile examination or other assessment.																		
Density Index/ Relative Density (Cohesionless Soils)	VL	VERY LOOSE																		
	L	LOOSE																		
	MD	MEDIUM DENSE																		
	D	DENSE																		
	VD	VERY DENSE																		
	()	Bracketed symbol indicates estimated density based on ease of drilling or other assessment.																		
		<table> <thead> <tr> <th></th><th>Density Index (I_D) Range (%)</th><th>SPT 'N' Value Range (Blows/300mm)</th></tr> </thead> <tbody> <tr> <td>VL</td><td>≤ 15</td><td>0 – 4</td></tr> <tr> <td>L</td><td>> 15 and ≤ 35</td><td>4 – 10</td></tr> <tr> <td>MD</td><td>> 35 and ≤ 65</td><td>10 – 30</td></tr> <tr> <td>D</td><td>> 65 and ≤ 85</td><td>30 – 50</td></tr> <tr> <td>VD</td><td>> 85</td><td>> 50</td></tr> </tbody> </table>		Density Index (I _D) Range (%)	SPT 'N' Value Range (Blows/300mm)	VL	≤ 15	0 – 4	L	> 15 and ≤ 35	4 – 10	MD	> 35 and ≤ 65	10 – 30	D	> 65 and ≤ 85	30 – 50	VD	> 85	> 50
	Density Index (I _D) Range (%)	SPT 'N' Value Range (Blows/300mm)																		
VL	≤ 15	0 – 4																		
L	> 15 and ≤ 35	4 – 10																		
MD	> 35 and ≤ 65	10 – 30																		
D	> 65 and ≤ 85	30 – 50																		
VD	> 85	> 50																		



Log Column	Symbol	Definition
Hand Penetrometer Readings	300 250	Measures reading in kPa of unconfined compressive strength. Numbers indicate individual test results on representative undisturbed material unless noted otherwise.
Remarks	'V' bit 'TC' bit T_{60} Soil Origin	Hardened steel 'V' shaped bit. Twin pronged tungsten carbide bit. Penetration of auger string in mm under static load of rig applied by drill head hydraulics without rotation of augers. The geological origin of the soil can generally be described as: RESIDUAL – soil formed directly from insitu weathering of the underlying rock. No visible structure or fabric of the parent rock. EXTREMELY WEATHERED – soil formed directly from insitu weathering of the underlying rock. Material is of soil strength but retains the structure and/or fabric of the parent rock. ALLUVIAL – soil deposited by creeks and rivers. ESTUARINE – soil deposited in coastal estuaries, including sediments caused by inflowing creeks and rivers, and tidal currents. MARINE – soil deposited in a marine environment. AEOLIAN – soil carried and deposited by wind. COLLUVIAL – soil and rock debris transported downslope by gravity, with or without the assistance of flowing water. Colluvium is usually a thick deposit formed from a landslide. The description 'slopewash' is used for thinner surficial deposits. LITTORAL – beach deposited soil.

Classification of Material Weathering

Term		Abbreviation		Definition
Residual Soil		RS		Material is weathered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are no longer visible, but the soil has not been significantly transported.
Extremely Weathered		XW		Material is weathered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are still visible.
Highly Weathered	Distinctly Weathered (Note 1)	HW	DW	The whole of the rock material is discoloured, usually by iron staining or bleaching to the extent that the colour of the original rock is not recognisable. Rock strength is significantly changed by weathering. Some primary minerals have weathered to clay minerals. Porosity may be increased by leaching, or may be decreased due to deposition of weathering products in pores.
Moderately Weathered		MW		The whole of the rock material is discoloured, usually by iron staining or bleaching to the extent that the colour of the original rock is not recognisable, but shows little or no change of strength from fresh rock.
Slightly Weathered		SW		Rock is partially discoloured with staining or bleaching along joints but shows little or no change of strength from fresh rock.
Fresh		FR		Rock shows no sign of decomposition of individual minerals or colour changes.

NOTE 1: The term 'Distinctly Weathered' is used where it is not practicable to distinguish between 'Highly Weathered' and 'Moderately Weathered' rock. 'Distinctly Weathered' is defined as follows: 'Rock strength usually changed by weathering. The rock may be highly discoloured, usually by iron staining. Porosity may be increased by leaching, or may be decreased due to deposition of weathering products in pores'. There is some change in rock strength.

Rock Material Strength Classification

Term	Abbreviation	Uniaxial Compressive Strength (MPa)	Guide to Strength	
			Point Load Strength Index $Is_{(50)}$ (MPa)	Field Assessment
Very Low Strength	VL	0.6 to 2	0.03 to 0.1	Material crumbles under firm blows with sharp end of pick; can be peeled with knife; too hard to cut a triaxial sample by hand. Pieces up to 30mm thick can be broken by finger pressure.
Low Strength	L	2 to 6	0.1 to 0.3	Easily scored with a knife; indentations 1mm to 3mm show in the specimen with firm blows of the pick point; has dull sound under hammer. A piece of core 150mm long by 50mm diameter may be broken by hand. Sharp edges of core may be friable and break during handling.
Medium Strength	M	6 to 20	0.3 to 1	Scored with a knife; a piece of core 150mm long by 50mm diameter can be broken by hand with difficulty.
High Strength	H	20 to 60	1 to 3	A piece of core 150mm long by 50mm diameter cannot be broken by hand but can be broken by a pick with a single firm blow; rock rings under hammer.
Very High Strength	VH	60 to 200	3 to 10	Hand specimen breaks with pick after more than one blow; rock rings under hammer.
Extremely High Strength	EH	> 200	> 10	Specimen requires many blows with geological pick to break through intact material; rock rings under hammer.



Preliminary Stage 2 ESA Borehole Logs



BOREHOLE LOG

Borehole No.
1
1/2
Easting: 307159.3
Northing: 6253132

Client: FABCOT PTY LTD
Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE
Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH Method: SPIRAL AUGER R.L. Surface: 38.34m
Date: 2/10/18 JK305 Datum: AHD
Logged/Checked by: A.V./A.J.H.

Groundwater Record	SAMPLES			Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	U50	DB									
DRY ON COMPLETION					0			FILL: Gravelly sand, fine to coarse grained, yellow brown, fine to coarse grained sandstone gravel.	D			
									w≈PL			
							CI-CH	as above, but dark grey.	w>PL	VSt		RESIDUAL
				N = 5 2,2,3				Silty CLAY: medium to high plasticity, brown mottled grey.			330 260 350	
					1			Silty CLAY: medium to high plasticity, red brown and grey.		(VSt-Hd)		
				N = 16 5,5,11								
					2							
							-	Extremely Weathered claystone: silty CLAY, medium plasticity, grey.	XW	(Hd)		BRINGELLY SHALE
								CLAYSTONE: brown and grey.	DW	VL-L		VERY LOW 'TC' BIT RESISTANCE
					3							LOW RESISTANCE
							-	SILTSTONE: dark grey and dark brown.				
					4							
					5							
					6				SW	M		MODERATE RESISTANCE WITH HIGH BANDS
					7							



BOREHOLE LOG

Borehole No.
1
2/2
Easting: 307159.3
Northing: 6253132

Client: FABCOT PTY LTD
Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE
Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH **Method:** SPIRAL AUGER JK305 **R.L. Surface:** 38.34m
Date: 2/10/18 **Datum:** AHD
Logged/Checked by: A.V./A.J.H.

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	U50	DB	DS									
									SILTSTONE: dark grey and dark brown.	SW	M		
						8			END OF BOREHOLE AT 7.5m				
						9							
						10							
						11							
						12							
						13							
						14							



BOREHOLE LOG

Borehole No.
2
1/2
Easting: 307220.6
Northing: 6253127

Client: FABCOT PTY LTD
Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE
Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH Method: SPIRAL AUGER R.L. Surface: 37.67m
Date: 2/10/18 JK305 Datum: AHD
Logged/Checked by: A.V./A.J.H.

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	U50	DB	DS									
DRY ON COMPLETION						0			FILL: Gravelly silty sand, fine to coarse grained, yellow brown, fine to coarse grained sandstone gravel, trace of sandstone cobbles.	D			
					N = 9 4,4,5			CI-CH	Silty CLAY: medium to high plasticity, red and grey.	w>PL	VSt	350 330 340	RESIDUAL
						1			Silty CLAY: medium to high plasticity, orange brown and grey.		Hd		
					N > 23 11,12 11/100mm REFUSAL				as above, but with extremely weathered claystone bands.			>600 >600 >600	
						2		-	CLAYSTONE: brown and grey.	DW	L		BRINGELLY SHALE
						3							LOW 'TC' BIT RESISTANCE
						4		-	SILTSTONE: dark grey and dark brown, with medium strength bands.				BANDS OF MODERATE RESISTANCE
						5							
						6				SW	M		MODERATE RESISTANCE
						7							



BOREHOLE LOG

Borehole No.
2
2/2
Easting: 307220.6
Northing: 6253127

Client: FABCOT PTY LTD
Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE
Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

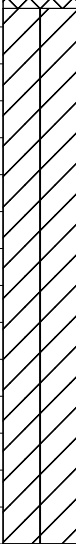
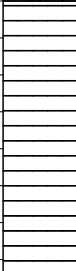
Job No. 31888AH **Method:** SPIRAL AUGER JK305 **R.L. Surface:** 37.67m
Date: 2/10/18 **Datum:** AHD
Logged/Checked by: A.V./A.J.H.

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	U50	DB	DS									
									SILTSTONE: dark grey and dark brown.	SW	M		
									END OF BOREHOLE AT 7.5m				
						8							
						9							
						10							
						11							
						12							
						13							
						14							



BOREHOLE LOG

Borehole No.
3
1/2
Easting: 307293.8
Northing: 6253125

Client: FABCOT PTY LTD													
Project: PROPOSED Highbay Distribution Warehouse													
Location: 250-266 Victoria Street, Wetherill Park, NSW													
Job No. 31888AH			Method: Spiral Auger					R.L. Surface: 37.02m					
Date: 27/9/18			JK305					Datum: AHD					
Logged/Checked by: S.M./A.H.J.													
Groundwater Record	SAMPLES			Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks	
	ES	U50	DB										DS
DRY ON COMPLETION					0		-	ASPHALTIC CONCRETE: 60mm.t	D				
							CH	FILL: Silty gravelly sand, fine to medium grained, dark grey, fine grained igneous gravel. Silty CLAY: high plasticity, light grey.	w≈PL	Hd	450 410 530	RESIDUAL	
				N = 12 7,7,5	1								
				N = 26 7,13,13	2						>600 >600 >600		
				N = SPT 9/120mm REFUSAL	3		-	as above, but light grey mottled red brown, with ironstone gravel bands.				>600 >600 >600	BRINGELLY SHALE
					4								VERY LOW 'TC' BIT RESISTANCE

2/2

Northing: 6253125

Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

Datum: AHD

Logged/Checked by: S.M./A.H.J.

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	USQ	DB	DS									
						</							



BOREHOLE LOG

Borehole No.
4
1/2
Easting: 307358.9
Northing: 6253114

Client: FABCOT PTY LTD												
Project: PROPOSED Highbay Distribution Warehouse												
Location: 250-266 Victoria Street, Wetherill Park, NSW												
Job No. 31888AH			Method: SPIRAL AUGER JK305						R.L. Surface: 36.66m			
Date: 26/9/18			Logged/Checked by: S.M./A.J.H.						Datum: AHD			
Groundwater Record	SAMPLES			Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	FS	U50	DB DS									
DRY ON COMPLETION					0		-	ASPHALTIC CONCRETE: 30mm.t	D			
							CH	FILL: Silty sandy gravel, fine grained, igneous, dark grey, fine to coarse grained sand.	w=PL	Hd		RESIDUAL
				N > 18 9,18/ 130mm REFUSAL	1			Silty CLAY: high plasticity, red brown, with sub angular fine grained ironstone gravel.			>600 >600 >600	
								as above, but light grey.				
								-	Extremely Weathered claystone: silty CLAY: medium to high plasticity, light grey, with low strength iron indurated bands.	XW	Hd	
					2							VERY LOW 'TC' BIT RESISTANCE WITH LOW BANDS
					3						>600 >600 >600	
				N = SPT 15/90mm REFUSAL				CLAYSTONE: light grey	DW	VL		LOW RESISTANCE
					4							
					5							
					6							
					7			as above, but dark grey		VL-L		



BOREHOLE LOG

Borehole No.

4

2/2

Easting: 307358.9

Northing: 6253114

Client:

FABCOT PTY LTD

Project:

PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE

Location:

250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH

Method: SPIRAL AUGER JK305

R.L. Surface: 36.66m

Date: 26/9/18

Datum: AHD

Logged/Checked by: S.M./A.J.H.

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/Weathering	Strength/Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	U50	DB	DS									
									CLAYSTONE: dark grey.	DW	VL-L		
									END OF BOREHOLE AT 7.5m				
						8							
						9							
						10							
						11							
						12							
						13							
						14							



BOREHOLE LOG

Borehole No.

5

1/2

Easting: 307157.8

Northing: 6253089

Client: FABCOT PTY LTD

Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE

Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH

Method: SPIRAL AUGER
JK205

R.L. Surface: 40.27m

Date: 2/10/18

Datum: AHD

Logged/Checked by: S.M./A.J.H.

Groundwater Record	SAMPLES			Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	U50	DB									
DRY ON COMPLET- ION					0		-	ASPHALTIC CONCRETE: 50mm.t	D	St		RESIDUAL
							CH	FILL: Silty sand, fine to coarse grained, dark grey, with fine grained igneous gavel.	w>PL			
				N = 8 3,4,4				Silty CLAY: high plasticity, brown.			160	
								as above,			160	
					1			but red brown.			180	
								as above,				
								but red brown mottled brown and light grey, with rounded fine grained ironstone gravel.	w≈PL	VSt-Hd		
				N = 20 5,7,13				Silty CLAY: high plasticity, light grey, with ironstone gravel bands.			300	
											430	
					2						520	
							-	Extremely Weathered siltstone: silty CLAY: medium plasticity, dark grey mottled yellow brown.	XW	HD		BRINGELLY SHALE VERY LOW 'TC' BIT RESISTANCE LOW RESISTANCE
								SILTSTONE: dark grey.	DW	VL		
					3							
					4							
					5				SW	L-M		
					6							
					7							MODERATE RESISTANCE



BOREHOLE LOG

Borehole No.
5
2/2
Easting: 307157.8
Northing: 6253089

Client: FABCOT PTY LTD
Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE
Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH **Method:** SPIRAL AUGER JK205 **R.L. Surface:** 40.27m
Date: 2/10/18 **Datum:** AHD
Logged/Checked by: S.M./A.J.H.

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	U50	DB	DS									
									SILTSTONE: dark grey.	SW	L-M		
									END OF BOREHOLE AT 7.5m				
						8							
						9							
						10							
						11							
						12							
						13							
						14							



BOREHOLE LOG

Borehole No.
6
1/2
Easting: 307208.1
Northing: 6253079

Client: FABCOT PTY LTD
Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE
Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW
Job No. 31888AH
Date: 2/10/18
Method: SPIRAL AUGER JK305
R.L. Surface: 39.23m
Datum: AHD
Logged/Checked by: A.V./A.J.H.

Groundwater Record	SAMPLES			Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	U50	DB									
DRY ON COMPLETION					0			FILL: Gravelly silty sand, fine to coarse grained, brown and grey, fine to medium grained sandstone gravel.	D			
				N = 10 3,4,6			CI-CH	FILL: Silty clay, medium to high plasticity, red and grey. Silty CLAY: medium to high plasticity, grey and brown mottled red brown.	w>PL	VSt	300 300 350	RESIDUAL
					1							
				N = 26 6,10,16				Silty CLAY: medium to high plasticity, orange brown and grey mottled dark grey.	w<PL	Hd	400 420 500	
					2							
							-	CLAYSTONE: brown and grey, with extremely weathered bands.	DW	VL		BRINGELLY SHALE VERY LOW 'TC' BIT RESISTANCE
					3							
					4			CLAYSTONE: brown and grey.		L		LOW RESISTANCE
					5							
					6			-	SILTSTONE: dark grey.	SW	M	
				7						H		HIGH RESISTANCE



BOREHOLE LOG

Borehole No.

6

2/2

Easting: 307208.1

Northing: 6253079

Client:

FABCOT PTY LTD

Project:

PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE

Location:

250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH

Method: SPIRAL AUGER JK305

R.L. Surface: 39.23m

Date: 2/10/18

Datum: AHD

Logged/Checked by: A.V./A.J.H.

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/Weathering	Strength/Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	U50	DB	DS									
									SILTSTONE: dark grey.	SW	H		
									END OF BOREHOLE AT 7.5m				
						8							
						9							
						10							
						11							
						12							
						13							
						14							



BOREHOLE LOG

Borehole No.

7

1/1

Easting: 307293.3

Northing: 6253069

Client: FABCOT PTY LTD

Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE

Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH

Method: SPIRAL AUGER
JK350

R.L. Surface: 36.23m

Date: 27/9/18

Datum: AHD

Logged/Checked by: S.M./A.J.H.

Groundwater Record	SAMPLES			Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	U50	DB									
DRY ON COMPLETION					0			CONCRETE: 248mm.t				10mm DIA. REINFORCEMENT
							-	FILL: Silty gravelly sand, fine to coarse grained, dark grey, fine grained igneous gravel.	D			208mm TOP COVER
				N = 7 2,3,4				FILL: Silty clay, high plasticity, red brown mottled light grey and brown, trace of fine grained ironstone gravel and slag.	w>PL		200 170 180	APPEARS MODERATELY COMPACTED
					1		CH	Silty CLAY: high plasticity, brown mottled dark grey, trace of ash.	w>PL	St	200 190 150	RESIDUAL
				N = 12 5,4,8				as above, but light grey mottled yellow brown, with sandy clay nodules and fine grained ironstone gravel.		VSt	300 280 270	
					2							
							-	Extremely Weathered siltstone: silty CLAY, medium plasticity, light grey mottled dark grey.	XW	Hd		BRINGELLY SHALE
							-	Interbedded SILTSTONE and CLAYSTONE: dark grey and dark brown.	DW	L		VERY LOW 'TC' BIT RESISTANCE
					3							LOW RESISTANCE
					4					L-M		
					5				SW	M-H		MODERATE TO HIGH RESISTANCE
					6			END OF BOREHOLE AT 6.0m				'TC' BIT REFUSAL
					7							



BOREHOLE LOG

Borehole No.
8
1/1
Easting: 307361.8
Northing: 6253060

Client: FABCOT PTY LTD
Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE
Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH Method: SPIRAL AUGER R.L. Surface: 35.75m
Date: 27/9/18 JK350 Datum: AHD
Logged/Checked by: S.M./A.J.H.

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	U50	DB	DS									
DRY ON COMPLETION						0			CONCRETE: 495mm.t				8mm DIA. REINFORCEMENT 270mm TOP COVER
					N = SPT 10/70mm REFUSAL	1		-	FILL: Silty gravelly sand, fine to coarse grained, dark grey, fine grained igneous gravel.	D			APPEARS WELL COMPACTED
								CH	FILL: Silty clay, high plasticity, red brown mottled grey and brown, trace of slag and glass fragments.	w>PL	VSt		RESIDUAL
					N = 13 4,4,9				Silty CLAY: high plasticity, red brown mottled light grey.			230 290 260	
						2			as above, but light grey mottled yellow brown.				
								-	Extremely Weathered claystone: silty CLAY, medium to high plasticity, light grey mottled red brown, with low strength bands.	XW	Hd		BRINGELLY SHALE
					N = SPT 19/150mm REFUSAL	3						600 >600 >600	VERY LOW 'TC' BIT RESISTANCE
						4							
								-	Interbedded CLAYSTONE and SILLTSTONE: dark grey and dark brown,	DW	L		LOW RESISTANCE
						5				SW	M		MODERATE RESISTANCE
						6					H		HIGH RESISTANCE
						7			END OF BOREHOLE AT 7.0m				



BOREHOLE LOG

Borehole No.
9
1/2
Easting: 307149.9
Northing: 6253026

Client: FABCOT PTY LTD												
Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE												
Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW												
Job No. 31888AH Method: SPIRAL AUGER R.L. Surface: 42.52m												
Date: 2/10/18 JK205 Datum: AHD												
Logged/Checked by: S.M./A.J.H.												
Groundwater Record	SAMPLES			Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	U50	DB									
DRY ON COMPLET- ION					0			FILL: Silty gravelly sand, fine to coarse grained, yellow brown and brown, fine to medium grained sandstone gavel.	D			
				N = 4 2,1,3			CH	Silty CLAY: high plasticity, red brown mottled light grey, trace of rounded fine grained ironstone gravel.	w>PL	St		RESIDUAL
					1			Silty CLAY: high plasticity, light grey, with ironstone gravel bands.	w<PL	Hd		
				N > 12 8,12/ 120mm REFUSAL			-	Extremely Weathered siltstone: silty CLAY, medium plasticity, grey.	XW	Hd		BRINGELLY SHALE
					2			SILTSTONE: dark grey.	DW	VL-L		VERY LOW 'TC' BIT RESISTANCE LOW RESISTANCE
					3							
					4				SW	L-M		MODERATE RESISTANCE
					5							
					6		-	SANDSTONE: fine to medium grained, grey, with siltstone bands.	SW	L-M		
					7							



BOREHOLE LOG

Borehole No.

10

1/2

Easting: 307203.5

Northing: 6253004

Client: FABCOT PTY LTD

Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE

Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH

Method: SPIRAL AUGER
JK205

R.L. Surface: 39.94m

Date: 2/10/18

Datum: AHD

Logged/Checked by: A.V./A.J.H.

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	U50	DB	DS									
DRY ON COMPLETION						0		-	ASPHALTIC CONCRETE: 50mm.t FILL: Gravelly sand, fine to coarse grained, dark grey, fine grained igneous gravel.	D			
					N = 16 7,8,8			CI-CH	Silty CLAY: medium to high plasticity, grey mottled brown.	w<PL	Hd	>600 >600 >600	RESIDUAL
						1							
					N = 39 5,13,26				as above, but with extremely weathered claystone bands.			>600 >600 >600	
						2		-	Extremely Weathered claystone: silty CLAY, medium to high plasticity, grey mottled orange brown.	XW	Hd		BRINGELLY SHALE VERY LOW 'TC' BIT RESISTANCE
					N = SPT 12/100mm REFUSAL	3			CLAYSTONE: brown mottled light grey.	DW	VL L		LOW RESISTANCE
						4							
						5		-	SILTSTONE: dark grey.				
						6				SW	M		MODERATE RESISTANCE
						7					H		HIGH RESISTANCE



BOREHOLE LOG

Borehole No.
10
2/2
Easting: 307203.5
Northing: 6253004

Client: FABCOT PTY LTD
Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE
Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

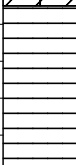
Job No. 31888AH **Method:** SPIRAL AUGER JK205 **R.L. Surface:** 39.94m
Date: 2/10/18 **Datum:** AHD
Logged/Checked by: A.V./A.J.H.

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	U50	DB	DS									
									SIILTSTONE: dark grey.	SW	H		
									END OF BOREHOLE AT 7.5m				
						8							
						9							
						10							
						11							
						12							
						13							
						14							



BOREHOLE LOG

Borehole No.
11
1/1
Easting: 307284.5
Northing: 6253007

Client: FABCOT PTY LTD													
Project: PROPOSED Highbay Distribution Warehouse													
Location: 250-266 Victoria Street, Wetherill Park, NSW													
Job No. 31888AH			Method: Spiral Auger JK350						R.L. Surface: 36.15m				
Date: 27/9/18			Logged/Checked by: S.M./A.J.H.						Datum: AHD				
Groundwater Record	SAMPLES			Field Tests	Depth (m)	Graphic Log	Unified Classification	Description	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks	
	FS	U50	DB DS										
DRY ON COMPLETION					0		-	CONCRETE: 205mm.t				8mm DIA. REINFORCEMENT 165 TOP COVER RESIDUAL	
							CH	FILL: Silty gravelly sand, fine to coarse grained, dark grey, fine grained igneous gravel, with slag. Silty CLAY: high plasticity, light grey mottled red brown.	D w>PL	VSt			
				N = 10 4,4,6	1		CI-CH	Silty CLAY: medium to high plasticity, light grey mottled red brown.	w≈PL	Hd	290 280 260		
				N = 21 5,9,12	2		-	CLAYSTONE: dark grey and dark brown.	DW	VL-L L-M			
					3		-	SILTSTONE: dark grey.	SW				
					4								
					5				SW	H			
								END OF BOREHOLE AT 5.0m					
					6								
					7								
													MODERATE RESISTANCE 'TC' BIT REFUSAL

BOREHOLE LOG

Borehole No.

12

1/2

Easting: 307351.8

Northing: 6252997

Client: FABCOT PTY LTD

Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE

Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH

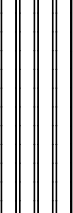
Method: SPIRAL AUGER
JK205

R.L. Surface: 36.24m

Date: 3/10/18

Datum: AHD

Logged/Checked by: S.M./A.J.H.

Groundwater Record	SAMPLES			Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	U50	DB									
DRY ON COMPLETION					0			FILL: Silty sandy gravel, fine to coarse grained igneous gravel, dark grey, fine to coarse grained sand, with concrete fragments.	D			GRAVEL COVER
				N = 4 1,2,2				FILL: Silty clay, high plasticity, brown mottled red brown and grey, with fine grained igneous and ironstone gravel.	w>PL		150 270 300	APPEARS POORLY COMPACTED
					1							
				N = 12 3,5,7							400 430 190	APPEARS WELL COMPACTED
					2							
					3			as above, but with sandy gravel bands.				
				N = 22 5,13,9							520 550 >600	
					4		CH	Silty CLAY: high plasticity, red brown mottled yellow brown, with fine grained ironstone gravel.	w>PL	VSt	300 360	RESIDUAL
					5			as above, but light grey mottled yellow brown, with ironstone gravel bands.	w≐PL	Hd	>600 >600 >600	
				N = 28 7,13,15								
					6		-	Extremely Weathered siltstone: silty CLAY, medium plasticity, grey.	XW	Hd		BRINGELLY SHALE
				N = SPT 10/70mm REFUSAL			-	SILTSTONE: dark grey.	DW	VL-L		VERY LOW 'TC' BIT RESISTANCE LOW RESISTANCE
					7							



BOREHOLE LOG

Borehole No.
12
2/2
Easting: 307351.8
Northing: 6252997

Client: FABCOT PTY LTD
Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE
Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH Method: SPIRAL AUGER R.L. Surface: 36.24m
Date: 3/10/18 JK205 Datum: AHD
Logged/Checked by: S.M./A.J.H.

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	U50	DB	DS									
									SILTSTONE: dark grey.	DW	VL-L		
									END OF BOREHOLE AT 7.5m				
						8							
						9							
						10							
						11							
						12							
						13							
						14							



BOREHOLE LOG

Borehole No.

13

1/1

Easting: 307142.7

Northing: 6252967

Client: FABCOT PTY LTD
Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE
Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH **Method:** SPIRAL AUGER JK205 **R.L. Surface:** 43.14m
Date: 2/10/18 **Datum:** AHD
Logged/Checked by: S.M./A.J.H.

Groundwater Record	SAMPLES			Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	U50	DB									
DRY ON COMPLETION					0			FILL: Silty gravelly sand, fine to coarse grained, grey and yellow brown, fine to medium grained sandstone gravel, trace of asphaltic concrete fragments, igneous gravel and slag. Silty CLAY: high plasticity, red brown.	D			
				N = 5 2,2,3			CH		w>PL	St	160 180 180	RESIDUAL
					1			as above, but light grey, with low strength iron indurated bands.		Hd	440 470 440	
				N = 15 5,7,8								
					2		-	Extremely Weathered siltstone: silty CLAY, medium plasticity, dark grey.	XW	Hd		BRINGELLY SHALE VERY LOW 'TC' BIT RESISTANCE
					3			SILTSTONE: dark grey.	DW	VL		
					4							
					5			as above, but with fine to medium grained sandstone bands.		L-M		MODERATE RESISTANCE
					6							
					7			END OF BOREHOLE AT 6.6m	SW	M		HIGH RESISTANCE 'TC' BIT REFUSAL



BOREHOLE LOG

Borehole No.

14

1/2

Easting: 307192.1

Northing: 6252961

Client: FABCOT PTY LTD

Project: PROPOSED Highbay Distribution Warehouse

Location: 250-266 Victoria Street, Wetherill Park, NSW

Job No. 31888AH

Method: SPIRAL AUGER
JK205

R.L. Surface: 40.16m

Date: 2/10/18

Datum: AHD

Logged/Checked by: A.V./A.J.H.

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/Weathering	Strength/Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	U50	DB	DS									
DRY ON COMPLETION						0		-	ASPHALTIC CONCRETE: 50mm.t	D	St		
								CI-CH	FILL: Gravelly sand, fine to coarse grained, dark grey, fine to coarse grained igneous gravel.	w _r ≠PL	VSt		RESIDUAL
					N = 13 5,6,7				Silty CLAY: medium to high plasticity, red brown.			250 300 260	
						1							
									Silty CLAY: medium to high plasticity, yellow brown.		VSt-Hd	440 380 >600	
					N = 22 6,9,13	2							
								-	Extremely Weathered siltstone: silty CLAY, medium plasticity, grey and brown, with clay bands.	XW	Hd		BRINGELLY SHALE
						3							VERY LOW 'TC' BIT RESISTANCE
					N > 10 14,10/ 100mm REFUSAL				SILTSTONE: grey.	DW	VL		LOW RESISTANCE
						4					L		
									SILTSTONE: dark grey and brown.	SW	M		MODERATE RESISTANCE
						5							
						6					M-H		
									as above, but dark brown.				
						7					H		HIGH RESISTANCE



BOREHOLE LOG

Borehole No.

14

2/2

Easting: 307192.1

Northing: 6252961

Client: FABCOT PTY LTD

Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE

Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH

Date: 2/10/18

Method: SPIRAL AUGER
JK205

Logged/Checked by: A.V./A.J.H.

R.L. Surface: 40.16m

Datum: AHD

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	U50	DB	DS									
									SILTSTONE: dark grey.	SW	H		
									END OF BOREHOLE AT 7.5m				
						8							
						9							
						10							
						11							
						12							
						13							
						14							



BOREHOLE LOG

Borehole No.
15
1/1
Easting: 307275.9
Northing: 6252950

Client: FABCOT PTY LTD														
Project: PROPOSED Highbay Distribution Warehouse														
Location: 250-266 Victoria Street, Wetherill Park, NSW														
Job No. 31888AH			Method: SPIRAL AUGER JK350						R.L. Surface: 34.60m					
Date: 27/09/18			Logged/Checked by: S.M./A.J.H.						Datum: AHD					
Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	Description	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks	
	FS	U50	DB	DS										
DRY ON COMPLETION						0			CONCRETE: 248mm.t				8mm DIA. REINFORCEMENT 148mm TOP COVER RESIDUAL	
								CI-CH	Silty sandy CLAY: medium to high plasticity, light grey mottled yellow brown, fine to medium grained sand. Clayey SAND: fine to medium grained, light grey and yellow brown, with sandy clay bands.	w>PL	(St)			
								SC		M	MD	410 320 >600		
					N = 14 10,8,6		1							
					N > 13 6,13/ 150mm REFUSAL							340 350 340		
							2		-	Extremely Weathered sandstone: clayey SAND: fine to medium grained, light grey and yellow brown. as above, but with quartz gravel.	XW	D		BRINGELLY SHALE VERY LOW 'TC' BIT RESISTANCE VERY LOW TO LOW RESISTANCE
										as above, but without quartz gravel and with low strength bands.				
										Interbedded CLAYSTONE and SILTSTONE: dark grey and dark brown, with extremely weathered seams. SILTSTONE: dark grey.	DW	VL-L		
							3		-				L	
							4		-		SW	L-M		MODERATE RESISTANCE
												H		HIGH RESISTANCE
										END OF BOREHOLE AT 4.5m				'TC' BIT REFUSAL
							5							
							6							
							7							



BOREHOLE LOG

Borehole No.

16

1/2

Easting: 307316.7

Northing: 6252941

Client: FABCOT PTY LTD

Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE

Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH

Method: SPIRAL AUGER
JK205

R.L. Surface: 35.43m

Date: 3/10/18

Datum: AHD

Logged/Checked by: S.M./A.J.H.

Groundwater Record	SAMPLES			Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	U50	DB									
DRY ON COMPLETION					0			FILL: Silty gravelly sand, fine to coarse grained, grey brown, fine grained ironstone and igneous gravel.	D w>PL			APPEARS MODERATELY COMPACTED
				N = 11 4,5,6				FILL: Silty clay, high plasticity, brown mottled light grey, yellow brown and red brown, with fine grained ironstone and igneous gravel, sand, trace of ash.			130 130 150	
					1			as above, but with gravelly sand bands.				
				N = 19 3,10,9							270 270 280	APPEARS WELL COMPACTED
					2		CH	Silty CLAY: high plasticity, dark brown mottled orange brown, with fine grained ironstone gravel.	w>PL	Hd	400 >600	RESIDUAL
								Silty sandy CLAY: high plasticity, red brown mottled yellow brown and light grey, fine to medium grained sand.				
					3		-	Extremely Weathered sandstone: clayey SAND, fine to medium grained, light grey, with low strength iron indurated bands.	XW	Hd		BRINGELLY SHALE VERY LOW 'TC' BIT RESISTANCE
					4			SANDSTONE: fine to medium grained, light grey, with medium strength iron indurated bands.	DW	L		MODERATE RESISTANCE
								as above, but with siltstone bands.		VL-L		LOW TO MODERATE RESISTANCE
					5							
					6		-	SILTSTONE: dark grey.	SW	L-M		
					7							



BOREHOLE LOG

Borehole No.
16
2/2
Easting: 307316.7
Northing: 6252941

Client: FABCOT PTY LTD													
Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE													
Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW													
Job No. 31888AH			Method: SPIRAL AUGER JK205				R.L. Surface: 35.43m						
Date: 3/10/18			Logged/Checked by: S.M./A.J.H.				Datum: AHD						
Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	U50	DB	DS									
									SILTSTONE: dark grey.	SW	L-M		
									END OF BOREHOLE AT 7.5m				
						8							
						9							
						10							
						11							
						12							
						13							
						14							



BOREHOLE LOG

Borehole No.
17
1/2
Easting: 307146.1
Northing: 6252933

Client: FABCOT PTY LTD												
Project: PROPOSED Highbay Distribution Warehouse												
Location: 250-266 Victoria Street, Wetherill Park, NSW												
Job No. 31888AH			Method: SPIRAL AUGER JK205						R.L. Surface: 42.67m			
Date: 2/10/18			Logged/Checked by: S.M./A.J.H.						Datum: AHD			
Groundwater Record	SAMPLES			Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	FS	U50	DB									
DRY ON COMPLETION					0			FILL: Silty gravelly sand, fine to coarse grained, grey and yellow brown, medium to coarse grained sandstone gravel, trace of asphaltic concrete fragments and slag.	D			
				N = 7 3,3,4			CH	Silty CLAY: high plasticity, red brown mottled light grey, trace of fine grained ironstone gravel.	w>PL	VSt	330 290 330	RESIDUAL
					1			as above, but light grey.				
				N > 12 7,12/90mm REFUSAL			-	Extremely Weathered siltstone: silty CLAY, medium plasticity, light grey mottled yellow brown.	XW	Hd	>600 >600 >600	BRINGELLY SHALE
					2			SILTSTONE: dark grey.	DW	VL-L		VERY LOW 'TC' BIT RESISTANCE LOW RESISTANCE
					3							
					4			SANDSTONE: fine to medium grained, grey.	DW	L		
					5							
					6			as above, but with siltstone bands.		M		MODERATE TO HIGH RESISTANCE
					7							



BOREHOLE LOG

Borehole No.
17
2/2
Easting: 307146.1
Northing: 6252933

Client: FABCOT PTY LTD
Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE
Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH **Method:** SPIRAL AUGER **R.L. Surface:** 42.67m
Date: 2/10/18 JK205 **Datum:** AHD
Logged/Checked by: S.M./A.J.H.

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	U50	DB	DS									
									SANDSTONE: fine to medium grained, grey, with siltstone bands.	SW	M		
									END OF BOREHOLE AT 7.5m				
						8							
						9							
						10							
						11							
						12							
						13							
						14							



BOREHOLE LOG

Borehole No.

18

1/2

Easting: 307183.3

Northing: 6252930

Client: FABCOT PTY LTD

Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE

Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH

Method: SPIRAL AUGER
JK205

R.L. Surface: 40.15m

Date: 2/10/18

Datum: AHD

Logged/Checked by: A.V./A.J.H.

Groundwater Record	SAMPLES			Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/Weathering	Strength/Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	U50	DB									
DRY ON COMPLETION					0		-	ASPHALTIC CONCRETE: 50mm.t	D			
							CI-CH	FILL: Gravelly sand, fine to coarse grained, dark grey, fine to medium grained igneous gravel.	w≈PL	VSt		RESIDUAL
				N = 9 4,4,5				Silty CLAY: medium to high plasticity, red brown mottled grey.			240 250 300	
					1							
				N = 26 7,11,15							290 350 300	
					2							BRINGELLY SHALE VERY LOW 'TC' BIT RESISTANCE LOW RESISTANCE MODERATE RESISTANCE
							-	Extremely Weathered sandstone: clayey SAND, fine to medium grained, brown, with clay bands.	XW	D		
				N = SPT 10/150mm REFUSAL	3							
								CLAYSTONE: brown and light grey and yellow brown.	DW	L		
					4							
								SILTSTONE: dark grey.	SW	M		
					5							
					6							
					7							



BOREHOLE LOG

Borehole No.
18
2/2
Easting: 307183.3
Northing: 6252930

Client: FABCOT PTY LTD
Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE
Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH **Method:** SPIRAL AUGER JK205 **R.L. Surface:** 40.15m
Date: 2/10/18 **Datum:** AHD
Logged/Checked by: A.V./A.J.H.

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	U50	DB	DS									
									SILTSTONE: dark grey.	SW	M		
									END OF BOREHOLE AT 7.5m				
						8							
						9							
						10							
						11							
						12							
						13							
						14							



BOREHOLE LOG

Borehole No.
19
1/1
Easting: 307255.5
Northing: 6252908

Client: FABCOT PTY LTD
Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE
Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW
Job No. 31888AH
Date: 27/9/18
Method: SPIRAL AUGER JK350
R.L. Surface: 33.27m
Datum: AHD
Logged/Checked by: S.M./A.J.H.

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	U50	DB	DS									
DRY ON COMPLETION						0		-	CONCRETE: 205mm.t				8mm DIA. REINFORCEMENT 105mm TOP COVER
								-	FILL: Sandy gravelly sand, fine to coarse grained, dark grey, fine grained igneous gravel, with slag.	D			
								-	Extremely Weathered sandstone: clayey SAND, fine to medium grained, light grey and yellow brown.	XW	D		BRINGELLY SHALE VERY LOW 'TC' BIT RESISTANCE
								-	SANDSTONE: fine to medium grained, light grey.	SW	M		MODERATE RESISTANCE
						1					H		HIGH RESISTANCE
						2			END OF BOREHOLE AT 1.8m				'TC' BIT RESISTANCE
						3							
						4							
						5							
						6							
						7							



BOREHOLE LOG

Borehole No.
20
1/2
Easting: 307313.1
Northing: 6252907

Client: FABCOT PTY LTD
Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE
Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH Method: SPIRAL AUGER R.L. Surface: 32.52m
Date: 28/9/18 JK350 Datum: AHD
Logged/Checked by: S.M./A.J.H.

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	U50	DB	DS									
DRY ON COMPLETION						0			CONCRETE: 195mm.t				8mm DIA. REINFORCEMENT 110mm TOP COVER RESIDUAL
								-	FILL: Silty gravelly sand, fine to coarse grained, dark grey, fine grained igneous gravel.	D	(Vst)		
					N > 15			CH	Silty CLAY: high plasticity, yellow brown mottled light grey.	w>PL			
					15,15/110mm			CI	Silty CLAY: medium plasticity, light grey, with fine grained ironstone gravel.	w<PL	Hd	>600	
					REFUSAL	1			as above, but with sandy clay nodules.			>600	
											VSt- Hd	530	
					N = 15							300	
					5,5,10	2			Sandy CLAY: medium plasticity, light grey mottled yellow brown, fine to medium grained sand.			380	
					N > 13	3		-	Extremely Weathered sandstone: clayey SAND, fine to medium grained, light grey and yellow brown.	XW	D	490	BRINGELLY SHALE VERY LOW 'TC' BIT RESISTANCE LOW TO MODERATE RESISTANCE
					6,13/130mm			-	SILTSTONE: dark grey.	SW	L-M	430	
					REFUSAL							280	
						4							MODERATE RESISTANCE
						5							MODERATE RESISTANCE
						6					M		MODERATE RESISTANCE
						7							MODERATE RESISTANCE



BOREHOLE LOG

Borehole No.
20
2/2
Easting: 307313.1
Northing: 6252907

Client: FABCOT PTY LTD
Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE
Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH **Method:** SPIRAL AUGER JK350 **R.L. Surface:** 32.52m
Date: 28/9/18 **Datum:** AHD
Logged/Checked by: S.M./A.J.H.

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	U50	DB	DS									
									SILTSTONE: dark grey.	SW	M		
									END OF BOREHOLE AT 7.5m				
						8							
						9							
						10							
						11							
						12							
						13							
						14							



BOREHOLE LOG

Borehole No.
21
1/2
Easting: 307128.9
Northing: 6252848

Client: FABCOT PTY LTD
Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE
Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH Method: SPIRAL AUGER R.L. Surface: 41.02m
Date: 20/9/18 JK205 Datum: AHD
Logged/Checked by: A.V./A.J.H.

Groundwater Record	SAMPLES			Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	U50	DB									
DRY ON COMPLETION					0		-	CONCRETE: 130mm.t FILL: Silty clay, medium to high plasticity, grey mottled brown, trace of organic matter.	w>PL	VSt		NO OBSERVED REINFORCEMENT APPEARS WELL COMPACTED
				N = 11 3,5,6							300 400 250	
					1		CH	Silty CLAY: high plasticity, grey mottled dark grey and red brown.	w<PL	Hd		
				N > 16 6,16/ 130mm							>600 >600 >600	RESIDUAL
				REFUSAL	2		-	CLAYSTONE: brown.	DW	VL		BRINGELLY SHALE VERY LOW 'TC' BIT RESISTANCE
					3		-	SILTSTONE: dark grey.	DW	L		LOW RESISATANCE
					4							
					5				SW	M		MODERATE RESISTANCE
					6							
					7					H		HIGH RESISTANCE

2/2

Northing: 6252848

Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

Datum: AHD

Logged/Checked by: A.V./A.J.H.

Groundwater Record	SAMPLES			Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	U50	DB									
	DS											
								SILTSTONE: dark grey.	SW	H		
								END OF BOREHOLE AT 7.5m				
					8							
					9							
					10							
					11							
					12							
					13							
					14							



BOREHOLE LOG

Borehole No.

22

1/1

Easting: 307218.7

Northing: 6252881

Client: FABCOT PTY LTD

Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE

Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH

Method: SPIRAL AUGER
JK350

R.L. Surface: 36.6m

Date: 3/10/18

Datum: AHD

Logged/Checked by: S.M./A.J.H.

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/Weathering	Strength/Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	U50	DB	DS									
						0		-	ASPHALTIC CONCRETE: 40mm.t	D			
					N = 8 2,3,5			CH	FILL: Silty gravelly sand, fine to coarse grained, dark grey, fine grained igneous gravel. Silty CLAY: high plasticity, yellow brown mottled dark grey, with fine grained ironstone gravel.	w>PL	St-VSt	190 240 240	RESIDUAL
						1			as above, but light grey.		VSt		
					N > 26 6,16, 10/80mm REFUSAL				as above, but mottled yellow brown.			300 360 370	BRINGELLY SHALE
						2		-	Extremely Weathered siltstone: silty CLAY, low to medium grained, dark grey. SILTSTONE: dark grey.	XW DW	Hd VL		VERY LOW 'TC' BIT RESISTANCE LOW RESISTANCE
						3							
						4		-	SANDSTONE: fine to medium grained, grey.	SW	L-M H		MODERATE RESISTANCE HIGH RESISTANCE
						5			END OF BOREHOLE AT 5.0m				'TC' BIT REFUSAL
						6							
						7							

ON COMPLETION



BOREHOLE LOG

Borehole No.

24

1/2

Easting: 307322

Northing: 6252811

Client: FABCOT PTY LTD

Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE

Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH

Method: SPIRAL AUGER
JK350

R.L. Surface: 32.53m

Date: 28/9/18

Datum: AHD

Logged/Checked by: S.M./A.J.H.

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	U50	DB	DS									
DRY ON COMPLETION						0		-	CONCRETE: 130mm.t				8mm DIA. REINFORCEMENT 80mm TOP COVER APPEARS MODERATELY COMPACTED
					N = 6 2,3,5				FILL: Silty gravelly sand, fine to coarse grained, dark grey, fine grained igneous gravel, trace of glass fragments and slag.	D			
						1			FILL: Silty clay, high plasticity, red brown mottled grey and yellow brown, trace of fine grained ironstone gravel, ash and slag.	w>PL		230 240 220	
					N = 7 2,3,4							170 180 130	
						2							
								CH	Silty CLAY: high plasticity, light grey mottled yellow brown, with fine grained ironstone gravel bands and sandy clay nodules.	w>PL	VSt		
					N = 11 12,5,6	3						340 280 380	
						4			as above, but without ironstone gravel bands.	w≐PL	VSt-Hd		
					N = 22 7,10,12							340 360 410	
						5							
								-	Extremely Weathered siltstone: silty CLAY, medium plasticity, light grey mottled yellow brown.	XW	Hd		BRINGELLY SHALE VERY LOW 'TC' BIT RESISTANCE LOW RESISTANCE
						6			SILTSTONE: dark grey.	DW	VL		
										SW	L-M		
						7							



BOREHOLE LOG

Borehole No.

24

2/2

Easting: 307322

Northing: 6252811

Client: FABCOT PTY LTD

Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE

Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH

Date: 28/9/18

Method: SPIRAL AUGER
JK350

Logged/Checked by: S.M./A.J.H.

R.L. Surface: 32.53m

Datum: AHD

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	U50	DB	DS									
									SILTSTONE: dark grey.	SW	L-M		
									END OF BOREHOLE AT 7.5m				
						8							
						9							
						10							
						11							
						12							
						13							
						14							



BOREHOLE LOG

Borehole No.

25

2/2

Easting: 307121.5

Northing: 6252796

Client:

FABCOT PTY LTD

Project:

PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE

Location:

250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH

Method: SPIRAL AUGER JK205

R.L. Surface: 41.45m

Date: 2/10/18

Datum: AHD

Logged/Checked by: S.M./A.J.H.

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/Weathering	Strength/Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	U50	DB	DS									
									SILTSTONE: dark grey.	SW	M		
											H		HIGH RESISTANCE
									END OF BOREHOLE AT 7.5m				
						8							
						9							
						10							
						11							
						12							
						13							
						14							



BOREHOLE LOG

Borehole No.
26
1/1
Easting: 307163.8
Northing: 6252791

Client: FABCOT PTY LTD														
Project: PROPOSED Highbay Distribution Warehouse														
Location: 250-266 Victoria Street, Wetherill Park, NSW														
Job No. 31888AH			Method: SPIRAL AUGER JK350						R.L. Surface: 38.78m					
Date: 28/9/18			Logged/Checked by: S.M./A.J.H.						Datum: AHD					
Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks	
	FS	U50	DB	DS										
DRY ON COMPLETION						0			FILL: Silty sand, fine to medium grained, dark brown, with fine grained igneous and ironstone gravel, clay nodules and slag.	M			GRASS COVER	
					N = 12 1,6,6			CH	Silty CLAY: high plasticity, yellow brown mottled red brown, with fine grained ironstone gravel.	w=PL	Hd	>600 >600 >600	RESIDUAL	
						as above, but light grey mottled red brown.								
					N = 19 6,9,10							>600 >600 >600		
						2		-	Extremely Weathered siltstone: silty CLAY, medium plasticity, light grey.	XW	Hd		BRINGELLY SHALE VERY LOW 'TC' BIT RESISTANCE LOW RESISTANCE	
						3			SILTSTONE: dark grey.	DW	L			
						4			SANDSTONE: fine to medium grained, light grey.	SW	M			MODERATE RESISTANCE
						5			END OF BOREHOLE 5.0m		H		HIGH RESISTANCE 'TC' BIT REFUSAL	
							6							
							7							



BOREHOLE LOG

Borehole No.
27
1/2
Easting: 307224.1
Northing: 6252778

Client: FABCOT PTY LTD													
Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE													
Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW													
Job No. 31888AH Method: SPIRAL AUGER R.L. Surface: 35.17m													
Date: 28/9/18 JK350 Datum: AHD													
Logged/Checked by: S.M./A.J.H.													
Groundwater Record	SAMPLES			Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks	
	ES	U50	DB										
DRY ON COMPLETION					0			FILL: Silty sand, fine to medium grained, dark brown, with ironstone gravel, clay nodules and slag.				GRASS COVER	
				N = 11 5,6,5							>600 >600 >600	APPEARS WELL COMPACTED	
					1		CH	Silty CLAY: high plasticity, dark yellow brown mottled red brown, with fine grained ironstone gravel. Silty CLAY: high plasticity, light grey mottled yellow brown.	w=PL	Hd	>600 >600 >600	RESIDUAL	
				N = 11 5,6,5							>600 >600 >600		
					2			as above, but with ironstone gravel bands.					
					3								
				N > 6 9,6/50mm			-	Extremely Weathered siltstone: silty CLAY, high plasticity, light grey mottled yellow brown.	XW	Hd		BRINGELLY SHALE	
				REFUSAL									VERY LOW 'TC' BIT RESISTANCE
					4			SILTSTONE: dark grey.	DW	L		LOW RESISTANCE	
					5								
				6									
				7									



BOREHOLE LOG

Borehole No.
27
2/2
Easting: 307224.1
Northing: 6252778

Client: FABCOT PTY LTD													
Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE													
Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW													
Job No. 31888AH Method: SPIRAL AUGER JK350 R.L. Surface: 35.17m													
Date: 28/9/18 Datum: AHD													
Logged/Checked by: S.M./A.J.H.													
Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	U50	DB	DS									
									SILTSTONE: dark grey.	DW	L		
									END OF BOREHOLE AT 7.5m				
						8							
						9							
						10							
						11							
						12							
						13							
						14							



BOREHOLE LOG

Borehole No.
28
1/2
Easting: 307265.3
Northing: 6252773

Client: FABCOT PTY LTD
Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE
Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH Method: SPIRAL AUGER R.L. Surface: 33.73m
Date: 28/9/18 JK350 Datum: AHD
Logged/Checked by: S.M./A.J.H.

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks	
	ES	U50	DB	DS										
DRY ON COMPLETION						0			FILL: Silty sand, fine to medium grained, brown, with root fibres.	D			APPEARS WELL COMPACTED	
					N = 18 8,10,8				FILL: Silty clay, medium to high plasticity, light grey mottled yellow brown and red brown, with fine grained ironstone gravel and sand.	w≈PL		>600 >600 >600		
						1								
					N = 8 5,4,4			CH	Silty CLAY: high plasticity, dark yellow brown mottled yellow brown, trace of fine grained ironstone gravel and ash. as above, but yellow brown mottled orange brown. as above, but light grey and yellow brown.	w>PL	VSt- Hd	420 370 380	RESIDUAL	
						2								
					N = 9 4,4,5	3	VSt							240 290 280
						4	Hd							
					N > 15 13,15/ 50mm				as above, but with ironstone bands.			>600 >600 >600	BRINGELLY SHALE VERY LOW 'TC' BIT RESISTANCE LOW RESISTANCE MODERATE RESISTANCE	
					END	5		-	Extremely Weathered siltstone: silty CLAY, low to medium plasticity, dark grey. SILTSTONE: dark grey.	XW	Hd			
										DW	L			
										SW	L-M			
							6					M		
							7							



BOREHOLE LOG

Borehole No.
28
2/2
Easting: 307265.3
Northing: 6252773

Client: FABCOT PTY LTD
Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE
Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH **Method:** SPIRAL AUGER JK350 **R.L. Surface:** 33.73m
Date: 28/9/18 **Datum:** AHD
Logged/Checked by: S.M./A.J.H.

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	U50	DB	DS									
									SILTSTONE: dark grey.	SW	M		
									END OF BOREHOLE AT 7.5m				
						8							
						9							
						10							
						11							
						12							
						13							
						14							



BOREHOLE LOG

Borehole No.
29
1/2
Easting: 307310.6
Northing: 6252768

Client: FABCOT PTY LTD
Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE
Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH Method: SPIRAL AUGER R.L. Surface: 32.09m
Date: 28/9/18 JK350 Datum: AHD
Logged/Checked by: S.M./A.J.H.

Groundwater Record	SAMPLES			Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	U50	DB									
DRY ON COMPLETION					0			FILL: Silty sand, fine to medium grained, brown, with clay nodules, slag and root fibres.	M			GRASS COVER APPEARS MODERATELY COMPACTED
				N = 8 4,4,4								
					1			FILL: Silty sand, fine to coarse grained, red brown and brown, with fine grained igneous gravel, brick and tile fragments and slag.				
				N = 9 5,4,5								
					2							RESIDUAL
						CI		Silty CLAY: medium plasticity, dark grey mottled yellow brown, trace of ash.	w>PL	S-F		
				N = 7 2,2,5								
						CH		Silty CLAY: high plasticity, light grey mottled yellow brown.		VSt	50 40 70 300 320 260	
					4							
				N > 22 10,13, 9/120mm		CI		Silty sandy CLAY: medium plasticity, light grey mottled yellow brown, fine to medium grained sand.			200 290 250	
				REFUSAL	5							BRINGELLY SHALE VERY LOW 'TC' BIT RESISTANCE LOW RESISTANCE
						-		Extremely Weathered sandstone: clayey SAND, fine to medium grained, light grey and yellow brown. SANDSTONE: fine to medium grained, light grey and yellow brown.	XW DW	D L	>600	
					6				SW	M		
					7							MODERATE RESISTANCE



BOREHOLE LOG

Borehole No.

29

2/2

Easting: 307310.6

Northing: 6252768

Client: FABCOT PTY LTD													
Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE													
Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW													
Job No. 31888AH			Method: SPIRAL AUGER JK350				R.L. Surface: 32.09m						
Date: 28/9/18			Logged/Checked by: S.M./A.J.H.				Datum: AHD						
Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	U50	DB	DS									
									SANDSTONE: fine to medium grained, light grey and yellow brown.	SW	M		
									END OF BOREHOLE AT 7.5m				
						8							
						9							
						10							
						11							
						12							
						13							
						14							



BOREHOLE LOG

Borehole No.
30
1/1
Easting: 307302.3
Northing: 6253026

Client: FABCOT PTY LTD
Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE
Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH Method: SPIRAL AUGER R.L. Surface: 36.35m
Date: 27/9/18 JK350 Datum: AHD
Logged/Checked by: S.M./A.J.H.

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	U50	DB	DS									
DRY ON COMPLETION						0			CONCRETE: 525mm.t				8mm DIA. REINFORCEMENT 405mm + 85mm TOP COVER
						1		-	FILL: Silty gravelly sand, fine to coarse grained, dark grey, angular fine grained igneous gravel, with glass fragments and slag.	D			APPEARS WELL COMPACTED
									FILL: Silty clay, high plasticity, brown mottled red brown and grey, trace of slag.	w>PL		380 480 270	
					N = SPT 11/80mm REFUSAL								
					N = 14 5,6,8								
						2		CH	Silty CLAY: high plasticity, light grey mottled yellow brown.	w=PL	Hd	500 460 450	RESIDUAL
						3		-	Extremely Weathered siltstone: silty CLAY, medium to high plasticity, light grey and red brown.	XW	Hd		BRINGELLY SHALE
									SILTSTONE: dark grey.	SW	L-M		VERY LOW 'TC' BIT RESISTANCE LOW RESISTANCE
						4							
						5							
									END OF BOREHOLE AT 5.4m		H		HIGH RESISTANCE 'TC' BIT REFUSAL
						6							
						7							

ENVIRONMENTAL LOGS EXPLANATORY NOTES

INTRODUCTION

These notes have been provided to amplify the environmental report in regard to classification methods, field procedures and certain matters relating to the logging of soil and rock. Not all notes are necessarily relevant to all reports.

Where geotechnical borehole logs are utilised for environmental purpose, reference should also be made to the explanatory notes included in the geotechnical report. Environmental logs are not suitable for geotechnical purposes.

The ground is a product of continuing natural and man-made processes and therefore exhibits a variety of characteristics and properties which vary from place to place and can change with time. Environmental studies include gathering and assimilating limited facts about these characteristics and properties in order to understand or predict the behaviour of the ground on a particular site under certain conditions. This report may contain such facts obtained by inspection, excavation, probing, sampling, testing or other means of investigation. If so, they are directly relevant only to the ground at the place where and time when the investigation was carried out.

DESCRIPTION AND CLASSIFICATION METHODS

The methods of description and classification of soils and rocks used in this report are based on Australian Standard 1726:2017 'Geotechnical Site Investigations'. In general, descriptions cover the following properties – soil or rock type, colour, structure, strength or density, and inclusions. Identification and classification of soil and rock involves judgement and the Company infers accuracy only to the extent that is common in current geoenvironmental practice.

Soil types are described according to the predominating particle size and behaviour as set out in the attached soil classification table qualified by the grading of other particles present (eg. sandy clay) as set out below:

Soil Classification	Particle Size
Clay	< 0.002mm
Silt	0.002 to 0.075mm
Sand	0.075 to 2.36mm
Gravel	2.36 to 63mm
Cobbles	63 to 200mm
Boulders	> 200mm

Non-cohesive soils are classified on the basis of relative density, generally from the results of Standard Penetration Test (SPT) as below:

Relative Density	SPT 'N' Value (blows/300mm)
Very loose (VL)	< 4
Loose (L)	4 to 10
Medium dense (MD)	10 to 30
Dense (D)	30 to 50
Very Dense (VD)	> 50

Cohesive soils are classified on the basis of strength (consistency) either by use of a hand penetrometer, vane shear, laboratory testing and/or tactile engineering examination. The strength terms are defined as follows.

Classification	Unconfined Compressive Strength (kPa)	Indicative Undrained Shear Strength (kPa)
Very Soft (VS)	≤ 25	≤ 12
Soft (S)	> 25 and ≤ 50	> 12 and ≤ 25
Firm (F)	> 50 and ≤ 100	> 25 and ≤ 50
Stiff (St)	> 100 and ≤ 200	> 50 and ≤ 100
Very Stiff (VSt)	> 200 and ≤ 400	> 100 and ≤ 200
Hard (Hd)	> 400	> 200
Friable (Fr)	Strength not attainable – soil crumbles	

Rock types are classified by their geological names, together with descriptive terms regarding weathering, strength, defects, etc. Where relevant, further information regarding rock classification is given in the text of the report. In the Sydney Basin, 'shale' is used to describe fissile mudstone, with a weakness parallel to bedding. Rocks with alternating inter-laminations of different grain size (eg. siltstone/claystone and siltstone/fine grained sandstone) are referred to as 'laminite'.

INVESTIGATION METHODS

The following is a brief summary of investigation methods currently adopted by the Company and some comments on their use and application. All methods except test pits, hand auger drilling and portable Dynamic Cone Penetrometers require the use of a mechanical rig which is commonly mounted on a truck chassis or track base.

Test Pits: These are normally excavated with a backhoe or a tracked excavator, allowing close examination of the in situ soils and 'weaker' bedrock if it is safe to descend into the pit. The depth of penetration is limited to about 3m for a backhoe and up to 6m for a large excavator. Limitations of test pits are the problems associated with disturbance and difficulty of reinstatement and the consequent effects on close-by structures. Care must be taken if construction is to be carried out near test pit locations to either properly recompact the backfill during construction or to design and construct the structure so as not to be adversely affected by poorly compacted backfill at the test pit location.

Hand Auger Drilling: A borehole of 50mm to 100mm diameter is advanced by manually operated equipment. Refusal of the hand auger can occur on a variety of materials such as obstructions within any fill, tree roots, hard clay, gravel or ironstone, cobbles and boulders, and does not necessarily indicate rock level.

Continuous Spiral Flight Augers: The borehole is advanced using 75mm to 115mm diameter continuous spiral flight augers, which are withdrawn at intervals to allow sampling and insitu testing. This is a relatively economical means of drilling in clays and in sands above the water table. Samples are returned to the surface by the flights or may be collected after withdrawal of the auger flights, but they can be very disturbed and layers may become mixed. Information from the auger sampling (as distinct from specific sampling by SPTs or undisturbed samples) is of limited reliability due to mixing or softening of samples by groundwater, or uncertainties as to the original depth of the samples. Augering below the groundwater table is of even lesser reliability than augering above the water table.

Rock Augering: Use can be made of a Tungsten Carbide (TC) bit for auger drilling into rock to indicate rock quality and continuity by variation in drilling resistance and from examination of recovered rock cuttings. This method of investigation is quick and relatively inexpensive but provides only an indication of the likely rock strength and predicted values may be in error by a strength order. Where rock strengths may have a significant impact on construction feasibility or costs, then further investigation by means of cored boreholes may be warranted.

Wash Boring: The borehole is usually advanced by a rotary bit, with water being pumped down the drill rods and returned up the annulus, carrying the drill cuttings. Only major changes in stratification can be assessed from the cuttings, together with some information from "feel" and rate of penetration.

Mud Stabilised Drilling: Either Wash Boring or Continuous Core Drilling can use drilling mud as a circulating fluid to stabilise the borehole. The term 'mud' encompasses a range of products ranging from bentonite to polymers. The mud tends to mask the cuttings and reliable identification is only possible from intermittent intact sampling (eg. from SPT and U50 samples) or from rock coring, etc.

Continuous Core Drilling: A continuous core sample is obtained using a diamond tipped core barrel. Provided full core recovery is achieved (which is not always possible in very low strength rocks and granular soils), this technique provides a very reliable (but relatively expensive) method of investigation. In rocks, NMLC or HQ triple tube core barrels, which give a core of about 50mm and 61mm diameter, respectively, is usually used with water flush. The length of core recovered is compared to the length drilled and any length not recovered is shown as NO CORE. The location of NO CORE recovery is determined on site by the supervising engineer; where the location is uncertain, the loss is placed at the bottom of the drill run.

Standard Penetration Tests: Standard Penetration Tests (SPT) are used mainly in non-cohesive soils, but can also be used in cohesive soils, as a means of indicating density or

strength and also of obtaining a relatively undisturbed sample. The test procedure is described in Australian Standard 1289.6.3.1–2004 (R2016) *'Methods of Testing Soils for Engineering Purposes, Soil Strength and Consolidation Tests – Determination of the Penetration Resistance of a Soil – Standard Penetration Test (SPT)'*.

The test is carried out in a borehole by driving a 50mm diameter split sample tube with a tapered shoe, under the impact of a 63.5kg hammer with a free fall of 760mm. It is normal for the tube to be driven in three successive 150mm increments and the 'N' value is taken as the number of blows for the last 300mm. In dense sands, very hard clays or weak rock, the full 450mm penetration may not be practicable and the test is discontinued.

The test results are reported in the following form:

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

N = 13
4, 6, 7

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

N > 30
15, 30/40mm

The results of the test can be related empirically to the engineering properties of the soil.

A modification to the SPT is where the same driving system is used with a solid 60° tipped steel cone of the same diameter as the SPT hollow sampler. The solid cone can be continuously driven for some distance in soft clays or loose sands, or may be used where damage would otherwise occur to the SPT. The results of this Solid Cone Penetration Test (SCPT) are shown as 'N_c' on the borehole logs, together with the number of blows per 150mm penetration.

LOGS

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

The terms and symbols used in preparation of the logs are defined in the following pages.

Interpretation of the information shown on the logs, and its application to design and construction, should therefore take into account the spacing of boreholes or test pits, the method of drilling or excavation, the frequency of sampling and testing and the possibility of other than 'straight line' variations between the boreholes or test pits. Subsurface conditions between boreholes or test pits may vary significantly from conditions encountered at the borehole or test pit locations.

GROUNDWATER

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

- Although groundwater may be present, in low permeability soils it may enter the hole slowly or perhaps not at all during the time it 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 and may not be the same at the time of construction.
- 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 be washed out of the hole or 'reverted' chemically if reliable water observations are to be made.

More reliable measurements can be made by installing standpipes which are read after the groundwater level has stabilised at intervals ranging from several days to 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 perched water tables or surface water.

FILL

The presence of fill materials can often be determined only by the inclusion of foreign objects (eg. bricks, steel, etc) or by distinctly unusual colour, texture or fabric. Identification of the extent of fill materials will also depend on investigation methods and frequency. Where natural soils similar to those at the site are used for fill, it may be difficult with limited testing and sampling to reliably assess the extent of the fill.

The presence of fill materials is usually regarded with caution as the possible variation in density and material type is much greater than with natural soil deposits. Consequently, there is an increased risk of adverse environmental characteristics or behaviour. If the volume and nature of fill is of importance to a project, then frequent test pit excavations are preferable to boreholes.

LABORATORY TESTING

Laboratory testing has not been undertaken to confirm the soil classification and rock strengths indicated on the environmental logs unless noted in the report.

SYMBOL LEGENDS

SOIL

	FILL
	TOPSOIL
	CLAY (CL, CI, CH)
	SILT (ML, MH)
	SAND (SP, SW)
	GRAVEL (GP, GW)
	SANDY CLAY (CL, CI, CH)
	SILTY CLAY (CL, CI, CH)
	CLAYEY SAND (SC)
	SILTY SAND (SM)
	GRAVELLY CLAY (CL, CI, CH)
	CLAYEY GRAVEL (GC)
	SANDY SILT (ML, MH)
	PEAT AND HIGHLY ORGANIC SOILS (Pt)

ROCK

	CONGLOMERATE
	SANDSTONE
	SHALE/MUDSTONE
	SILTSTONE
	CLAYSTONE
	COAL
	LAMINITE
	LIMESTONE
	PHYLLITE, SCHIST
	TUFF
	GRANITE, GABBRO
	DOLERITE, DIORITE
	BASALT, ANDESITE
	QUARTZITE

OTHER MATERIALS

	BRICKS OR PAVERS
	CONCRETE
	ASPHALTIC CONCRETE

CLASSIFICATION OF COARSE AND FINE GRAINED SOILS

Major Divisions		Group Symbol	Typical Names	Field Classification of Sand and Gravel	Laboratory Classification	
Coarse grained soil (more than 65% of soil excluding oversize fraction is greater than 0.075mm)	GRAVEL (more than half of coarse fraction is larger than 2.36mm)	GW	Gravel and gravel-sand mixtures, little or no fines	Wide range in grain size and substantial amounts of all intermediate sizes, not enough fines to bind coarse grains, no dry strength	≤ 5% fines	$C_u > 4$ $1 < C_c < 3$
		GP	Gravel and gravel-sand mixtures, little or no fines, uniform gravels	Predominantly one size or range of sizes with some intermediate sizes missing, not enough fines to bind coarse grains, no dry strength	≤ 5% fines	Fails to comply with above
		GM	Gravel-silt mixtures and gravel-sand-silt mixtures	'Dirty' materials with excess of non-plastic fines, zero to medium dry strength	≥ 12% fines, fines are silty	Fines behave as silt
		GC	Gravel-clay mixtures and gravel-sand-clay mixtures	'Dirty' materials with excess of plastic fines, medium to high dry strength	≥ 12% fines, fines are clayey	Fines behave as clay
	SAND (more than half of coarse fraction is smaller than 2.36mm)	SW	Sand and gravel-sand mixtures, little or no fines	Wide range in grain size and substantial amounts of all intermediate sizes, not enough fines to bind coarse grains, no dry strength	≤ 5% fines	$C_u > 6$ $1 < C_c < 3$
		SP	Sand and gravel-sand mixtures, little or no fines	Predominantly one size or range of sizes with some intermediate sizes missing, not enough fines to bind coarse grains, no dry strength	≤ 5% fines	Fails to comply with above
		SM	Sand-silt mixtures	'Dirty' materials with excess of non-plastic fines, zero to medium dry strength	≥ 12% fines, fines are silty	N/A
		SC	Sand-clay mixtures	'Dirty' materials with excess of plastic fines, medium to high dry strength	≥ 12% fines, fines are clayey	

Laboratory Classification Criteria

A well graded coarse grained soil is one for which the coefficient of uniformity $C_u > 4$ and the coefficient of curvature $1 < C_c < 3$. Otherwise, the soil is poorly graded. These coefficients are given by:

$$C_u = \frac{D_{60}}{D_{10}} \quad \text{and} \quad C_c = \frac{(D_{30})^2}{D_{10} D_{60}}$$

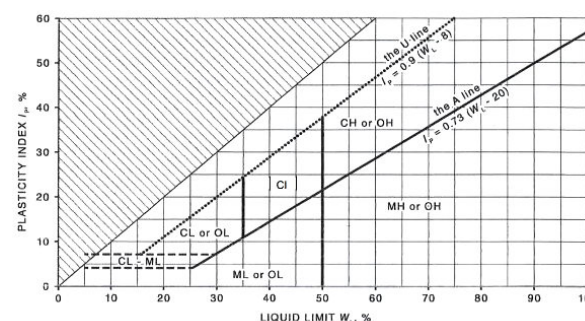
Where D_{10} , D_{30} and D_{60} are those grain sizes for which 10%, 30% and 60% of the soil grains, respectively, are smaller.

NOTES:

- For a coarse grained soil with a fines content between 5% and 12%, the soil is given a dual classification comprising the two group symbols separated by a dash; for example, for a poorly graded gravel with between 5% and 12% silt fines, the classification is GP-GM.
- Where the grading is determined from laboratory tests, it is defined by coefficients of curvature (C_c) and uniformity (C_u) derived from the particle size distribution curve.
- Clay soils with liquid limits $> 35\%$ and $\leq 50\%$ may be classified as being of medium plasticity.
- The U line on the Modified Casagrande Chart is an approximate upper bound for most natural soils.

Major Divisions		Group Symbol	Typical Names	Field Classification of Silt and Clay			Laboratory Classification
				Dry Strength	Dilatancy	Toughness	% < 0.075mm
Fine grained soils (more than 35% of soil excluding oversize fraction is less than 0.075mm)	SILT and CLAY (low to medium plasticity)	ML	Inorganic silt and very fine sand, rock flour, silty or clayey fine sand or silt with low plasticity	None to low	Slow to rapid	Low	Below A line
		CL, CI	Inorganic clay of low to medium plasticity, gravelly clay, sandy clay	Medium to high	None to slow	Medium	Above A line
		OL	Organic silt	Low to medium	Slow	Low	Below A line
	SILT and CLAY (high plasticity)	MH	Inorganic silt	Low to medium	None to slow	Low to medium	Below A line
		CH	Inorganic clay of high plasticity	High to very high	None	High	Above A line
		OH	Organic clay of medium to high plasticity, organic silt	Medium to high	None to very slow	Low to medium	Below A line
	Highly organic soil	Pt	Peat, highly organic soil	—	—	—	—

Modified Casagrande Chart for Classifying Silts and Clays according to their Behaviour



LOG SYMBOLS

Log Column	Symbol	Definition																		
Groundwater Record	▼	Standing water level. Time delay following completion of drilling/excavation may be shown.																		
	—C—	Extent of borehole/test pit collapse shortly after drilling/excavation.																		
	▶	Groundwater seepage into borehole or test pit noted during drilling or excavation.																		
Samples	ES U50 DB DS ASB ASS SAL	Sample taken over depth indicated, for environmental analysis. Undisturbed 50mm diameter tube sample taken over depth indicated. Bulk disturbed sample taken over depth indicated. Small disturbed bag sample taken over depth indicated. Soil sample taken over depth indicated, for asbestos analysis. Soil sample taken over depth indicated, for acid sulfate soil analysis. Soil sample taken over depth indicated, for salinity analysis.																		
Field Tests	N = 17 4, 7, 10	Standard Penetration Test (SPT) performed between depths indicated by lines. Individual figures show blows per 150mm penetration. 'Refusal' refers to apparent hammer refusal within the corresponding 150mm depth increment.																		
	N _c =	5																		
		7																		
		3R																		
	VNS = 25 PID = 100	Vane shear reading in kPa of undrained shear strength. Photoionisation detector reading in ppm (soil sample headspace test).																		
Moisture Condition (Fine Grained Soils)	w > PL w ≈ PL w < PL w ≈ LL w > LL	Moisture content estimated to be greater than plastic limit. Moisture content estimated to be approximately equal to plastic limit. Moisture content estimated to be less than plastic limit. Moisture content estimated to be near liquid limit. Moisture content estimated to be wet of liquid limit.																		
(Coarse Grained Soils)	D M W	DRY – runs freely through fingers. MOIST – does not run freely but no free water visible on soil surface. WET – free water visible on soil surface.																		
Strength (Consistency) Cohesive Soils	VS S F St VSt Hd Fr ()	VERY SOFT – unconfined compressive strength ≤ 25kPa. SOFT – unconfined compressive strength > 25kPa and ≤ 50kPa. FIRM – unconfined compressive strength > 50kPa and ≤ 100kPa. STIFF – unconfined compressive strength > 100kPa and ≤ 200kPa. VERY STIFF – unconfined compressive strength > 200kPa and ≤ 400kPa. HARD – unconfined compressive strength > 400kPa. FRIABLE – strength not attainable, soil crumbles. Bracketed symbol indicates estimated consistency based on tactile examination or other assessment.																		
Density Index/ Relative Density (Cohesionless Soils)	VL L MD D VD ()	<table border="1"> <thead> <tr> <th></th><th>Density Index (I_D) Range (%)</th><th>SPT 'N' Value Range (Blows/300mm)</th></tr> </thead> <tbody> <tr> <td>VERY LOOSE</td><td>≤ 15</td><td>0 – 4</td></tr> <tr> <td>LOOSE</td><td>> 15 and ≤ 35</td><td>4 – 10</td></tr> <tr> <td>MEDIUM DENSE</td><td>> 35 and ≤ 65</td><td>10 – 30</td></tr> <tr> <td>DENSE</td><td>> 65 and ≤ 85</td><td>30 – 50</td></tr> <tr> <td>VERY DENSE</td><td>> 85</td><td>> 50</td></tr> </tbody> </table> Bracketed symbol indicates estimated density based on ease of drilling or other assessment.		Density Index (I _D) Range (%)	SPT 'N' Value Range (Blows/300mm)	VERY LOOSE	≤ 15	0 – 4	LOOSE	> 15 and ≤ 35	4 – 10	MEDIUM DENSE	> 35 and ≤ 65	10 – 30	DENSE	> 65 and ≤ 85	30 – 50	VERY DENSE	> 85	> 50
	Density Index (I _D) Range (%)	SPT 'N' Value Range (Blows/300mm)																		
VERY LOOSE	≤ 15	0 – 4																		
LOOSE	> 15 and ≤ 35	4 – 10																		
MEDIUM DENSE	> 35 and ≤ 65	10 – 30																		
DENSE	> 65 and ≤ 85	30 – 50																		
VERY DENSE	> 85	> 50																		
Hand Penetrometer Readings	300 250	Measures reading in kPa of unconfined compressive strength. Numbers indicate individual test results on representative undisturbed material unless noted otherwise.																		

Log Symbols continued

Log Column	Symbol	Definition
Remarks	'V' bit 'TC' bit  Soil Origin	Hardened steel 'V' shaped bit. Twin pronged tungsten carbide bit. Penetration of auger string in mm under static load of rig applied by drill head hydraulics without rotation of augers. The geological origin of the soil can generally be described as: RESIDUAL – soil formed directly from insitu weathering of the underlying rock. No visible structure or fabric of the parent rock. EXTREMELY WEATHERED – soil formed directly from insitu weathering of the underlying rock. Material is of soil strength but retains the structure and/or fabric of the parent rock. ALLUVIAL – soil deposited by creeks and rivers. ESTUARINE – soil deposited in coastal estuaries, including sediments caused by inflowing creeks and rivers, and tidal currents. MARINE – soil deposited in a marine environment. AEOLIAN – soil carried and deposited by wind. COLLUVIAL – soil and rock debris transported downslope by gravity, with or without the assistance of flowing water. Colluvium is usually a thick deposit formed from a landslide. The description 'slopewash' is used for thinner surficial deposits. LITTORAL – beach deposited soil.

Classification of Material Weathering

Term		Abbreviation		Definition
Residual Soil		RS		Material is weathered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are no longer visible, but the soil has not been significantly transported.
Extremely Weathered		XW		Material is weathered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are still visible.
Highly Weathered	Distinctly Weathered (Note 1)	HW	DW	The whole of the rock material is discoloured, usually by iron staining or bleaching to the extent that the colour of the original rock is not recognisable. Rock strength is significantly changed by weathering. Some primary minerals have weathered to clay minerals. Porosity may be increased by leaching, or may be decreased due to deposition of weathering products in pores.
Moderately Weathered		MW		The whole of the rock material is discoloured, usually by iron staining or bleaching to the extent that the colour of the original rock is not recognisable, but shows little or no change of strength from fresh rock.
Slightly Weathered		SW		Rock is partially discoloured with staining or bleaching along joints but shows little or no change of strength from fresh rock.
Fresh		FR		Rock shows no sign of decomposition of individual minerals or colour changes.

NOTE 1: The term 'Distinctly Weathered' is used where it is not practicable to distinguish between 'Highly Weathered' and 'Moderately Weathered' rock. 'Distinctly Weathered' is defined as follows: *'Rock strength usually changed by weathering. The rock may be highly discoloured, usually by iron staining. Porosity may be increased by leaching, or may be decreased due to deposition of weathering products in pores'*. There is some change in rock strength.

Rock Material Strength Classification

Term	Abbreviation	Uniaxial Compressive Strength (MPa)	Guide to Strength	
			Point Load Strength Index $IS_{(50)}$ (MPa)	Field Assessment
Very Low Strength	VL	0.6 to 2	0.03 to 0.1	Material crumbles under firm blows with sharp end of pick; can be peeled with knife; too hard to cut a triaxial sample by hand. Pieces up to 30mm thick can be broken by finger pressure.
Low Strength	L	2 to 6	0.1 to 0.3	Easily scored with a knife; indentations 1mm to 3mm show in the specimen with firm blows of the pick point; has dull sound under hammer. A piece of core 150mm long by 50mm diameter may be broken by hand. Sharp edges of core may be friable and break during handling.
Medium Strength	M	6 to 20	0.3 to 1	Scored with a knife; a piece of core 150mm long by 50mm diameter can be broken by hand with difficulty.
High Strength	H	20 to 60	1 to 3	A piece of core 150mm long by 50mm diameter cannot be broken by hand but can be broken by a pick with a single firm blow; rock rings under hammer.
Very High Strength	VH	60 to 200	3 to 10	Hand specimen breaks with pick after more than one blow; rock rings under hammer.
Extremely High Strength	EH	> 200	> 10	Specimen requires many blows with geological pick to break through intact material; rock rings under hammer.



Appendix D: Example Waste Tracking Record

Offsite Disposal

[illegible]

¹ After NSW EPA Waste Classification Guidelines/ The excavated natural material order 2014 / Meets POEO VENM Definition / other

² If material was excavated and stockpiled post classification

³ Samples must include those collected specifically for waste classification purposes and samples collected from the source area for purposes other than waste classification

⁴ Keep Units Consistent

⁵ If volume on docket is different to volume on Waste Classification Letter

^o If one is available

7 If undertaken

[illegible]



Appendix E: Guidelines and Reference Documents



Contaminated Land Management Act 1997 (NSW)

Conveyancing Act (1919) (NSW).

Environmental Planning and Assessment Act 1979 (NSW)

Managing Land Contamination, Planning Guidelines SEPP55 – Remediation of Land (1998)

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