REPORT TO

SUTHERLAND SHIRE COUNCIL

C/- NBRS ARCHITECTURE

ON

PRELIMINARY ENVIRONMENTAL SITE ASSESSMENT

FOR

PROPOSED REFURBISHMENTS TO SUTHERLAND ENTERTAINMENT CENTRE AND PEACE PARK

AT

30 ETON STREET, SUTHERLAND, NSW

Date: 19 February 2020

Ref: E32889Brpt

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Executive Summary

NBRS Architecture, on behalf of Sutherland Shire Council ('the client'), commissioned JK Environments (JKE) to undertake a Preliminary Environmental Site Assessment (ESA) for the proposed Sutherland Entertainment Centre re-development at 30 Eton Street, Sutherland, NSW.

The ESA was confined to the Peace Park development area which has been referred to as 'the site' whilst the Sutherland Entertainment Centre (SEC) has been referred to as the 'wider site'. This report has been prepared to support the lodgement of a Development Application (DA) with Sutherland Shire Council.

JKE understand that the proposed development is currently at a conceptual stage and will generally include the re-development of the Peace Park located off Eton Street. Soil excavation is anticipated to be minimal, which is mainly associated with landscaping work. Based on the supplied architectural plan, alterations to the existing SEC building is understood to be minor and likely involves the reconstruction of the concrete forecourt area interconnecting Eton Street to the west.

The primary aims of the assessment were to identify any past or present potentially contaminating activities at the site, identify the potential for site contamination, and make a preliminary assessment of the soil and groundwater contamination conditions. The assessment objectives were to:

- Provide an appraisal of the past site use(s) based on a review of historical records;
- Assess the current site conditions and use(s) via a site walkover inspection;
- Identify potential contamination sources/areas of environmental concern (AEC) and contaminants of potential concern (CoPC);
- Assess the soil and groundwater contamination conditions via implementation of a preliminary sampling and analysis program;
- Prepare a conceptual site model (CSM);
- Assess the potential risks posed by contamination to the receptors identified in the CSM (Tier 1 assessment);
- Provide a preliminary waste classification for off-site disposal of soil;
- Assess whether the site is suitable or can be made suitable for the proposed development (from a contamination viewpoint); and
- Assess whether further intrusive investigation and/or remediation is required.

The scope of work included the following:

- Review of site information, including background and site history information from a Lotsearch Pty Ltd Environmental Risk and Planning Report;
- Preparation of a CSM;
- Design and implementation of a sampling, analysis and quality plan (SAQP) including soil sampling from eight boreholes and groundwater sampling from three monitoring wells installed at the site. Selected soil and groundwater samples were analysed for a range of CoPC outlined in the CSM;
- Interpretation of the analytical results against the adopted Site Assessment Criteria (SAC);
- Data Quality Assessment; and
- Preparation of a report including a Tier 1 risk assessment.

All soil contamination results were below the adopted SAC. The results indicate a low potential for significant, widespread occurrence of the CoPC identified in the CSM. It is acknowledged that the sampling for the ESA was preliminary in nature, and although there was no soil contamination found that was assessed to pose a risk to the receptors, there is a potential for unexpected finds. On this basis, JKE recommend preparing and implementing an Unexpected Finds Protocol (UFP) for the development. The UFP will outline the measures to be implemented in the event asbestos or any other potential contamination issues are detected during the development works.

Copper, nickel and zinc were detected in the groundwater samples above the ecological SAC. These metals are commonly detected in groundwater in urban environments due to runoff and leakages from water pipes and other infrastructure. These detections are considered to be consistent with background conditions and were similar across the site, therefore the copper, nickel and zinc in groundwater are not considered to pose a risk to the receptors.

Based on the findings of the preliminary ESA, the site is considered to be suitable for the proposed development from a contamination viewpoint. The following recommendations should be implemented in order to address the data gaps:

- Prepare and implement an UFP for the proposed development. A suitably qualified contaminated land consultant should be engaged for this work; and
- Undertake additional testing to confirm the waste classification of soil prior to off-site disposal.

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

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Attachments

Abbreviations

Asbestos Fines/Fibrous Asbestos	**AF/FA**
Ambient Background Concentrations	**ABC**
Added Contaminant Limits	**ACL**
Asbestos Containing Material	**ACM**
Australian Drinking Water Guidelines	**ADWG**
Area of Environmental Concern	**AEC**
Australian Height Datum	**AHD**
Acid Sulfate Soil	**ASS**
Above-Ground Storage Tank	**AST**
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**
Contaminated Land Management	**CLM**
Contaminant(s) of Potential Concern	**CoPC**
Chain of Custody	**COC**
Conceptual Site Model	**CSM**
Development Application	**DA**
Dial Before You Dig	**DBYD**
Data Quality Indicator	**DQI**
Data Quality Objective	**DQO**
Detailed Site Investigation	**DSI**
Ecological Investigation Level	**EIL**
Environmental Investigation Services	**EIS**
Ecological Screening Level	**ESL**
Environmental Management Plan	**EMP**
Excavated Natural Material	**ENM**
Environment Protection Authority	**EPA**
Environmental Site Assessment	**ESA**
Ecological Screening Level	**ESL**
Fibre Cement Fragment(s)	**FCF**
General Approval of Immobilisation	**GAI**
Groundwater Dependant Ecosystem	**GDE**
Health Investigation Level	**HILs**
Hardness Modified Trigger Values	**HMTV**
Health Screening Level	**HSL**
Health Screening Level-Site Specific Assessment	**HSL-SSA**
International Organisation of Standardisation	**ISO**
JK Environments	**JKE**
Lab Control Spike	**LCS**
Light Non-Aqueous Phase Liquid	**LNAPL**
Map Grid of Australia	**MGA**
National Association of Testing Authorities	**NATA**
National Environmental Protection Measure	**NEPM**
Not Limiting	**NL**
Organochlorine Pesticides	**OCP**
Organophosphate Pesticides	**OPP**
Polycyclic Aromatic Hydrocarbons	**PAH**
Potential ASS	**PASS**
Polychlorinated Biphenyls	**PCBs**
Per-and Polyfluoroalkyl Substances	**PFAS**
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**
Site Assessment Criteria	**SAC**
Sampling, Analysis and Quality Plan	**SAQP**
Site Audit Statement	**SAS**
Site Audit Report	**SAR**
Sutherland Entertainment Centre	**SEC**
Site Specific Assessment	**SSA**
Source, Pathway, Receptor	**SPR**
Specific Contamination Concentration	**SCC**
Standard Penetration Test	**SPT**
Standard Sampling Procedure	**SSP**
Standing Water Level	**SWL**
Trip Blank	**TB**
Toxicity Characteristic Leaching Procedure	**TCLP**
Total Recoverable Hydrocarbons	**TRH**
Trip Spike	**TS**
Upper Confidence Limit	**UCL**
Unexpected Finds Protocol	**UFP**
United States Environmental Protection Agency	**USEPA**
Underground Storage Tank	**UST**
Virgin Excavated Natural Material	**VENM**
Volatile Organic Compounds	**VOC**
World Health Organisation	**WHO**
Work Health and Safety	**WHS**

Units

Litres	**L**
Metres BGL	**mBGL**
Metres	**m**
Millivolts	**mV**
Millilitres	**ml or mL**
Milliequivalents	**meq**
micro Siemens per Centimetre	**µS/cm**
Micrograms per Litre	**µg/L**
Milligrams per Kilogram	**mg/kg**
Milligrams per Litre	**mg/L**
Parts Per Million	**ppm**
Percentage	**%**

1 INTRODUCTION

NBRS Architecture, acting on behalf of Sutherland Shire Council ('the client'), commissioned JK Environments (JKE) to undertake a Preliminary Environmental Site Assessment (ESA) for the proposed Sutherland Entertainment Centre re-development at 30 Eton Street, Sutherland, NSW. The site location is shown on Figure 1 and the assessment was confined to the proposed development area as shown on Figure 2.

The ESA was confined to the Peace Park development area which has been referred to as 'the site' whilst the Sutherland Entertainment Centre (SEC) has been referred to as the 'wider site'.

This report has been prepared to support the lodgement of a Development Application (DA) with Sutherland Shire Council.

Environmental Investigation Services (EIS) re-branded to JK Environments in mid-2019 and will continue to function as the environmental division of JK Group alongside JK Geotechnics and JK Drilling.

1.1 Proposed Development Details

JKE understand that the proposed development is currently at a conceptual stage and will generally include the re-development of the Peace Park located off Eton Street. Soil excavation is anticipated to be minimal, which is mainly associated with landscaping work.

Based on the supplied architectural plan, alterations to the existing SEC building is understood to be minor and likely involves the reconstruction of the concrete forecourt area interconnecting Eton Street to the west. Selected developments plans issued to JKE are attached in the appendices.

1.2 Aims and Objectives

The primary aims of the assessment were to identify any past or present potentially contaminating activities at the site, identify the potential for site contamination, and make a preliminary assessment of the soil and groundwater contamination conditions. The assessment objectives were to:

- Provide an appraisal of the past site use(s) based on a review of historical records;
- Assess the current site conditions and use(s) via a site walkover inspection;
- Identify potential contamination sources/areas of environmental concern (AEC) and contaminants of potential concern (CoPC);
- Assess the soil and groundwater contamination conditions via implementation of a preliminary sampling and analysis program (SAQP);
- Prepare a conceptual site model (CSM);
- Assess the potential risks posed by contamination to the receptors identified in the CSM (Tier 1 assessment);
- Provide a preliminary waste classification for off-site disposal of soil;
- Assess whether the site is suitable or can be made suitable for the proposed development (from a contamination viewpoint); and
- Assess whether further intrusive investigation and/or remediation is required.

1.3 Scope of Work

The assessment was undertaken generally in accordance with a JKE proposal (Ref: EP50624B2) of 26 November 2019 and written acceptance from the client of 6 December 2019. The scope of work included the following:

- Review of site information, including background and site history information from a Lotsearch Pty Ltd *Environmental Risk and Planning Report*;
- Preparation of a CSM;
- Design and implementation of a SAQP;
- Interpretation of the analytical results against the adopted Site Assessment Criteria (SAC);
- Data Quality Assessment; and
- Preparation of a report including a Tier 1 risk assessment.

The scope of work was undertaken with reference to the National Environmental Protection (Assessment of Site Contamination) Measure 1999 as amended (2013)[1], other guidelines made under or with regards to the Contaminated Land Management Act (1997)[2] and State Environmental Planning Policy No.55 – Remediation of Land (1998)[3]. A list of reference documents/guidelines is included in the appendices.

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

[2] Contaminated Land Management Act 1997 (NSW) (referred to as CLM Act 1997)

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

2 SITE INFORMATION

2.1 Site Identification

Table 2-1: Site Identification

Current Site Owner:	Sutherland Shire Council
Site Address:	30 Eton Street, Sutherland, NSW
Lot & Deposited Plan:	Lot 7 Section 46 DP802 and part of Lot 1 in DP1253156
Current Land Use:	Public park
Proposed Land Use:	Continue use as public park
Local Government Authority:	Sutherland Shire Council
Current Zoning:	B3 – Commercial core RE1 – Public Recreation
Site Area (m^2):	Approximately 3,000 (wider site including the SEC is approximately 5,500m^2)
RL (AHD in m) (approx.):	106 - 108
Geographical Location (decimal degrees) (approx.):	Latitude: -34.031053 Longitude: 151.059479
Site Location Plan:	Figure 1
Sample Location Plan:	Figure 2

2.2 Site Location and Regional Setting

The site is located in a predominantly commercial/retail area of Sutherland. The site is bounded by Eton Street and Merton Street to the west and east respectively. An asphaltic paved carpark associated with the Sutherland Council Chamber building bounds the site to the north and commercial buildings, including Centrelink and a church bounds the site to the south. Sutherland Station is located approximately 150m to the south-west of the site.

2.3 Topography

The regional topography is gently undulating and generally falls towards the north. The site itself is located approximately on the peak of the north facing hill and generally falls towards the north-east at approximately 1-2°. The site appeared to have been terraced towards the north, consisting a series of levelled lawn areas and water feature ponds.

2.4 Site Inspection

A walkover inspection of the site was undertaken by JKE on 23 January 2020. The inspection was limited to accessible areas of the site and immediate surrounds. An internal inspection of SEC buildings was not undertaken. Selected site photographs obtained during the inspection are attached in the appendices.

A summary of the inspection findings is outlined in the following subsections:

2.4.1 Current Site Use and/or Indicators of Former Site Use

At the time of inspection, the site was used as a public park (Peace Park) consisting of a pedestrian link which provided pedestrian access to the SEC building from Eton Street and Merton Street located to the west and east of the site respectively.

No indicators of former site use were observed during the inspection, however, a discussion between JKE and Sutherland Council personnel indicated that the northern part of the site (current Peace Park and War Memorial) was formerly occupied by the Sutherland Council Chamber building until the mid-1990's.

2.4.2 Buildings, Structures and Roads

The wider site was occupied by a large three-storey theatre building of the SEC comprising of brick and concrete construction. Areas of landscaping, including water features, grass lawns and planted trees were observed within Peace Park. Areas of concrete pavement were observed located laterally, west to east across the site to provide pedestrian access across Peace Park. A concrete paved forecourt area, consisting of a flight of stairs was located within the street frontage side of the SEC building interconnecting Eton Street to the west. The building and paved areas generally appeared in good condition based on a cursory examination.

2.4.3 Boundary Conditions, Soil Stability and Erosion

The site was generally unfenced. Northern and southern site boundaries were defined by adjacent buildings and the western (fronting Eton Street) and eastern boundaries (fronting Merton Street) were generally open to allow pedestrian access across Peace Park. Soil instability and erosion were not observed due to extensive pavement and well-maintained grassed areas across majority of the site.

2.4.4 Visible or Olfactory Indicators of Contamination

An electricity transformer and sub-station kiosk was observed to the east of the entertainment centre building located along the eastern site boundary. Other indicators of site contamination (i.e. asbestos containing material in/on soil, stained or odorous soils or tanks) were not observed during the inspection. It is noted that the majority of the site was concrete paved or grass covered and soils could not be visually inspected.

2.4.5 Presence of Drums/Chemicals, Waste and Fill Material

The site appeared to have been levelled to account for the current surface levels within the grassed areas of the park. Terraced lawns and water feature ponds were retained by a series of concrete retaining walls

approximately 0.2m to 0.5m tall. Fill material is likely to be present within these terraces and beneath the existing water feature ponds.

2.4.6 Drainage and Services

Surface water is expected to enter the stormwater drains located onsite. Excess surface water is expected to flow across the site towards the north, and/or infiltrate permeable parts of the site such as lawn areas.

2.4.7 Sensitive Environments

Sensitive environments such as wetlands, natural ponds, creeks or extensive areas of natural vegetation were not identified on site or in the immediate surrounds.

2.4.8 Landscaped Areas and Visible Signs of Plant Stress

Extensive areas of landscaping, including exotic grass lawns, exotic tree species and hedges were observed throughout Peace Park. The onsite vegetation appeared in good condition and dieback or signs of phyto-toxic stress were not observed.

2.5 Surrounding Land Use

During the site inspection, JKE observed the following land uses in the immediate surrounds:

- North – Sutherland Shire Council Chamber building and associated asphaltic paved carpark;
- South – The SEC then commercial establishments including Centrelink and a church;
- East – Merton Street and Japanese garden with large asphalt paved carpark and a public park further to the east; and
- West – Eton Street and small retail shops (Eton Arcade) including cafes, restaurants and message therapist further to the west.

JKE did not observe any land uses in the immediate surrounds that were identified as potential off-site contamination sources.

2.6 Underground Services

The 'Dial Before You Dig' (DBYD) plans were reviewed for the assessment in order to establish whether any major underground services exist at the site or in the immediate vicinity that could act as a preferential pathway for contamination migration. The search indicated the following:

- Telstra cables extent onto the central section of the site from Eton Street located to the west; and
- An electrical easement was located in the central section of the site which ran from east to west. The easement joined the substation kiosk located on the east boundary.

The backfill along the above services could act as preferential pathways for contamination migration. Copies of relevant plans are attached in the appendices.

2.7 Interview with Site Personnel

Preliminary discussions with Sutherland Shire Council representative on 14 January 2020 indicated that the former Council Chamber was historically located at the site, within the current Peace Park. This building had been demolished in the mid-1990 and Peace Park was established at the site.

2.8 Local Meteorology

Key meteorological data for Lucas Heights (Australia's Nuclear Science and Technology Organisation) Observatory weather station available on the Bureau of Meteorology (BOM)[4] website has been reviewed and JKE note the following:

- The highest mean rainfall occurred in March, with a total of 119.6mm;
- The lowest mean rainfall occurred in September, with a total of 51.4mm; and
- In the two weeks leading up to the JKE site inspection, Sydney experienced a relatively dry period with low average rainfall recorded in December 2019.

2.9 Section 10.7 Planning Certificate

The section 10.7 (2 and 5) planning certificates were reviewed for the assessment. Copies of the certificates are attached in the appendices. A summary of the relevant information is outlined below:

- The land is not deemed to be: significantly contaminated; subject to a management order; subject of an approved voluntary management proposal; or subject to an on-going management order under the provisions of the CLM Act 1997 (the Act);
- The land is not the subject of a Site Audit Statement within the meaning of the Act (SAS);
- The land is not located within an acid sulfate soil (ASS) risk area; and
- The land is not located in a heritage conservation area nor does the site contain items of environmental heritage.

[4]http://www.bom.gov.au/climate/averages/tables/cw_066078_All.shtml visited on 31 January 2020

3 GEOLOGY AND HYDROGEOLOGY

3.1 Regional Geology

Regional geological information presented in the Lotsearch report (attached in the appendices) indicated that the site is underlain by Hawkesbury Sandstone, which typically consists of medium to coarse grained quartz sandstone with minor shale and laminite lenses.

3.2 Acid Sulfate Soil (ASS) Risk and Planning

The site is not located in an ASS risk area according to the risk maps prepared by the Department of Land and Water Conservation and is not located in a Class 1, 2, 3, 4 or 5 risk area according to the Sutherland Shire Council Environmental Plan (2015).

3.3 Hydrogeology

Hydrogeological information presented in the Lotsearch report indicated that the regional aquifer on-site and in the areas immediately surrounding the site includes porous, extensive aquifers of low to moderate productivity. There were a total of 60 registered bores within the report buffer of 2,000m. In summary:

- The nearest registered bore was located approximately 89m to the west of the site. This was utilised for waste disposal purposes;
- The majority of the bores were registered for monitoring purposes;
- There were no nearby bores (i.e. within 500m) registered for domestic or irrigation uses. The remaining bores were over 500m from the site and were generally listed as monitoring bores or as domestic bores; and
- The drillers log information from the closest registered bores typically identified fill and/or clay soil to depths of up to 5.18m below ground level (BGL), underlain by sandstone bedrock. Standing water levels (SWLs) in the bores ranged from approximately 0.3mBGL to 7.5mBGL.

Based on this information, there were no registered users of groundwater for beneficial purposes (like drinking water or irrigation) in close proximity to the site.

The information reviewed for this assessment indicated that the subsurface conditions at the site are likely to consist of relatively low permeability (residual) soils overlying shallow bedrock. The potential for viable groundwater abstraction and use of shallow 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.

3.4 Receiving Water Bodies

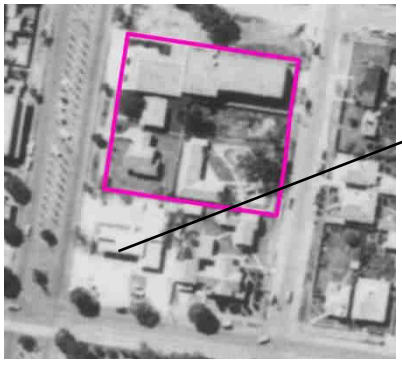
The nearest surface waterbody was Woronora River located over 1,000m to the north west of the site. Considering the distance from the site, this waterbody is not considered to be a potential receptor.

4 SITE HISTORY INFORMATION

4.1 Review of Historical Aerial Photographs

Historical aerial photographs were included in the Lotsearch report. JKE has reviewed the photographs and summarised relevant information in the following table:

Table 4-1: Summary of Historical Aerial Photographs

Year	Details
1943	The aerial photograph was of relatively poor quality. The site appeared mostly vacant and grassed towards the southern portion, with a small residential type building that occupied the north-western corner of the site. A retaining wall/fence line was visible to the south of the residential building which ran from Eton to Merton Street. The central and south sections of the site appeared to be vacant and grassed. Several walking tracks were visible on the grassed areas located centrally at the site. A row of trees was located along the east site boundary, fronting Merton Street. The site was generally open along the west boundary which fronted Eton Street (this area to the south of the residence was probably used as a park or was vacant land). The surrounds generally included low density residential land use with some commercial/retail buildings further to the west of the site, across Eton Street.
1956	Two additional square shaped buildings (possibly for commercial use) were visible on the western section of the site. Minor alterations appeared to have been undertaken to the residential building located at the north-west section of the site. The surrounds generally appeared similar to the previous photograph.
1961	The small residential building located at the north-west corner of the site had been demolished. A large rectangular shaped commercial type building had been constructed within the northern portion of the site. Two adjoining structures occupied the western parts of the site. An 'L' shaped building and associated forecourt were visible to the south/south-east of the site. The remainder of the surrounds generally appeared similar to the previous photograph, with the exception of the demolition of several buildings located to the north of the site.
1965	The site generally appeared similar to the previous photograph. Former residential type buildings located immediately to the north of the site had been demolished. A large rectangular commercial building had been constructed to the north of the site. Paved areas associated with the commercial building was visible to the north of the site. A former residential building to the south of the site (at the corner of Eton and Flora Streets) had been demolished and a service station/motor garage occupied this area. The service station/motor garage appeared to have been in operation at this time based on the parked vehicles visible at the property shown on the image below. 

Year	Details
1970	The site generally appeared similar to the previous photograph. A former building complex located to the north of the site, at the junction of Eton Street and the Old Princes Highway had been demolished. This area was occupied by a grassed reserve.
1984	Two structures in the south-western section of the site had been demolished and this area appeared largely paved. The land immediately to the south/south-east of the site had been redeveloped and two square buildings occupied this area. The buildings appeared generally similar in footprint to the existing (2020) SEC buildings. A general increase in commercial/retail land use had occurred to the east of the site, including a large asphaltic paved carpark and commercial type buildings located to the north-east of the site.
1994	The north section of the site had been redeveloped, with the rectangular shaped building demolished and a park generally similar to the existing (2020) Peace Park occupied this area. The surrounds generally appeared similar to the previous photograph.
2000	The site and surrounding features appeared generally similar to the previous photograph. The service station located to the south of the site (at the corner of Eton and Flora Streets) had been demolished and a large square shaped commercial building occupied the area. The building was generally similar in footprint to the existing Centrelink and Medicare building observed to the south of the site.
2007	The site and immediate surroundings generally appeared similar to the previous photograph.
2014	The site and surrounding features appeared generally similar to the previous photograph, with the exception of further commercial buildings located to the north-east of the site.
2018	The site and surrounding features appeared generally similar to the previous photograph.
2019	The site and surrounding features appeared generally similar to the previous photograph and present (2020) layout.

4.2 Review of Council Records

Council records were sourced under a formal access to information request and were reviewed for the ESA. The council records indicated that the site was used by the Sutherland Shire Council as the SEC since at least circa 1973 (commencement of the DA for the theatre building). Several building and development applications were sighted pertaining to extensions to an existing cool room in November 1978. Ancillary development consisted of the installation of a microwave radio link antenna by the University of Wollongong in June 2004 and installation of an illuminated advertising sign in April 2008. The records also indicated that the site had been leased to various companies which included use of the theatre building as a Red Cross blood donation centre and for museum exhibition.

The records did not indicate any incidences pertaining to major fires at the site or the use of firefighting foam (a potential source of per and poly-fluoroalkyl substances – PFAS) at the site. There were no reports or inspections in relation to land contamination at the site.

4.3 SafeWork NSW Records

A review of SafeWork NSW records for the site is currently underway. The results will be summarised in a separate letter when received.

4.4 NSW EPA Records

The Lotsearch report included information from the NSW EPA databases for the following:

- Records maintained in relation to contaminated land under Section 58 of the CLM Act 1997;
- Records of sites notified in accordance with the Guidelines on the Duty to Report Contamination under Section 60 of the CLM Act 1997 (2015)[5]; and
- Licensed activities under the Protection of the Environment Operations Act (1997)[6].

The search included the site area and surrounding areas in the report buffer of 1,000m. The search indicated the following:

- There are no records for the site under Section 58 of the CLM Act 1997. The records indicate three current and three former notices for the United Service Station and Sutherland Reservoir located approximately 174m to the north west of the site. Considering the regional topography, these properties are located downgradient (i.e. down-slope) from the site and hence not considered a potential off-site contamination source;
- The site has not been notified with regards to the Guidelines on the Duty to Report Contamination under Section 60 of the CLM Act 1997. The records indicate notification of two service station properties located approximately 112m and 174m to the north and north-west of the site. Considering the regional topography, these properties are located downgradient from the site and hence not considered a potential off-site contamination source; and
- There were no records for licenced activities at the site under the POEO Act 1997. A current license exists for Sydney Trains in the rail corridor to the south and west of the site, and various former licenses exist for the application of herbicides in waterways located over 800m from the site.

The off-site properties identified in the records noted above are considered unlikely to pose a contamination risk to the site from an off-site contamination migration perspective as the notified service stations are located down-gradient of the site (to the north).

4.5 Historical Business Directory and Additional Lotsearch Information

Historical business records for the site and surrounding areas in the report buffer were included in the Lotsearch report (attached in the appendices). The records indicated the following:

- There were no current or historical business activities onsite. The businesses in the surrounds typically included commercial or retail type activities;

[5] NSW EPA, (2015). *Guidelines on the Duty to Report Contamination under Section 60 of the CLM Act 1997.* (referred to as Duty to Report Contamination)

[6] Protection of the Environment Operations Act 1997 (NSW) (referred to as POEO Act 1997)

- There were seven motor mechanics registered within the report buffer between the 1950s and 1990s. The closest of which was located on President Avenue, approximately cross-gradient and 220m to the south-west of the site. Other motor garages were located down-gradient of the site; and
- There were three dry cleaner businesses registered within the report buffer between the 1950s and 1980s, the closest of which was for a property located on Eton Street, approximately cross-gradient and 35m to the west of the site. The other dry cleaner businesses were located on Princes Highway and Boyle Street, approximately cross-gradient and 125m and 190m to the south-west of the site.

JKE are of the opinion that the historical businesses in the report buffer have a low potential to represent potential off-site sources of site contamination considering the age of operation (30 years +), distance from the site and the fact that they were all located down or cross-gradient.

In addition to the above, JKE have reviewed additional information contained within the Lotsearch report and note the following:

- There were no local or state heritage items at the site or in the immediate surrounds;
- There were no significant ecological constraints at the site or in the immediate surrounds;
- There were no mapped groundwater dependent ecosystems (GDE) within 500m and down-gradient of the site; and
- There were no listed properties in the Lotsearch report buffer (2,000m) that were listed in the NSW EPA PFAS Investigation Program.

4.6 Summary of Site History Information

A time line summary of the historical land uses and activities is presented in the table below. The information presented in the table is based on a weight of evidence assessment of the site history documentation and observations made by JKE.

Table 4-2: Summary of Historical Land Uses

Year(s)	Potential Land Use / Activities
Pre-1940s	Residential land use with some vacant grassed areas.
Mid-1950s	Demolition of a residential-type building occurred in the north-western part of the site. Re-development of the site occurred for commercial land use.
Circa 1960-1970	Demolition occurred in the south-western section of the site sometime between 1970 and 1984. Further commercial development of the site. Possibly use as the former Council chamber.
1980s-present	Demolition occurred at the northern part of the site and the current Peace Park was established post-1990s. The land to the south/south-east of the site was used as the SEC.

JKE note that the former service station located at No. 36 Eton Street (at the corner of Eton and Flora Streets), to the south of the site appeared to have been in operation between 1965 and 2000. However, this premises was listed as an electrical contractor and electrician business within the 1950s business directory presented in the Lotsearch report.

4.7 Integrity of Site History Information

The majority of the site history information was obtained from government organisations as outlined in the relevant sections of this report. The veracity of the information from these sources is considered to be relatively high. A certain degree of information loss can be expected given the lack of specific land use details over time. JKE have relied upon the Lotsearch report and have not independently verified any information contained within. However, it is noted that the Lotsearch report is generated based on databases maintained by various government agencies and is expected to be reliable.

5 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 site information (including the site inspection information) and the review of site history information. Reference should also be made to the figures attached in the appendices.

A review of the CSM in relation to source, pathway and receptor (SPR) linkages has been undertaken as part of the Tier 1 risk assessment process, as outlined in Section 10.

5.1 Potential Contamination Sources/AEC and CoPC

The potential contamination sources/AEC and CoPC are presented in the following table:

Table 5-1: Potential (and/or known) Contamination Sources/AEC and Contaminants of Potential Concern

Source / AEC	CoPC
Fill material – The site levels, especially towards the central part of the site appeared to have been historically filled to achieve the current terrace levels. The fill may have been imported from various sources and could be contaminated. The boreholes drilled for the ESA encountered fill ranging in depth from approximately 0.3mBGL to 2.1mBGL.	Heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc), petroleum hydrocarbons (referred to as total recoverable hydrocarbons – TRHs), benzene, toluene, ethylbenzene and xylene (BTEX), polycyclic aromatic hydrocarbons (PAHs), organochlorine pesticides (OCPs), organophosphate pesticides (OPPs), polychlorinated biphenyls (PCBs) and asbestos.
Use of pesticides – Pesticides may have been used around the site.	Heavy metals and OCPs
Hazardous Building Material – Hazardous building materials may be present as a result of former building and demolition activities. These materials may also be present in the fill on site. Based on the aerial photographs, the site appeared to have been developed in stages commencing from the 1950s. During this time, several buildings including a large rectangular shaped commercial type building had been demolished in the northern part of the site before 1994.	Asbestos, lead and PCBs
Off-site area 1 – Former service station at 36 Eton Street (at the corner of Eton and Flora Streets) observed in the historical aerial photograph. The use and storage of fuel could have resulted in potential leaks impacting the groundwater.	Heavy metals (lead), TRH, BTEX, naphthalene and volatile organic compounds (VOCs)

5.2 Mechanism for Contamination, Affected Media, Receptors and Exposure Pathways

The mechanisms for contamination, affected media, receptors and exposure pathways relevant to the potential contamination sources/AEC are outlined in the following CSM table:

Table 5-2: CSM

Potential mechanism for contamination	The potential mechanisms for contamination are most likely to include 'top-down' impacts and spills. There is a potential for sub-surface releases to have occurred if deep fill (or other buried infrastructure) is present, although this is considered to be the least likely mechanism for contamination. The mechanisms for contamination from off-site sources would be via the migration of contaminated groundwater.
Affected media	Soil and groundwater have been identified as potentially affected media.
Receptor identification	Human receptors include current and future site occupants/users (including adults and children), construction workers and intrusive maintenance workers. Off-site human receptors include adjacent land users (primarily in a commercial/retail setting). Ecological receptors include terrestrial organisms and plants within unpaved areas.
Potential exposure pathways	Potential exposure pathways relevant to the human receptors include ingestion, dermal absorption and inhalation of dust (all contaminants) and vapours (volatile TRH, naphthalene, BTEX and VOCs). The potential for exposure would typically be associated with the construction and excavation works, and the on-going use of the site. Potential exposure pathways for ecological receptors include primary contact, ingestion and uptake by plants. Exposure during future site use could occur via direct contact with soil in unpaved areas such as gardens, inhalation of airborne asbestos fibres during soil disturbance, or inhalation of vapours within enclosed or semi-enclosed spaces such as trenches/buildings. Exposure to groundwater is unlikely to occur in the Woronora River through direct migration.
Potential exposure mechanisms	The following have been identified as potential exposure mechanisms for site contamination: • Vapour intrusion into service trenches (either from soil contamination or volatilisation of contaminants from groundwater); • Contact (dermal, ingestion or inhalation) with exposed soils in landscaped areas and/or unpaved areas. This will be mainly associated with on-going use of the Peace Park; • Migration of contaminated groundwater onto the site from up-gradient areas. This could result in exposure through volatilisation of contaminants; and • Migration of groundwater off-site.
Presence of preferential pathways for contaminant movement	An electrical easement runs through the site (see attached DBYD plans). The backfill around this service could act as a potential preferential pathway for contaminant migration. This could occur via groundwater/seepage, or via soil/vapour migration through the backfill.

6 SAMPLING, ANALYSIS AND QUALITY PLAN

6.1 Data Quality Objectives (DQO)

Data Quality Objectives (DQOs) were developed to define the type and quality of data required to achieve the project objectives outlined in Section 1.2. The DQOs were prepared with reference to the process outlined in Schedule B2 of NEPM (2013) and the Guidelines for the NSW Site Auditor Scheme, 3rd Edition (2017)[7]. The seven-step DQO approach for this project is outlined in the following sub-sections.

The DQO process is validated in part by the Data Quality Assurance/Quality Control (QA/QC) Evaluation. The Data (QA/QC) Evaluation is summarised in Section 8.1 and the detailed evaluation is provided in the appendices.

6.1.1 Step 1 - State the Problem

The CSM identified potential sources of contamination/AEC at the site that may pose a risk to human health and the environment. Investigation data is required to assess the contamination status of the site, assess the risks posed by the contaminants in the context of the proposed development/intended land use, and assess whether remediation is required. This information will be considered by the consent authority in exercising its planning functions in relation to the development proposal.

A waste classification is required prior to off-site disposal of excavated soil/bedrock.

The DQOs were developed by the author of this report and checked by the reviewer. Both the author and reviewer were joint decision-makers in relation to Step 2 of the DQO process.

6.1.2 Step 2 - Identify the Decisions of the Study

The objectives of the assessment are outlined in Section 1.2. The decisions to be made reflect these objectives and are as follows:

- Did the site inspection, or does the historical information identify potential contamination sources/AEC at the site?
- Are any results above the SAC?
- Do potential risks associated with contamination exist, and if so, what are they?
- Is remediation required?
- Is the site characterisation sufficient to provide adequate confidence in the above decisions?
- Is the site suitable for the proposed development, or can the site be made suitable subject to further characterisation and/or remediation?

6.1.3 Step 3 - Identify Information Inputs

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

- Site information, including site observations and site history documentation;
- Sampling of potentially affected media, including soil and groundwater;

[7] NSW EPA (2017). *Guidelines for the NSW Site Auditor Scheme, 3rd ed.* (referred to as Site Auditor Guidelines 2017)

- Observations of sub-surface variables such as soil type, photo-ionisation detector (PID) concentrations, odours and staining, and groundwater physiochemical parameters;
- Laboratory analysis of soils and groundwater for the CoPC identified in the CSM; and
- Field and laboratory QA/QC data.

6.1.4 Step 4 - Define the Study Boundary

The sampling was confined to the site boundaries as shown in Figure 2 and was limited vertically to a depth of approximately 6mBGL (spatial boundary). The sampling was completed between 22 and 28 January 2020 (temporal boundary). The assessment of potential risk to adjacent land users has been made based on data collected within the site boundary.

Sampling was not undertaken within sensitive areas of the site as advised by the client due to access constraints.

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

6.1.5.1 Tier 1 Screening Criteria

The laboratory data will be assessed against relevant Tier 1 screening criteria (referred to as SAC), as outlined in Section 7. Exceedances of the SAC do not necessarily indicate a requirement for remediation or a risk to human health and/or the environment. Exceedances are considered in the context of the CSM and valid SPR-linkages.

For this assessment, the individual results have been assessed as either above or below the SAC. Statistical evaluation of the dataset via calculation of mean values and/or 95% upper confidence limit (UCL) values has not been undertaken due to the spatial distribution of the data and the number of samples submitted for analysis.

6.1.5.2 Field and Laboratory QA/QC

Field QA/QC included analysis of inter-laboratory duplicates, intra-laboratory duplicates, trip spike and trip blank samples. Further details regarding the sampling and analysis undertaken, and the acceptable limits adopted, is provided in the Data Quality (QA/QC) Evaluation in the appendices.

The suitability of the laboratory data is assessed against the laboratory QA/QC criteria which is outlined in the attached laboratory reports. These criteria were developed and implemented in accordance with the laboratory's National Association of Testing Authorities, Australia (NATA) accreditation and align with the acceptable limits for QA/QC samples as outlined in NEPM (2013) and other relevant guidelines.

In the event that acceptable limits are not met by the laboratory analysis, other lines of evidence are reviewed (e.g. field observations of samples, preservation, handling etc) and, where required, consultation with the laboratory is undertaken in an effort to establish the cause of the non-conformance. Where uncertainty exists, JKE typically adopt the most conservative concentration reported (or in some cases, consider the data from the affected sample as an estimate).

6.1.5.3 Appropriateness of Practical Quantitation Limits (PQLs)

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

6.1.6 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 undertaken with reference to Schedule B(3) of NEPM (2013) using the data quality assurance information collected.

Decision errors can be controlled through the use of hypothesis testing. The test can be used to show either that the baseline condition is false or that there is insufficient evidence to indicate that the baseline condition is false. The null hypothesis is an assumption that is assumed to be true in the absence of contrary evidence. For this assessment, the null hypothesis has been adopted which is that, there is considered to be a complete SPR linkage for the CoPC identified in the CSM unless this linkage can be proven not to (or unlikely to) exist. The null hypothesis has been adopted for this assessment.

6.1.7 Step 7 - Optimise the Design for Obtaining Data

The most resource-effective design will be used in an optimum manner to achieve the assessment objectives. Adjustment of the assessment design can occur following consultation or feedback from project stakeholders. For this investigation, the design was optimised via consideration of the various lines of evidence used to select the sample locations, the media being sampled, and also by the way in which the data were collected.

The sampling plan and methodology are outlined in the following sub-sections.

6.2 Soil Sampling Plan and Methodology

The soil sampling plan and methodology adopted for this assessment is outlined in the table below:

Table 6-1: Soil Sampling Plan and Methodology

Aspect	Input
Sampling Density	Samples were collected from eight locations as shown on the attached Figure 2. Based on the site area (3,000m^2), this number of locations corresponded to a sampling density of approximately one sample per 375m^2. The sampling density was marginally below the minimum sampling density of nine locations outlined in the NSW EPA Contaminated Sites Sampling Design Guidelines (1995)[8]. However, a grid-based sampling plan could not be adopted due to site access constrains encountered during the investigation.
Sampling Plan	The sampling locations were placed on a judgemental sampling plan and were broadly positioned for site coverage. This sampling plan was considered suitable to make a preliminary assessment of potential risks associated with the AEC and CoPC identified in the CSM, and assess whether further investigation is warranted.

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

Aspect	Input
Set-out and Sampling Equipment	Sampling locations were set out using a tape measure. In-situ sampling locations were checked for underground services by an external contractor prior to sampling. Samples were collected using a drill rig equipped with spiral flight augers. Soil samples were obtained from a Standard Penetration Test (SPT) split-spoon sampler, or directly from the auger when conditions did not allow use of the SPT sampler.
Sample Collection and Field QA/QC	Soil samples were obtained on 22 January 2020 in accordance with the standard sampling procedure (SSP) attached in the appendices. Soil samples were collected from the fill and natural profiles based on field observations. The sample depths are shown on the logs attached in the appendices. Samples were placed in glass jars with plastic caps and Teflon seals with minimal headspace. Samples for asbestos analysis were placed in zip-lock plastic bags. During sampling, soil at selected depths was split into primary and duplicate samples for field QA/QC analysis.
Field Screening	A portable Photoionisation Detector (PID) fitted with a 10.6mV lamp was used to screen the samples for the presence of volatile organic compounds (VOCs). PID screening for VOCs was undertaken on soil samples using the soil sample headspace method. VOC data was obtained from partly filled zip-lock plastic bags following equilibration of the headspace gases. PID calibration records are maintained on file by JKE. Fill/spoil at the sampling locations was visually inspected during the works for the presence of fibre cement fragments.
Decontami-nation and Sample Preservation	Sampling personnel used disposable nitrile gloves during sampling activities. Re-usable sampling equipment was decontaminated as outlined in the SSP. Soil samples were preserved by immediate storage in an insulated sample container with ice in accordance with the SSP. On completion of the fieldwork, the samples were stored temporarily in fridges in the JKE warehouse before being delivered in the insulated sample container to a NATA registered laboratory for analysis under standard chain of custody (COC) procedures.

6.3 Groundwater Sampling Plan and Methodology

The groundwater sampling plan and methodology is outlined in the table below:

Table 6-2: Groundwater Sampling Plan and Methodology

Aspect	Input
Sampling Plan	Groundwater monitoring wells were installed in BH1 (MW1), BH3 (MW3) and BH5 (MW5) shown on Figure 2. The rationale for the well locations was as follows: • MW1 – located in the vicinity and up-gradient boundary to assess groundwater conditions flowing onto the site from the former service station located at 36 Eton Street; • MW3 – provides spatial coverage and an inter-mediate gradient of the site; and • MW5 – provides spatial coverage and to assess groundwater conditions flowing beneath the site and beyond the northern site boundary.
Monitoring Well Installation Procedure	The monitoring well construction details are documented on the appropriate borehole logs attached in the appendices. The monitoring wells were installed to depths of approximately 6mBGL. The wells were generally constructed as follows: • 50mm diameter Class 18 PVC (machine slotted screen) was installed in the lower section of the well to intersect groundwater;

Aspect	Input
	• 50mm diameter Class 18 PVC casing was installed in the upper section of the well (screw fixed); • A 2mm sand filter pack was used around the screen section for groundwater infiltration; • A hydrated bentonite seal/plug was used on top of the sand pack to seal the well; and • A gatic cover was installed at the surface with a concrete plug to limit the inflow of surface water.
Monitoring Well Development	The monitoring wells were developed on 23 January 2020 using a submersible electrical pump in accordance with the SSP. Due to the hydrogeological conditions, groundwater inflow into the wells was relatively low, therefore the wells were pumped until they were effectively dry and steady-state conditions were not achieved. The field monitoring records and calibration data are attached in the appendices.
Groundwater Sampling	The monitoring wells were allowed to recharge for approximately five days after development. Groundwater samples were obtained on 28 January 2020. Prior to sampling, the monitoring wells were checked for the presence of Light Non-Aqueous Phase Liquids (LNAPL) using an inter-phase probe electronic dip meter. The monitoring well head space was checked for VOCs using a calibrated PID unit. The samples were obtained using a peristaltic pump. During sampling, the following parameters were monitored using calibrated field instruments (see SSP): • Standing water level (SWL) using an electronic dip meter; and • pH, temperature, electrical conductivity (EC), dissolved oxygen (DO) and redox potential (Eh) using a YSI Multi-probe water quality meter. Steady state conditions could not be achieved due to very slow recharge conditions. Groundwater samples were obtained directly from the single use PVC tubing and placed in the sample containers. Duplicate samples were obtained by alternate filling of sample containers. This technique was adopted to minimise disturbance of the samples and loss of volatile contaminants associated with mixing of liquids in secondary containers, etc. Groundwater removed from the wells during development and sampling was transported to JKE in jerry cans and stored in holding drums prior to collection by a licensed waste water contractor for off-site disposal. The field monitoring record and calibration data are attached in the appendices.
Decontaminant and Sample Preservation	The decontamination procedure adopted during sampling is outlined in the SSP attached in the appendices. During development, the pump was flushed between monitoring wells with potable water (single-use tubing was used for each well). The pump tubing was discarded after each sampling event and replaced therefore no decontamination procedure was considered necessary. The samples were preserved with reference to the analytical requirements and placed in an insulated container with ice in accordance with the SSP. On completion of the fieldwork, the samples were delivered in the insulated sample container to a NATA registered laboratory for analysis under standard COC procedures.

6.4 Analytical Schedule

The analytical schedule (for primary samples) is outlined in the following table:

Table 6-3: Analytical Schedule (Primary Samples)

Analyte/CoPC	Fill Samples	Natural Soil Samples	Fibre Cement Material Samples	Groundwater Samples
Heavy Metals	12	-	-	3
TRH/BTEX	12	-	-	3
VOCs	-	-	-	3
PAHs	12	-	-	3
OCPs/OPPs	8	-	-	-
PCBs	8	-	-	3
Asbestos	12	-	-	-
pH/CEC/Clay Content (%)	2	-	-	-
pH/EC	-	-	-	3

6.4.1 Laboratory Analysis

Samples were analysed by an appropriate, NATA Accredited laboratory using the analytical methods detailed in Schedule B(3) of NEPM 2013. Reference should be made to the laboratory reports attached in the appendices for further details.

Table 6-4: Laboratory Details

Samples	Laboratory	Report Reference
All primary samples and field QA/QC samples including (intra-laboratory duplicates, trip blanks, trip spikes and field rinsate samples)	Envirolab Services Pty Ltd NSW, NATA Accreditation Number – 2901 (ISO/IEC 17025 compliance)	235189, 235447 and 235189-A
Inter-laboratory duplicates	Envirolab Services Pty Ltd VIC, NATA Accreditation Number – 2901 (ISO/IEC 17025 compliance)	19779 and 19796

7 SITE ASSESSMENT CRITERIA (SAC)

The SAC were derived from the NEPM 2013 and other guidelines as discussed in the following sub-sections. The guideline values for individual contaminants are presented in the attached report tables and further explanation of the various criteria adopted is provided in the appendices.

7.1 Soil

Soil data were compared to relevant Tier 1 screening criteria in accordance with NEPM (2013) as outlined below.

7.1.1 Human Health

- Health Investigation Levels (HILs) for a 'Public open space' exposure scenario (HIL-C). This was considered appropriate considering that the site will be development as a park;
- Health Screening Levels (HSLs) for a 'low-high density residential' exposure scenario (HSL-A & HSL-B). HSLs were calculated based on conservative assumptions including a 'sand' type and a depth interval of 0m to 1m. The more conservative HSLs were adopted for the ESA as petroleum hydrocarbons are non-limiting (NL) under a public open space (HSL-C) scenario;
- The HSLs for direct contact presented in the CRC Care Technical Report No. 10 – Health screening levels for hydrocarbons in soil and groundwater Part 1: Technical development document (2011)[9] were considered; and
- Asbestos was assessed on the basis of presence/absence. Asbestos HSLs were not adopted as detailed asbestos quantification was not undertaken for the ESA.

7.1.2 Environment (Ecological – terrestrial ecosystems)

- Ecological Investigation Levels (EILs) and Ecological Screening Levels (ESLs) for an 'urban residential and public open space' (URPOS) exposure scenario. These have only been applied to the top 2m of soil as outlined in NEPM (2013). The criterion for benzo(a)pyrene has been increased from the value presented in NEPM (2013) based on the Canadian Soil Quality Guidelines[10];
- ESLs were adopted based on a coarse soil type for all samples; and
- EILs for selected metals were initially calculated based on the most conservative added contaminant limit (ACL) values presented in Schedule B(1) of NEPM (2013) and published ambient background concentration (ABC) values presented in the document titled Trace Element Concentrations in Soils from Rural and Urban Areas of Australia (1995)[11]. There were two exceedances of the EIL for copper and zinc based on the initial EIL screening using the above method, therefore pH and CEC analysis was undertaken on the samples with copper and zinc above the SAC and the EIL was adjusted based on the pH and CEC results. This method is considered to be adequate for the Tier 1 screening.

[9] Cooperative Research Centre for Contamination Assessment and Remediation of the Environment (CRC Care), (2011). Technical Report No. 10 - *Health screening levels for hydrocarbons in soil and groundwater Part 1: Technical development document*

[10] Canadian Council of Ministers of the Environment, (1999). *Canadian soil quality guidelines for the protection of environmental and human health: Benzo(a)Pyrene (1997)* (referred to as the Canadian Soil Quality Guidelines)

[11] Olszowy, H., Torr, P., and Imray, P., (1995), *Trace Element Concentrations in Soils from Rural and Urban Areas of Australia. Contaminated Sites Monograph Series No. 4*. Department of Human Services and Health, Environment Protection Agency, and South Australian Health Commission

7.1.3 Management Limits for Petroleum Hydrocarbons

Management limits for petroleum hydrocarbons (as presented in Schedule B1 of NEPM 2013) were considered following evaluation of human health and ecological risks, and risks to groundwater.

7.1.4 Waste Classification

Data for the waste classification assessment were assessed in accordance with the Waste Classification Guidelines, Part 1: Classifying Waste (2014)[12] as outlined in the following table:

Table 7-1: Waste Categories

Category	Description
General Solid Waste (non-putrescible)	• If Specific Contaminant Concentration (SCC) ≤ Contaminant Threshold (CT1) then Toxicity Characteristics Leaching Procedure (TCLP) not needed to classify the soil as general solid waste; and • If TCLP ≤ TCLP1 and SCC ≤ SCC1 then treat as general solid waste.
Restricted Solid Waste (non-putrescible)	• If SCC ≤ CT2 then TCLP not needed to classify the soil as restricted solid waste; and • If TCLP ≤ TCLP2 and SCC ≤ SCC2 then treat as restricted solid waste.
Hazardous Waste	• If SCC > CT2 then TCLP not needed to classify the soil as hazardous waste; and • If TCLP > TCLP2 and/or SCC > SCC2 then treat as hazardous waste.
Virgin Excavated Natural Material (VENM)	Natural material (such as clay, gravel, sand, soil or rock fines) that meet the following: • 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.

7.2 Groundwater

Groundwater data were 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)[13]. Environmental values for this assessment include aquatic ecosystems and human-health risks in non-use scenarios. For the assessment of health risks in non-use scenarios we have taken a conservative approach and assessed volatiles assuming that there may be buildings permanently occupied on site.

7.2.1 Human Health

HSLs for a 'low-high density residential' exposure scenario (HSL-A/HSL-B). HSLs were calculated based on a sand soil type and the observed depth to groundwater. The more conservative HSLs were adopted for the ESA as petroleum hydrocarbons are NL under HSL-C.

[12] NSW EPA, (2014). *Waste Classification Guidelines, Part 1: Classifying Waste.* (referred to as Waste Classification Guidelines 2014)

[13] NSW Department of Environment and Conservation, (2007). *Guidelines for the Assessment and Management of Groundwater Contamination*

- As there was not 2m of soil across the entire site, the HSL criteria for groundwater are not strictly applicable. On this basis, JKE has also undertaken a site-specific assessment (SSA) for the Tier 1 screening of human health risks posed by volatile contaminants in groundwater. The assessment included selection of alternative Tier 1 criteria that were considered suitably protective of human health. These criteria are based on drinking water guidelines and have been referred to as HSL-SSA. The criteria were based on the following (as shown in the attached report tables):
    - Australian Drinking Water Guidelines 2011 (updated 2018)[14] for BTEX compounds and selected VOCs;
    - World Health Organisation (WHO) document titled Petroleum Products in Drinking-water, Background document for the development of WHO Guidelines for Drinking Water Quality (2008)[15] for petroleum hydrocarbons;
    - USEPA Region 9 screening levels for naphthalene (threshold value for tap water); and
    - The use of the laboratory PQLs for other contaminants where there were no Australian guidelines.

7.2.2 Environment (Ecological - aquatic ecosystems)

Groundwater Investigation Levels (GILs) for 95% protection of marine species were adopted based on the Default Guideline Values in the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2018)[16]. The 99% trigger values were adopted where required to account for bioaccumulation. Low and moderate reliability trigger values were also adopted for some contaminants where high-reliability trigger values don't exist.

[14] National Health and Medical Research Council (NHMRC), (2018). *National Water Quality Management Strategy, Australian Drinking Water Guidelines 2011* (referred to as ADWG 2011)

[15] World Health Organisation (WHO), (2008). *Petroleum Products in Drinking-water, Background document for the development of WHO Guidelines for Drinking Water Quality* (referred to as WHO 2008)

[16] Australian and New Zealand Governments (ANZG), (2018). *Australian and New Zealand Guidelines for Fresh and Marine Water Quality.* Australian and New Zealand Governments and Australian state and territory governments, Canberra ACT, Australia (referred to as ANZG 2018)

8 RESULTS

8.1 Summary of Data (QA/QC) Evaluation

The data evaluation is presented in the appendices. In summary, JKE are of the opinion that the data are adequately precise, accurate, representative, comparable and complete to serve as a basis for interpretation to achieve the investigation objectives.

8.2 Subsurface Conditions

A summary of the subsurface conditions encountered during the investigation is presented in the following table. Reference should be made to the borehole logs attached in the appendices for further details.

Table 8-1: Summary of Subsurface Conditions

Profile	Description
Pavement	Concrete pavement was encountered at the surface in BH1, BH3 and BH6. The concrete ranged in thickness from approximately 140mm to 200mm.
Fill	Fill was encountered at the surface or beneath the pavement in all boreholes and extended to depths of approximately 0.3mBGL to 2.1mBGL. BH8 was terminated in the fill at a maximum depth of approximately 0.4mBGL due to hand auger refusal on gravel. The fill typically comprised silty clay, silty sandy clay, sandy clay, silty clayey sand, clayey sand, silty sand and sand with inclusions of igneous, ironstone and sandstone gravel, terracotta fragments, root fibres and ash. The terracotta inclusions (which is indicative of demolition waste) was detected only in borehole BH1 at a depth of approximately 0.8mBGL and extended to a depth of approximately 1mBGL. There was no staining or odours observed in the fill. Inclusions of demolition rubble (like concrete, bricks, tiles etc.) or fibre cement fragments (FCF) were not encountered in the fill, except for BH1 as discussed above.
Natural Soil	Natural (residual) silty clay was encountered beneath the fill in all boreholes and extended to the termination depth of BH2 and BH6 (maximum depth of approximately 3mBGL). The natural silty clay extended to depths of between approximately 1.3mBGL to 2.8mBGL in all other boreholes. The natural soil was typically grey, red brown mottled grey, orange brown and grey and contained inclusions of ironstone gravel. There was no staining or odours observed in the natural soil.
Bedrock	Siltstone bedrock was encountered beneath the natural silty clay in BH1, BH3, BH4, BH5 and BH7. The siltstone was typically grey and red brown with ironstone bands, and assessed to be extremely weathered upon first contact. The boreholes were terminated in the siltstone bedrock at a maximum depth of approximately 6mBGL.
Groundwater	Groundwater seepage was not encountered in the boreholes during drilling. Groundwater monitoring wells were installed in boreholes BH1 (MW1), BH3 (MW3) and BH5 (MW5). The monitoring wells were initially dry following installation. Further groundwater observations are detailed in Section 8.3.

8.3 Field Screening

A summary of the field screening results are presented in the following table:

Table 8-2: Summary of Field Screening

Aspect	Details
PID Screening of Soil Samples for VOCs	PID soil sample headspace readings are presented in attached report tables and the COC documents attached in the appendices. The results ranged from 0ppm to 2.5ppm equivalent isobutylene. These results indicate a lack of PID detectable VOCs. Selected samples with elevated PID readings were included in the analysis schedule and were analysed for TRH and BTEX.
Groundwater Depth & Flow	All boreholes were dry during and a short time after completion of drilling. Standing water level (SWL) measured in the monitoring wells installed at the site ranged from 3.16mBGL to 3.68mBGL.
Groundwater Field Parameters	Field measurements recorded during sampling were as follows: - pH ranged from 5.02 to 5.42; - EC ranged from 1,518µS/cm to 4,379µS/cm; - Eh ranged from 106.8mV to 184.6mV; and - DO ranged from 2mg/L to 4.2mg/L. The maximum PID reading in the monitoring well headspace was 5.7ppm.
LNAPLs petroleum hydrocarbons	Phase separated product (i.e. LNAPL) were not detected using the interphase probe during groundwater sampling.

8.4 Soil Laboratory Results

The soil laboratory results are compared to the relevant SAC in the attached report tables. A summary of the results assessed against the SAC is presented below:

8.4.1 Human Health and Environmental (Ecological) Assessment

Table 8-3: Summary of Soil Laboratory Results – Human Health and Environmental (Ecological)

Analyte	Results Compared to SAC
Heavy Metals	All heavy metals results were below the SAC.
TRH	All TRH results were below the SAC.
BTEX	All BTEX results were below the SAC and below the laboratory PQLs.
PAHs	All PAH results were below the SAC.
OCPs and OPPs	All OCP and OPP results were below the SAC and below the laboratory PQLs.
PCBs	All PCB results were below the SAC and below the laboratory PQLs.
Asbestos	All asbestos results were below the SAC (i.e. asbestos was absent in the samples analysed for the investigation).

8.4.2 Preliminary Waste Classification Assessment

The laboratory results were assessed against the criteria presented in Part 1 of the Waste Classification Guidelines, as summarised previously in this report. The results are presented in the report tables attached in the appendices. A summary of the results is presented in the following table:

Table 8-4: Summary of Soil Laboratory Results Compared to CT and SCC Criteria

Analyte	No. of Samples Analysed	No. of Results > CT Criteria	No. of Results > SCC Criteria	Comments
Heavy Metals	12	0	0	-
TRH	12	0	0	-
BTEX	12	0	0	-
Total PAHs	12	0	0	-
Benzo(a)pyrene	12	0	0	-
OCPs & OPPs	8	0	0	-
PCBs	8	0	0	-
Asbestos	12	-	-	Asbestos was not detected in the samples analysed.

8.5 Groundwater Laboratory Results

The groundwater laboratory results were compared to the relevant SAC in the attached report tables. A summary of the results assessed against the SAC is presented in the following table:

Table 8-5: Summary of Groundwater Laboratory Results – Human Health and Environmental (Ecological)

Analyte	Results Compared to SAC
Heavy Metals	Copper (maximum 3µg/L), nickel (maximum 27µg/L) and zinc (maximum 160µg/L) concentrations in MW1/GWDUP2, MW3 and MW5/GWDUP1 exceeded the ecological SAC (see Figure 3). All other heavy metal results were below the SAC.
TRH	All TRH results were below the SAC. Hydrocarbon fraction TRH F2 was detected in all three groundwater samples at very low concentrations that ranged from 54µg/L to 81µg/L.
BTEX	All BTEX results were below the SAC.
Other VOCs	All VOC results were below the SAC and below the laboratory PQLs.
PAHs	All PAH results were below the SAC and below the laboratory PQLs.
Other Parameters	The results for pH and EC are summarised below: • pH ranged from 5 to 7. The pH in samples MW3 and MW5 were outside the range of the ecological SAC; and • EC ranged from 1,200µS/cm to 3,500µS/cm.

9 PRELIMINARY WASTE CLASSIFICATION

9.1 Preliminary Waste Classification of Fill

Based on the results of the assessment, and at the time of reporting, the fill material at the site is preliminarily classified as **General Solid Waste (non-putrescible)**. Additional testing will be required to confirm this classification during development works.

Fill should be disposed of to a facility that is appropriately licensed by the NSW EPA to receive this waste stream. The facility should be contacted to obtain the required approvals prior to commencement of excavation.

9.2 Classification of Natural Soil

Due to the preliminary nature of this assessment, no testing of the natural soil has been undertaken at the site. It is understood that only minimal excavation works may be necessary for the proposed development and we do not expect that natural soils would be disposed off-site.

In the event that excavation of natural soil is proposed, additional testing of the natural soil will be required to classify the material for off-site disposal.

10 DISCUSSION

10.1 Tier 1 Risk Assessment and Review of CSM

For a contaminant to represent a risk to a receptor, the following three conditions must be present:

1. Source – The presence of a contaminant;
2. Pathway – A mechanism or action by which a receptor can become exposed to the contaminant; and
3. Receptor – The human or ecological entity which may be adversely impacted following exposure to contamination.

If one of the above components is missing, the potential for adverse risks is relatively low.

The CSM identified the following AEC/potential sources of contamination at the site:

- Imported fill (entire site);
- Use of Pesticides (entire site);
- Hazardous Building Material (entire site); and
- Up-gradient/off-site areas (off-site to the south).

10.1.1 Soil

All soil contamination results were below the adopted SAC. The results indicate a low potential for significant (i.e. contaminant concentrations that pose a risk in the context of the proposed land use), widespread occurrence of the CoPC identified in the CSM.

Asbestos analysis in soil was undertaken at a reporting limit of 0.1g/kg. Asbestos quantification testing to assess the data against HSLs was not undertaken for the preliminary ESA. Based on the results of the ESA, JKE are of the opinion that quantification analysis to evaluate the data against the asbestos HSLs is not considered necessary due to the following:

- With the exception of traces of terracotta in BH1, the boreholes drilled for the ESA did not detect any demolition waste or FCF in the fill soil;
- The site inspection or investigation for the ESA did not identify any FCF at the site;
- The laboratory testing did not identify any asbestos at the reporting limit. The laboratory testing also included trace analysis which did not detect any asbestos; and
- The laboratory used for the analysis report the presence of any material containing asbestos (or with the potential to contain asbestos) even if found below the reporting limit (this is reported in the comments section if this occurs). No such detections were made in the samples analysed for the ESA.

Considering that the samples were obtained from boreholes using spiral auger which limits visual observations of the soils, as a precaution, JKE recommend implementing an Unexpected Finds Protocol (UFP) for the development. The UFP will outline the measures to be implemented in the event asbestos or any other potential contamination issues are detected during the development works.

10.1.2 Groundwater

10.1.2.1 Heavy Metals

Copper, nickel and zinc were detected in the groundwater samples above the ecological SAC.

Copper, nickel and zinc are commonly detected in groundwater in urban environments due to runoff and leakages from water pipes and other infrastructure. These detections at the site are consistent with background conditions and were similar across the site. On this basis, these elevations are not considered to pose a risk to ecological receptors. We also note that the closest water body is over 1,000m away from the site.

10.1.2.2 Hydrocarbons

Traces of light to mid-fraction TRH F2 were encountered marginally above the reporting limit in all samples. It is considered unlikely that the TRH is from an onsite point source as the concentrations were similar across the site. It is possible that the low concentrations of TRH F2 in the groundwater are due to the historic off-site source, which included a service station up-gradient of the site at the corner of Eton and Flora Streets on the mid-1900s. The TRH F2 was not detected at concentrations that could pose an unacceptable risk to the receptors under the proposed land use scenario.

10.2 Decision Statements

The decision statements are addressed below:

> *Did the site inspection, or does the historical information identify potential contamination sources/AEC at the site?*

Yes. The site inspection and site history assessment identified AEC listed in the CSM including imported fill material, use of pesticides, hazardous building material and an off-site source associated with an up-gradient former service station.

> *Are any results above the SAC?*

Yes. Copper, nickel and zinc in groundwater samples were above the ecological SAC.

> *Do potential risks associated with contamination exist, and if so, what are they?*

No. The proposed development will not be utilising the groundwater at the site.

> *Is remediation/further assessment required?*

Remediation is not required at this stage. JKE recommend developing a UFP for the development to manage risks associated with unexpected finds.

> *Is the site characterisation sufficient to provide adequate confidence in the above decisions?*

Yes.

Is the site suitable for the proposed development, or can the site be made suitable subject to further characterisation and/or remediation?

JKE are of the opinion that the site is suitable for the proposed development described in Section 1.1. A UFP should be prepared and implements for the development. Additional testing for waste classification will be required prior to off-site disposal of material.

10.3 Data Gaps

An assessment of data gaps is provided in the following table:

Table 10-1: Data Gap Assessment

Data Gap	Assessment
SafeWork records not reviewed	Given the prolonged commercial history of the site, it is considered likely that some records pertaining to the storage of dangerous goods could potentially exist for the site. The search for dangerous goods records for the site is currently underway and we expect a reply from SafeWork NSW. The results will be summarised in a separate letter when received.
Land title records not reviewed	The ESA included site history assessment from the Lotsearch report, NSW EPA records, Council records and Section 10.7 (2&5) certificates. Considering the landuse, the lack of land title records is not considered to alter the CSM or the assessment of the site contamination conditions. No further assessment of this data gap is considered necessary.
Asbestos Quantification not undertaken.	Asbestos analysis in soil was undertaken at a reporting limit of 0.1g/kg. Asbestos quantification testing was not undertaken and recommendations have been made for preparation of a UFP to compensate for the preliminary nature of the assessment. The UFP will outline the measures to be implemented in the event asbestos or any other potential contamination issues are detected during the development works.

11 CONCLUSIONS AND RECOMMENDATIONS

The assessment included a review of historical information and sampling from eight boreholes and groundwater sampling from three monitoring wells. The site history assessment identified potential sources of contamination including: imported fill; use of pesticides; hazardous building materials; and an off-site source of contamination that included a service station up-gradient of the site.

The investigation did not identify any visible or olfactory indicators of contamination. All soil laboratory results were below the adopted human health and ecological SAC. Individual heavy metals were identified above the ecological SAC in groundwater; however, these were considered to be due to regional conditions and were not considered to pose a risk in the context of the proposed development.

Based on the findings of the preliminary ESA, the site is considered to be suitable for the proposed development from a contamination viewpoint. The following recommendations should be implemented in order to address the data gaps:

- Prepare and implement a UFP for the proposed development. A suitably qualified contaminated land consultant[17] should be engaged for this work; and
- Undertake additional testing to confirm the waste classification of soil prior to off-site disposal.

At this stage, the ESA did not trigger any requirements to notify the NSW EPA under the NSW EPA Guidelines on the Duty to Report Contamination under Section 60 of the CLM Act 1997 (2015)[18].

JKE consider that the report objectives outlined in Section 1.2 have been addressed.

[17] JKE recommend that the consultancy engaged for the work be a member of the Australian Contaminated Land Consultants Associated (ACLCA), and/or the individual undertaking the works be certified under one of the NSW EPA endorsed certified practitioner schemes

[18] NSW EPA, (2015). *Guidelines on the Duty to Report Contamination under Section 60 of the CLM Act 1997* (referred to as Duty to Report Contamination)

12 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 landuse. 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

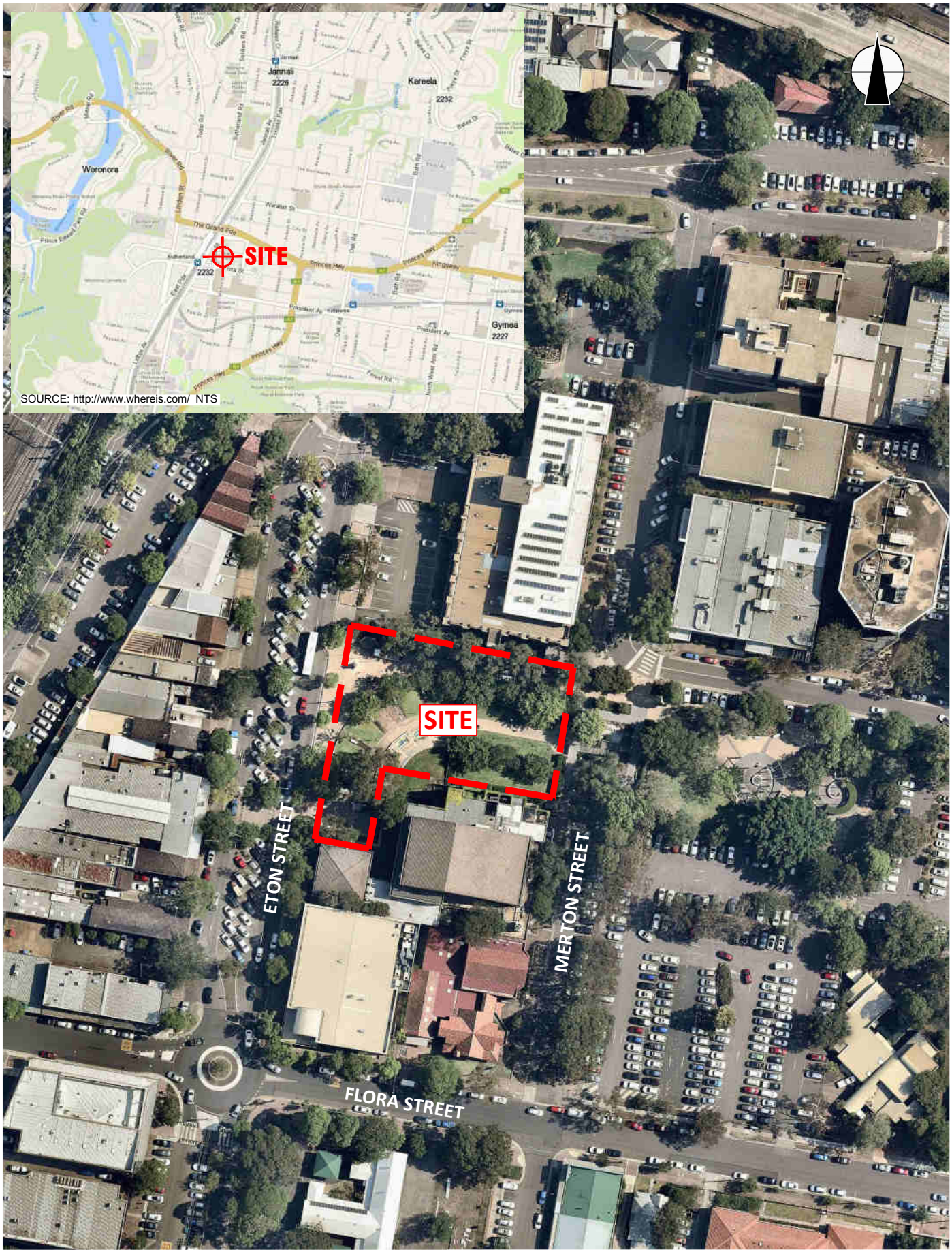
Borehole and test pit logs are prepared by environmental scientists, engineers or geologists based upon interpretation of field conditions and laboratory evaluation of field samples. Logs are normally provided in our reports and these should not be re-drawn for inclusion in site remediation or other 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

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

Title: **SITE LOCATION PLAN**

Location: LOT 1 DP1253156, 30 ETON STREET SUTHERLAND, NSW

Report No: E32889B

Figure: 1

JKEnvironments

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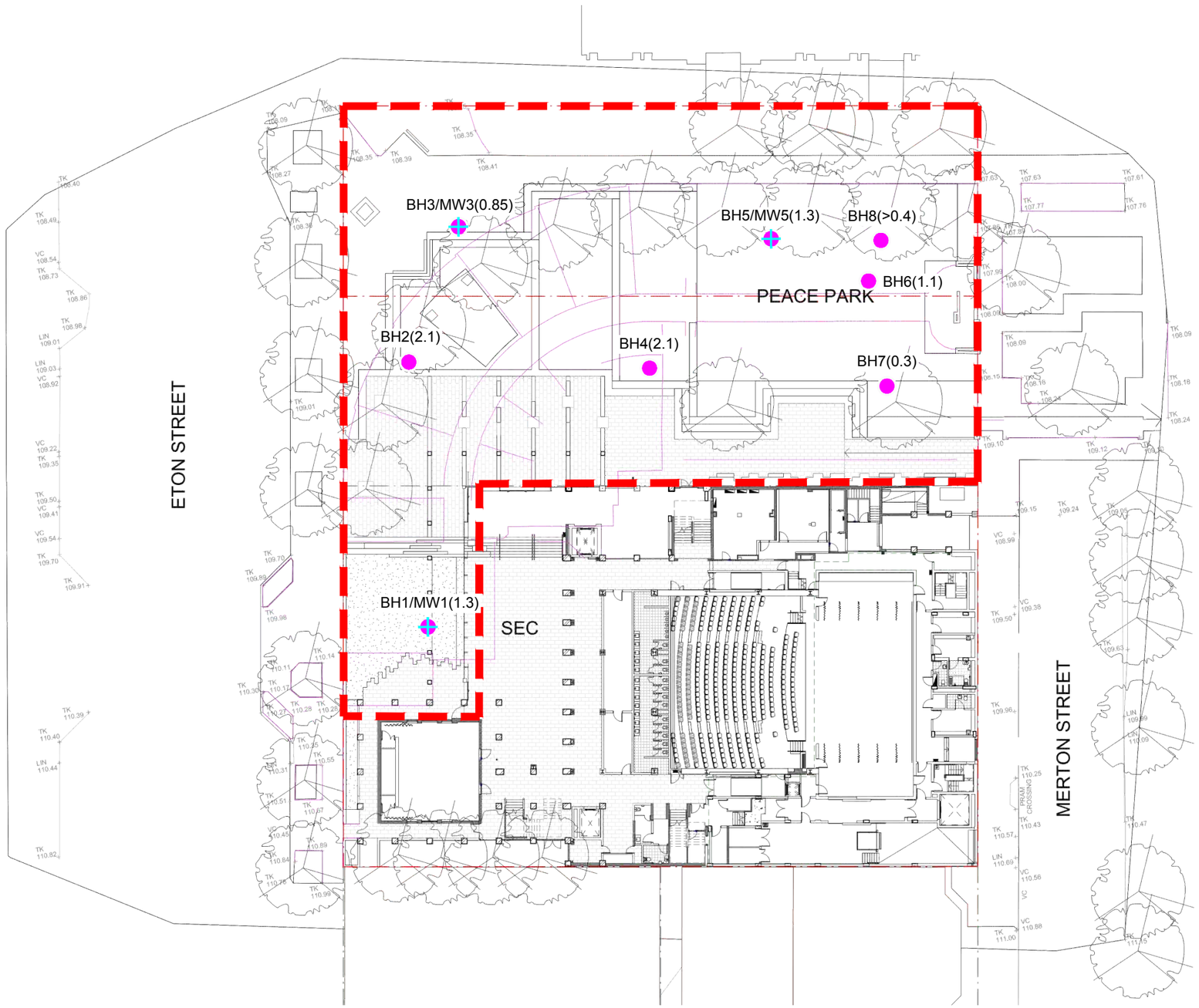

LEGEND

APPROXIMATE SITE BOUNDARY	
BH(Fill Depth)	BOREHOLE LOCATION, NUMBER AND DEPTH OF FILL (m)
BH/MW(Fill Depth)	BOREHOLE AND GROUND WATER MONITORING WELL LOCATION, NUMBER AND DEPTH OF FILL (m)

0 5 10 15 20 25

SCALE 1:500 @A3 METRES

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

Title: **BOREHOLE LOCATION PLAN**

Location: LOT 1 DP1253156, 30 ETON STREET, SUTHERLAND, NSW

Report No: E32889B

Figure: 2

JKEnvironments

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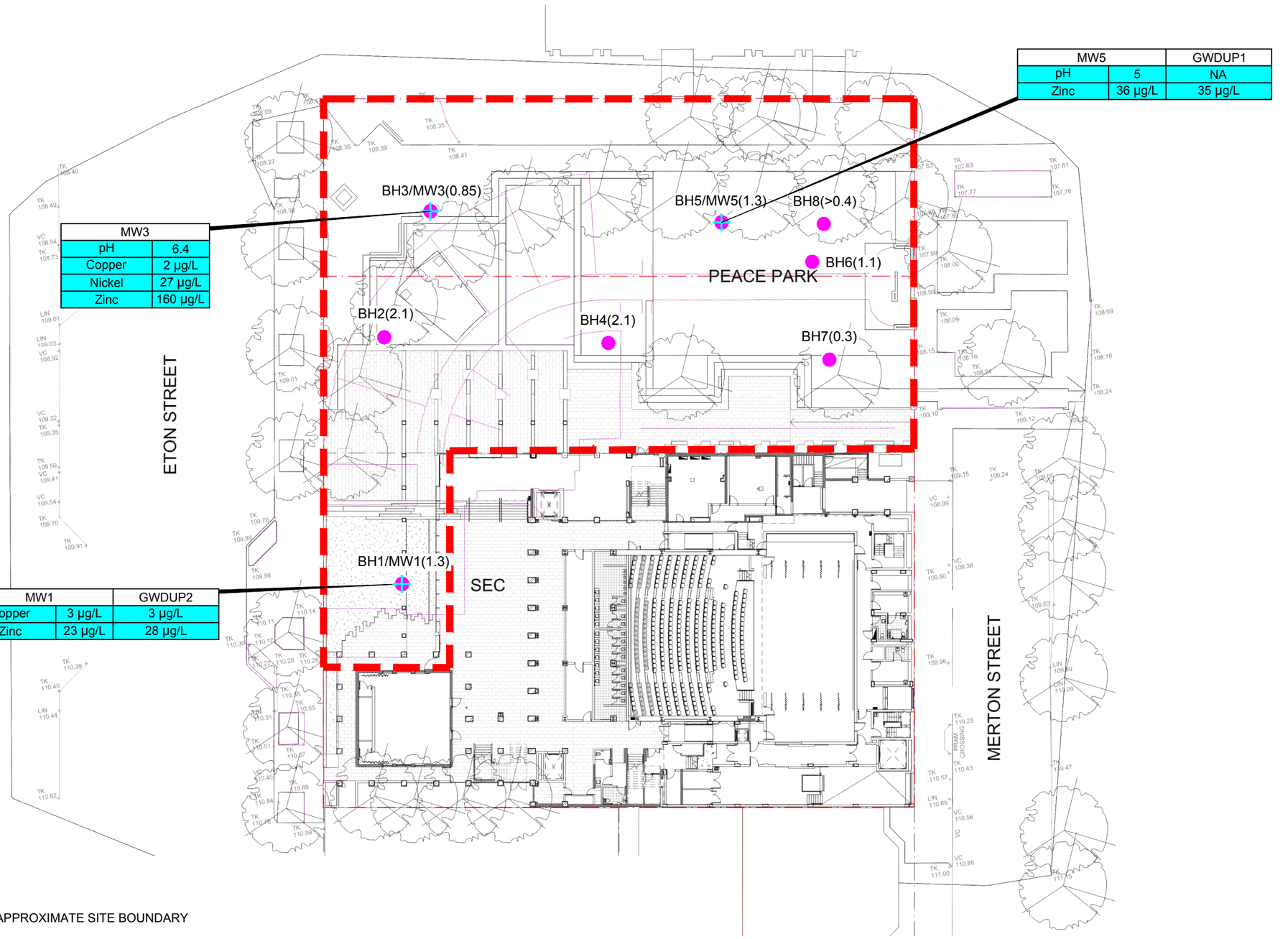

LEGEND

APPROXIMATE SITE BOUNDARY	
BH(Fill Depth)	BOREHOLE LOCATION, NUMBER AND DEPTH OF FILL (m)
BH/MW(Fill Depth)	BOREHOLE AND GROUND WATER MONITORING WELL LOCATION, NUMBER AND DEPTH OF FILL (m)
SAMPLE ID / CHEMICAL — CONCENTRATION (µg/L)	GROUNDWATER SAMPLE EXCEEDANCE
	GROUNDWATER CONTAMINATION ABOVE SAC

0 5 10 15 20 25
SCALE 1:500 @A3 METRES

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

Title: **CONTAMINATION LOCATION PLAN**

Location: LOT 1 DP1253156, 30 ETON STREET, SUTHERLAND, NSW

Report No: E32889B

Figure: 3

JKEnvironments

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Appendix B: Laboratory Results Summary Tables

ABBREVIATIONS AND EXPLANATIONS

Abbreviations used in the Tables:

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

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TABLE S1
SOIL LABORATORY RESULTS COMPARED TO NEPM 2013.
HIL-C: 'Public open space; secondary schools; and footpaths'

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	0.1	100
Site Assessment Criteria (SAC)			300	90	300	17000	600	80	1200	30000	300	3	10	340	400	10	70	400	10	250	1	Detected/Not Detected
Sample Reference	**Sample Depth**	**Sample Description**																				
BH1	0.14-0.3	FILL: Silty Clayey Sand	**6**	<0.4	**16**	**20**	**58**	<0.1	**11**	**92**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH1-Lab duplicate	0.14-0.3	FILL: Silty Clayey Sand	**8**	<0.4	**21**	**24**	**79**	**0.1**	**12**	**100**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
BH1	0.7-0.8	FILL: Silty Clayey Sand	**11**	<0.4	**29**	**2**	**19**	<0.1	**2**	**5**	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
BH2	0.0-0.1	FILL: Silty Sand	**5**	<0.4	**10**	**9**	**12**	<0.1	**6**	**28**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH3	0.2-0.3	FILL: Silty Sand	**5**	<0.4	**19**	**240**	**68**	<0.1	**11**	**280**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH3	0.4-0.6	FILL: Silty Clay	**6**	<0.4	**19**	**51**	**35**	<0.1	**6**	**130**	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
BH4	0.0-0.1	FILL: Clayey Sand	<4	<0.4	**6**	**14**	**12**	<0.1	**3**	**31**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH4	1.7-1.9	FILL: Silty Sandy Clay	**6**	<0.4	**21**	**14**	**34**	<0.1	**12**	**43**	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
BH5	0.0-0.2	FILL: Silty Sand	**5**	<0.4	**7**	**30**	**21**	<0.1	**4**	**88**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH6	0.14-0.3	FILL: Clayey Sand	<4	<0.4	**14**	**13**	**31**	<0.1	**8**	**22**	**0.1**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH7	0.0-0.2	FILL: Silty Clayey Sand	**6**	<0.4	**14**	**22**	**24**	<0.1	**3**	**140**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH8	0.0-0.1	FILL: Silty Sand	**5**	<0.4	**4**	**5**	**5**	<0.1	**2**	**310**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH8	0.1-0.2	FILL: Sandy Clay	**5**	<0.4	**18**	**11**	**19**	<0.1	**10**	**49**	**0.06**	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
SDUP1	0.2-0.3	FILL: Silty Sand	<4	<0.4	**12**	**260**	**61**	<0.1	**9**	**300**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
SDUP3	0.0-0.2	FILL: Silty Sand	**5**	<0.4	**7**	**22**	**20**	<0.1	**3**	**78**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
SDUP3-Lab duplicate	0.0-0.2	FILL: Silty Sand	**4**	<0.4	**7**	**26**	**20**	<0.1	**4**	**100**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
SDUP5	0.14-0.3	FILL: Silty Clayey Sand	**7**	<0.4	**23**	**28**	**74**	<0.1	**14**	**110**	**0.06**	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SDUP5-Lab duplicate	0.14-0.3	FILL: Silty Clayey Sand	**8**	<0.4	**27**	**27**	**78**	<0.1	**18**	**130**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Number of Samples			18	18	18	18	18	18	18	18	17	17	12	12	12	12	12	12	12	12	12	12
Maximum Value			11	<PQL	29	260	79	0.1	18	310	0.1	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	Not Detected

Concentration above the SAC **VALUE**
Concentration above the PQL **Bold**

Standard deviation exceeds data assessment criteria **VALUE**

TABLE S2
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-A/B:LOW/HIGH DENSITY RESIDENTIAL							
Sample Reference	**Sample Depth**	**Sample Description**	**Depth Category**	**Soil Category**								
BH1	0.14-0.3	FILL: Silty Clayey Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0.3
BH1-Lab duplicate	0.14-0.3	FILL: Silty Clayey Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	NA
BH1	0.7-0.8	FILL: Silty Clayey Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH2	0.0-0.1	FILL: Silty Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH3	0.2-0.3	FILL: Silty Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	2.5
BH3	0.4-0.6	FILL: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	1.3
BH4	0.0-0.1	FILL: Clayey Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH4	1.7-1.9	FILL: Silty Sandy Clay	1m to <2m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH5	0.0-0.2	FILL: Silty Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH6	0.14-0.3	FILL: Clayey Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH7	0.0-0.2	FILL: Silty Clayey Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH8	0.0-0.1	FILL: Silty Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH8	0.1-0.2	FILL: Sandy Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
SDUP1	0.2-0.3	FILL: Silty Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	NA
SDUP3	0.0-0.2	FILL: Silty Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	NA
SDUP3-Lab duplicate	0.0-0.2	FILL: Silty Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	NA
SDUP5	0.14-0.3	FILL: Silty Clayey Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	NA
Total Number of Samples					18	18	18	18	18	18	18	13
Maximum Value					<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	2.5

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_6-C_{10} (F1)	>C_{10}-C_{16} (F2)	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene
BH1	0.14-0.3	FILL: Silty Clayey Sand	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH1-Lab duplicate	0.14-0.3	FILL: Silty Clayey Sand	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH1	0.7-0.8	FILL: Silty Clayey Sand	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH2	0.0-0.1	FILL: Silty Sand	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH3	0.2-0.3	FILL: Silty Sand	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH3	0.4-0.6	FILL: Silty Clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH4	0.0-0.1	FILL: Clayey Sand	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH4	1.7-1.9	FILL: Silty Sandy Clay	1m to <2m	Sand	70	240	0.5	220	NL	60	NL
BH5	0.0-0.2	FILL: Silty Sand	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH6	0.14-0.3	FILL: Clayey Sand	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH7	0.0-0.2	FILL: Silty Clayey Sand	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH8	0.0-0.1	FILL: Silty Sand	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH8	0.1-0.2	FILL: Sandy Clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
SDUP1	0.2-0.3	FILL: Silty Sand	0m to <1m	Sand	45	110	0.5	160	55	40	3
SDUP3	0.0-0.2	FILL: Silty Sand	0m to <1m	Sand	45	110	0.5	160	55	40	3
SDUP3-Lab duplicate	0.0-0.2	FILL: Silty Sand	0m to <1m	Sand	45	110	0.5	160	55	40	3
SDUP5	0.14-0.3	FILL: Silty Clayey Sand	0m to <1m	Sand	45	110	0.5	160	55	40	3

TABLE S3
SOIL LABORATORY RESULTS COMPARED TO MANAGEMENT LIMITS
All data in mg/kg unless stated otherwise

			C_6-C_{10} (F1) plus BTEX	>C_{10}-C_{16} (F2) plus napthalene	>C_{16}-C_{34} (F3)	>C_{34}-C_{40} (F4)
PQL - Envirolab Services			25	50	100	100
NEPM 2013 Land Use Category			**RESIDENTIAL, PARKLAND & PUBLIC OPEN SPACE**			
Sample Reference	**Sample Depth**	**Soil Texture**				
BH1	0.14-0.3	Coarse	<25	<50	**230**	**240**
BH1-Lab duplicate	0.14-0.3	Coarse	<25	<50	**190**	**220**
BH1	0.7-0.8	Coarse	<25	<50	<100	**150**
BH2	0.0-0.1	Coarse	<25	<50	<100	<100
BH3	0.2-0.3	Coarse	<25	<50	**140**	<100
BH3	0.4-0.6	Coarse	<25	<50	<100	<100
BH4	0.0-0.1	Coarse	<25	<50	<100	<100
BH4	1.7-1.9	Coarse	<25	<50	<100	<100
BH5	0.0-0.2	Coarse	<25	<50	<100	<100
BH6	0.14-0.3	Coarse	<25	<50	<100	<100
BH7	0.0-0.2	Coarse	<25	<50	<100	<100
BH8	0.0-0.1	Coarse	<25	<50	<100	<100
BH8	0.1-0.2	Coarse	<25	<50	<100	<100
SDUP1	0.2-0.3	Coarse	<25	<50	**190**	<100
SDUP3	0.0-0.2	Coarse	<25	<50	<100	<100
SDUP3-Lab duplicate	0.0-0.2	Coarse	<25	<50	<100	<100
SDUP5	0.14-0.3	Coarse	<25	<50	**180**	**100**
Total Number of Samples			18	18	18	18
Maximum Value			<PQL	<PQL	190	100

Concentration above the SAC **VALUE**
Concentration above the PQL **Bold**

MANAGEMENT LIMIT ASSESSMENT CRITERIA

Sample Reference	**Sample Depth**	**Soil Texture**	C_6-C_{10} (F1) plus BTEX	>C_{10}-C_{16} (F2) plus napthalene	>C_{16}-C_{34} (F3)	>C_{34}-C_{40} (F4)
BH1	0.14-0.3	Coarse	700	1000	2500	10000
BH1-Lab duplicate	0.14-0.3	Coarse	700	1000	2500	10000
BH1	0.7-0.8	Coarse	700	1000	2500	10000
BH2	0.0-0.1	Coarse	700	1000	2500	10000
BH3	0.2-0.3	Coarse	700	1000	2500	10000
BH3	0.4-0.6	Coarse	700	1000	2500	10000
BH4	0.0-0.1	Coarse	700	1000	2500	10000
BH4	1.7-1.9	Coarse	700	1000	2500	10000
BH5	0.0-0.2	Coarse	700	1000	2500	10000
BH6	0.14-0.3	Coarse	700	1000	2500	10000
BH7	0.0-0.2	Coarse	700	1000	2500	10000
BH8	0.0-0.1	Coarse	700	1000	2500	10000
BH8	0.1-0.2	Coarse	700	1000	2500	10000
SDUP1	0.2-0.3	Coarse	700	1000	2500	10000
SDUP3	0.0-0.2	Coarse	700	1000	2500	10000
SDUP3-Lab duplicate	0.0-0.2	Coarse	700	1000	2500	10000
SDUP5	0.14-0.3	Coarse	700	1000	2500	10000

TABLE S4
SOIL LABORATORY RESULTS COMPARED T0 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		5,600	4,200	5,800	8,100	140	21,000	5,900	17,000	2,200	
Site Use		HIGH DENSITY RESIDENTIAL - DIRECT SOIL CONTACT									
Sample Reference	**Sample Depth**										
BH1	0.14-0.3	<25	<50	**230**	**240**	<0.2	<0.5	<1	<3	<1	**0.3**
BH1-Lab duplicate	0.14-0.3	<25	<50	**190**	**220**	<0.2	<0.5	<1	<3	<1	NA
BH1	0.7-0.8	<25	<50	<100	**150**	<0.2	<0.5	<1	<3	<1	**0**
BH2	0.0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	**0**
BH3	0.2-0.3	<25	<50	**140**	<100	<0.2	<0.5	<1	<3	<1	**2.5**
BH3	0.4-0.6	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	**1.3**
BH4	0.0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	**0**
BH4	1.7-1.9	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	**0**
BH5	0.0-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	**0**
BH6	0.14-0.3	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	**0**
BH7	0.0-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	**0**
BH8	0.0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	**0**
BH8	0.1-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	**0**
SDUP1	0.2-0.3	<25	<50	**190**	<100	<0.2	<0.5	<1	<3	<1	NA
SDUP3	0.0-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	NA
SDUP3-Lab duplicate	0.0-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	NA
SDUP5	0.14-0.3	<25	<50	**180**	**100**	<0.2	<0.5	<1	<1	<1	NA
Total Number of Samples		18	18	18	18	18	18	18	18	18	13
Maximum Value		<PQL	<PQL	230	240	<PQL	<PQL	<PQL	<PQL	<PQL	2.5

Concentration above the SAC — **VALUE**
Concentration above the PQL — **Bold**

TABLE S5
SOIL LABORATORY RESULTS COMPARED TO NEPM 2013 EILs AND ESLs
All data in mg/kg unless stated otherwise

Land Use Category				URBAN RESIDENTIAL AND PUBLIC OPEN SPACE																	
							AGED HEAVY METALS-EILs						EILs		ESLs							
				pH	CEC (cmolc/kg)	Clay Content (% clay)	Arsenic	Chromium	Copper	Lead	Nickel	Zinc	Naphthalene	DDT	C_6-C_{10} (F1)	>C_{10}-C_{16} (F2) plus napthalene	>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	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
Sample Reference	**Sample Depth**	**Sample Description**	**Soil Texture**																			
BH1	0.14-0.3	FILL: Silty Clayey Sand	Coarse	NA	NA	NA	**6**	**16**	**20**	**58**	**11**	**92**	<1	<0.1	<25	<50	**230**	**240**	<0.2	<0.5	<1	<3	<0.05
BH1-Lab duplicate	0.14-0.3	FILL: Silty Clayey Sand	Coarse	NA	NA	NA	**8**	**21**	**24**	**79**	**12**	**100**	<1	<0.1	<25	<50	**190**	**220**	<0.2	<0.5	<1	<3	<0.05
BH1	0.7-0.8	FILL: Silty Clayey Sand	Coarse	NA	NA	NA	**11**	**29**	**2**	**19**	**2**	**5**	<1	NA	<25	<50	<100	**150**	<0.2	<0.5	<1	<3	<0.05
BH2	0.0-0.1	FILL: Silty Sand	Coarse	NA	NA	NA	**5**	**10**	**9**	**12**	**6**	**28**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
BH3	0.2-0.3	FILL: Silty Sand	Coarse	**10.1**	**46**	NA	**5**	**19**	**240**	**68**	**11**	**280**	<1	<0.1	<25	<50	**140**	<100	<0.2	<0.5	<1	<3	<0.05
BH3	0.4-0.6	FILL: Silty Clay	Coarse	NA	NA	NA	**6**	**19**	**51**	**35**	**6**	**130**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
BH4	0.0-0.1	FILL: Clayey Sand	Coarse	NA	NA	NA	<4	**6**	**14**	**12**	**3**	**31**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
BH4	1.7-1.9	FILL: Silty Sandy Clay	Coarse	NA	NA	NA	**6**	**21**	**14**	**34**	**12**	**43**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
BH5	0.0-0.2	FILL: Silty Sand	Coarse	NA	NA	NA	**5**	**7**	**30**	**21**	**4**	**88**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
BH6	0.14-0.3	FILL: Clayey Sand	Coarse	NA	NA	NA	<4	**14**	**13**	**31**	**8**	**22**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
BH7	0.0-0.2	FILL: Silty Clayey Sand	Coarse	NA	NA	NA	**6**	**14**	**22**	**24**	**3**	**140**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
BH8	0.0-0.1	FILL: Silty Sand	Coarse	**6.8**	**4.0**	NA	**5**	**4**	**5**	**5**	**2**	**310**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
BH8	0.1-0.2	FILL: Sandy Clay	Coarse	NA	NA	NA	**5**	**18**	**11**	**19**	**10**	**49**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<3	**0.06**
SDUP1	0.2-0.3	FILL: Silty Sand	Coarse	**10.1**	**46**	NA	<4	**12**	**260**	**61**	**9**	**300**	<1	<0.1	<25	<50	**190**	<100	<0.2	<0.5	<1	<3	<0.05
SDUP3	0.0-0.2	FILL: Silty Sand	Coarse	NA	NA	NA	**5**	**7**	**22**	**20**	**3**	**78**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
SDUP3-Lab duplicate	0.0-0.2	FILL: Silty Sand	Coarse	NA	NA	NA	**4**	**7**	**26**	**20**	**4**	**100**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
SDUP5	0.14-0.3	FILL: Silty Clayey Sand	Coarse	NA	NA	NA	**7**	**23**	**28**	**74**	**14**	**110**	<1	NA	<25	<50	**180**	**100**	<0.2	<0.5	<1	<1	**0.06**
SDUP5-Lab duplicate	0.14-0.3	FILL: Silty Clayey Sand	Coarse	NA	NA	NA	**8**	**27**	**27**	**78**	**18**	**130**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Number of Samples				3	3	0	18	18	18	18	18	18	17	12	17	17	17	17	17	17	17	17	17
Maximum Value				10.1	46	NA	11	29	260	79	18	310	<PQL	<PQL	<PQL	<PQL	230	240	<PQL	<PQL	<PQL	<PQL	0.06

Concentration above the SAC **VALUE**
Concentration above the PQL **Bold**
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

Sample Reference	Sample Depth	Sample Description	Soil Texture	pH	CEC (cmolc/kg)	Clay Content (% clay)	Arsenic	Chromium	Copper	Lead	Nickel	Zinc	Naphthalene	DDT	C_6-C_{10} (F1)	>C_{10}-C_{16} (F2) plus napthalene	>C_{16}-C_{34} (F3)	>C_{34}-C_{40} (F4)	Benzene	Toluene	Ethylbenzene	Total Xylenes	B(a)P
BH1	0.14-0.3	FILL: Silty Clayey Sand	Coarse	NA	NA	NA	100	200	90	1300	35	190	170	180	180	120	300	2800	50	85	70	105	20
BH1-Lab duplicate	0.14-0.3	FILL: Silty Clayey Sand	Coarse	NA	NA	NA	100	200	90	1300	35	190	170	180	180	120	300	2800	50	85	70	105	20
BH1	0.7-0.8	FILL: Silty Clayey Sand	Coarse	NA	NA	NA	100	200	90	1300	35	190	170	--	180	120	300	2800	50	85	70	105	20
BH2	0.0-0.1	FILL: Silty Sand	Coarse	NA	NA	NA	100	200	90	1300	35	190	170	180	180	120	300	2800	50	85	70	105	20
BH3	0.2-0.3	FILL: Silty Sand	Coarse	**10.1**	**46**	NA	100	200	260	1300	560	1400	170	180	180	120	300	2800	50	85	70	105	20
BH3	0.4-0.6	FILL: Silty Clay	Coarse	NA	NA	NA	100	200	90	1300	35	190	170	--	180	120	300	2800	50	85	70	105	20
BH4	0.0-0.1	FILL: Clayey Sand	Coarse	NA	NA	NA	100	200	90	1300	35	190	170	180	180	120	300	2800	50	85	70	105	20
BH4	1.7-1.9	FILL: Silty Sandy Clay	Coarse	NA	NA	NA	100	200	90	1300	35	190	170	--	180	120	300	2800	50	85	70	105	20
BH5	0.0-0.2	FILL: Silty Sand	Coarse	NA	NA	NA	100	200	90	1300	35	190	170	180	180	120	300	2800	50	85	70	105	20
BH6	0.14-0.3	FILL: Clayey Sand	Coarse	NA	NA	NA	100	200	90	1300	35	190	170	180	180	120	300	2800	50	85	70	105	20
BH7	0.0-0.2	FILL: Silty Clayey Sand	Coarse	NA	NA	NA	100	200	90	1300	35	190	170	180	180	120	300	2800	50	85	70	105	20
BH8	0.0-0.1	FILL: Silty Sand	Coarse	**6.8**	**4.0**	NA	100	200	120	1300	35	350	170	180	180	120	300	2800	50	85	70	105	20
BH8	0.1-0.2	FILL: Sandy Clay	Coarse	NA	NA	NA	100	200	90	1300	35	190	170	--	180	120	300	2800	50	85	70	105	20
SDUP1	0.2-0.3	FILL: Silty Sand	Coarse	10.1	46	NA	100	200	260	1300	560	1400	170	180	180	120	300	2800	50	85	70	105	20
SDUP3	0.0-0.2	FILL: Silty Sand	Coarse	NA	NA	NA	100	200	90	1300	35	190	170	180	180	120	300	2800	50	85	70	105	20
SDUP3-Lab duplicate	0.0-0.2	FILL: Silty Sand	Coarse	NA	NA	NA	100	200	90	1300	35	190	170	180	180	120	300	2800	50	85	70	105	20
SDUP5	0.14-0.3	FILL: Silty Clayey Sand	Coarse	NA	NA	NA	100	200	90	1300	35	190	170	--	180	120	300	2800	50	85	70	105	20
SDUP5-Lab duplicate	0.14-0.3	FILL: Silty Clayey Sand	Coarse	NA	NA	NA	100	200	90	1300	35	190	--	--	--	--	--	--	--	--	--	--	--

TABLE S6
SOIL LABORATORY RESULTS COMPARED TO WASTE CLASSIFICATION GUIDELINES
All data in mg/kg unless stated otherwise

			HEAVY METALS								PAHs		OC/OP PESTICIDES				Total	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	PCBs	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	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		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		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		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		40,000	72	2,073	4,320	7,200	-
Sample Reference	**Sample Depth**	**Sample Description**																									
BH1	0.14-0.3	FILL: Silty Clayey Sand	**6**	<0.4	**16**	**20**	**58**	<0.1	**11**	**92**	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	**210**	**210**	<0.2	<0.5	<1	<3	Not Detected
BH1-Lab duplicate	0.14-0.3	FILL: Silty Clayey Sand	**8**	<0.4	**21**	**24**	**79**	**0.1**	**12**	**100**	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	**170**	**170**	<0.2	<0.5	<1	<3	NA
BH1	0.7-0.8	FILL: Silty Clayey Sand	**11**	<0.4	**29**	**2**	**19**	<0.1	**2**	**5**	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	Not Detected
BH2	0.0-0.1	FILL: Silty Sand	**5**	<0.4	**10**	**9**	**12**	<0.1	**6**	**28**	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	Not Detected
BH3	0.2-0.3	FILL: Silty Sand	**5**	<0.4	**19**	**240**	**68**	<0.1	**11**	**280**	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	**110**	**110**	<0.2	<0.5	<1	<3	Not Detected
BH3	0.4-0.6	FILL: Silty Clay	**6**	<0.4	**19**	**51**	**35**	<0.1	**6**	**130**	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	Not Detected
BH4	0.0-0.1	FILL: Clayey Sand	<4	<0.4	**6**	**14**	**12**	<0.1	**3**	**31**	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	Not Detected
BH4	1.7-1.9	FILL: Silty Sandy Clay	**6**	<0.4	**21**	**14**	**34**	<0.1	**12**	**43**	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	Not Detected
BH5	0.0-0.2	FILL: Silty Sand	**5**	<0.4	**7**	**30**	**21**	<0.1	**4**	**88**	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	Not Detected
BH6	0.14-0.3	FILL: Clayey Sand	<4	<0.4	**14**	**13**	**31**	<0.1	**8**	**22**	**0.1**	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	Not Detected
BH7	0.0-0.2	FILL: Silty Clayey Sand	**6**	<0.4	**14**	**22**	**24**	<0.1	**3**	**140**	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	Not Detected
BH8	0.0-0.1	FILL: Silty Sand	**5**	<0.4	**4**	**5**	**5**	<0.1	**2**	**310**	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	Not Detected
BH8	0.1-0.2	FILL: Sandy Clay	**5**	<0.4	**18**	**11**	**19**	<0.1	**10**	**49**	**0.06**	**0.06**	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	Not Detected
SDUP1	0.2-0.3	FILL: Silty Sand	<4	<0.4	**12**	**260**	**61**	<0.1	**9**	**300**	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	**110**	**140**	**250**	<0.2	<0.5	<1	<3	NA
SDUP3	0.0-0.2	FILL: Silty Sand	**5**	<0.4	**7**	**22**	**20**	<0.1	**3**	**78**	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	NA
SDUP3-Lab duplicate	0.0-0.2	FILL: Silty Sand	**4**	<0.4	**7**	**26**	**20**	<0.1	**4**	**100**	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	NA
SDUP5	0.14-0.3	FILL: Silty Clayey Sand	**7**	<0.4	**23**	**28**	**74**	<0.1	**14**	**110**	**0.06**	**0.06**	NA	NA	NA	NA	NA	<25	<50	<100	**180**	**180**	<0.2	<0.5	<1	<1	NA
SDUP5-Lab duplicate	0.14-0.3	FILL: Silty Clayey Sand	**8**	<0.4	**27**	**27**	**78**	<0.1	**18**	**130**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Number of samples			18	18	18	18	18	18	18	18	17	17	12	12	12	12	12	17	17	17	17	17	17	17	17	17	12
Maximum Value			11	<PQL	29	260	79	0.1	18	310	0.1	0.06	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	110	210	250	<PQL	<PQL	<PQL	<PQL	Not Detected

Concentration above the CT1 — **VALUE**
Concentration above SCC1 — **VALUE**
Concentration above the SCC2 — **VALUE**
Concentration above PQL — **Bold**

TABLE Q1
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 = BH3 (0.2-0.3)	Arsenic	4	5	<4	3.5	86
Dup Ref = SDUP1	Cadmium	0.4	<0.4	<0.4	NC	NC
	Chromium	1	19	12	15.5	45
Envirolab Report: 235189	Copper	1	240	260	250.0	8
	Lead	1	68	61	64.5	11
	Mercury	0.1	<0.1	<0.1	NC	NC
	Nickel	1	11	9	10.0	20
	Zinc	1	280	300	290.0	7
	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	140	190	165.0	30
	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

RPD Results Above the Acceptance Criteria VALUE

JKEnvironments

TABLE Q2
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 = BH5 (0-0.2)	Arsenic	4	5	5	5.0	0
Dup Ref = SDUP3	Cadmium	0.4	<0.4	<0.4	NC	NC
	Chromium	1	7	7	7.0	0
Envirolab Report: 235189	Copper	1	30	26	28.0	14
	Lead	1	21	20	20.5	5
	Mercury	0.1	<0.1	<0.1	NC	NC
	Nickel	1	4	4	4.0	0
	Zinc	1	88	100	94.0	13
	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 C6-C10 (F1)	25	<25	<25	NC	NC
	TRH >C10-C16 (F2)	50	<50	<50	NC	NC
	TRH >C16-C34 (F3)	100	<100	<100	NC	NC
	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

RPD Results Above the Acceptance Criteria VALUE

TABLE Q3
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 (0.14-0.3)	Arsenic	4	4	8	8	8.0	0
Dup Ref = SDUP5	Cadmium	0.4	0.4	<0.4	<0.4	NC	NC
	Chromium	1	1	21	27	24.0	25
Envirolab Report: 235189	Copper	1	1	24	27	25.5	12
Envirolab VIC Report: 19779	Lead	1	1	79	78	78.5	1
	Mercury	0.1	0.1	0.1	<0.1	0.1	67
	Nickel	1	1	12	18	15.0	40
	Zinc	1	1	100	130	115.0	26
	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	<0.1	<0.1	NC	NC
	Anthracene	0.1	0.1	<0.1	<0.1	NC	NC
	Fluoranthene	0.1	0.1	<0.1	<0.1	NC	NC
	Pyrene	0.1	0.1	<0.1	<0.1	NC	NC
	Benzo(a)anthracene	0.1	0.1	<0.1	<0.1	NC	NC
	Chrysene	0.1	0.1	<0.1	<0.1	NC	NC
	Benzo(b,j+k)fluoranthene	0.2	0.2	<0.2	<0.2	NC	NC
	Benzo(a)pyrene	0.05	0.05	<0.05	0.06	0.0	82
	Indeno(123-cd)pyrene	0.1	0.1	<0.1	<0.1	NC	NC
	Dibenzo(ah)anthracene	0.1	0.1	<0.1	<0.1	NC	NC
	Benzo(ghi)perylene	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	230	180	205.0	24
	TRH >C34-C40 (F4)	100	100	240	100	170.0	82
	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

RPD Results Above the Acceptance Criteria VALUE

TABLE Q4
GROUNDWATER INTRA-LABORATORY DUPLICATE RESULTS & RPD CALCULATIONS
All results in µg/L unless stated otherwise

SAMPLE	ANALYSIS	Envirolab PQL	INITIAL	REPEAT	MEAN	RPD %
Sample Ref = MW5	Arsenic	1	<1	<1	NC	NC
Dup Ref = GWDUP1	Cadmium	0.1	<0.1	<0.1	NC	NC
	Chromium	1	<1	<1	NC	NC
Envirolab Report: 235447	Copper	1	<1	<1	NC	NC
	Lead	1	<1	<1	NC	NC
	Mercury	0.05	<0.05	<0.05	NC	NC
	Nickel	1	6	6	6	0
	Zinc	1	36	35	36	3
	Naphthalene	0.2	<0.2	<0.2	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	0.1	<0.1	<0.1	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
	TRH C6-C10 (F1)	10	<10	<10	NC	NC
	TRH >C10-C16 (F2)	50	60	<50	43	82
	TRH >C16-C34 (F3)	100	<100	<100	NC	NC
	TRH >C34-C40 (F4)	100	<100	<100	NC	NC
	Benzene	1	<1	<1	NC	NC
	Toluene	1	<1	<1	NC	NC
	Ethylbenzene	1	<1	<1	NC	NC
	m+p-xylene	2	<2	<2	NC	NC
	o-xylene	1	<1	<1	NC	NC

RPD Results Above the Acceptance Criteria VALUE

TABLE Q5
GROUNDWATER INTER-LABORATORY DUPLICATE RESULTS & RPD CALCULATIONS
All results in µg/L unless stated otherwise

SAMPLE	ANALYSIS	Envirolab PQL	Envirolab VIC PQL	INITIAL	REPEAT	MEAN	RPD %
Sample Ref = MW1	Arsenic	1	1	<1	<1	NC	NC
Dup Ref = GWDUP2	Cadmium	0.1	0.1	<0.1	<0.1	NC	NC
	Chromium	1	1	<1	<1	NC	NC
Envirolab Report: 235447	Copper	1	1	3	3	3	0.0
Envirolab Vic Report: 19796	Lead	1	1	<1	<1	NC	NC
	Mercury	0.05	0.05	<0.05	<0.05	NC	NC
	Nickel	1	1	3	3	3	0.0
	Zinc	1	1	24	28	26	15.4
	Naphthalene	0.2	0.2	<0.2	<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	<0.1	<0.1	NC	NC
	Anthracene	0.1	0.1	<0.1	<0.1	NC	NC
	Fluoranthene	0.1	0.1	<0.1	<0.1	NC	NC
	Pyrene	0.1	0.1	<0.1	<0.1	NC	NC
	Benzo(a)anthracene	0.1	0.1	<0.1	<0.1	NC	NC
	Chrysene	0.1	0.1	<0.1	<0.1	NC	NC
	Benzo(b,j+k)fluoranthene	0.2	0.2	<0.2	<0.2	NC	NC
	Benzo(a)pyrene	0.1	0.1	<0.1	<0.1	NC	NC
	Indeno(123-cd)pyrene	0.1	0.1	<0.1	<0.1	NC	NC
	Dibenzo(ah)anthracene	0.1	0.1	<0.1	<0.1	NC	NC
	Benzo(ghi)perylene	0.1	0.1	<0.1	<0.1	NC	NC
	TRH C6-C10 (F1)	10	10	<10	<10	NC	NC
	TRH >C10-C16 (F2)	50	50	54	<50	39.5	73.4
	TRH >C16-C34 (F3)	100	100	<100	<100	NC	NC
	TRH >C34-C40 (F4)	100	100	<100	<100	NC	NC
	Benzene	1	1	<1	<1	NC	NC
	Toluene	1	1	<1	<1	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

RPD Results Above the Acceptance Criteria **VALUE**

TABLE Q6
SUMMARY OF FIELD QA/QC RESULTS

ANALYSIS	Envirolab PQL		TB-S1[S]	TS-S1[S]	TB-W1[W]	TS-W1[W]
			22.01.20	22.01.20	28.01.20	28.01.20
	mg/kg	µg/L	mg/kg	% Recovery	mg/kg	% Recovery
Benzene	0.2	0.2	<0.2	98%	<1	120%
Toluene	0.5	0.5	<0.5	98%	<1	122%
Ethylbenzene	1	1	<1	100%	<1	109%
m+p-xylene	2	2	<2	100%	<2	105%
o-xylene	1	1	<1	99%	<1	111%

Explanation:
[W] Sample type (water)
[S] Sample type (sand)
BTEX concentrations in trip spikes are presented as % recovery

Values above PQLs/Acceptance criteria **VALUE**

ABBREVIATIONS AND EXPLANATIONS

Abbreviations used in the Tables:

ADWG: AustralianDrinking Water Guidelines
ANZG Australian and New Zealand Guidelines
B(a)P: Benzo(a)pyrene
CRC: Cooperative Research Centre
ESLs: Ecological Screening Levels
GIL: Groundwater Investigation Levels
HILs: Health Investigation Levels
HSLs: Health Screening Levels
HSL-SSA: Health Screening Level-SiteSpecific Assessment
NA: Not Analysed
NC: Not Calculated
NEPM: National Environmental Protection Measure
NHMRC: National Health and Medical Research Council
NL: Not Limiting
NSL: No Set Limit
OCP: Organochlorine Pesticides
OPP: Organophosphorus Pesticides
PAHs: Polycyclic Aromatic Hydrocarbons
ppm: Parts per million
PCBs: Polychlorinated Biphenyls
PCE: Perchloroethylene (Tetrachloroethylene or Tetrachloroethene)
PQL: Practical Quantitation Limit
RS: Rinsate Sample
RSL: Regional Screening Levels
SAC: Site Assessment Criteria
SSA: Site Specific Assessment
SSHSLs Site Specific Health Screening Levels
TB: Trip Blank
TCA: 1,1,1 Trichloroethane (methyl chloroform)
TCE: Trichloroethylene (Trichloroethene)
TS: Trip Spike
TRH: Total Recoverable Hydrocarbons
UCL: Upper Level Confidence Limit on Mean Value
USEPA United States Environmental Protection Agency
VOCC: Volatile Organic Chlorinated Compounds
WHO: World Health Organisation

TABLE G1
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	
PQL - Envirolab Services				10	50	1	1	1	2	1	PID
NEPM 2013 - Land Use Category				**HSL-A/B: LOW/HIGH DENSITY RESIDENTIAL**							
Sample Reference	**Water Depth**	**Depth Category**	**Soil Category**								
MW1	3.45	2m to <4m	Clay	<10	**54**	<1	<1	<1	<2	<1	0.5
MW3	3.16	2m to <4m	Clay	<10	**81**	<1	<1	<1	<2	<1	5.7
MW5	3.68	2m to <4m	Clay	<10	**60**	<1	<1	<1	<2	<1	1.1
GWDUP1	3.68	2m to <4m	Clay	<10	<50	<1	<1	<1	<2	<1	NA
GWDUP2	3.45	2m to <4m	Clay	<10	<50	<1	<1	<1	<2	<1	NA
GWDUP2 - Lab duplicate	3.45	2m to <4m	Clay	<10	NA	<1	<1	<1	<2	<1	NA
Total Number of Samples				6	5	6	6	6	6	6	3
Maximum Value				<PQL	81	<PQL	<PQL	<PQL	<PQL	<PQL	5.7

Concentration above the SAC **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
MW1	3.45	2m to <4m	Clay	NL	NL	5000	NL	NL	NL	NL
MW3	3.16	2m to <4m	Clay	NL	NL	5000	NL	NL	NL	NL
MW5	3.68	2m to <4m	Clay	NL	NL	5000	NL	NL	NL	NL
GWDUP1	3.68	2m to <4m	Clay	NL	NL	5000	NL	NL	NL	NL
GWDUP2	3.45	2m to <4m	Clay	NL	NL	5000	NL	NL	NL	NL
GWDUP2 - Lab duplicate	3.45	2m to <4m	Clay	NL	NA	5000	NL	NL	NL	NL

TABLE G2
SUMMARY OF GROUNDWATER LABORATORY RESULTS COMPARED TO ECOLOGICAL GILs SAC
All results in µg/L unless stated otherwise.

	PQL Envirolab Services	ANZG 2018 Marine Waters	SAMPLES						
			MW1	MW1 - Lab duplicate	MW3	MW5	GWDUP1	GWDUP2	GWDUP2 - Lab duplicate
Inorganic Compounds and Parameters									
pH		7 - 8.5	7	NA	6.4	5	NA	NA	NA
Electrical Conductivity (µS/cm)	1	NSL	**1200**	NA	**3500**	**1600**	NA	NA	NA
Turbidity (NTU)		NSL	NA	NA	NA	NA	NA	NA	NA
Metals and Metalloids									
Arsenic (As III)	1	2.3	<1	<1	<1	<1	<1	<1	NA
Cadmium	0.1	0.7	<0.1	<0.1	**0.3**	<0.1	<0.1	<0.1	NA
Chromium (SAC for Cr III adopted)	1	27	<1	<1	<1	<1	<1	<1	NA
Copper	1	1.3	**3**	**3**	**2**	<1	<1	**3**	NA
Lead	1	4.4	<1	<1	<1	<1	<1	<1	NA
Total Mercury (inorganic)	0.05	0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	NA
Nickel	1	7	**3**	**3**	**27**	**6**	**6**	**3**	NA
Zinc	1	15	**23**	**24**	**160**	**36**	**35**	**28**	NA
Monocyclic Aromatic Hydrocarbons (BTEX Compounds)									
Benzene	1	500	<1	NA	<1	<1	<1	<1	<1
Toluene	1	180	<1	NA	<1	<1	<1	<1	<1
Ethylbenzene	1	5	<1	NA	<1	<1	<1	<1	<1
m+p-xylene	2	75	<2	NA	<2	<2	<2	<2	<2
o-xylene	1	350	<1	NA	<1	<1	<1	<1	<1
Total xylenes	2	NSL	<2	NA	<2	<2	<2	<2	<2
Volatile Organic Compounds (VOCs), including chlorinated VOCs									
Dichlorodifluoromethane	10	NSL	<10	NA	<10	<10	<10	<10	<10
Chloromethane	10	NSL	<10	NA	<10	<10	<10	<10	<10
Vinyl Chloride	10	100	<10	NA	<10	<10	<10	<10	<10
Bromomethane	10	NSL	<10	NA	<10	<10	<10	<10	<10
Chloroethane	10	NSL	<10	NA	<10	<10	<10	<10	<10
Trichlorofluoromethane	10	NSL	<10	NA	<10	<10	<10	<10	<10
1,1-Dichloroethene	1	700	<1	NA	<1	<1	<1	<1	<1
Trans-1,2-dichloroethene	1	NSL	<1	NA	<1	<1	<1	<1	<1
1,1-dichloroethane	1	250	<1	NA	<1	<1	<1	<1	<1
Cis-1,2-dichloroethene	1	NSL	<1	NA	<1	<1	<1	<1	<1
Bromochloromethane	1	NSL	<1	NA	<1	<1	<1	<1	<1
Chloroform	1	370	<1	NA	<1	<1	<1	<1	<1
2,2-dichloropropane	1	NSL	<1	NA	<1	<1	<1	<1	<1
1,2-dichloroethane	1	1900	<1	NA	<1	<1	<1	<1	<1
1,1,1-trichloroethane	1	270	<1	NA	<1	<1	<1	<1	<1
1,1-dichloropropene	1	NSL	<1	NA	<1	<1	<1	<1	<1
Cyclohexane	1	NSL	<1	NA	<1	<1	<1	<1	<1
Carbon tetrachloride	1	240	<1	NA	<1	<1	<1	<1	<1
Benzene	1	500	<1	NA	<1	<1	<1	<1	<1
Dibromomethane	1	NSL	<1	NA	<1	<1	<1	<1	<1
1,2-dichloropropane	1	900	<1	NA	<1	<1	<1	<1	<1
Trichloroethene	1	330	<1	NA	<1	<1	<1	<1	<1
Bromodichloromethane	1	NSL	<1	NA	<1	<1	<1	<1	<1
trans-1,3-dichloropropene	1	NSL	<1	NA	<1	<1	<1	<1	<1
cis-1,3-dichloropropene	1	NSL	<1	NA	<1	<1	<1	<1	<1
1,1,2-trichloroethane	1	1900	<1	NA	<1	<1	<1	<1	<1
Toluene	1	180	<1	NA	<1	<1	<1	<1	<1
1,3-dichloropropane	1	1100	<1	NA	<1	<1	<1	<1	<1
Dibromochloromethane	1	NSL	<1	NA	<1	<1	<1	<1	<1
1,2-dibromoethane	1	NSL	<1	NA	<1	<1	<1	<1	<1
Tetrachloroethene	1	70	<1	NA	<1	<1	<1	<1	<1
1,1,1,2-tetrachloroethane	1	NSL	<1	NA	<1	<1	<1	<1	<1
Chlorobenzene	1	55	<1	NA	<1	<1	<1	<1	<1
Ethylbenzene	1	5	<1	NA	<1	<1	<1	<1	<1
Bromoform	1	NSL	<1	NA	<1	<1	<1	<1	<1
m+p-xylene	2	75	<2	NA	<2	<2	<2	<2	<2
Styrene	1	NSL	<1	NA	<1	<1	<1	<1	<1
1,1,2,2-tetrachloroethane	1	400	<1	NA	<1	<1	<1	<1	<1
o-xylene	1	350	<1	NA	<1	<1	<1	<1	<1
1,2,3-trichloropropane	1	NSL	<1	NA	<1	<1	<1	<1	<1
Isopropylbenzene	1	30	<1	NA	<1	<1	<1	<1	<1
Bromobenzene	1	NSL	<1	NA	<1	<1	<1	<1	<1
n-propyl benzene	1	NSL	<1	NA	<1	<1	<1	<1	<1
2-chlorotoluene	1	NSL	<1	NA	<1	<1	<1	<1	<1
4-chlorotoluene	1	NSL	<1	NA	<1	<1	<1	<1	<1
1,3,5-trimethyl benzene	1	NSL	<1	NA	<1	<1	<1	<1	<1
Tert-butyl benzene	1	NSL	<1	NA	<1	<1	<1	<1	<1
1,2,4-trimethyl benzene	1	NSL	<1	NA	<1	<1	<1	<1	<1
1,3-dichlorobenzene	1	260	<1	NA	<1	<1	<1	<1	<1
Sec-butyl benzene	1	NSL	<1	NA	<1	<1	<1	<1	<1
1,4-dichlorobenzene	1	60	<1	NA	<1	<1	<1	<1	<1
4-isopropyl toluene	1	NSL	<1	NA	<1	<1	<1	<1	<1
1,2-dichlorobenzene	1	160	<1	NA	<1	<1	<1	<1	<1
n-butyl benzene	1	NSL	<1	NA	<1	<1	<1	<1	<1
1,2-dibromo-3-chloropropane	1	NSL	<1	NA	<1	<1	<1	<1	<1
1,2,4-trichlorobenzene	1	20	<1	NA	<1	<1	<1	<1	<1
Hexachlorobutadiene	1	NSL	<1	NA	<1	<1	<1	<1	<1
1,2,3-trichlorobenzene	1	3	<1	NA	<1	<1	<1	<1	<1
Polycyclic Aromatic Hydrocarbons (PAHs)									
Naphthalene	0.2	50	<0.2	<0.2	<0.2	<0.2	<0.2	<0.1	NA
Acenaphthylene	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
Acenaphthene	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
Fluorene	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
Phenanthrene	0.1	0.6	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
Anthracene	0.1	0.01	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
Fluoranthene	0.1	1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
Pyrene	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
Benzo(a)anthracene	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
Chrysene	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
Benzo(b,j+k)fluoranthene	0.2	NSL	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	NA
Benzo(a)pyrene	0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
Indeno(1,2,3-c,d)pyrene	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
Dibenzo(a,h)anthracene	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
Benzo(g,h,i)perylene	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA

Concentration above the SAC	**VALUE**
Concentration above the PQL	**Bold**
GIL >PQL	Red

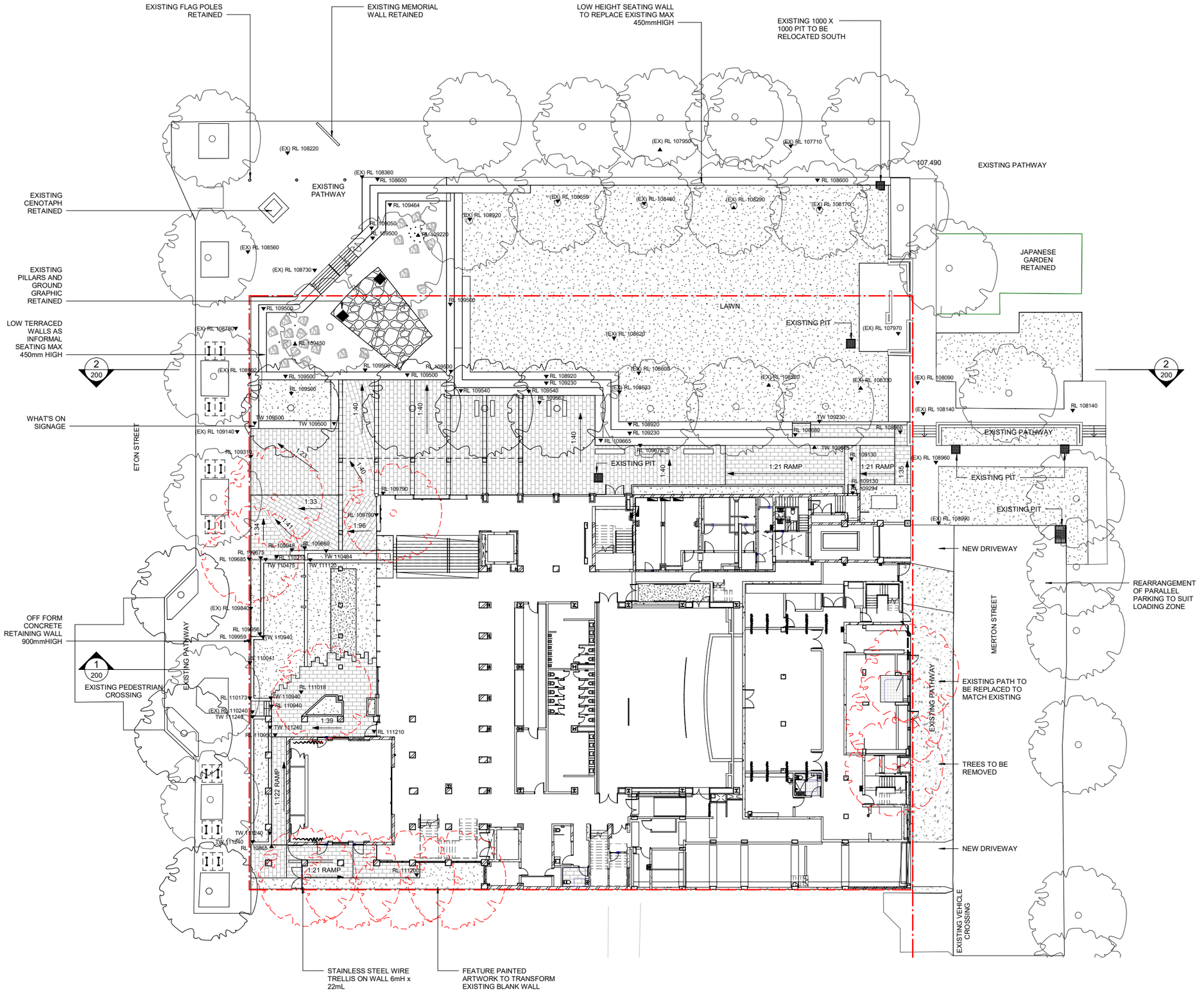
TABLE G3
GROUNDWATER LABORATORY RESULTS COMPARED TO SITE SPECIFIC HSLs - RISK ASSESSMENT
All results in µg/L unless stated otherwise.

	PQL Envirolab Services	NHMRC ADWG 2011 (v3.5 2018)	WHO 2008	USEPA RSL Tapwater 2017	SAMPLES						
					MW1	MW1 - Lab duplicate	MW3	MW5	GWDUP1	GWDUP2	GWDUP2 - Lab duplicate
Total Recoverable Hydrocarbons (TRH)											
C_6-C_9 Aliphatics (assessed using F1)	10	-	15000	-	<10	NA	<10	<10	<10	<10	<10
>C_9-C_{14} Aliphatics (assessed using F2)	50	-	100	-	**54**	[NT]	**81**	**60**	<50	<50	NA
Monocyclic Aromatic Hydrocarbons (BTEX Compounds)											
Benzene	1	1	-	-	<1	NA	<1	<1	<1	<1	<1
Toluene	1	800	-	-	<1	NA	<1	<1	<1	<1	<1
Ethylbenzene	1	300	-	-	<1	NA	<1	<1	<1	<1	<1
Total xylenes	2	600	-	-	<2	NA	<2	<2	<2	<2	<2
Polycyclic Aromatic Hydrocarbons (PAHs)											
Naphthalene	1	-	-	6.1	<1	NA	<1	<1	<1	<1	<1
Volatile Organic Compounds (VOCs), including chlorinated VOCs											
Dichlorodifluoromethane	10	-	-	-	<10	NA	<10	<10	<10	<10	<10
Chloromethane	10	-	-	-	<10	NA	<10	<10	<10	<10	<10
Vinyl Chloride	10	0.3	-	-	<10	NA	<10	<10	<10	<10	<10
Bromomethane	10	-	-	-	<10	NA	<10	<10	<10	<10	<10
Chloroethane	10	-	-	-	<10	NA	<10	<10	<10	<10	<10
Trichlorofluoromethane	10	-	-	-	<10	NA	<10	<10	<10	<10	<10
1,1-Dichloroethene	1	30	-	-	<1	NA	<1	<1	<1	<1	<1
Trans-1,2-dichloroethene	1	60	-	-	<1	NA	<1	<1	<1	<1	<1
1,1-dichloroethane	1	-	-	-	<1	NA	<1	<1	<1	<1	<1
Cis-1,2-dichloroethene	1	60	-	-	<1	NA	<1	<1	<1	<1	<1
Bromochloromethane	1	250	-	-	<1	NA	<1	<1	<1	<1	<1
Chloroform	1		-	-	<1	NA	<1	<1	<1	<1	<1
2,2-dichloropropane	1	-	-	-	<1	NA	<1	<1	<1	<1	<1
1,2-dichloroethane	1	3	-	-	<1	NA	<1	<1	<1	<1	<1
1,1,1-trichloroethane	1	-	-	-	<1	NA	<1	<1	<1	<1	<1
1,1-dichloropropene	1	-	-	-	<1	NA	<1	<1	<1	<1	<1
Cyclohexane	1	-	-	-	<1	NA	<1	<1	<1	<1	<1
Carbon tetrachloride	1	3	-	-	<1	NA	<1	<1	<1	<1	<1
Benzene	1	1	-	-	<1	NA	<1	<1	<1	<1	<1
Dibromomethane	1	-	-	-	<1	NA	<1	<1	<1	<1	<1
1,2-dichloropropane	1	-	-	-	<1	NA	<1	<1	<1	<1	<1
Trichloroethene	1	-	-	-	<1	NA	<1	<1	<1	<1	<1
Bromodichloromethane	1	-	-	-	<1	NA	<1	<1	<1	<1	<1
trans-1,3-dichloropropene	1	100	-	-	<1	NA	<1	<1	<1	<1	<1
cis-1,3-dichloropropene	1	100	-	-	<1	NA	<1	<1	<1	<1	<1
1,1,2-trichloroethane	1	-	-	-	<1	NA	<1	<1	<1	<1	<1
Toluene	1	800	-	-	<1	NA	<1	<1	<1	<1	<1
1,3-dichloropropane	1	-	-	-	<1	NA	<1	<1	<1	<1	<1
Dibromochloromethane	1	-	-	-	<1	NA	<1	<1	<1	<1	<1
1,2-dibromoethane	1	-	-	-	<1	NA	<1	<1	<1	<1	<1
Tetrachloroethene	1	50	-	-	<1	NA	<1	<1	<1	<1	<1
1,1,1,2-tetrachloroethane	1	-	-	-	<1	NA	<1	<1	<1	<1	<1
Chlorobenzene	1	300	-	-	<1	NA	<1	<1	<1	<1	<1
Ethylbenzene	1	300	-	-	<1	NA	<1	<1	<1	<1	<1
Bromoform	1	-	-	-	<1	NA	<1	<1	<1	<1	<1
m+p-xylene	2	-	-	-	<2	NA	<2	<2	<2	<2	<2
Styrene	1	30	-	-	<1	NA	<1	<1	<1	<1	<1
1,1,2,2-tetrachloroethane	1	-	-	-	<1	NA	<1	<1	<1	<1	<1
o-xylene	1	-	-	-	<1	NA	<1	<1	<1	<1	<1
1,2,3-trichloropropane	1	-	-	-	<1	NA	<1	<1	<1	<1	<1
Isopropylbenzene	1	-	-	-	<1	NA	<1	<1	<1	<1	<1
Bromobenzene	1	-	-	-	<1	NA	<1	<1	<1	<1	<1
n-propyl benzene	1	-	-	-	<1	NA	<1	<1	<1	<1	<1
2-chlorotoluene	1	-	-	-	<1	NA	<1	<1	<1	<1	<1
4-chlorotoluene	1	-	-	-	<1	NA	<1	<1	<1	<1	<1
1,3,5-trimethyl benzene	1	-	-	-	<1	NA	<1	<1	<1	<1	<1
Tert-butyl benzene	1	-	-	-	<1	NA	<1	<1	<1	<1	<1
1,2,4-trimethyl benzene	1	-	-	-	<1	NA	<1	<1	<1	<1	<1
1,3-dichlorobenzene	1	20	-	-	<1	NA	<1	<1	<1	<1	<1
Sec-butyl benzene	1	-	-	-	<1	NA	<1	<1	<1	<1	<1
1,4-dichlorobenzene	1	40	-	-	<1	NA	<1	<1	<1	<1	<1
4-isopropyl toluene	1	-	-	-	<1	NA	<1	<1	<1	<1	<1
1,2-dichlorobenzene	1	1500	-	-	<1	NA	<1	<1	<1	<1	<1
n-butyl benzene	1	-	-	-	<1	NA	<1	<1	<1	<1	<1
1,2-dibromo-3-chloropropane	1	-	-	-	<1	NA	<1	<1	<1	<1	<1
1,2,4-trichlorobenzene	1	30	-	-	<1	NA	<1	<1	<1	<1	<1
1,2,3-trichlorobenzene	1		-	-	<1	NA	<1	<1	<1	<1	<1
Hexachlorobutadiene	1	7	-	-	<1	NA	<1	<1	<1	<1	<1

Concentration above the SAC — **VALUE**
Concentration above the PQL — **Bold**
GIL >PQL — Red

Appendix C: Site Information and Site History

Proposed Development Plans



Issue

No.	Date	Description	Chkd
2	27/08/2019	Concept Plan for Council Presentation	
3	15/10/2019	Schematic Design for QS	
4	16/10/2019	Schematic Design for PWG	
5	30/10/2019	Updated Schematic	
6	04/11/2019	Updated Schematic	
7	11/11/2019	For Exhibition	
8	22/11/2019	Updated Schematic for QS	
9	29/11/2019	Schematic Design Issue	
10	17/01/2020	Draft DA	

Drawing Title
LANDSCAPE SITE PLAN

Project
Sutherland Shire Entertainment Centre (SEC)
at
30 Eaton Street, Sutherland NSW

for
Sutherland Shire Council (SSC REF. 17700)

Landscape Architect
NBRS ARCHITECTURE. LANDSCAPE
Sydney
61 2 9922 2344
nbrsarchitecture.com

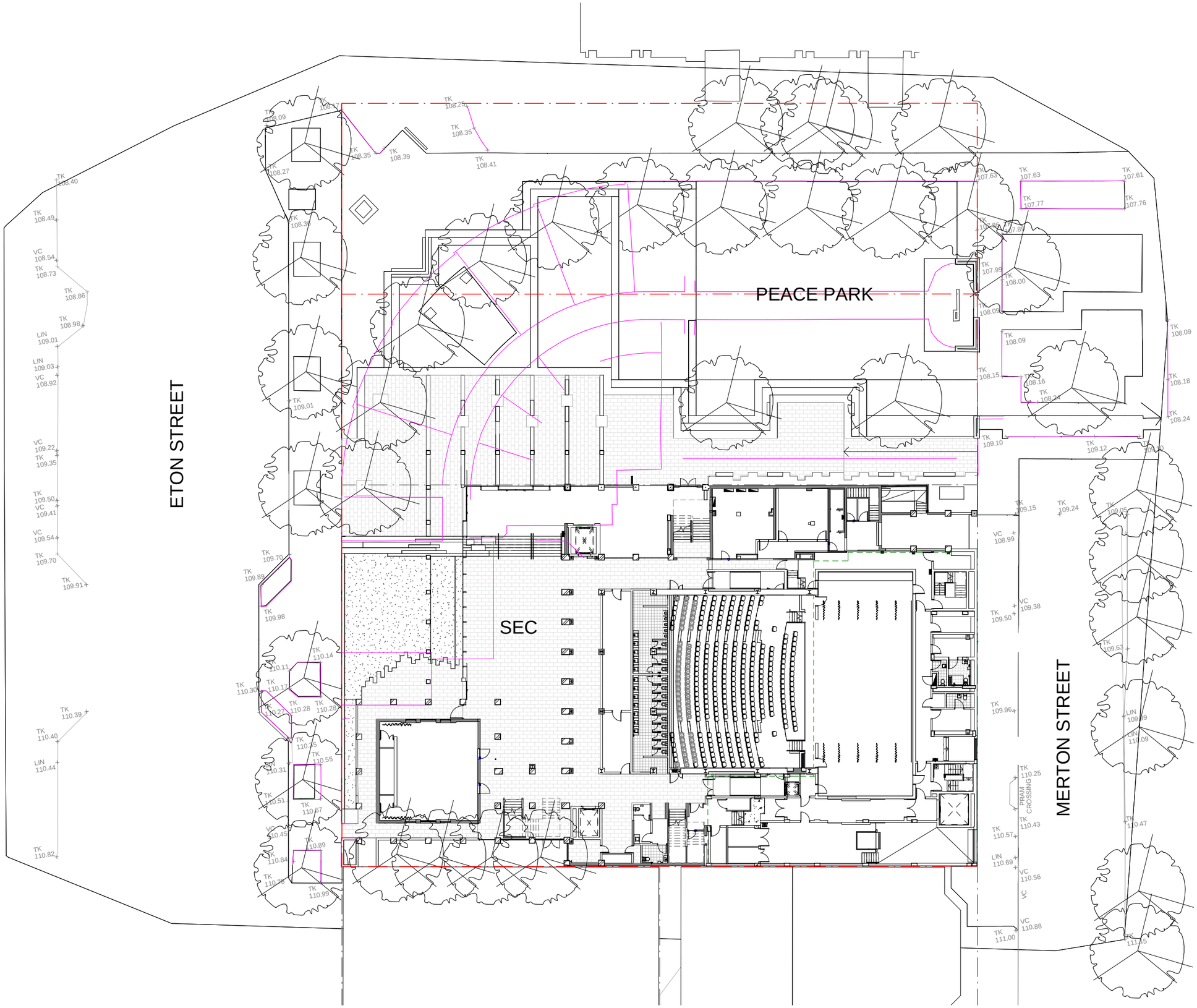
Nominated Architects:
Andrew Duffin NSW 5602
NBRS & Partners Pty Ltd VIC 51197
ABN 16 002 247 565

SCC Ref. No 17700

Date 1/17/2020 12:31:26 PM
Scale 1 : 200 @ A1

Drawing Reference
18465-NBRS-L-100

Revision
10



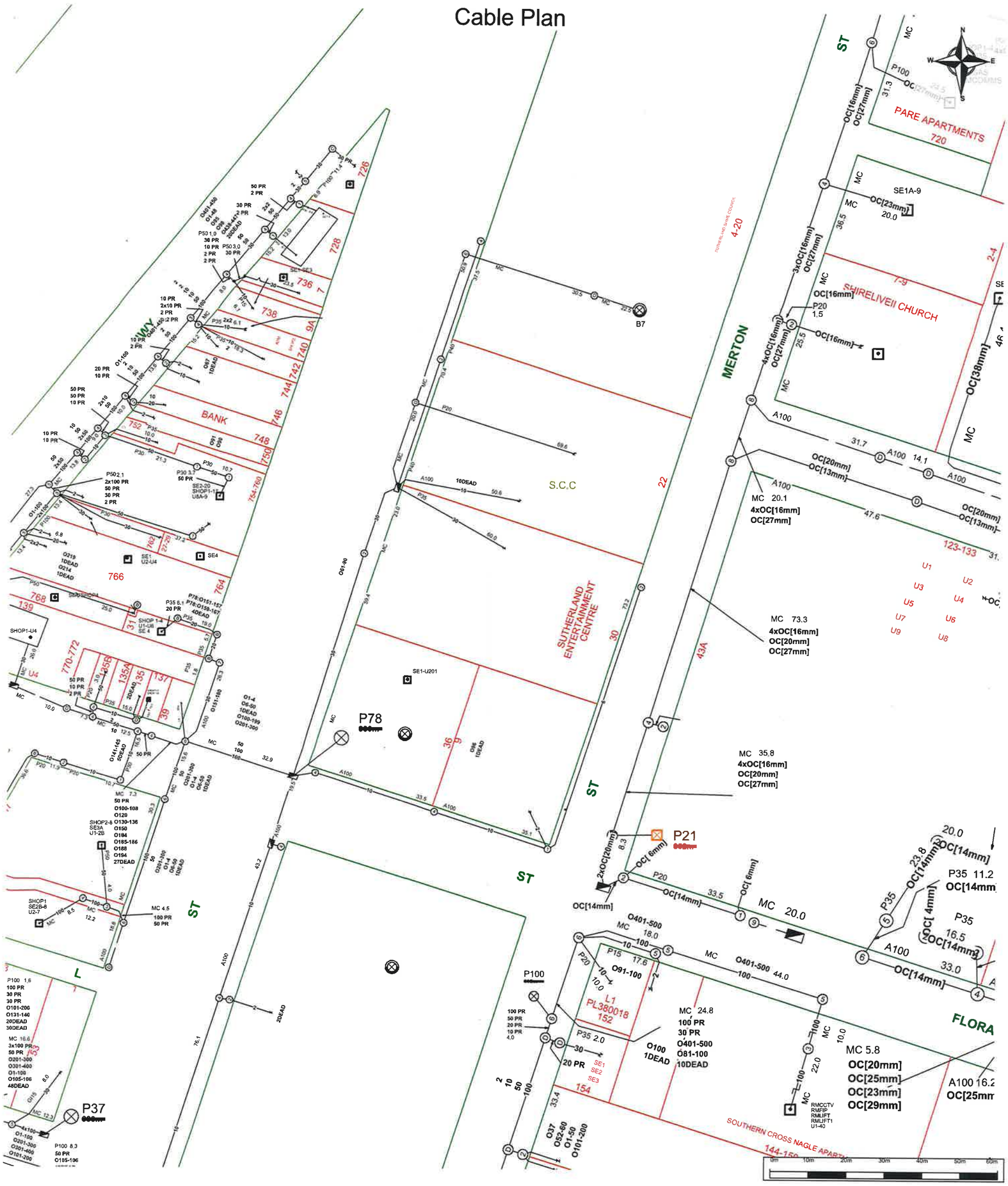
CHROFI | NBRSARCHITECTURE.

Sutherland Shire Entertainment Centre

Site Plan

Dial Before You Dig Services Plans

Cable Plan



For all Telstra DBYD plan enquiries -
email - Telstra.Plans@team.telstra.com
For urgent onsite contact only - ph 1800 653 935 (bus hrs)

TELSTRA CORPORATION LIMITED A.C.N. 051 775 556

Sequence Number: 92915637

Generated On 06/12/2019 11:10:10

CAUTION: Critical Network Route in plot area.
DO NOT PROCEED with any excavation prior to seeking advice from Telstra Plan Services on : 1800 653 935

The above plan must be viewed in conjunction with the Mains Cable Plan on the following page

SU544 - MC1

Ref: C9

SU54413

SU54414

ETON ST

MERTON ST

SU54413

SU54414

WARNING

Ausgrid

GMLA0

Distribution - 92915636

Page 1 of 1

5 Dec 2019

1:169

10 metres