REPORT TO

ERILYAN

ON

ADDITIONAL ENVIRONMENTAL SITE ASSESSMENT

FOR

PROPOSED MEDICAL CENTRE

AT

LOT 7 IN DP1020015 – 49 FRENCHS FOREST ROAD EAST, FRENCHS FOREST, NSW

Date: 9 December 2019
Ref: E32505BTrpt2Rev2

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Executive Summary

Erilyan ('the client') commissioned JK Environments (JKE) to undertake an Additional Environmental Site Assessment (AESA) for the proposed medical centre at Lot 7 in DP1020015 – 49 Frenchs Forest Road East, Frenchs Forest, NSW ('the site'). The site location is shown on Figure 1 and the assessment was confined to the site boundaries as shown on Figure 2.

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

JKE have previously undertaken a Preliminary Stage 1 Environmental Site Assessment at the site. A summary of this information has been included in Section 2.

It is understood the proposed development includes construction of a four-storey building with roof top plant rooms, over four levels of basement incorporating parking and proposed clinical radiation bunker zone. It is assumed that excavation of at least 13m will be required for the basement construction.

The site is currently leased to a contractor and is being used as a storage yard associated with works on the surrounding road upgrades. Two pages of the conditions of the Lease were provided to JKE for review. JKE consider it likely the stockpiled materials (eight stockpiles) and a minimum of 300mm of earth below the top of grade will be removed from the site prior to handover of the site for the proposed development.

The primary aims of the assessment were to provide additional information for the proposed development. The assessment objectives were to:

- Review existing conceptual site model (CSM) based on investigation findings;
- Assess the contamination conditions of the in-situ soil via implementation of a sampling and analysis program;
- Assess the contamination conditions of the stockpiled materials and potential for residual risk to the site via a preliminary sampling program;
- Assess the potential risks posed by contamination to the receptors identified in the CSM (Tier 1 assessment);
- Provide a waste classification for off-site disposal of in-situ 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 AESA included a walkover site inspection, soil sampling from seven test pits for in-situ soil assessment and sampling from eight stockpiles of fill and gravel material for screening purposes. The walkover inspection confirmed the site was being utilised as a storage yard and comprised several soil (fill) and gravel stockpiles. No visible or olfactory indicators of contamination were observed during the site inspection.

The assessments identified in-situ fill material to depths of between approximately 0.5m below ground level (BGL) and 1.3mBGL, underlain by residual silty clay and clayey sand soils. The fill comprised gravelly sand, silty clay, silty sand and silty sandy clay. The fill contained inclusions of igneous, ironstone and sandstone gravel, brick fragments, concrete fragments, asphalt fragments, ash, tile fragments and slag. A selection of soil samples were analysed for the contaminants of potential concern (CoPC) identified in the CSM. Elevated concentrations of the CoPC were not encountered above the adopted SAC in any of the in-situ soil samples.

Eight stockpiles were sampled and screened for a selection of the CoPC. The stockpiles ranged in volume from 7.5m^3 to 85m^3. Stockpiled materials generally comprised gravelly sand, silty sand, sand or sandy gravel. One stockpile sample reported an elevated total recoverable hydrocarbon (TRH F2) concentration above the ecological SAC. Ecological risks associated with this exceedance were assessed and were considered to be negligible.

Based on the findings of the assessment, the proposed development as outlined in Section 1.1, and with consideration of the conditions of the Lease as outlined in Section 2.1.2, JKE are of the opinion that the site is suitable for the proposed development and that potential risks associated with contamination at the site are low and further investigation (or remediation) is not considered to be required.

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

Table of Contents

List of Tables

Attachments

Abbreviations

Additional Environmental Site Assessment	**ESA**
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**
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**
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**
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**
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

Erilyan ('the client') commissioned JK Environments (JKE) to undertake an Additional Environmental Site Assessment (AESA) for the proposed medical centre at Lot 7 in DP1020015 – 49 Frenchs Forest Road East, Frenchs Forest, NSW ('the site'). The site location is shown on Figure 1 and the assessment was confined to the site boundaries as shown on Figure 2.

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

JKE have previously undertaken a Preliminary Stage 1 Environmental Site Assessment at the site. A summary of this information has been included in Section 2.

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

1.1 Proposed Development Details

It is understood the proposed development includes construction of a four-storey medical centre with roof top plant rooms over four levels of basement incorporating parking and proposed clinical radiation bunker zone. It is assumed that excavation of at least 13m will be required for the basement construction.

1.2 Aims and Objectives

The primary aims of the assessment were to provide additional information for the proposed development. The assessment objectives were to:

- Review existing conceptual site model (CSM) based on investigation findings;
- Assess the soil contamination conditions of the in-situ soil via implementation of a sampling and analysis program;
- Assess the contamination conditions of the stockpiled materials and the potential for residual risk to the site (following vacation of the site by the lessee) via a preliminary sampling program;
- Assess the potential risks posed by contamination to the receptors identified in the CSM (Tier 1 assessment);
- Provide a waste classification for off-site disposal of in-situ 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: EP50714BT) of 15 November 2019 and written acceptance from the client of 19 November 2019. The scope of work included the following:

- Review of previous JKE report (dated 30 August 2019[1]);
- Preparation of a CSM;
- Design and implementation of a sampling, analysis and quality plan (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)[2], other guidelines made under or with regards to the Contaminated Land Management Act (1997)[3] and State Environmental Planning Policy No.55 – Remediation of Land (1998)[4]. A list of reference documents/guidelines is included in the appendices.

[1] Report to Forest Central Business Park Pty Ltd on Preliminary Stage 1 Environmental Site Assessment for Proposed Commercial Development at Lot 7 in DP1020015 – 49 Frenchs Forest Road East, Frenchs Forest, NSW (report ref: E32505BTrpt, dated 30 August 2019) (referred to as JKE PESA report 2019).

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

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

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

2 SITE INFORMATION

2.1 Background

2.1.1 PESA, JKE (August 2019)

In August 2019, JKE were engaged to undertake a PESA at the site. The scope of works included a site history review, walkover inspection and soil sampling from seven boreholes (BH1 to BH7, refer to Figure 2). The site history review indicated that the site was owned or leased to individuals with professions listed as grazier, fruiter and or farmer and aerial photographs showed that the site was part of a larger cleared and potentially agricultural property up until around 1956. The site inspection also identified stockpiles of fill soil being stored on the site.

Fill was encountered at the surface in all boreholes and extended to depths of approximately 0.3m to 1.0m. The fill typically comprised silty gravelly clay, silty clay and silty clayey gravel with inclusions of igneous gravel, ash and sand. Natural residual silty clay material was encountered beneath the fill in all boreholes. Groundwater was not encountered in any of the boreholes drilled for the PESA to a maximum depth of 5.1m below ground level (BGL).

Based on the scope of work undertaken for the PESA, the following potential contamination sources/areas of environmental concern (AEC):

- Fill material;
- Agricultural land use; and
- Hazardous building materials.

As the site was identified as being utilised for agricultural purposes, an activity that may cause contamination as listed in Table 1 of the SEPP55 Planning Guidelines, the requirement for a Stage 2 investigation was triggered. In addition, although soil sampling had been undertaken as part of the PESA, the majority of the western portion of the site and areas beneath the stored materials were not assessed due to accessibility constraints.

The report concluded by recommending the following:

- Sampling and analysis of the stockpiled materials should be undertaken in accordance with the NSW EPA Waste Classification Guidelines prior to offsite disposal of the material;
- Following removal of the stockpiles and other stored materials, an inspection of the site surface should be undertaken across the site; and
- Additional sampling should be undertaken in the western portion of the site beneath the stockpiled materials following their removal to confirm the preliminary waste classification and characterise the site contamination conditions in this section of the site.

It was subsequently established that the stockpiles were the lessee's responsibility in terms of re-use and/or disposal. Therefore, the recommendation in point one above did not need to be implemented by the client (on the assumption the lessee is operating under an appropriate Environment Protection License and would need to manage these materials under that licence and/or the Lease – see Section 2.1.2 for further details).

Data obtained during the PESA has been presented in the laboratory summary tables in the appendices alongside the data obtained during the current assessment.

2.1.2 Lessee Agreement - Condition 25.1(a)(3) (00197188.DOC;1)

In October 2019, the client provided JKE with a copy of pages 44 and 45 of document reference 00197188.DOC:1, which the client indicated to be pages extracted from the Lessor Agreement with the current Lessee. The following condition was noted:

> *'Condition 25.1(a)(3)The Lessee must carry out the following works: on or before the termination or expiry of this lease, the Lessee must remove from the Land, everything that it has brought onto or placed on the Land including all pavement material and a minimum of 300mm of earth below the top of grade, so that no residual material is left on the Land, and must provide a certificate addressed to the Lessor, from a consultant acceptable to the Lessor, certifying that all material over the entirety of the Premises is Virgin Excavated Natural Material (as defined in the Protection of the Environment Operations Act 1997).'*

The following is noted based on the pages provided:

- A document reference number is provided in the footer of each page however no date or other identifying references are provided;
- No identifier is provided on either page for the Land/Premises being referred to within the Conditions presented; and
- It is noted that page 44, on which Condition 25.1(a)(3) was presented, was not signed, however page 45 was.

JKE note the conditions of the Lessor Agreement and consider it likely the stockpiled materials (eight stockpiles) and a minimum of 300mm of earth below the top of grade will be removed from the site prior to handover of the site for the proposed development. Based on this assumption, a waste classification of the stockpiles was not undertaken.

2.2 Site Identification

Table 2-1: Site Identification

Current Site Owner:	Forest Central Business Park Pty Limited
Site Address:	49 Frenchs Forest Road East, Frenchs Forest, NSW
Lot & Deposited Plan:	Lot 7 in DP1020015
Current Land Use:	Storage yard for civil works (assumed to be Warringah Road upgrade)
Proposed Land Use:	Commercial (medical centre)
Local Government Authority:	Northern Beaches Council
Current Zoning:	B7 – Business Park

Site Area (m^2):	1,800
RL (AHD in m) (approx.):	158.72 – 160.25
Geographical Location (decimal degrees) (approx.):	Latitude: -33.752629 Longitude: 151.239671
Site Location and Regional Setting:	The site is located in a predominantly commercial area of Frenchs Forest. The site is bounded by Warringah Road to the south. The site is located approximately 1.1km to the south-west of Middle Creek.
Topography:	The regional topography is generally flat with the site itself sloping down towards the south at approximately 5° to Warringah Road. Parts of the site appear to have been levelled to account for the current site use as a storage yard.
Regional geology:	The site is underlain by Triassic aged deposits of the Wianamatta Group, which typically consists of shale and laminite.
Acid Sulfate Soil (ASS) Risk and Planning:	The site is not located within an ASS risk area.
Hydrogeology:	Subsurface conditions at the site consist of relatively low permeability (residual) soils overlying shallow bedrock. The potential for viable groundwater abstraction and use of groundwater under these conditions is considered to be low. There is a reticulated water supply in the area and consumption of groundwater is not expected to occur. Use of groundwater is not proposed as part of the development. Of the 28 registered bores within 2km of the site, no nearby bores were registered for domestic or irrigation uses. Considering the local topography and surrounding land features, JKE would generally expect groundwater to flow towards the south-west.
Receiving water bodies:	Surface water bodies were not identified in the immediate vicinity of the site. The closest surface water body is Middle Creek located approximately 1.1km to the north-east of the site, however this is located over a ridgeline from the site and not considered to be a potential receptor. The closest down-gradient surface water receptor is Manly Creek located approximately 1.04km south of the site. This is down-gradient, however due to the distance from site, it is not considered to be a potential receptor.
Underground Services:	The DBYD plans reviewed for the PESA indicated that a sewer main extends through the central section of the site in a north-south direction (refer to Figure 2). The sewer is understood to be at a depth of approximately 3m below ground and also extends through the business park (commercial) located to the north of the site. Considering the geological conditions (discussed above), there is a potential for the sewer trench to act as a preferential pathway for contamination migration (i.e. through relatively permeable backfill).

2.3 Site Inspection

A walkover inspection of the site was undertaken by JKE on 20 November 2019. The site was relatively similar to the observation made during the PESA:

- The site was being utilised as a storage yard and comprised eight stockpiles of imported materials generally comprising sandy or gravelly fill material (refer to Section 6.3 and Figure 3);
- No visible or olfactory indicators of contamination were observed during the site inspection;
- It would be expected that any surface water and run off would flow towards the south in keeping with the site topography. Stormwater pits were not observed on the site;
- Sensitive environments such as wetlands, ponds, creeks or extensive areas of natural vegetation were not identified on site or in the immediate surrounds; and
- Vegetation was observed along the southern boundary and included small to medium trees and shrubs. The vegetation appeared to be in good condition based on a cursory inspection with little to no die back evident.

2.4 Surrounding Land Use

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

- North – Forest Central Business Park (commercial office spaces);
- South – Warringah Road with further commercial business beyond;
- East – asphaltic concrete covered car park also utilised for weekend market stalls; and
- West – Forest Central Business Park (commercial office spaces) and other commercial properties beyond.

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

2.5 Site History Summary

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 information presented in the JKE PESA report 2019 and current site inspection findings.

Table 2-2: Summary of Historical Land Uses

Year(s)	Potential Land Use / Activities	Supporting Evidence
Pre-1954	• Agricultural land-use (fruit growing, market gardens and/or grazing).	Historical land title records indicated that the site was owned or leased to individuals with professions listed as grazier, fruiter and or farmer. Significant contamination of the land may have occurred as a result of these professions and any site related activities. Aerial photographs indicated that the site was part of a large cleared and potentially agricultural property during this time.

Year(s)	Potential Land Use / Activities	Supporting Evidence
2002 - 2005	• Potential filling of the site may have occurred during the construction of former building and structures on the site; • Construction/demolition of buildings; and • Potential hazardous building materials within existing buildings/structures.	Aerial photographs indicated a structure on the site and exposed soils at the surface during the time period.
2009 – 2018	• Storage of materials (stockpiles for road upgrade works); and • Storage of plant/vehicles.	Potential for contamination of the site from storage of contaminated materials (stockpiles) and other civil works materials.

3 CONCEPTUAL SITE MODEL

3.1 Potential Contamination Sources/AEC and CoPC

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

Table 3-1: Potential (and/or known) Contamination Sources/AEC and Contaminants of Potential Concern

Source / AEC	CoPC
Fill material – The site has been historically filled to achieve the existing levels. The fill may have been imported from various sources and could be contaminated. During the PESA, fill stockpiles were observed onsite and aerial photographs indicated that the site has been utilised as a civil storage yard since at least 2009. During the PESA, in-situ fill was encountered at depths of between 0.3m to 1.0m and typically comprised silty gravelly clay, silty clay and silty clayey gravel with inclusions of igneous gravel, ash and sand.	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.
Historical agricultural use – The site appears to have been used for grazing, fruit growing and or farming purposes. This could have resulted in contamination across the site via use of machinery, application of pesticides and building/demolition of various structures.	Heavy metals, TRH, PAHs, OCPs, OPPs and asbestos JKE note that pesticides only became commercially available in the 1940s. Prior to this time pesticides were predominantly heavy metal compounds.
Hazardous Building Material – Hazardous building materials may be present as a result of former building and demolition activities.	Asbestos, lead and PCBs

3.2 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 3-2: CSM

Potential mechanism for contamination	Potential mechanisms for contamination include: • Fill material – importation of impacted material, 'top-down' impacts (e.g. placement of fill, leaching from surficial material etc), or sub-surface release (e.g. impacts from buried material); • Historical agricultural use – 'top-down' and spills (e.g. application of pesticides, refuelling or repairing machinery, and other activities at the ground surface level); and • Hazardous building materials – 'top-down' (e.g. demolition resulting in surficial impacts in unpaved areas).

Affected media	Soil has been identified as the potentially affected medium. The potential for groundwater impacts is considered to be relatively low. However, groundwater would need to be considered in the event significant contamination was identified in soil.
Receptor identification	Human receptors include site occupants/users (predominantly including adults in a commercial exposure scenario), construction workers and intrusive maintenance workers. Off-site human receptors include adjacent land users. Ecological receptors include terrestrial organisms and plants within unpaved areas (including the proposed landscaped 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 and BTEX). The potential for exposure would typically be associated with the construction and excavation works, and future use of the site. Potential exposure pathways for ecological receptors include primary contact and ingestion. 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 spaces such as buildings and basements.
Potential exposure mechanisms	The following have been identified as potential exposure mechanisms for site contamination: • Vapour intrusion into the proposed basement and/or building (e.g. from soil contamination); • Contact (dermal, ingestion or inhalation) with exposed soils in landscaped areas and/or unpaved areas.
Presence of preferential pathways for contaminant movement	The sewer (see Figure 2) and the associated sewer trench/trench backfill is a potential preferential pathway for contaminant migrations. This could occur via groundwater/seepage if present, or via soil/vapour migration through the sewer and/or trench backfill.

4 SAMPLING, ANALYSIS AND QUALITY PLAN

4.1 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)[5]. 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 6.1 and the detailed evaluation is provided in the appendices.

4.1.1 Step 1 - State the Problem

Additional data is required to address the data gaps identified in the PESA. These data gaps include: an absence of data across the majority of the western portion of the site and areas beneath stored and stockpiled materials (at the time of the PESA), and assessment of the stockpiled materials (from a contamination viewpoint).

4.1.2 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:

- 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?

4.1.3 Step 3 - Identify Information Inputs

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

- Existing relevant environmental data from previous reports;
- Site information, including site observations and site history documentation;
- Sampling of soil and stockpiled materials;
- Observations of sub-surface variables such as soil type, photo-ionisation detector (PID) concentrations, odours and staining;
- Laboratory analysis of soils and fibre cement for the CoPC identified in the CSM; and
- Field and laboratory QA/QC data.

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

4.1.4 Step 4 - Define the Study Boundary

The sampling will be confined to the site boundaries as shown in Figure 2 and will be limited vertically to a depth of 1.8m (spatial boundary). The sampling was completed on 20 November 2019 (temporal boundary).

The assessment of stockpiles was generally limited to one sample per stockpile (stockpile characterisation boundary). The assessment of potential onsite risk has been made based on review of the PESA, the current site inspection and data collected within the site boundary during the PESA and current investigation. The assessment of potential risk to adjacent land users has been made based on data collected within the site boundary during the PESA and AESA.

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

4.1.5.1 Tier 1 Screening Criteria

The laboratory data will be assessed against relevant Tier 1 screening criteria (referred to as SAC), as outlined in Section 5. 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.

4.1.5.2 Field and Laboratory QA/QC

Field QA/QC included analysis of inter-laboratory duplicates, intra-laboratory duplicates, trip blank and rinsate 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).

4.1.5.3 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.

4.1.6 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.

4.1.7 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 (supported by data from the PESA), the medium 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.

4.2 Soil Sampling Plan and Methodology

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

Table 4-1: Soil Sampling Plan and Methodology

Aspect	Input
Sampling Density	The sampling density for asbestos in soil included sampling at the minimum sampling density recommended in the Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia (2009)[6] (endorsed in NEPM 2013). This density met the investigation regime outlined in Table 1 of the WA DoH (2009) guidelines, for a site with a 'suspect' likelihood of asbestos. Samples for other contaminants were collected from seven locations as shown on the attached Figure 2. Based on the site area (1,800m^2), this number of locations corresponded to a sampling

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

Aspect	Input
	density of approximately one sample per 257m^2. The sampling plan was not designed to meet the minimum sampling density for hotspot identification, as outlined in the NSW EPA Contaminated Sites Sampling Design Guidelines (1995)[7]. The stockpiles (eight in total) were estimated to be between 7.5m^3 and 85m^3 in volume. One sample was obtained from Stockpile 1 (S1), Stockpile 6 (S6), Stockpile 7 (S7) and Stockpile 8 (S8). Three samples were obtained from Stockpile 2 (S2), Stockpile 3(S3), Stockpile 4 (S4) and stockpile 5 (S5). This number of samples was considered suitable to provide data for a contamination screening of each stockpile.
Sampling Plan	The in-situ sampling locations were placed on a judgemental sampling plan and were broadly positioned for site coverage, taking into consideration areas that were previously inaccessible during the PESA. This sampling plan was considered suitable to provide additional assessment of potential risks associated with the AEC and CoPC identified in the CSM. The stockpiles were sampled on a judgemental sampling plan and were broadly positioned to provide a representative sample/s of the stockpiled material. This sampling plan was considered suitable to provide assessment of potential risks associated with the CoPC identified in the CSM.
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 5 tonne excavator. Samples were obtained from the test pit walls or directly from the bucket by hand. Where sampling occurred from the bucket, JKE collected samples from the central portion of large soil clods, or from material that was unlikely to have come into contact with the bucket.
Sample Collection and Field QA/QC	Soil samples were obtained on 20 November 2019 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. The field screening for asbestos quantification included the following:

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

Aspect	Input
	• A representative 10L sample was collected from fill at 1m intervals, or from each distinct fill profile. The bulk sample intervals are shown on the attached test pit logs; • Each 10L sample was weighed using an electronic scale; • Each bulk sample was passed through a sieve with a 7.1mm aperture and inspected for the presence of fibre cement; • The condition of fibre cement or any other suspected asbestos materials was noted on the field records; and • If observed, any fragments of fibre cement in the 10L sample were collected, placed in a zip-lock bag and assigned a unique identifier. Calculations for asbestos content were undertaken based on the requirements outlined in Schedule B1 of NEPM (2013), as summarised in Section 5.1. A calibration/check of the accuracy of the scale used for weighing the fibre cement fragments was undertaken using a set of calibration weights. Calibration/check records are maintained on file by JKE. The scale used to weigh the 10L samples was not calibrated, however this is not considered significant as this method of providing a weight for the bulk sample is considered to be considerably more accurate than applying a nominal soil density conversion.
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. 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.

4.3 Analytical Schedule

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

Table 4-2: Analytical Schedule (Primary Samples)

Analyte/CoPC	Fill Samples	Natural Soil Samples	Fibre Cement Material Samples	Stockpile Samples
Heavy Metals	14	5	-	8
TRH/BTEX	14	5	-	8
PAHs	14	5	-	8
OCPs/OPPs	12	5	-	8
PCBs	12	5	-	8
Asbestos	9	-	1	8

Analyte/CoPC	Fill Samples	Natural Soil Samples	Fibre Cement Material Samples	Stockpile Samples
Toxicity characteristic leachate procedure (TCLP) Metals and/or PAHs for waste classification purposes	3	5	-	-

4.3.1 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 4-3: Laboratory Details

Samples	Laboratory	Report Reference
All primary samples and field QA/QC samples including (intra-laboratory duplicates, trip blanks and field rinsate samples)	Envirolab Services Pty Ltd NSW, NATA Accreditation Number – 2901 (ISO/IEC 17025 compliance)	231315
Inter-laboratory duplicates	Envirolab Services Pty Ltd VIC, NATA Accreditation Number – 2901 (ISO/IEC 17025 compliance)	19090

5 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.

5.1 Soil

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

5.1.1 Human Health

- Health Investigation Levels (HILs) for a 'commercial/industrial' land use exposure scenario (HIL-D);
- Health Screening Levels (HSLs) for a 'commercial/industrial' land use exposure scenario (HSL-D). HSLs were calculated based on conservative assumptions including a 'sand' type and a depth interval of 0m to 1m;
- Health screening levels 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)[8] were considered; and
- Asbestos via the laboratory analysis was assessed on the basis of presence/absence in stockpiled material and surface fill soils. Asbestos was also assessed against the HSL-D criteria in in-situ fill via bulk quantification screening methods as specified in NEPM 2013. A summary of the asbestos criteria is provided in the table below:

Table 5-1: Details for Asbestos SAC

Guideline	Applicability
Asbestos in Soil	The HSL-D criteria were adopted for the assessment of asbestos in soil. The SAC adopted for asbestos were derived from the NEPM 2013 and are based on WA DoH (2009) guidance. The SAC include the following: • <0.05% w/w bonded asbestos containing material (ACM) in soil; and • <0.001% w/w asbestos fines/fibrous asbestos (AF/FA) in soil. The NEPM (2013) and WA DoH (2009) also specify that the surface should be free of visible asbestos. Concentrations for bonded ACM concentrations in soil are based on the following equation which is presented in Schedule B1 of NEPM (2013): $$\textbf{\% w/w asbestos in soil} = \frac{\textbf{\% asbestos content x bonded ACM (kg)}}{\text{Soil volume (L) x soil density (kg/L)}}$$ However, we are of the opinion that the actual soil volume in a 10L bucket varies considerably due to the presence of voids, particularly when assessing cohesive soils. Therefore, each

[8] 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*

Guideline	Applicability
	bucket sample was weighed using electronic scales and the above equation was adjusted as follows (we note that the units have also converted to grams): **% w/w asbestos in soil =** $\frac{\text{**% asbestos content x bonded ACM (g)**}}{\text{Soil weight (g)}}$

5.1.2 Environment (Ecological – terrestrial ecosystems)

- Ecological Investigation Levels (EILs) and Ecological Screening Levels (ESLs) for a 'commercial / industrial' land use 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[9];
- ESLs were adopted based on the soil type (coarse or fine); and
- EILs for selected metals were 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)[10]. This method is considered to be adequate for the Tier 1 screening.

5.1.3 Management Limits for Petroleum Hydrocarbons

Management limits for petroleum hydrocarbons (as presented in Schedule B1 of NEPM 2013) were adopted.

5.1.4 Waste Classification

Data for the waste classification assessment were assessed in accordance with the Waste Classification Guidelines, Part 1: Classifying Waste (2014)[11] as outlined in the following table:

Table 5-2: 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.

[9] 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)

[10] 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

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

Category	Description
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.

6 RESULTS

6.1 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.

6.2 Subsurface Conditions

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

Table 6-1: Summary of Subsurface Conditions

Profile	Description
Fill	Fill was encountered at the surface in all test pits and extended to depths of approximately 0.5m to 1.3m. The fill typically comprised gravelly sand, silty clay, silty sand and silty sandy clay with inclusions of igneous, ironstone and sandstone gravel, brick fragments, concrete fragments, asphalt fragments, ash, tile fragments and slag. Neither staining nor odours were observed in the fill materials during fieldwork. Asbestos containing material was not observed in the fill material during fieldwork.
Natural Soil	Residual silty clay natural soil was encountered in all test pits beneath the fill material and extended to the maximum termination depth of the investigation at 1.8m. Neither staining nor odours were observed in the natural soil during fieldwork.
Groundwater	Groundwater seepage was not encountered in the test pits during drilling. All test pits remained dry on completion of drilling and a short time after.

6.3 Stockpiled Materials

A summary of the material within each stockpile encountered during the investigation is presented in the following table.

Table 6-2: Summary of Stockpiled Materials

Stockpile No.	Description	Approximate Volume (m^3)
Stockpile 1 (S1)	Fill material generally comprising brown, sand and gravel. One fragment of fibre cement (AMF1) was encountered within this stockpile. The fragment was not found to contain asbestos as discussed later in this report.	60
Stockpile 2 (S2)	Fill material generally comprising of brown silty sand.	85
Stockpile 3 (S3)	Fill material generally comprising of brown sandy gravel with concrete fragments.	11

Stockpile No.	Description	Approximate Volume (m^3)
Stockpile 4 (S4)	Fill material generally comprising brown sandy gravel.	7.5
Stockpile 5 (S5)	Fill material generally comprising yellow brown sand.	15
Stockpile 6 (S6)	Fill material generally comprising brown sandy gravel with concrete fragments.	60
Stockpile 7 (S7)	Fill material generally comprising grey gravelly sand with concrete and brick fragments.	10
Stockpile 8 (S8)	Fill material generally comprising grey gravelly sand with concrete and brick fragments.	30

6.4 Field Screening

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

Table 6-3: 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 0.4ppm equivalent isobutylene. These results indicate low concentrations of PID detectable VOCs are present in some samples. The PID results were not significant.
Bulk Screening for Asbestos	The field screening for asbestos materials was undertaken via the bulk (10L) fill sampling during this investigation to assess the extent of asbestos contamination in fill. Fibre cement/ACM was not encountered in any of the fill profiles that were screened. The bulk field screening results are presented in the attached tables.

6.5 In-situ Soil Laboratory Results

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

6.5.1 Human Health (HIL/HSL) and Environmental (Ecological) Assessment

Table 6-4: 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.
PAHs	All PAH results were below the SAC.
OCPs and OPPs	All OCP and OPP results were below the SAC. All pesticide concentrations were below the laboratory PQLs.

Analyte	Results Compared to SAC
PCBs	All PCB results were below the SAC. All PCB concentrations were below the laboratory PQLs.
Asbestos	All asbestos results for in-situ soil samples were below the SAC (i.e. asbestos was absent in the samples analysed for the investigation).

6.5.2 Management Limits

Table 6-5: Summary of Soil Laboratory Results – Management Limits

Analyte	Results Compared to SAC
TRH	All TRH results were below the SAC.

6.5.3 Direct Contact (Intrusive Maintenance Worker)

Table 6-6: Summary of Soil Laboratory Results – Direct Contact (Intrusive Maintenance Worker)

Analyte	Results Compared to SAC
TRH	All TRH results were below the SAC.
BTEX	All BTEX results were below the SAC.

6.5.4 Waste Classification Assessment (In-situ Soil)

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 6-7: 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	8	0	0	-
TRH	8	0	0	-
BTEX	8	0	0	-
Total PAHs	8	0	0	-
Benzo(a)pyrene	8	0	0	-
OCPs & OPPs	8	0	0	-
PCBs	8	0	0	-
Asbestos	8	-	-	Asbestos was not detected in the samples analysed.

Table 6-8: Summary of Soil Laboratory Results Compared to TCLP Criteria

Analyte	No. of Samples Analysed	No. of Results > TCLP Criteria	Comments
Arsenic	3	0	-
Cadmium	3	0	-
Chromium	3	0	-
Lead	3	0	-
Mercury	3	0	-
Nickel	3	0	-
Benzo(a)pyrene	3	0	-

6.6 Stockpiled Materials Soil Laboratory Results

The stockpiled materials 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:

6.6.1 Human Health and Environmental (Ecological) Assessment

Table 6-9: Summary of Stockpiled Materials Laboratory Results – Human Health and Environmental (Ecological)

Analyte	Results Compared to SAC
Heavy Metals	All heavy metals results were below the SAC.
TRH	The TRH (F3) concentration of 240mg/kg reported in one stockpile sample (SP6-1), exceeded the ecological SAC of 170mg/kg. All other TRH results were below the SAC.
BTEX	All BTEX results were below the SAC.
PAHs	All PAH results were below the SAC.
OCPs and OPPs	All OCP and OPP results were below the SAC. All pesticide concentrations were below the laboratory PQLs.
PCBs	All PCB results were below the SAC. All PCB concentrations were below the laboratory PQLs.
Asbestos	The fragment of fibre cement (AMF1-SP1) did not contain asbestos. All asbestos results were below the SAC (i.e. asbestos was absent in the samples analysed for the investigation).

7 WASTE CLASSIFICATION ASSESSMENT

The stockpiles of fill and gravel as observed at the site are not included in this waste classification as it is understood this material is contracted to be removed by the Lessee prior to site handover.

7.1 Waste Classification of In-situ Fill

Based on the results of the assessment, and at the time of reporting, the fill material is classified as **General Solid Waste (non-putrescible)**. Surplus fill should be disposed of to a facility that is appropriately licensed to receive this waste stream. The facility should be contacted to obtain the required approvals prior to commencement of excavation.

7.2 Classification of Natural Soil/Bedrock

Based on the scope of work undertaken for this assessment, and at the time of reporting, JKE are of the opinion that the natural soil and bedrock at the site meets the definition of **VENM** for off-site disposal or re-use purposes. VENM is considered suitable for re-use on-site (from a contamination viewpoint), or alternatively, the information included in this report may be used to assess whether the material is suitable for beneficial reuse at another site as fill material.

In accordance with Part 1 of the Waste Classification Guidelines, the VENM is pre-classified as general solid waste and can also be disposed of accordingly to a facility that is licensed to accept it.

8 DISCUSSION

8.1 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.

8.1.1 In-situ Soil

Elevated concentrations of the CoPC were not encountered above the adopted SAC in any of the in-situ soil samples analysed for the current assessment.

During the PESA, TRH (F3) was reported at a concentration of 2,400mg/kg in natural silty clay at one location (BH8) and above the ecological SAC. This concentration was located at a depth of 0.5m below existing ground level. During the AESA, observations made of the subsurface conditions via test pitting indicated that the natural silty clay profile containing ironstone gravels between depths of 0.2m and 1.3mBGL and logged as natural soils during the PESA (BH1, BH2, BH3 and BH8) was most likely engineered fill or re-worked natural soil. Following a review of the entire dataset, including the soil texture applied to the sample, it is noted that the reported concentration of 2,400mg/kg in the sample from BH8 is below the ecological SAC adopted for the AESA.

This elevated concentration of TRHF3 is considered at least partly due to organic interference as no odours or staining were noted in the material during the fieldwork and no detectable VOCs were recorded during the soil sample headspace screening. Although, it is possible the TRHs are associated with minor oil leaks/spills. The engineered fill/re-worked natural soil layer is underlain by a layer of residual silty clay to a depth of approximately 2.3mBGL, which is then underlain by siltstone bedrock. Groundwater was not detected in any of the sampling locations during either the PESA or the AESA to a maximum depth of 5.1mBGL. Based on this, there is considered to be a low potential risk to groundwater from the TRHs encountered in the fill at the site.

No asbestos materials were encountered on the site surface or in the soil during either the PESA or the AESA. Based on the site observations and soil results, risks associated with the potential occurrence of asbestos in fill are considered to be low.

8.2 Stockpiled Materials

The sample analysed from Stockpile 6 (SP6-S1) reported an elevated TRH (F2) concentration of 240mg/kg, which exceeded the adopted ecological SAC of 170mg/kg (refer to Figure 4). The stockpile generally comprised sandy gravel material with concrete fragments. Detectable VOCs were not recorded during the soil sample headspace screening. In the context of the proposed development, the elevated concentration

of TRH (F2) encountered in Stockpile 6 above the ecological SAC is not considered to pose an unacceptable residual risk to ecological site receptors for the following reasons:

- The site is a commercial property located in an urban setting and is not located in an ecological sensitive area which could impact any endangered species on site therefore it would be reasonable to assume there are no endangered or species on site;
- The existing flora at the site does not show any significant signs of stress; and
- The conditions of the Lease indicate that this material will be removed from the site along with the top 300mm of material prior to handover of site for the proposed development.

8.3 Decision Statements

The decision statements are addressed below:

Are any results above the SAC?

Yes. One stockpile soil sample reported a TRH (F2) concentration above the ecological SAC.

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

Considering the conditions of the Lease, JKE understand that *everything brought onto or placed on the site* (i.e. stockpiled materials), *and a minimum of 300mm of earth below the top of grade* will be removed from the site prior to handover for the proposed development. Therefore, JKE are of the opinion that residual ecological risks associated with the concentration of TRH (F2) in Stockpile 6 at the site are low/negligible and this is not a trigger for remediation.

Is remediation required?

Based on the data obtained for the PESA and AESA, remediation is not required.

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

The site characterisation is considered to be 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?

JKE are of the opinion that the site is suitable for the proposed development outlined in Section 1.1.

8.4 Data Gaps

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

Table 8-1: Data Gap Assessment

Data Gap	Assessment
Groundwater sampling	Based on the site history and the results reported, the potential for groundwater contamination to pose a risk to the receptors is considered to be low. Additional work to address this data gap is not recommended based on the findings of the assessment. Groundwater sampling may be required in the event that temporary dewatering is undertaken as part of the basement construction (to facilitate off-site disposal), however this requirement does not alter our conclusion regarding site suitability.

9 CONCLUSIONS AND RECOMMENDATIONS

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

The AESA included a walkover site inspection, soil sampling from seven test pits for in-situ soil assessment and sampling from eight stockpiles of fill and gravel material for screening purposes. The walkover inspection confirmed the site was being utilised as a storage yard and comprised several soil (fill) and gravel stockpiles. No visible or olfactory indicators of contamination were observed during the site inspection.

The assessment identified in-situ fill to depths of between approximately 0.5mBGL and 1.3mBGL, underlain by residual silty clay and clayey sand soils. The fill comprised gravelly sand, silty clay, silty sand and silty sandy clay. The fill contained inclusions of igneous, ironstone and sandstone gravel, brick fragments, concrete fragments, asphalt fragments, ash, tile fragments and slag. A selection of soil samples were analysed for the CoPC identified in the CSM. Elevated concentrations of the CoPC were not encountered above the adopted SAC in any of the in-situ soil samples analysed for the AESA.

Eight stockpiles were sampled and screened for a selection of CoPC. The stockpiles ranged in volume from 7.5m^3 to 85m^3. Stockpiled materials generally comprised gravelly sand, silty sand, sand or sandy gravel. One sample per stockpile was analysed for a range of CoPC identified in the CSM. One stockpile sample reported a TRH (F2) concentration above the ecological SAC. Ecological risks associated with this exceedance were assessed and were considered to be negligible.

Based on the findings of the assessment, the proposed development as outlined in Section 1.1, and with consideration of the conditions of the Lease as outlined in Section 2.1.2, JKE are of the opinion that the site is suitable for the proposed development and that potential risks associated with contamination at the site are low and further investigation (or remediation) is not considered to be required.

10 LIMITATIONS

The report limitations are outlined below:

- JKE accepts no responsibility for any unidentified contamination issues at the site, or for any contamination impacts that occur between the date of our investigations and the end of the Lease. 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

0 10 20 30 40 50

SCALE 1:1000 @A4 METRES

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

Title: **SITE LOCATION PLAN**

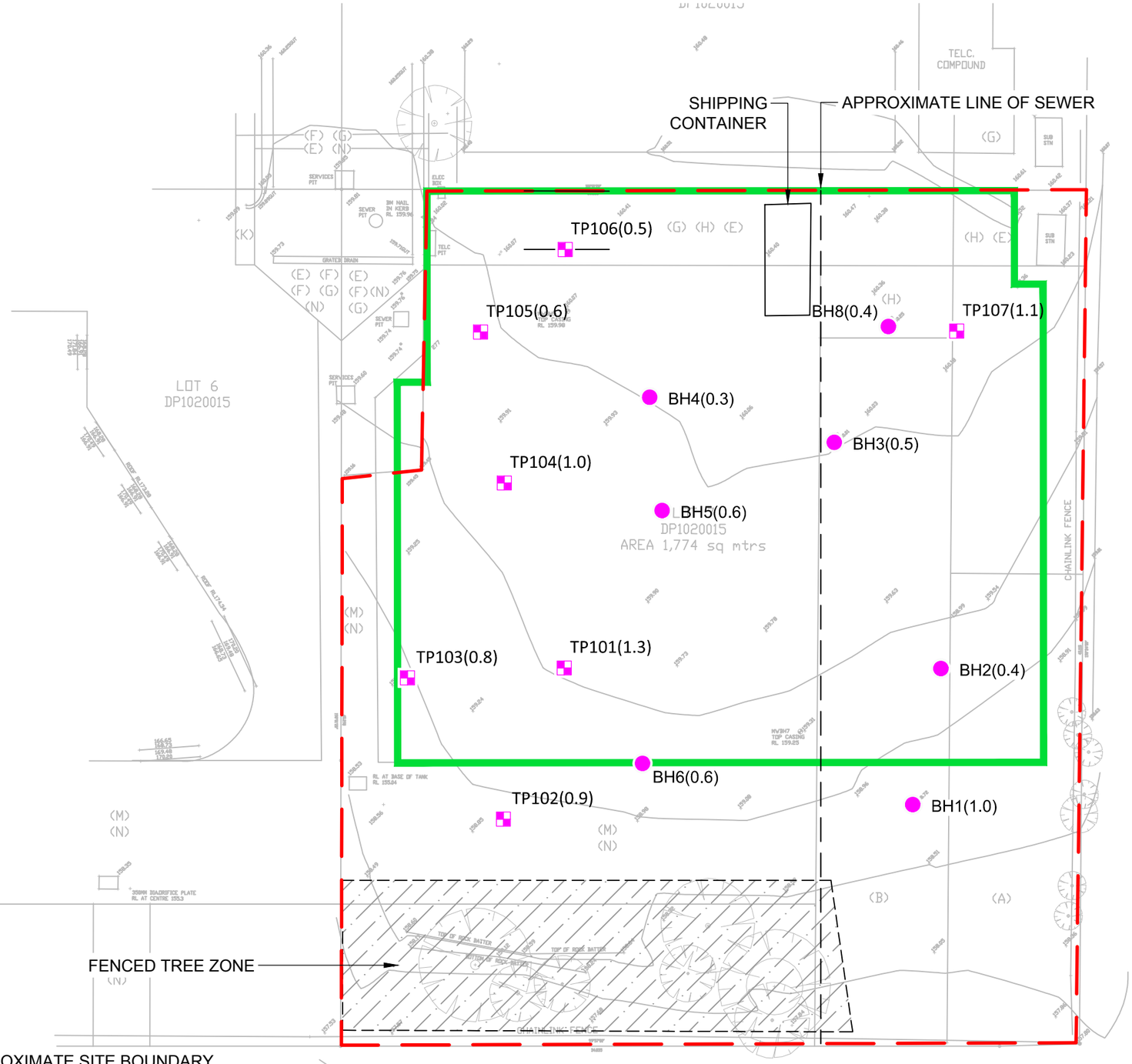
Location: FRENCHS FOREST BUSINESS PARK
FRENCHS FOREST, NSW

Report No: E32505BTrpt2

Figure: 1

JKEnvironments

PLOT DATE: 28/11/2019 1:00:21 PM DWG FILE: S:\5 EIS\5C- EIS JOBS\32000\SE32505BT FRENCHS FOREST\CAD\E32505BTRPT2.DWG



LEGEND

— — —	APPROXIMATE SITE BOUNDARY
▬▬▬	OUTLINE OF PROPOSED BASEMENT 3
● BH1 (Fill Depth)	BOREHOLE LOCATION, NUMBER AND DEPTH OF FILL (m) DRILLED DURING PREVIOUS JKE ASESSMENT.
■ TP101 (Fill Depth)	TEST PIT LOCATION, NUMBER AND DEPTH OF FILL (m)

0 2.5 5 7.5 10 12.5

SCALE 1:250 @A3 METRES

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

Title: **SAMPLE LOCATION PLAN**

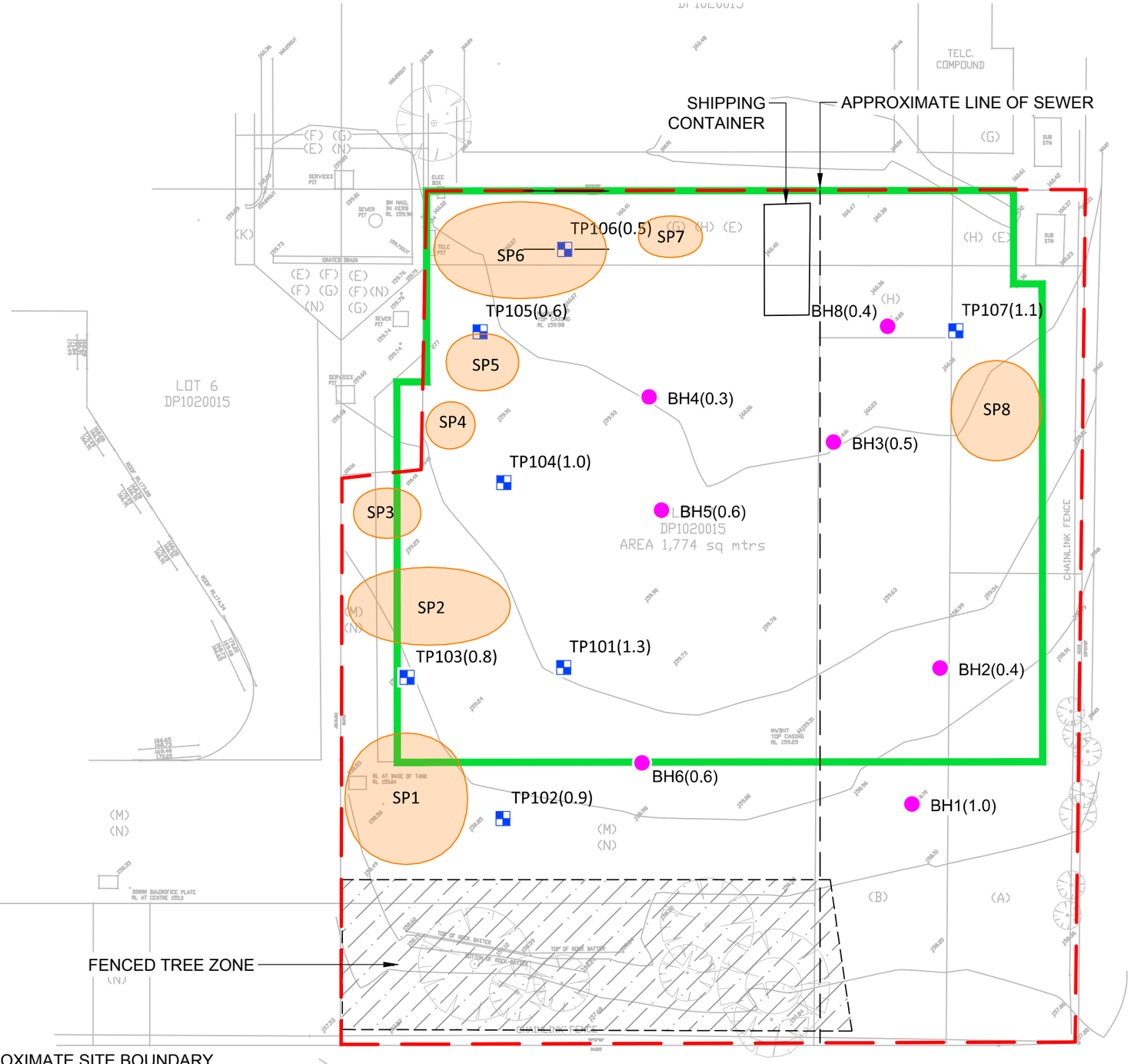
Location: FRENCHS FOREST BUSINESS PARK
FRENCHS FOREST, NSW

Report No: E32505BTrpt2

Figure: 2

JKEnvironments

PLOT DATE: 28/11/2019 12:58:36 PM DWG FILE: S:\5 EIS\5C EIS JOBS\32000'S\E32505BT FRENCHS FOREST\CADIE32505BTRPT2.DWG



LEGEND

- APPROXIMATE SITE BOUNDARY
- OUTLINE OF PROPOSED BASEMENT 3
- BH1 (Fill Depth) — BOREHOLE LOCATION, NUMBER AND DEPTH OF FILL (m) DRILLED DURING PREVIOUS JKE ASESSMENT.
- TP101 (Fill Depth) — TEST PIT LOCATION, NUMBER AND DEPTH OF FILL (m)
- SP1 — APPROXIMATE STOCKPILE LOCATION AND NUMBER

SCALE 0 2.5 5 7.5 10 12.5 METRES 1:250 @A3

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

Title: **STOCKPILE LOCATION PLAN**

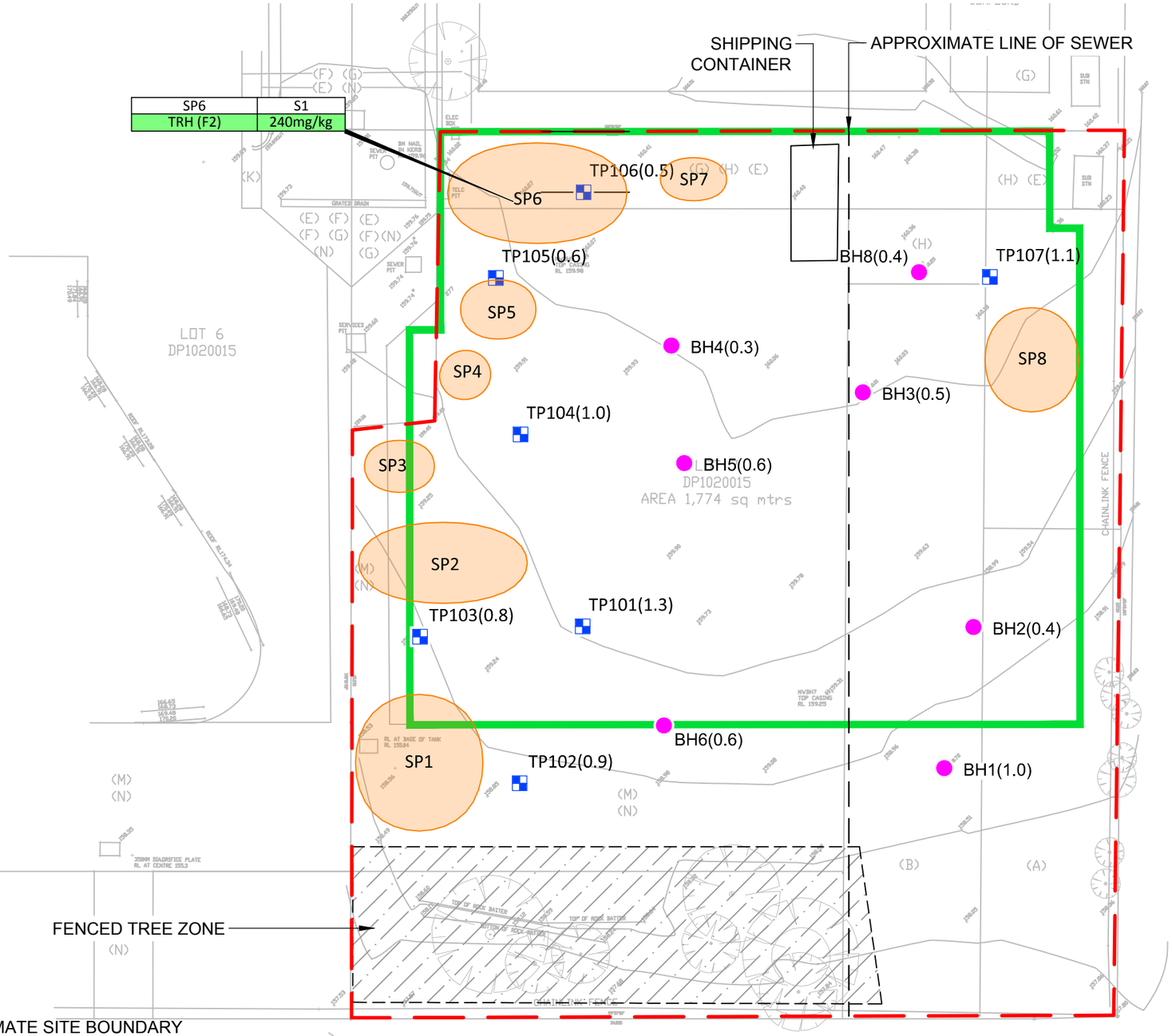
Location: FRENCHS FOREST BUSINESS PARK FRENCHS FOREST, NSW

Report No: E32505BTrpt2

Figure: 3

JKEnvironments

PLOT DATE: 28/11/2019 1:01:19 PM DWG FILE: S:\5 EIS\5C EIS JOBS\32000'S\E32505BT FRENCHS FOREST\CAD\E32505BTRPT2.DWG



LEGEND

- APPROXIMATE SITE BOUNDARY
- OUTLINE OF PROPOSED BASEMENT 3
- BH1 (Fill Depth) — BOREHOLE LOCATION, NUMBER AND DEPTH OF FILL (m) DRILLED DURING PREVIOUS JKE ASESSMENT.
- TP101 (Fill Depth) — TEST PIT LOCATION, NUMBER AND DEPTH OF FILL (m)
- SP1 — APPROXIMATE STOCKPILE LOCATION AND NUMBER

LOCATION	SAMPLE ID
ANALYTE	CONCENTRATION (units)

- SOIL CONTAMINATION ABOVE SAC FOR ECOLOGICAL RISK

SCALE 0 2.5 5 7.5 10 12.5 METRES — 1:250 @A3

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

Title: **CONTAMINATION LOCATION PLAN STOCKPILED MATERIALS**

Location: FRENCHS FOREST BUSINESS PARK FRENCHS FOREST, NSW

Report No: E32505BTrpt2

Figure: 4

JKEnvironments

PLOT DATE: 28/11/2019 1:01:32 PM DWG FILE: S:\5 EIS\5C EIS JOBS\32000\SIE32505BT FRENCHS FOREST\CAD\E32505BTRPT2.DWG

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
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 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
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 Ager
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.

TABLE A
SOIL LABORATORY RESULTS COMPARED TO NEPM 2013.
HIL-D: 'Commercial/Industrial'

All data in mg/kg unless stated otherwise			HEAVY METALS								PAHs		ORGANOCHLORINE PESTICIDES (OCPs)							OP PESTICIDES (OPPs)	TOTAL PCBs	ASBESTOS FIBRES
			Arsenic	Cadmium	Chromium VI	Copper	Lead	Mercury	Nickel	Zinc	Total PAHs	Carcinogenic PAHs	HCB	Endosulfan	Methoxychlor	Aldrin & Dieldrin	Chlordane	DDT, DDD & DDE	Heptachlor	Chlorpyrifos		
PQL - Envirolab Services			4	0.4	1	1	1	0.1	1	1	-	0.05	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	100
Site Assessment Criteria (SAC)			3000	900	3600	240000	1500	730	6000	400000	4000	40	80	2000	2500	45	530	3600	50	2000	7	Detected/Not Detected
Sample Reference	**Sample Depth**	**Sample Description**																				
BH1	0.0-0.2	Fill: silty gravelly clay	5	<0.4	31	16	22	0.4	14	56	1.4	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH1	0.0-0.2	Laboratory duplicate	6	<0.4	41	23	15	0.3	8	39	5.8	0.7	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
BH1	0.0-0.2	Laboratory triplicate	5	<0.4	31	26	16	0.1	12	53	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH1	0.5-0.7	Silty clay	<4	<0.4	19	3	12	<0.1	3	10	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH2	0.0-0.2	Fill: silty clay	<4	<0.4	29	31	6	0.1	50	86	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH2	0.5-0.7	Silty clay	12	<0.4	40	6	31	0.1	5	24	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH3	0.0-0.3	Fill: silty clay	4	<0.4	25	13	12	<0.1	9	35	0.5	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH3	0.7-0.9	Silty clay	7	<0.4	15	5	14	<0.1	6	160	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH4	0.0-0.3	Fill: silty clay	<4	<0.4	33	23	12	<0.1	11	26	3.2	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH5	0.0-0.3	Fill: silty clay	<4	<0.4	51	23	14	<0.1	17	21	4.1	0.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH6	0.0-0.3	Fill: silty clay	<4	<0.4	16	38	21	<0.1	14	35	5.6	0.8	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH6	0.6-0.8	Silty clay	<4	<0.4	16	2	9	<0.1	3	3	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH8	0.0-0.1	Fill: silty clayey gravel	<4	<0.4	11	96	7	<0.1	7	26	1.1	<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	Laboratory duplicate	<4	<0.4	15	51	4	<0.1	5	21	0.87	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
BH8	0.0-0.1	Laboratory triplicate	<4	<0.4	16	43	4	<0.1	5	23	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH8	0.5-0.7	Silty clay	10	<0.4	36	<1	92	0.1	<1	12	0.2	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP101	0-0.1	Fill: Gravelly Sand	<4	<0.4	39	35	18	<0.1	21	35	4.3	0.8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP102	0-0.2	Fill: Silty Clay	<4	<0.4	10	7	14	<0.1	5	22	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
TP102	0-0.2	Laboratory Duplicate	<4	<0.4	10	8	12	<0.1	5	21	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
TP102	0.9-1.1	Silty Clay	<4	<0.4	10	<1	8	<0.1	<1	<1	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
TP103	0-0.2	Fill: Silty Clay	<4	<0.4	19	9	14	<0.1	8	18	0.64	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP103	0.8-1.0	Silty Clay	<4	<0.4	13	<1	8	<0.1	<1	1	0.2	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
TP104	0.1-0.3	Fill: Silty Sandy Clay	<4	<0.4	10	25	9	<0.1	8	28	2.5	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
TP105	0-0.1	Fill: Silty Sand	<4	<0.4	11	14	15	<0.1	8	35	0.4	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
TP105	0.6-0.8	Silty Clay	6	<0.4	12	<1	10	<0.1	<1	<1	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
TP106	0.5-0.7	Silty Clay	<4	<0.4	9	<1	12	<0.1	<1	<1	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
TP107	1.1-1.3	Silty Clay	5	<0.4	14	<1	14	<0.1	1	96	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
SP1-1	-	Fill: gravelly sand	<4	<0.4	24	22	16	<0.1	8	34	3.3	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
SP2-2	-	Fill: silty sand	<4	<0.4	9	15	20	<0.1	6	47	1.6	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
SP2-2	-	Fill: silty sand	<4	<0.4	9	14	16	0.2	5	42	1.9	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
SP3-2	-	Fill: sandy gravel	<4	<0.4	<1	1	2	<0.1	<1	4	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
SP4-2	-	Fill: sandy gravel	<4	<0.4	10	25	2	<0.1	31	22	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
SP5-2	-	Fill: sand	<4	<0.4	4	2	6	<0.1	2	9	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
SP6-1	-	Fill: sandy gravel	<4	<0.4	29	17	9	<0.1	12	16	5.3	0.6	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
SP7-1	-	Fill: sandy gravel	<4	<0.4	9	15	20	<0.1	5	53	0.98	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
SP8-1	-	Fill: sandy gravel	<4	<0.4	10	20	11	<0.1	7	27	17	1.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
AMF1-SP1	-	Material	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
Total Number of Samples			36	36	36	36	36	36	36	36	34	34	26	26	26	26	26	26	26	26	26	18
Maximum Value			12	<PQL	51	96	92	0.4	50	160	17	1.5	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	NC

Concentration above the SAC **VALUE**

TABLE B
SOIL LABORATORY RESULTS COMPARED TO HSLs
All data in mg/kg unless stated otherwise

					C_6-C_{10} (F1)	$>C_{10}$-C_{16} (F2)	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene	Field PID Measurement
PQL - Envirolab Services					25	50	0.2	0.5	1	1	1	ppm
NEPM 2013 HSL Land Use Category					**HSL-D: COMMERCIAL/INDUSTRIAL**							
Sample Reference	**Sample Depth**	**Sample Description**	**Depth Category**	**Soil Category**								
BH1	0.0-0.2	Fill: silty gravelly clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH1	0.0-0.2	Laboratory duplicate	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH1	0.0-0.2	Laboratory triplicate	0m to <1m	Sand	NA	NA	NA	NA	NA	NA	NA	0
BH1	0.5-0.7	Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH2	0.0-0.2	Fill: silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH2	0.5-0.7	Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH3	0.0-0.3	Fill: silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH3	0.7-0.9	Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH4	0.0-0.3	Fill: silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH5	0.0-0.3	Fill: silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH6	0.0-0.3	Fill: silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH6	0.6-0.8	Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH8	0.0-0.1	Fill: silty clayey gravel	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH8	0.0-0.1	Laboratory duplicate	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH8	0.0-0.1	Laboratory triplicate	0m to <1m	Sand	NA	NA	NA	NA	NA	NA	NA	0
BH8	0.5-0.7	Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
TP101	0-0.1	Fill: Gravelly Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0.4
TP102	0-0.2	Fill: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
TP102	0-0.2	Laboratory Duplicate	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
TP102	0.9-1.1	Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
TP103	0-0.2	Fill: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0.4
TP103	0.8-1.0	Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
TP104	0.1-0.3	Fill: Silty Sandy Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
TP105	0-0.1	Fill: Silty Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
TP105	0.6-0.8	Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
TP106	0.5-0.7	Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
TP107	1.1-1.3	Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
SP1-1	-	Fill: gravelly sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
SP2-2	-	Fill: silty sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0.2
SP2-2	-	Fill: silty sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
SP3-2	-	Fill: sandy gravel	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
SP4-2	-	Fill: sandy gravel	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
SP5-2	-	Fill: sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
SP6-1	-	Fill: sandy gravel	0m to <1m	Sand	<25	240	<0.2	<0.5	<1	<3	<1	0
SP7-1	-	Fill: sandy gravel	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0.1
SP8-1	-	Fill: sandy gravel	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0.1
AMF1-SP1	-	Material	0m to <1m	Sand	NA	NA	NA	NA	NA	NA	NA	0
Total Number of Samples					34	34	34	34	34	34	34	37
Maximum Value					<PQL	240	<PQL	<PQL	<PQL	<PQL	<PQL	0.4

Concentration above the SAC **VALUE**

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

SITE ASSESSMENT CRITERIA

					C_6-C_{10} (F1)	$>C_{10}$-C_{16} (F2)	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene
PQL - Envirolab Services					25	50	0.2	0.5	1	1	1
NEPM 2013 HSL Land Use Category					**HSL-D: COMMERCIAL/INDUSTRIAL**						
Sample Reference	**Sample Depth**	**Sample Description**	**Depth Category**	**Soil Category**							
BH1	0.0-0.2	Fill: silty gravelly clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH1	0.0-0.2	Laboratory duplicate	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH1	0.0-0.2	Laboratory triplicate	0m to <1m	Sand	NA	NA	NA	NA	NA	NA	NA
BH1	0.5-0.7	Silty clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH2	0.0-0.2	Fill: silty clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH2	0.5-0.7	Silty clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH3	0.0-0.3	Fill: silty clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH3	0.7-0.9	Silty clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH4	0.0-0.3	Fill: silty clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH5	0.0-0.3	Fill: silty clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH6	0.0-0.3	Fill: silty clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH6	0.6-0.8	Silty clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH8	0.0-0.1	Fill: silty clayey gravel	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH8	0.0-0.1	Laboratory duplicate	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH8	0.0-0.1	Laboratory triplicate	0m to <1m	Sand	NA	NA	NA	NA	NA	NA	NA
BH8	0.5-0.7	Silty clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP101	0-0.1	Fill: Gravelly Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP102	0-0.2	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP102	0-0.2	Laboratory Duplicate	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP102	0.9-1.1	Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP103	0-0.2	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP103	0.8-1.0	Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP104	0.1-0.3	Fill: Silty Sandy Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP105	0-0.1	Fill: Silty Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP105	0.6-0.8	Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP106	0.5-0.7	Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP107	1.1-1.3	Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SP1-1	-	Fill: gravelly sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SP2-2	-	Fill: silty sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SP2-2	-	Fill: silty sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SP3-2	-	Fill: sandy gravel	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SP4-2	-	Fill: sandy gravel	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SP5-2	-	Fill: sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SP6-1	-	Fill: sandy gravel	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SP7-1	-	Fill: sandy gravel	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SP8-1	-	Fill: sandy gravel	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
AMF1-SP1	-	Material	0m to <1m	Sand	NA	NA	NA	NA	NA	NA	NA

JKEnvironments

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

Land Use Category				COMMERCIAL/INDUSTRIAL																	
							AGED HEAVY METALS-EILs						EILs		ESLs						
				pH	CEC ($cmol_c/kg$)	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	0.0-0.2	Fill: silty gravelly clay	Fine	NA	NA	NA	5	31	16	22	14	56	<1	<0.1	<25	<50	260	220	<0.2	<0.5	<1	<3	0.2
BH1	0.0-0.2	Laboratory duplicate	Fine	NA	NA	NA	6	41	23	15	8	39	<1	<0.1	<25	<50	300	250	<0.2	<0.5	<1	<3	0.5
BH1	0.0-0.2	Laboratory triplicate	Fine	NA	NA	NA	5	31	26	16	12	53	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH1	0.5-0.7	Silty clay	Fine	NA	NA	NA	<4	19	3	12	3	10	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
BH2	0.0-0.2	Fill: silty clay	Fine	NA	NA	NA	<4	29	31	6	50	86	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
BH2	0.5-0.7	Silty clay	Fine	NA	NA	NA	12	40	6	31	5	24	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
BH3	0.0-0.3	Fill: silty clay	Fine	NA	NA	NA	4	25	13	12	9	35	<1	<0.1	<25	<50	210	250	<0.2	<0.5	<1	<3	0.1
BH3	0.7-0.9	Silty clay	Fine	NA	NA	NA	7	15	5	14	6	160	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
BH4	0.0-0.3	Fill: silty clay	Fine	NA	NA	NA	<4	33	23	12	11	26	<1	<0.1	<25	<50	650	870	<0.2	<0.5	<1	<3	0.3
BH5	0.0-0.3	Fill: silty clay	Fine	NA	NA	NA	<4	51	23	14	17	21	<1	NA	<25	<50	1300	1600	<0.2	<0.5	<1	<3	0.4
BH6	0.0-0.3	Fill: silty clay	Fine	NA	NA	NA	<4	16	38	21	14	35	<1	<0.1	<25	<50	1000	1200	<0.2	<0.5	<1	<3	0.56
BH6	0.6-0.8	Silty clay	Fine	NA	NA	NA	<4	16	2	9	3	3	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
BH8	0.0-0.1	Fill: silty clayey gravel	Coarse	NA	NA	NA	<4	11	96	7	7	26	<1	<0.1	<25	<50	650	1200	<0.2	<0.5	<1	<3	0.1
BH8	0.0-0.1	Laboratory duplicate	Coarse	NA	NA	NA	<4	15	51	4	5	21	<1	<0.1	<25	<50	650	1200	<0.2	<0.5	<1	<3	0.1
BH8	0.0-0.1	Laboratory triplicate	Coarse	NA	NA	NA	<4	16	43	4	5	23	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH8	0.5-0.7	Silty clay	Fine	NA	NA	NA	10	36	<1	92	<1	12	<1	NA	<25	<50	2400	1100	<0.2	<0.5	<1	<3	<0.05
TP101	0-0.1	Fill: Gravelly Sand	Coarse	NA	NA	NA	<4	39	35	18	21	35	<1	NA	<25	<50	750	900	<0.2	<0.5	<1	<3	0.5
TP102	0-0.2	Fill: Silty Clay	Fine	NA	NA	NA	<4	10	7	14	5	22	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
TP102	0-0.2	Laboratory Duplicate	Fine	NA	NA	NA	<4	10	8	12	5	21	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
TP102	0.9-1.1	Silty Clay	Fine	NA	NA	NA	<4	10	<1	8	<1	<1	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
TP103	0-0.2	Fill: Silty Clay	Fine	NA	NA	NA	<4	19	9	14	8	18	<1	NA	<25	<50	240	240	<0.2	<0.5	<1	<3	0.09
TP103	0.8-1.0	Silty Clay	Fine	NA	NA	NA	<4	13	<1	8	<1	1	<1	<0.1	<25	<50	650	140	<0.2	<0.5	<1	<3	<0.05
TP104	0.1-0.3	Fill: Silty Sandy Clay	Fine	NA	NA	NA	<4	10	25	9	8	28	<1	<0.1	<25	<50	250	310	<0.2	<0.5	<1	<3	0.3
TP105	0-0.1	Fill: Silty Sand	Coarse	NA	NA	NA	<4	11	14	15	8	35	<1	<0.1	<25	<50	160	170	<0.2	<0.5	<1	<3	0.08
TP105	0.6-0.8	Silty Clay	Fine	NA	NA	NA	6	12	<1	10	<1	<1	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
TP106	0.5-0.7	Silty Clay	Fine	NA	NA	NA	<4	9	<1	12	<1	<1	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
TP107	1.1-1.3	Silty Clay	Fine	NA	NA	NA	5	14	<1	14	1	96	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
SP1-1	-	Fill: gravelly sand	Coarse	NA	NA	NA	<4	24	22	16	8	34	<1	<0.1	<25	<50	540	490	<0.2	<0.5	<1	<3	0.3
SP2-2	-	Fill: silty sand	Coarse	NA	NA	NA	<4	9	15	20	6	47	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	0.2
SP2-2	-	Fill: silty sand	Coarse	NA	NA	NA	<4	9	14	16	5	42	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	0.1
SP3-2	-	Fill: sandy gravel	Coarse	NA	NA	NA	<4	<1	1	2	<1	4	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
SP4-2	-	Fill: sandy gravel	Coarse	NA	NA	NA	<4	10	25	2	31	22	<1	<0.1	<25	<50	100	130	<0.2	<0.5	<1	<3	<0.05
SP5-2	-	Fill: sand	Coarse	NA	NA	NA	<4	4	2	6	2	9	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
SP6-1	-	Fill: sandy gravel	Coarse	NA	NA	NA	<4	29	17	9	12	16	<1	<0.1	<25	240	1200	1300	<0.2	<0.5	<1	<3	0.4
SP7-1	-	Fill: sandy gravel	Coarse	NA	NA	NA	<4	9	15	20	5	53	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	0.1
SP8-1	-	Fill: sandy gravel	Coarse	NA	NA	NA	<4	10	20	11	7	27	<1	<0.1	<25	<50	290	360	<0.2	<0.5	<1	<3	0.97
AMF1-SP1	-	Material	Coarse	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Number of Samples							36	36	36	36	36	36	34	26	34	34	34	34	34	34	34	34	34
Maximum Value							12	51	96	92	50	160	<PQL	<PQL	<PQL	240	2400	1600	<PQL	<PQL	<PQL	<PQL	0.97

Concentration above the SAC

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

							AGED HEAVY METALS-EILs						EILs		ESLs								
				pH	CEC ($cmol_c/kg$)	Clay Content (% clay)	Arsenic	Chromium	Copper	Lead	Nickel	Zinc	Naphthalene	DDT	C_6-C_{10} (F1)	$>C_{10}$-C_{16} (F2) plus	$>C_{16}$-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	0.0-0.2	Fill: silty gravelly clay	Fine	NA	NA	NA	160	323	113	1963	60	232	370	640	215	170	2500	6600	95	135	185	95	72
BH1	0.0-0.2	Laboratory duplicate	Fine	NA	NA	NA	160	323	113	1963	60	232	370	640	215	170	2500	6600	95	135	185	95	72
BH1	0.0-0.2	Laboratory triplicate	Fine	NA	NA	NA	160	323	113	1963	60	232	--	--	--	--	--	--	--	--	--	--	--
BH1	0.5-0.7	Silty clay	Fine	NA	NA	NA	160	323	113	1963	60	232	370	--	215	170	2500	6600	95	135	185	95	72
BH2	0.0-0.2	Fill: silty clay	Fine	NA	NA	NA	160	323	113	1963	60	232	370	640	215	170	2500	6600	95	135	185	95	72
BH2	0.5-0.7	Silty clay	Fine	NA	NA	NA	160	323	113	1963	60	232	370	--	215	170	2500	6600	95	135	185	95	72
BH3	0.0-0.3	Fill: silty clay	Fine	NA	NA	NA	160	323	113	1963	60	232	370	640	215	170	2500	6600	95	135	185	95	72
BH3	0.7-0.9	Silty clay	Fine	NA	NA	NA	160	323	113	1963	60	232	370	--	215	170	2500	6600	95	135	185	95	72
BH4	0.0-0.3	Fill: silty clay	Fine	NA	NA	NA	160	323	113	1963	60	232	370	640	215	170	2500	6600	95	135	185	95	72
BH5	0.0-0.3	Fill: silty clay	Fine	NA	NA	NA	160	323	113	1963	60	232	370	--	215	170	2500	6600	95	135	185	95	72
BH6	0.0-0.3	Fill: silty clay	Fine	NA	NA	NA	160	323	113	1963	60	232	370	640	215	170	2500	6600	95	135	185	95	72
BH6	0.6-0.8	Silty clay	Fine	NA	NA	NA	160	323	113	1963	60	232	370	--	215	170	2500	6600	95	135	185	95	72
BH8	0.0-0.1	Fill: silty clayey gravel	Coarse	NA	NA	NA	160	323	113	1963	60	232	370	640	215	170	1700	3300	75	135	165	180	72
BH8	0.0-0.1	Laboratory duplicate	Coarse	NA	NA	NA	160	323	113	1963	60	232	370	640	215	170	1700	3300	75	135	165	180	72
BH8	0.0-0.1	Laboratory triplicate	Coarse	NA	NA	NA	160	323	113	1963	60	232	--	--	--	--	--	--	--	--	--	--	--
BH8	0.5-0.7	Silty clay	Fine	NA	NA	NA	160	323	113	1963	60	232	370	--	215	170	2500	6600	95	135	185	95	72
TP101	0-0.1	Fill: Gravelly Sand	Coarse	NA	NA	NA	160	323	113	1963	60	232	370	--	215	170	1700	3300	75	135	165	180	72
TP102	0-0.2	Fill: Silty Clay	Fine	NA	NA	NA	160	323	113	1963	60	232	370	640	215	170	2500	6600	95	135	185	95	72
TP102	0-0.2	Laboratory Duplicate	Fine	NA	NA	NA	160	323	113	1963	60	232	370	640	215	170	2500	6600	95	135	185	95	72
TP102	0.9-1.1	Silty Clay	Fine	NA	NA	NA	160	323	113	1963	60	232	370	640	215	170	2500	6600	95	135	185	95	72
TP103	0-0.2	Fill: Silty Clay	Fine	NA	NA	NA	160	323	113	1963	60	232	370	--	215	170	2500	6600	95	135	185	95	72
TP103	0.8-1.0	Silty Clay	Fine	NA	NA	NA	160	323	113	1963	60	232	370	640	215	170	2500	6600	95	135	185	95	72
TP104	0.1-0.3	Fill: Silty Sandy Clay	Fine	NA	NA	NA	160	323	113	1963	60	232	370	640	215	170	2500	6600	95	135	185	95	72
TP105	0-0.1	Fill: Silty Sand	Coarse	NA	NA	NA	160	323	113	1963	60	232	370	640	215	170	1700	3300	75	135	165	180	72
TP105	0.6-0.8	Silty Clay	Fine	NA	NA	NA	160	323	113	1963	60	232	370	640	215	170	2500	6600	95	135	185	95	72
TP106	0.5-0.7	Silty Clay	Fine	NA	NA	NA	160	323	113	1963	60	232	370	640	215	170	2500	6600	95	135	185	95	72
TP107	1.1-1.3	Silty Clay	Fine	NA	NA	NA	160	323	113	1963	60	232	370	640	215	170	2500	6600	95	135	185	95	72
SP1-1	-	Fill: gravelly sand	Coarse	NA	NA	NA	160	323	113	1963	60	232	370	640	215	170	1700	3300	75	135	165	180	72
SP2-2	-	Fill: silty sand	Coarse	NA	NA	NA	160	323	113	1963	60	232	370	640	215	170	1700	3300	75	135	165	180	72
SP2-2	-	Fill: silty sand	Coarse	NA	NA	NA	160	323	113	1963	60	232	370	640	215	170	1700	3300	75	135	165	180	72
SP3-2	-	Fill: sandy gravel	Coarse	NA	NA	NA	160	323	113	1963	60	232	370	640	215	170	1700	3300	75	135	165	180	72
SP4-2	-	Fill: sandy gravel	Coarse	NA	NA	NA	160	323	113	1963	60	232	370	640	215	170	1700	3300	75	135	165	180	72
SP5-2	-	Fill: sand	Coarse	NA	NA	NA	160	323	113	1963	60	232	370	640	215	170	1700	3300	75	135	165	180	72
SP6-1	-	Fill: sandy gravel	Coarse	NA	NA	NA	160	323	113	1963	60	232	370	640	215	170	1700	3300	75	135	165	180	72
SP7-1	-	Fill: sandy gravel	Coarse	NA	NA	NA	160	323	113	1963	60	232	370	640	215	170	1700	3300	75	135	165	180	72
SP8-1	-	Fill: sandy gravel	Coarse	NA	NA	NA	160	323	113	1963	60	232	370	640	215	170	1700	3300	75	135	165	180	72
AMF1-SP1	-	Material	Coarse	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

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

			HEAVY METALS								PAHs		OC/OP PESTICIDES				Total PCBs	TRH					BTEX COMPOUNDS				ASBESTOS FIBRES
			Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc	Total PAHs	B(a)P	Total Endosulfans	Chloropyrifos	Total Moderately Harmful	Total Scheduled		C_6-C_9	C_{10}-C_{14}	C_{15}-C_{28}	C_{29}-C_{36}	Total C_{10}-C_{36}	Benzene	Toluene	Ethyl benzene	Total Xylenes	
PQL - Envirolab Services			4	0.4	1	1	1	0.1	1	1	-	0.05	0.1	0.1	0.1	0.1	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	0.0-0.2	Fill: silty gravelly clay	5	<0.4	31	16	22	0.4	14	56	1.4	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	110	240	350	<0.2	<0.5	<1	<3	Not Detected
BH1	0.0-0.2	Laboratory duplicate	6	<0.4	41	23	15	0.3	8	39	5.8	0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	140	260	400	<0.2	<0.5	<1	<3	NA
BH1	0.0-0.2	Laboratory triplicate	5	<0.4	31	26	16	0.1	12	53	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH1	0.5-0.7	Silty clay	<4	<0.4	19	3	12	<0.1	3	10	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	NA
BH2	0.0-0.2	Fill: silty clay	<4	<0.4	29	31	6	0.1	**50**	86	<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
BH2	0.5-0.7	Silty clay	12	<0.4	40	6	31	0.1	5	24	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	NA
BH3	0.0-0.3	Fill: silty clay	4	<0.4	25	13	12	<0.1	9	35	0.5	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	220	220	<0.2	<0.5	<1	<3	Not Detected
BH3	0.7-0.9	Silty clay	7	<0.4	15	5	14	<0.1	6	160	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	NA
BH4	0.0-0.3	Fill: silty clay	<4	<0.4	33	23	12	<0.1	11	26	3.2	0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	250	660	910	<0.2	<0.5	<1	<3	Not Detected
BH5	0.0-0.3	Fill: silty clay	<4	<0.4	51	23	14	<0.1	17	21	4.1	0.4	NA	NA	NA	NA	NA	<25	<50	440	1300	1740	<0.2	<0.5	<1	<3	NA
BH6	0.0-0.3	Fill: silty clay	<4	<0.4	16	38	21	<0.1	14	35	5.6	0.56	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	340	1100	1440	<0.2	<0.5	<1	<3	Not Detected
BH6	0.6-0.8	Silty clay	<4	<0.4	16	2	9	<0.1	3	3	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	NA
BH8	0.0-0.1	Fill: silty clayey gravel	<4	<0.4	11	96	7	<0.1	7	26	1.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	160	810	970	<0.2	<0.5	<1	<3	Not Detected
BH8	0.0-0.1	Laboratory duplicate	<4	<0.4	15	51	4	<0.1	5	21	0.87	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	140	810	950	<0.2	<0.5	<1	<3	NA
BH8	0.0-0.1	Laboratory triplicate	<4	<0.4	16	43	4	<0.1	5	23	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH8	0.5-0.7	Silty clay	10	<0.4	36	<1	92	0.1	<1	12	0.2	<0.05	NA	NA	NA	NA	NA	<25	<50	280	2800	3080	<0.2	<0.5	<1	<3	NA
TP101	0-0.1	Fill: Gravelly Sand	<4	<0.4	39	35	18	<0.1	21	35	4.3	0.5	NA	NA	NA	NA	NA	<25	<50	260	730	990	<0.2	<0.5	<1	<3	NA
TP102	0-0.2	Fill: Silty Clay	<4	<0.4	10	7	14	<0.1	5	22	<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
TP102	0-0.2	Laboratory Duplicate	<4	<0.4	10	8	12	<0.1	5	21	<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
TP102	0.9-1.1	Silty Clay	<4	<0.4	10	<1	8	<0.1	<1	<1	<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
TP103	0-0.2	Fill: Silty Clay	<4	<0.4	19	9	14	<0.1	8	18	0.64	0.09	NA	NA	NA	NA	NA	<25	<50	110	190	300	<0.2	<0.5	<1	<3	NA
TP103	0.8-1.0	Silty Clay	<4	<0.4	13	<1	8	<0.1	<1	1	0.2	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	690	690	<0.2	<0.5	<1	<3	NA
TP104	0.1-0.3	Fill: Silty Sandy Clay	<4	<0.4	10	25	9	<0.1	8	28	2.5	0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	120	260	380	<0.2	<0.5	<1	<3	Not Detected
TP105	0-0.1	Fill: Silty Sand	<4	<0.4	11	14	15	<0.1	8	35	0.4	0.08	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	130	130	<0.2	<0.5	<1	<3	Not Detected
TP105	0.6-0.8	Silty Clay	6	<0.4	12	<1	10	<0.1	<1	<1	<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
TP106	0.5-0.7	Silty Clay	<4	<0.4	9	<1	12	<0.1	<1	<1	<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
TP107	1.1-1.3	Silty Clay	5	<0.4	14	<1	14	<0.1	1	96	<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
Total Number of samples			27	27	27	27	27	27	27	27	25	25	17	17	17	17	17	25	25	25	25	25	25	25	25	25	9
Maximum Value			12	<PQL	51	96	92	0.4	50	160	5.8	0.56	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	440	2800	3080	<PQL	<PQL	<PQL	<PQL	NC

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

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

			Arsenic	Cadmium	Chromium	Lead	Mercury	Nickel	B(a)P
PQL - Envirolab Services			0.05	0.01	0.01	0.03	0.0005	0.02	0.001
TCLP1 - General Solid Waste			5	1	5	5	0.2	2	0.04
TCLP2 - Restricted Solid Waste			20	4	20	20	0.8	8	0.16
TCLP3 - Hazardous Waste			>20	>4	>20	>20	>0.8	>8	>0.16
Sample Reference	**Sample Depth**	**Sample Description**							
BH2	0.0-0.2	Fill: silty clay	NA	NA	NA	NA	NA	0.07	NA
TP102	0-0.2	Fill: Silty Clay	<0.05	<0.01	<0.01	<0.03	<0.0005	<0.02	<0.001
TP102	0-0.2	Laboratory Duplicate	<0.05	<0.01	<0.01	<0.03	<0.0005	<0.02	<0.001
TP102	0.9-1.1	Silty Clay	<0.05	<0.01	<0.01	<0.03	<0.0005	<0.02	<0.001
TP103	0.8-1.0	Silty Clay	<0.05	<0.01	<0.01	<0.03	<0.0005	<0.02	<0.001
TP104	0.1-0.3	Fill: Silty Sandy Clay	<0.05	<0.01	<0.01	<0.03	<0.0005	<0.02	<0.001
TP105	0-0.1	Fill: Silty Sand	<0.05	<0.01	<0.01	<0.03	<0.0005	<0.02	<0.001
TP105	0.6-0.8	Silty Clay	<0.05	<0.01	<0.01	<0.03	<0.0005	<0.02	<0.001
TP106	0.5-0.7	Silty Clay	<0.05	<0.01	<0.01	<0.03	<0.0005	<0.02	<0.001
TP107	1.1-1.3	Silty Clay	<0.05	<0.01	<0.01	<0.03	<0.0005	<0.02	<0.001
Total Number of samples			9	9	9	9	9	10	9
Maximum Value			<PQL	<PQL	<PQL	<PQL	<PQL	0.07	<PQL

General Solid Waste	**VALUE**
Restricted Solid Waste	**VALUE**
Hazardous Waste	**VALUE**

TABLE F
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			**COMMERCIAL/INDUSTRIAL**			
Sample Reference	**Sample Depth**	**Soil Texture**				
BH1	0.0-0.2	Coarse	<25	<50	260	220
BH1	0.0-0.2	Coarse	<25	<50	300	250
BH1	0.0-0.2	Coarse	NA	NA	NA	NA
BH1	0.5-0.7	Coarse	<25	<50	<100	<100
BH2	0.0-0.2	Coarse	<25	<50	<100	<100
BH2	0.5-0.7	Coarse	<25	<50	<100	<100
BH3	0.0-0.3	Coarse	<25	<50	210	250
BH3	0.7-0.9	Coarse	<25	<50	<100	<100
BH4	0.0-0.3	Coarse	<25	<50	650	870
BH5	0.0-0.3	Coarse	<25	<50	1300	1600
BH6	0.0-0.3	Coarse	<25	<50	1000	1200
BH6	0.6-0.8	Coarse	<25	<50	<100	<100
BH8	0.0-0.1	Coarse	<25	<50	650	1200
BH8	0.0-0.1	Coarse	<25	<50	650	1200
BH8	0.0-0.1	Coarse	NA	NA	NA	NA
BH8	0.5-0.7	Coarse	<25	<50	2400	1100
TP101	0-0.1	Coarse	<25	<50	750	900
TP102	0-0.2	Fine	<25	<50	<100	<100
TP102	0-0.2	Fine	<25	<50	<100	<100
TP102	0.9-1.1	Fine	<25	<50	<100	<100
TP102	0-0.2	Fine	<25	<50	<100	<100
TP102	0.9-1.1	Fine	<25	<50	<100	<100
TP103	0-0.2	Fine	<25	<50	240	240
TP103	0.8-1.0	Fine	<25	<50	650	140
TP104	0.1-0.3	Fine	<25	<50	250	310
TP105	0-0.1	Coarse	<25	<50	160	170
TP105	0.6-0.8	Fine	<25	<50	<100	<100
TP106	0.5-0.7	Fine	<25	<50	<100	<100
TP107	1.1-1.3	Fine	<25	<50	<100	<100
SP1-1	-	Coarse	<25	<50	540	490
SP2-2	-	Coarse	<25	<50	<100	<100
SP2-2	-	Coarse	<25	<50	<100	<100
SP3-2	-	Coarse	<25	<50	<100	<100
SP4-2	-	Coarse	<25	<50	100	130
SP5-2	-	Coarse	<25	<50	<100	<100
SP6-1	-	Coarse	<25	240	1200	1300
SP7-1	-	Coarse	<25	<50	<100	<100
SP8-1	-	Coarse	<25	<50	290	360
AMF1-SP1	-	Coarse	NA	NA	NA	NA
Total Number of Samples			34	34	34	34
Maximum Value			<PQL	240	2400	1600

Concentration above the SAC **VALUE**

MANAGEMENT LIMIT ASSESSMENT CRITERIA

			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			**COMMERCIAL/INDUSTRIAL**			
Sample Reference	**Sample Depth**	**Soil Texture**				
BH1	0.0-0.2	Coarse	700	1000	3500	10000
BH1	0.0-0.2	Coarse	700	1000	3500	10000
BH1	0.0-0.2	Coarse	--	--	--	--
BH1	0.5-0.7	Coarse	700	1000	3500	10000
BH2	0.0-0.2	Coarse	700	1000	3500	10000
BH2	0.5-0.7	Coarse	700	1000	3500	10000
BH3	0.0-0.3	Coarse	700	1000	3500	10000
BH3	0.7-0.9	Coarse	700	1000	3500	10000
BH4	0.0-0.3	Coarse	700	1000	3500	10000
BH5	0.0-0.3	Coarse	700	1000	3500	10000
BH6	0.0-0.3	Coarse	700	1000	3500	10000
BH6	0.6-0.8	Coarse	700	1000	3500	10000
BH8	0.0-0.1	Coarse	700	1000	3500	10000
BH8	0.0-0.1	Coarse	700	1000	3500	10000
BH8	0.0-0.1	Coarse	--	--	--	--
BH8	0.5-0.7	Coarse	700	1000	3500	10000
TP101	0-0.1	Coarse	700	1000	3500	10000
TP102	0-0.2	Fine	800	1000	5000	10000
TP102	0-0.2	Fine	800	1000	5000	10000
TP102	0.9-1.1	Fine	800	1000	5000	10000
TP103	0-0.2	Fine	800	1000	5000	10000
TP103	0.8-1.0	Fine	800	1000	5000	10000
TP104	0.1-0.3	Fine	800	1000	5000	10000
TP105	0-0.1	Coarse	700	1000	3500	10000
TP105	0.6-0.8	Fine	800	1000	5000	10000
TP106	0.5-0.7	Fine	800	1000	5000	10000
TP107	1.1-1.3	Fine	800	1000	5000	10000
SP1-1	-	Coarse	700	1000	3500	10000
SP2-2	-	Coarse	700	1000	3500	10000
SP2-2	-	Coarse	700	1000	3500	10000
SP3-2	-	Coarse	700	1000	3500	10000
SP4-2	-	Coarse	700	1000	3500	10000
SP5-2	-	Coarse	700	1000	3500	10000
SP6-1	-	Coarse	700	1000	3500	10000
SP7-1	-	Coarse	700	1000	3500	10000
SP8-1	-	Coarse	700	1000	3500	10000
AMF1-SP1	-	Coarse	--	--	--	--

TABLE G
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		82,000	62,000	85,000	120,000	1,100	120,000	85,000	130,000	29,000	
Site Use		**Intrusive Maintenance Worker - DIRECT SOIL CONTACT**									
Sample Reference	**Sample Depth**										
BH1	0.0-0.2	<25	<50	260	220	<0.2	<0.5	<1	<3	<1	0
BH1	0.0-0.2	<25	<50	300	250	<0.2	<0.5	<1	<3	<1	0
BH1	0.0-0.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	0
BH1	0.5-0.7	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH2	0.0-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH2	0.5-0.7	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH3	0.0-0.3	<25	<50	210	250	<0.2	<0.5	<1	<3	<1	0
BH3	0.7-0.9	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH4	0.0-0.3	<25	<50	650	870	<0.2	<0.5	<1	<3	<1	0
BH5	0.0-0.3	<25	<50	1300	1600	<0.2	<0.5	<1	<3	<1	0
BH6	0.0-0.3	<25	<50	1000	1200	<0.2	<0.5	<1	<3	<1	0
BH6	0.6-0.8	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH8	0.0-0.1	<25	<50	650	1200	<0.2	<0.5	<1	<3	<1	0
BH8	0.0-0.1	<25	<50	650	1200	<0.2	<0.5	<1	<3	<1	0
BH8	0.0-0.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	0
BH8	0.5-0.7	<25	<50	2400	1100	<0.2	<0.5	<1	<3	<1	0
TP101	0-0.1	<25	<50	750	900	<0.2	<0.5	<1	<3	<1	0.4
TP102	0-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
TP102	0-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
TP102	0.9-1.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
TP103	0-0.2	<25	<50	240	240	<0.2	<0.5	<1	<3	<1	0.4
TP103	0.8-1.0	<25	<50	650	140	<0.2	<0.5	<1	<3	<1	0
TP104	0.1-0.3	<25	<50	250	310	<0.2	<0.5	<1	<3	<1	0
TP105	0-0.1	<25	<50	160	170	<0.2	<0.5	<1	<3	<1	0
TP105	0.6-0.8	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
TP106	0.5-0.7	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
TP107	1.1-1.3	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
SP1-1	-	<25	<50	540	490	<0.2	<0.5	<1	<3	<1	0
SP2-2	-	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0.2
SP2-2	-	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
SP3-2	-	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
SP4-2	-	<25	<50	100	130	<0.2	<0.5	<1	<3	<1	0
SP5-2	-	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
SP6-1	-	<25	240	1200	1300	<0.2	<0.5	<1	<3	<1	0
SP7-1	-	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0.1
SP8-1	-	<25	<50	290	360	<0.2	<0.5	<1	<3	<1	0.1
AMF1-SP1	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	0
Total Number of Samples		34	34	34	34	34	34	34	34	34	37
Maximum Value		<PQL	240	2400	1600	<PQL	<PQL	<PQL	<PQL	<PQL	0.4

Concentration above the SAC **VALUE**

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

FIELD DATA														
Date Sampled	Sample reference	Sample Depth	Visible ACM in top 100mm	Approx. Volume of Soil (L)	Soil Mass (g)	Mass ACM (g)	Mass Asbestos in ACM (g)	[Asbestos from ACM in soil] (%w/w)	Mass ACM <7mm (g)	Mass Asbestos in ACM <7mm (g)	[Asbestos from ACM <7mm in soil] (%w/w)	Mass FA (g)	Mass Asbestos in FA (g)	[Asbestos from FA in soil] (%w/w)
SAC			**No**				0.05	**0.01**			**0.001**			**0.001**
20/11/2019	TP101	0.0-0.3	No	10	14,400	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--
20/11/2019	TP101	0.3-1.2	NA	10	9,400	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--
20/11/2019	TP101	1.2-1.3	NA	10	13,400	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--
20/11/2019	TP102	0.0-0.2	No	10	12,900	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--
20/11/2019	TP102	0.2-0.9	NA	10	12,400	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--
20/11/2019	TP103	0.0-0.3	No	10	13,800	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--
20/11/2019	TP103	0.3-0.8	NA	10	13,100	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--
20/11/2019	TP104	0.0-0.1	No	10	13,100	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--
20/11/2019	TP104	0.1-0.6	NA	10	14,700	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--
20/11/2019	TP104	0.6-1.0	NA	10	11,200	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--
20/11/2019	TP105	0.0-0.1	No	10	12,700	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--
20/11/2019	TP105	0.1-0.4	NA	10	9,600	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--
20/11/2019	TP105	0.4-0.6	NA	10	14,800	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--
20/11/2019	TP106	0.0-0.5	No	10	13,200	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--
20/11/2019	TP107	0.0-0.8	No	10	13,300	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--
20/11/2019	TP107	0.8-1.1	NA	10	14,000	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--

Concentration above the SAC **VALUE**

TABLE I1
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 (0.0-0.3m)	Arsenic	4	<4	<4	NC	NC
Dup Ref = DUP1	Cadmium	0.4	<0.4	<0.4	NC	NC
	Chromium	1	51	27	39.0	62
Envirolab Report: 223166	Copper	1	23	23	23.0	0
	Lead	1	14	17	15.5	19
	Mercury	0.1	<0.1	<0.1	NC	NC
	Nickel	1	17	23	20.0	30
	Zinc	1	21	30	25.5	35
	Naphthalene	0.1	<0.1	<0.1	NC	NC
	Acenaphthylene	0.1	<0.1	0.1	0.1	67
	Acenaphthene	0.1	<0.1	<0.1	NC	NC
	Fluorene	0.1	<0.1	<0.1	NC	NC
	Phenanthrene	0.1	0.2	0.2	0.2	0
	Anthracene	0.1	<0.1	<0.1	NC	NC
	Fluoranthene	0.1	0.6	0.6	0.6	0
	Pyrene	0.1	1	0.9	1.0	11
	Benzo(a)anthracene	0.1	0.3	0.3	0.3	0
	Chrysene	0.1	0.4	0.4	0.4	0
	Benzo(b,j+k)fluoranthene	0.2	0.7	0.6	0.7	15
	Benzo(a)pyrene	0.05	0.4	0.3	0.4	29
	Indeno(123-cd)pyrene	0.1	0.2	0.2	0.2	0
	Dibenzo(ah)anthracene	0.1	<0.1	<0.1	NC	NC
	Benzo(ghi)perylene	0.1	0.4	0.3	0.4	29
	Toluene	0.5	<25	<25	NC	NC
	Ethylbenzene	1	<50	<50	NC	NC
	m+p-xylene	2	1300	860	1080.0	41
	o-xylene	1	1600	1100	1350.0	37
	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 I2

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 = TP102 (0.0-0.2m)	Arsenic	4	<4	<4	NC	NC
Dup Ref = DUPSW102	Cadmium	0.4	<0.4	<0.4	NC	NC
	Chromium	1	10	5	7.5	67
Envirolab Report: 231315	Copper	1	7	4	5.5	55
	Lead	1	14	9	11.5	43
	Mercury	0.1	<0.1	<0.1	NC	NC
	Nickel	1	5	3	4.0	50
	Zinc	1	22	24	23.0	9
	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
	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 J
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 = TP101 (0.0-0.1m)	Arsenic	4	4	<4	<4	NC	NC
Dup Ref = DUPSW101 (0.0-0.1m)	Cadmium	0.4	0.4	<0.4	<0.4	NC	NC
	Chromium	1	1	39	26	32.5	40
Envirolab Report: 231315	Copper	1	1	35	74	54.5	72
Envirolab VIC Report: 19090	Lead	1	1	18	19	18.5	5
	Mercury	0.1	0.1	<0.1	<0.1	NC	NC
	Nickel	1	1	21	20	20.5	5
	Zinc	1	1	35	31	33.0	12
	Naphthalene	0.1	0.1	<0.1	<0.1	NC	NC
	Acenaphthylene	0.1	0.1	<0.1	0.1	0.1	67
	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	0.2	0.2	67
	Anthracene	0.1	0.1	<0.1	<0.1	NC	NC
	Fluoranthene	0.1	0.1	0.4	0.3	0.4	29
	Pyrene	0.1	0.1	0.8	0.6	0.7	29
	Benzo(a)anthracene	0.1	0.1	0.3	0.2	0.3	40
	Chrysene	0.1	0.1	0.4	0.2	0.3	67
	Benzo(b,j+k)fluoranthene	0.2	0.2	0.8	0.4	0.6	67
	Benzo(a)pyrene	0.05	0.05	0.5	0.24	0.4	70
	Indeno(123-cd)pyrene	0.1	0.1	0.3	0.1	0.2	100
	Dibenzo(ah)anthracene	0.1	0.1	<0.1	<0.1	NC	NC
	Benzo(ghi)perylene	0.1	0.1	0.5	0.2	0.4	86
	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	750	590	670.0	24
	TRH >C34-C40 (F4)	100	100	900	940	920.0	4
	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 K
SUMMARY OF FIELD QA/QC RESULTS

ANALYSIS	Envirolab PQL mg/kg	TBAM1[S]	TB2[S]	FRAM1[S]
		1-Aug-19	20-Nov-19	20-Nov-19
		mg/kg	mg/kg	µg/L
Benzene	0.2	<0.2	<0.2	<1
Toluene	0.5	<0.5	<0.5	<1
Ethylbenzene	1	<1	<1	<1
m+p-xylene	2	<2	<2	<2
o-xylene	1	<1	<1	<1

Explanation:
[S] Sample type (sand)

Values above PQLs/Acceptance criteria **VALUE**

Appendix C: Proposed Development Plan

PROJECT MAUI - ONCOLOGY

WARRINGAH ROAD & WAKEHURST PARKWAY, FRENCHS FOREST

SHEET LIST DA			
Sheet Number	Sheet Name	Current Revision	Current Revision Date
DA			
000-Specification + Site			
DA-000	COVER SHEET	8	09.12.19
DA-010	SITE PLAN - EXISTING	5	09.12.19
DA-011	SITE PLAN - PROPOSED	8	09.12.19
DA-012	SITE ANALYSIS PLAN	3	04.12.19
DA-015	SURVEY PLAN	5	09.12.19
DA-020	DEMOLITION PLAN	4	09.12.19
DA-021	EXCAVATION PLAN	4	09.12.19
DA-050	ROOF PLAN	4	04.12.19
100-General Arrangement Plans			
DA-099	FLOOR PLAN - BASEMENT 4	1	04.12.19
DA-100	FLOOR PLAN - BASEMENT 3	6	04.12.19
DA-101	FLOOR PLAN - BASEMENT 2	6	04.12.19
DA-102	FLOOR PLAN - BASEMENT 1	6	04.12.19
DA-103	FLOOR PLAN - GROUND	6	04.12.19
DA-104	FLOOR PLAN - LEVEL 1	4	04.12.19
DA-105	FLOOR PLAN - LEVEL 2	4	04.12.19
DA-106	FLOOR PLAN - LEVEL 3	4	04.12.19
DA-120	FLOOR PLAN - SIGNAGE	4	04.12.19
200-Elevations			
DA-200	ELEVATIONS - SHEET 1	4	04.12.19
DA-201	ELEVATIONS - SHEET 2	4	04.12.19
DA-202	ELEVATIONS - SHEET 3	3	04.12.19
300-Sections			
DA-300	SECTIONS - SHEET 1	5	09.12.19
DA-301	SECTIONS - SHEET 2	5	09.12.19
800-Shadow Studies			
DA-800	SHADOW STUDIES - SHEET 1	3	04.12.19
DA-801	SHADOW STUDIES - SHEET 2	4	04.12.19
900-Perspectives			
DA-900	3D VIEWS	4	04.12.19
DA-901	PHOTOMONTAGE	4	04.12.19
1000-Notification Plans			
DA-1000	NOTIFICATION PLAN - SITE	4	04.12.19
DA-1001	NOTIFICATION PLAN - ELEVATIONS	3	04.12.19

DRAWING STATUS:

DEVELOPMENT APPLICATION

Rev	Revision Description	Date
1	Preliminary DA Issue	23.08.19
2	Issue for Information	28.08.19
3	Draft DA Issue	30.08.19
4	ISSUE FOR DA	05.09.19
5	REISSUE FOR DA	06.09.19
6	REISSUE FOR DA	27.11.19
7	ISSUE FOR DA	04.12.19
8	REISSUE FOR DA	09.12.19

DRAWING LEGEND:

1. Architectural drawings shall be read in conjunction with other consultant drawings and specifications. Any discrepancies shall be referred to team 2 architects before proceeding with work.
2. All dimensions and levels are in millimeters unless noted otherwise. No dimension shall be obtained by scaling the drawing.
3. All dimensions to be checked on site with any discrepancies referred to team 2 architects before proceeding with work.
4. All work to be carried out in accordance with the requirements of the principal certifying authority, current ncc & australian standards.

NOTE:

EASEMENTS SUBJECT TO FINAL SURVEY

Client
GenesisCare
11/41-43 Bourke Rd
Alexandria NSW 2015

Builder
Erilyan
1/27 Hotham Parade
Artarmon NSW 2064

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MELBOURNE
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Reg Vic: 19340

Project:
Project Maui Oncology
Warringah Road & Wakehurst Parkway

Title:
COVER SHEET

Project #	Scale	Drw.	Chd.
856	1 : 50 @A1		

Drawing #	Rev.
DA-000	8

DRAWING STATUS:

DEVELOPMENT APPLICATION

Rev	Revision Description	Date
1	Preliminary DA Issue	23.08.19
2	Draft DA Issue	30.08.19
3	ISSUE FOR DA	05.09.19
4	ISSUE FOR DA	04.12.19
5	REISSUE FOR DA	09.12.19

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Client
GenesisCare
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0 1 2 3 4 5
SCALE 1:100

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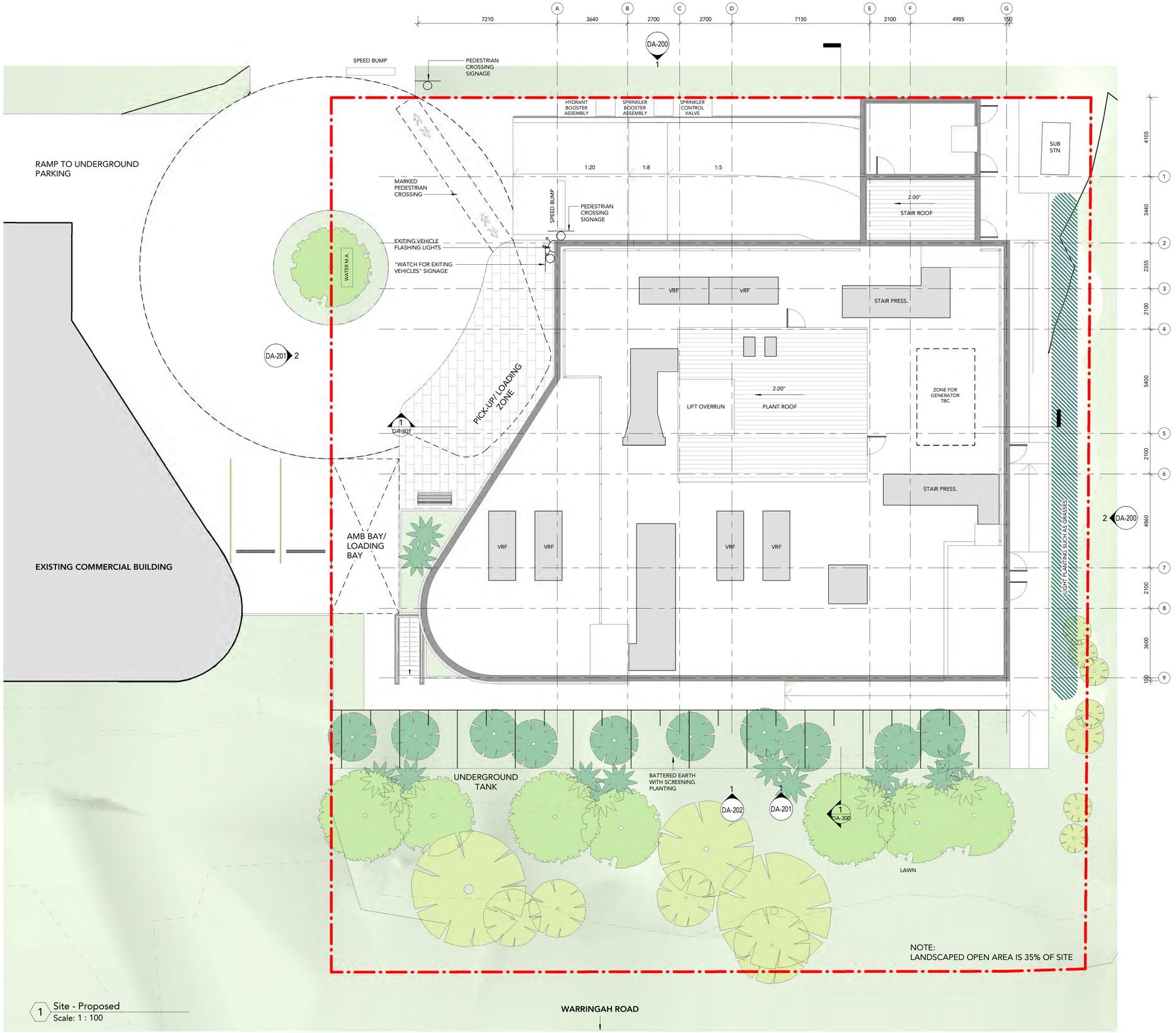
South Yarra VIC 3141
ABN: 72 104 833 507
Reg Vic: 19340

Project:
Project Maui Oncology
Warringah Road & Wakehurst Parkway

Title:
SITE PLAN - EXISTING

Project #:	Scale:	Drw:	Chd:
856	1 : 100 @A1	Author	Checker

Drawing #: DA-010
Rev: 5



1 Site - Proposed
Scale: 1 : 100

DRAWING STATUS:

DEVELOPMENT APPLICATION

Rev	Revision Description	Date
1	Preliminary DA Issue	23.08.19
3	Draft DA Issue	30.08.19
2	Issue for Information	30.08.19
4	Updated Drawing for Information	03.09.19
5	ISSUE FOR DA	05.09.19
6	REISSUE FOR DA	27.11.19
7	ISSUE FOR DA	04.12.19
8	REISSUE FOR DA	09.12.19

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LEGENDS:

- PROPOSED WALLS & FLOORS
- NEIGHBOURING EXISTING BUILDINGS
- EXISTING PLANTING
- PROPOSED PLANTING
- DEMOLITION/EXCAVATION AREA

NOTE: EASEMENTS SUBJECT TO FINAL SURVEY

Client
GenesisCare
11/41-43 Bourke Rd
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0 1 2 3 4 5
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Reg Vic: 19340

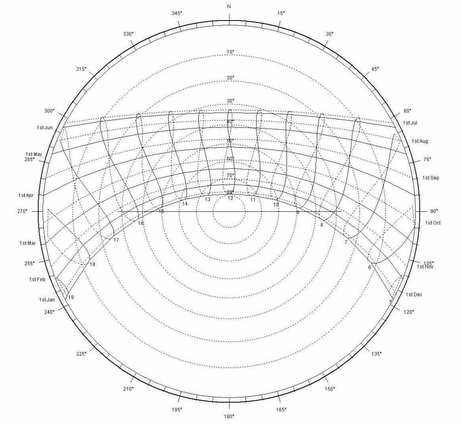
Project:
Project Maui Oncology
Warringah Road & Wakehurst Parkway

Title:
SITE PLAN - PROPOSED

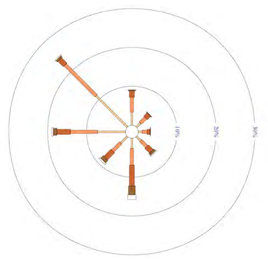
Project #:	Scale:	Drw:	Chd:
856	As indicated @A1	Author	Checker

Drawing #: DA-011
Rev: 8

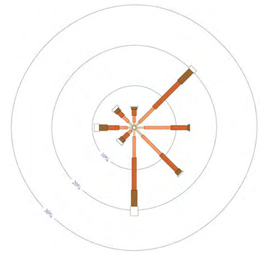
LOCATION PLAN
SIX MAPS



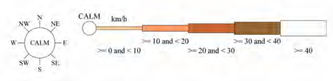
SUN PATH DIAGRAM
SYDNEY



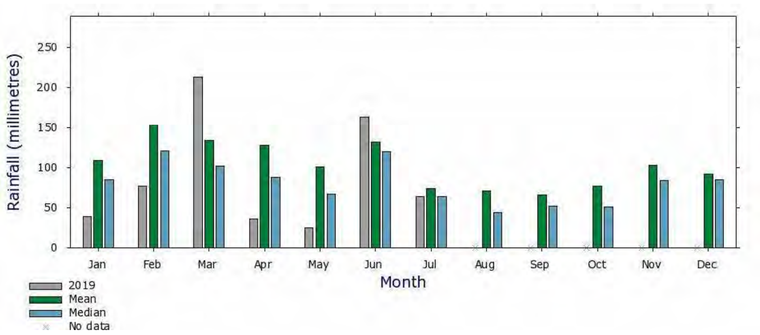
WIND DIRECTION AND STRENGHT 9AM
SYDNEY



WIND DIRECTION AND STRENGHT 3PM
SYDNEY

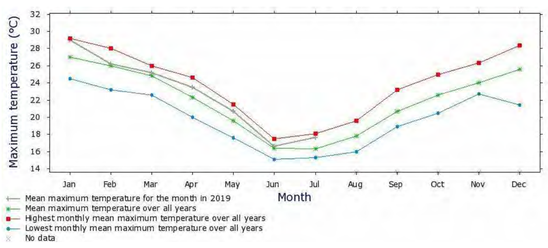


LOCATION PLAN
SIX MAPS

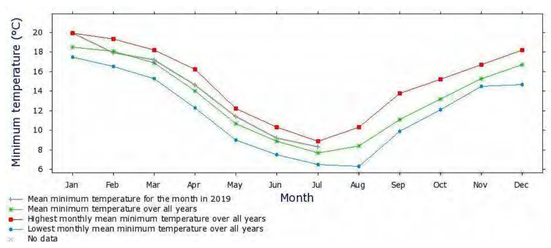


RAINFALL DATA: BELROSE
CLIMATE DATA FROM BUREAU OF METEOROLOGY

SITE PLAN
SIX MAPS



MAXIMUM TEMPERATURE DATA: TERRY HILLS
CLIMATE DATA FROM BUREAU OF METEOROLOGY



MINIMUM TEMPERATURE DATA: TERRY HILLS
CLIMATE DATA FROM BUREAU OF METEOROLOGY

DRAWING STATUS:

DEVELOPMENT APPLICATION

Rev	Revision Description	Date
1	Draft DA Issue	30.08.19
2	ISSUE FOR DA	05.09.19
3	ISSUE FOR DA	04.12.19

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Client
GenesisCare
11/41-43 Bourke Rd
Alexandria NSW 2015

Builder
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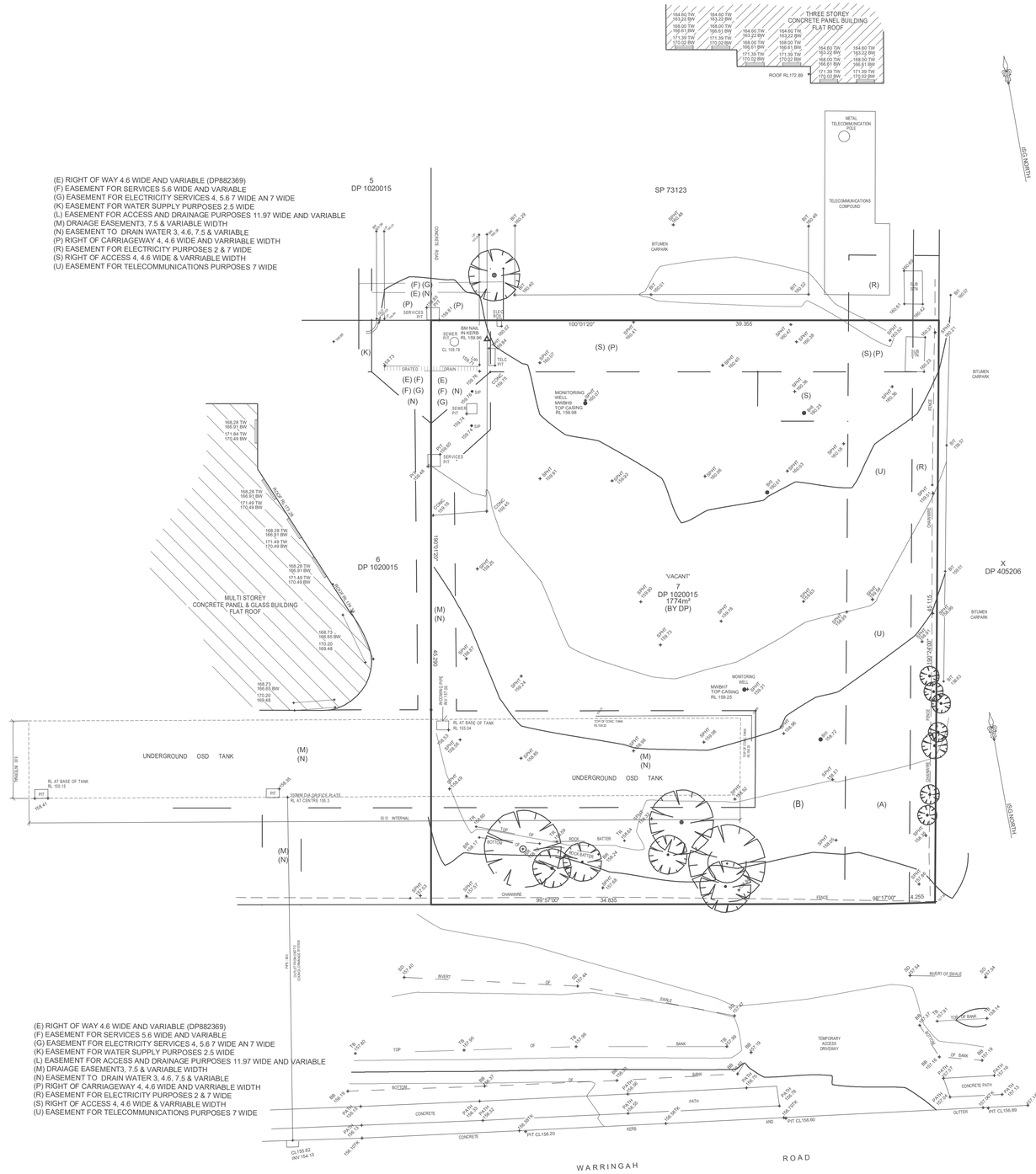
ABN: 72 104 833 507
Reg Vic: 19340

Project:
Project Maui Oncology
Warringah Road & Wakehurst Parkway

Title:
SITE ANALYSIS PLAN

Project #:	Scale:	Drw:	Chd:
856	@A1	Author	Checker

Drawing #: DA-012
Rev: 3



1 Site - Survey
Scale: 1 : 200

DRAWING STATUS:

DEVELOPMENT APPLICATION

Rev	Revision Description	Date
1	Preliminary DA Issue	23.08.19
2	Draft DA Issue	30.08.19
3	ISSUE FOR DA	05.09.19
4	ISSUE FOR DA	04.12.19
5	REISSUE FOR DA	09.12.19

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NOTE: EASEMENTS SUBJECT TO FINAL SURVEY

Client
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0 1 2 3 4 5 10
SCALE 1:200

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Project:
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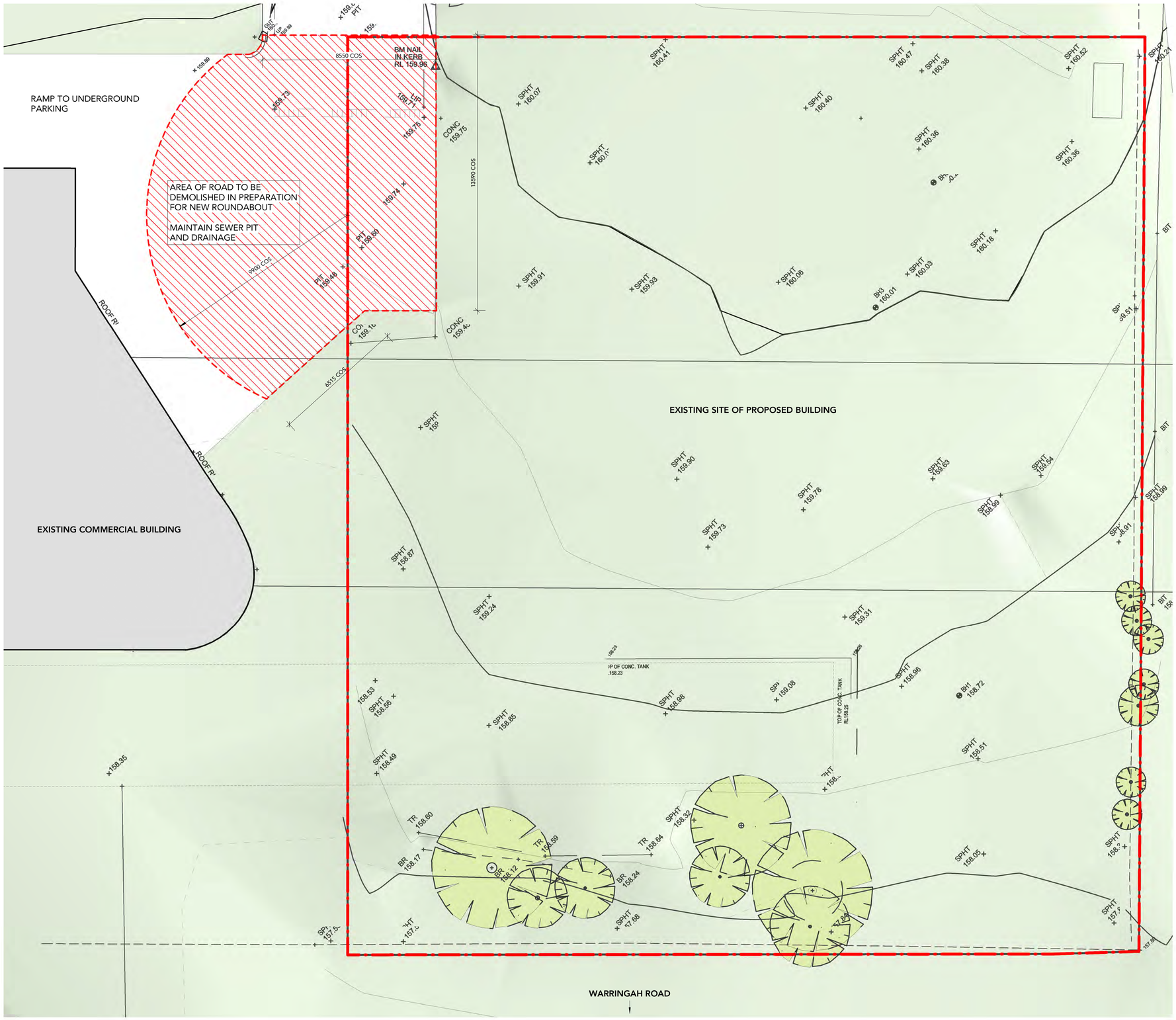
Warringah Road & Wakehurst Parkway

Title:
SURVEY PLAN

Project #:	Scale:	Drw:	Chd:
856	1 : 200 @A1	Author	Checker

Drawing #: DA-015
Rev: 5



1 Site - Demolition
Scale: 1 : 100

DRAWING STATUS:

DEVELOPMENT APPLICATION

Rev	Revision Description	Date
1	Draft DA Issue	30.08.19
2	ISSUE FOR DA	05.09.19
3	ISSUE FOR DA	04.12.19
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LEGENDS:

- PROPOSED WALLS & FLOORS
- NEIGHBOURING EXISTING BUILDINGS
- EXISTING PLANTING
- PROPOSED PLANTING
- DEMOLITION/EXCAVATION AREA

NOTE: EASEMENTS SUBJECT TO FINAL SURVEY

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0 1 2 3 4 5
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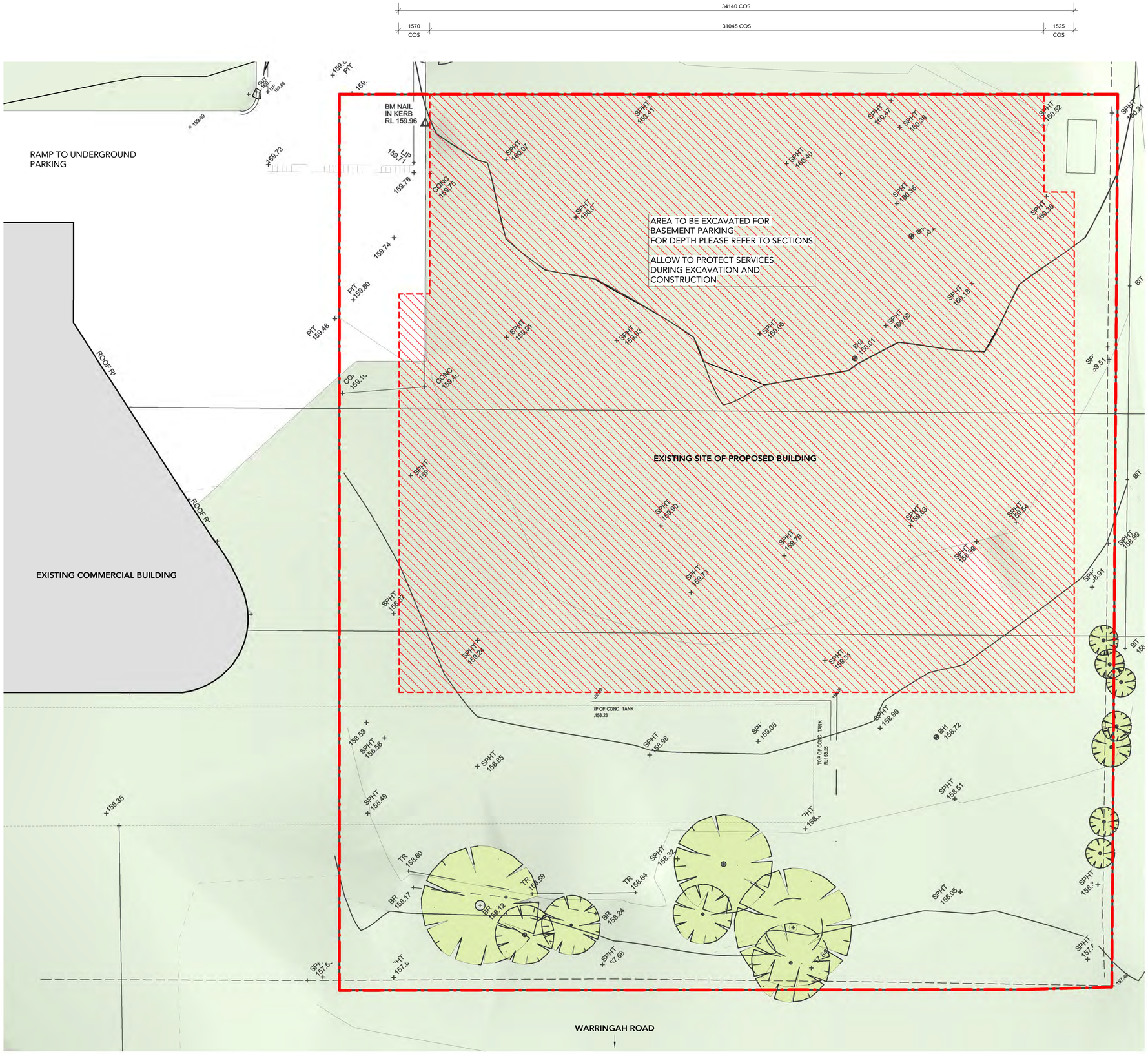
Project:
Project Maui Oncology
Warringah Road & Wakehurst Parkway

Title:
DEMOLITION PLAN

Project #:	Scale:	Drw:	Chd:
856	As indicated @A1	Author	Checker

Drawing #: DA-020
Rev: 4



1 Site - Excavation
Scale: 1 : 100

DRAWING STATUS:

DEVELOPMENT APPLICATION

Rev	Revision Description	Date
1	Draft DA Issue	30.08.19
2	ISSUE FOR DA	05.09.19
3	ISSUE FOR DA	04.12.19
4	REISSUE FOR DA	09.12.19

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LEGENDS:

- PROPOSED WALLS & FLOORS
- NEIGHBOURING EXISTING BUILDINGS
- EXISTING PLANTING
- PROPOSED PLANTING
- DEMOLITION/EXCAVATION AREA

NOTE: EASEMENTS SUBJECT TO FINAL SURVEY

Client
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SCALE 1:100

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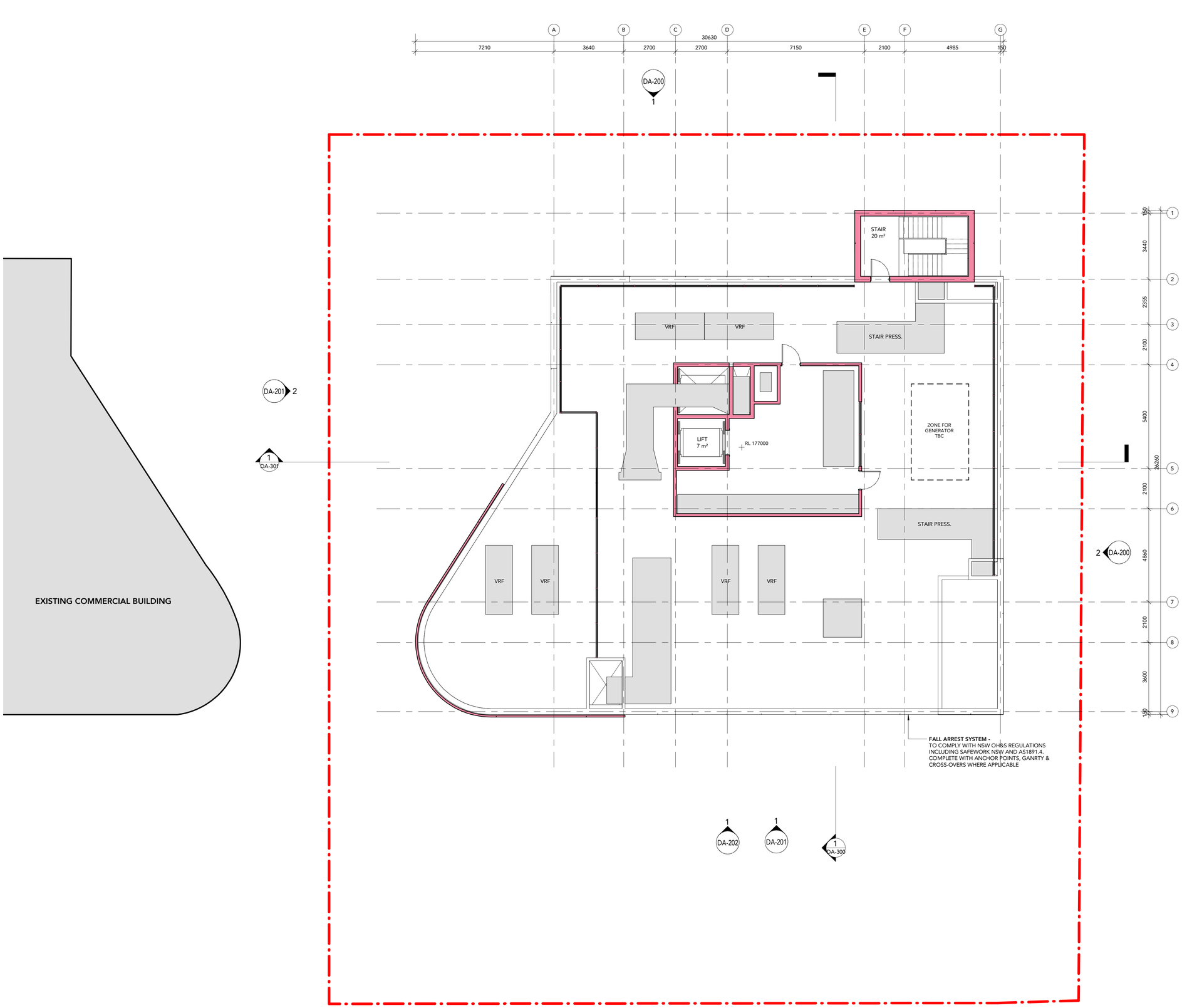
Project:
Project Maui Oncology
Warringah Road & Wakehurst Parkway

Title:
EXCAVATION PLAN

Project #:	Scale:	Drw:	Chd:
856	As indicated @A1	Author	Checker

Drawing #: DA-021
Rev: 4



1 Floor Plan - Roof
Scale: 1 : 100

DRAWING STATUS:

DEVELOPMENT APPLICATION

Rev	Revision Description	Date
1	Preliminary DA Issue	23.08.19
2	Draft DA Issue	30.08.19
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4	ISSUE FOR DA	04.12.19

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LEGENDS:

- PROPOSED WALLS & FLOORS
- NEIGHBOURING EXISTING BUILDINGS
- EXISTING PLANTING
- PROPOSED PLANTING
- DEMOLITION/EXCAVATION AREA

NOTE: EASEMENTS SUBJECT TO FINAL SURVEY

Client
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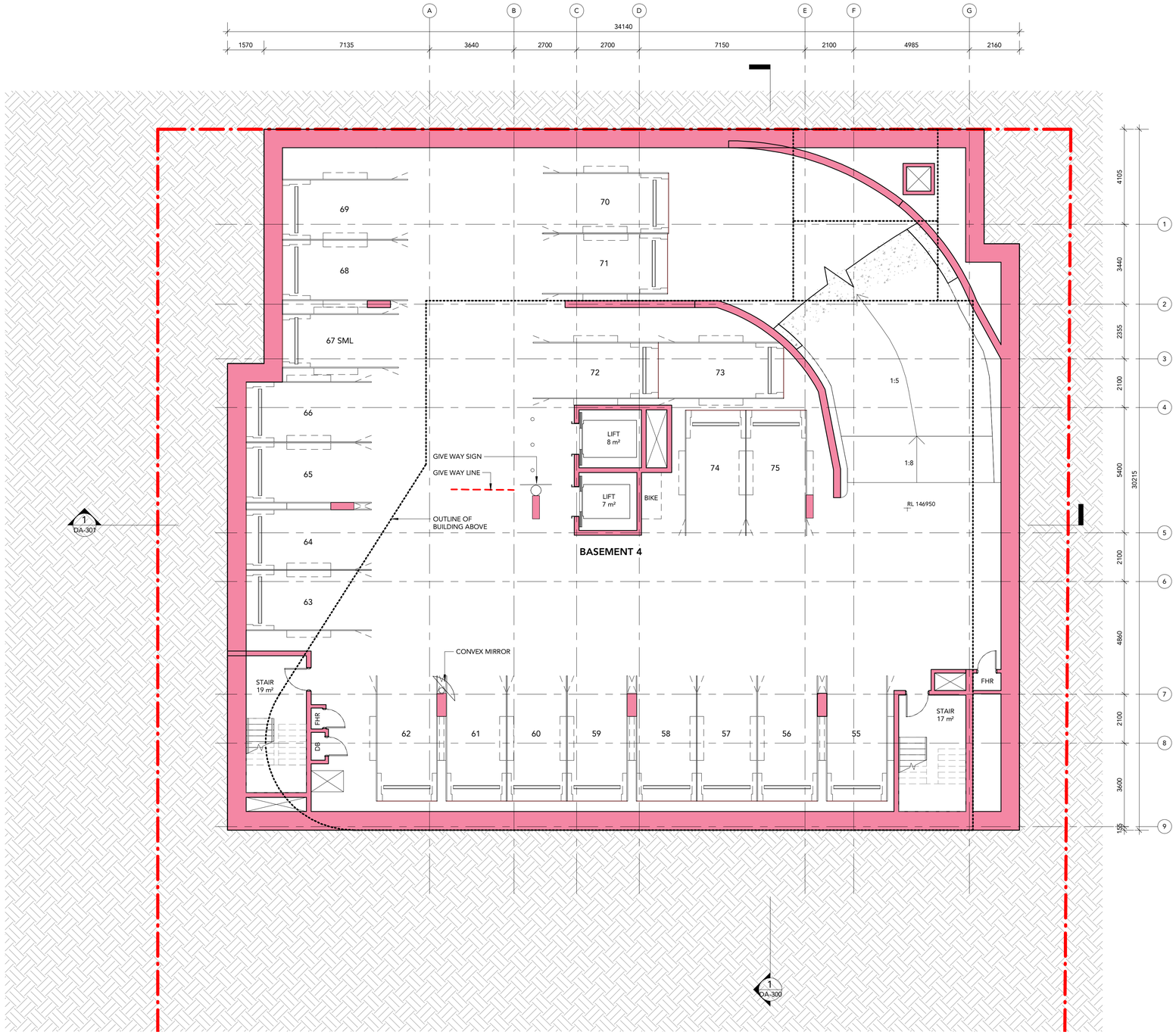
Project:
Project Maui Oncology
Warringah Road & Wakehurst Parkway

Title:
ROOF PLAN

Project #:	Scale:	Drw:	Chd:
856	As indicated @A1	Author	Checker

Drawing #: DA-050
Rev: 4



1 Floor Plan - Basement 4
Scale: 1 : 100

DRAWING STATUS:

DEVELOPMENT APPLICATION

Rev	Revision Description	Date
1	ISSUE FOR DA	04.12.19

DRAWING LEGEND:

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LEGENDS:

- PROPOSED WALLS & FLOORS
- NEIGHBOURING EXISTING BUILDINGS
- EXISTING PLANTING
- PROPOSED PLANTING
- DEMOLITION/EXCAVATION AREA

NOTE: EASEMENTS SUBJECT TO FINAL SURVEY

Client
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0 1 2 3 4 5
SCALE 1:100

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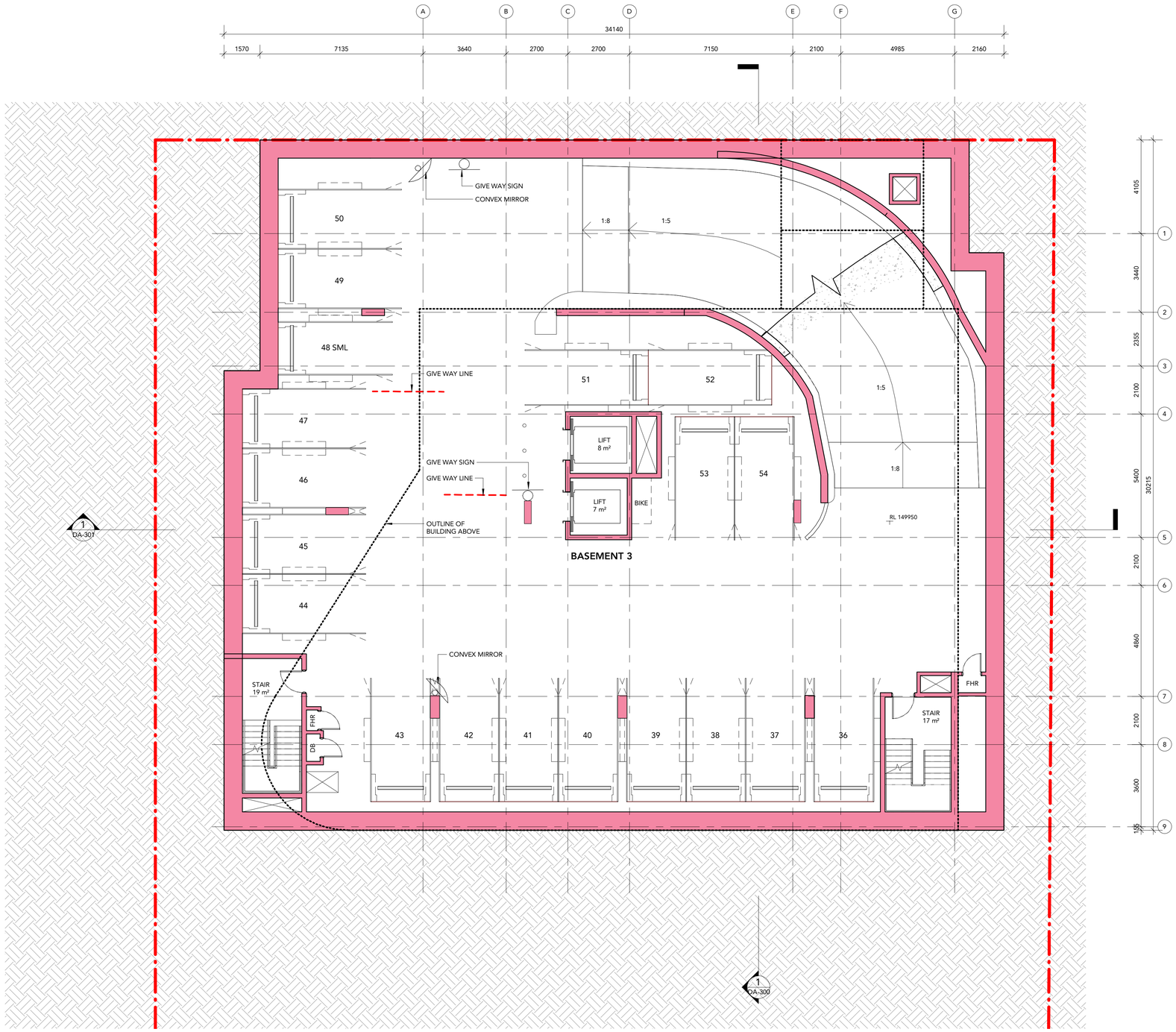
Reg Vic: 19340

Project:
Project Maui Oncology
Warringah Road & Wakehurst Parkway

Title:
FLOOR PLAN - BASEMENT 4

Project #:	Scale:	Drw:	Ckd:
856	As indicated @A1	Author	Checker

Drawing #: DA-099
Rev: 1



1 Floor Plan - Basement 3
Scale: 1 : 100

DRAWING STATUS:

DEVELOPMENT APPLICATION

Rev	Revision Description	Date
1	Preliminary DA Issue	23.08.19
2	Issue for Information	28.08.19
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LEGENDS:

- PROPOSED WALLS & FLOORS
- NEIGHBOURING EXISTING BUILDINGS
- EXISTING PLANTING
- PROPOSED PLANTING
- DEMOLITION/EXCAVATION AREA

NOTE: EASEMENTS SUBJECT TO FINAL SURVEY

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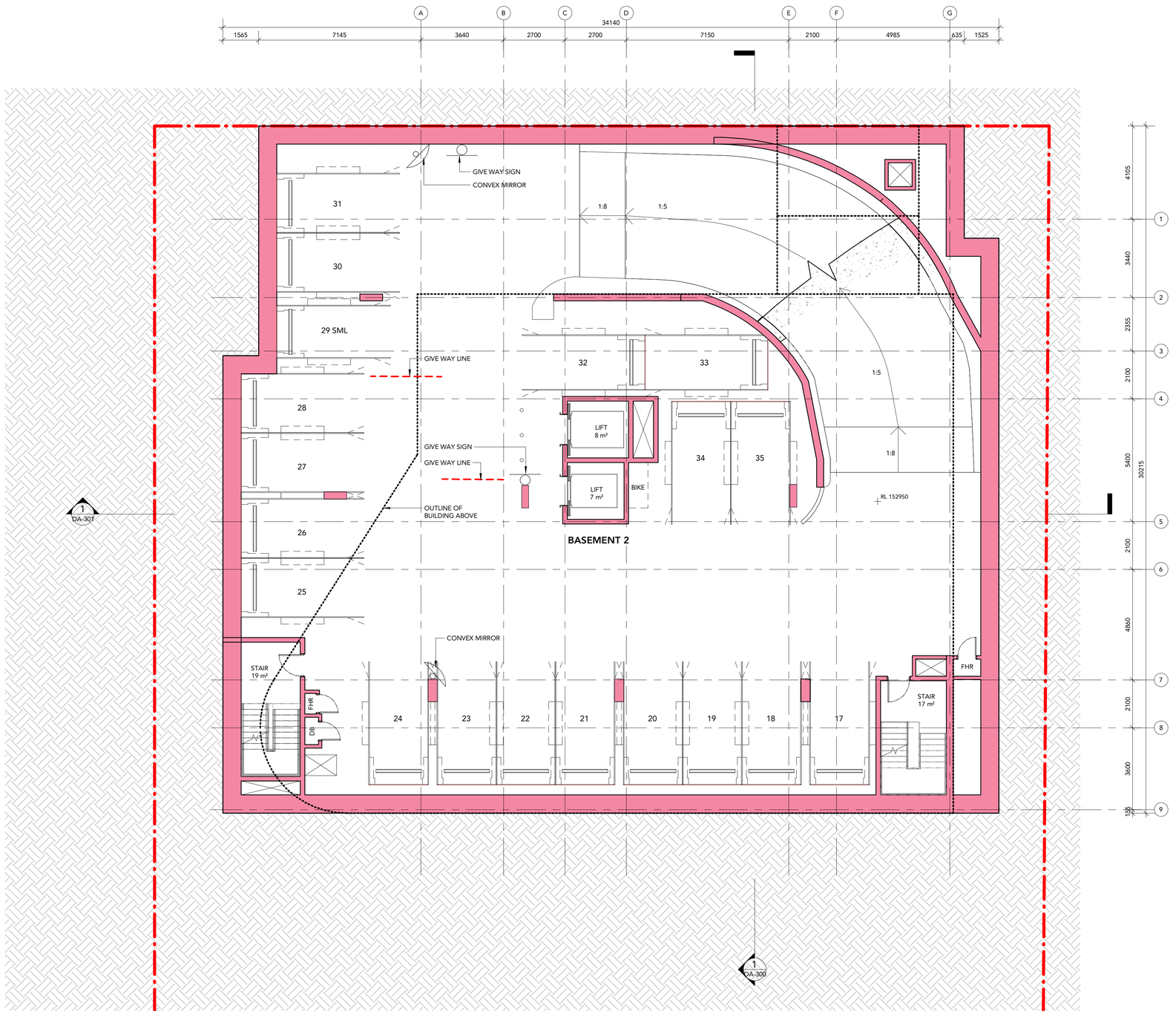
Reg Vic: 19340

Project:
Project Maui Oncology
Warringah Road & Wakehurst Parkway

Title:
FLOOR PLAN - BASEMENT 3

Project #:	Scale:	Drw:	Chd:
856	As indicated @A1	Author	Checker

Drawing #: DA-100
Rev: 6



1 Floor Plan - Basement 2
Scale: 1 : 100

DRAWING STATUS:

DEVELOPMENT APPLICATION

Rev	Revision Description	Date
1	Preliminary DA Issue	23.08.19
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LEGENDS:

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- NEIGHBOURING EXISTING BUILDINGS
- EXISTING PLANTING
- PROPOSED PLANTING
- DEMOLITION/EXCAVATION AREA

NOTE: EASEMENTS SUBJECT TO FINAL SURVEY

Client
GenesisCare
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Builder
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SCALE 1:100

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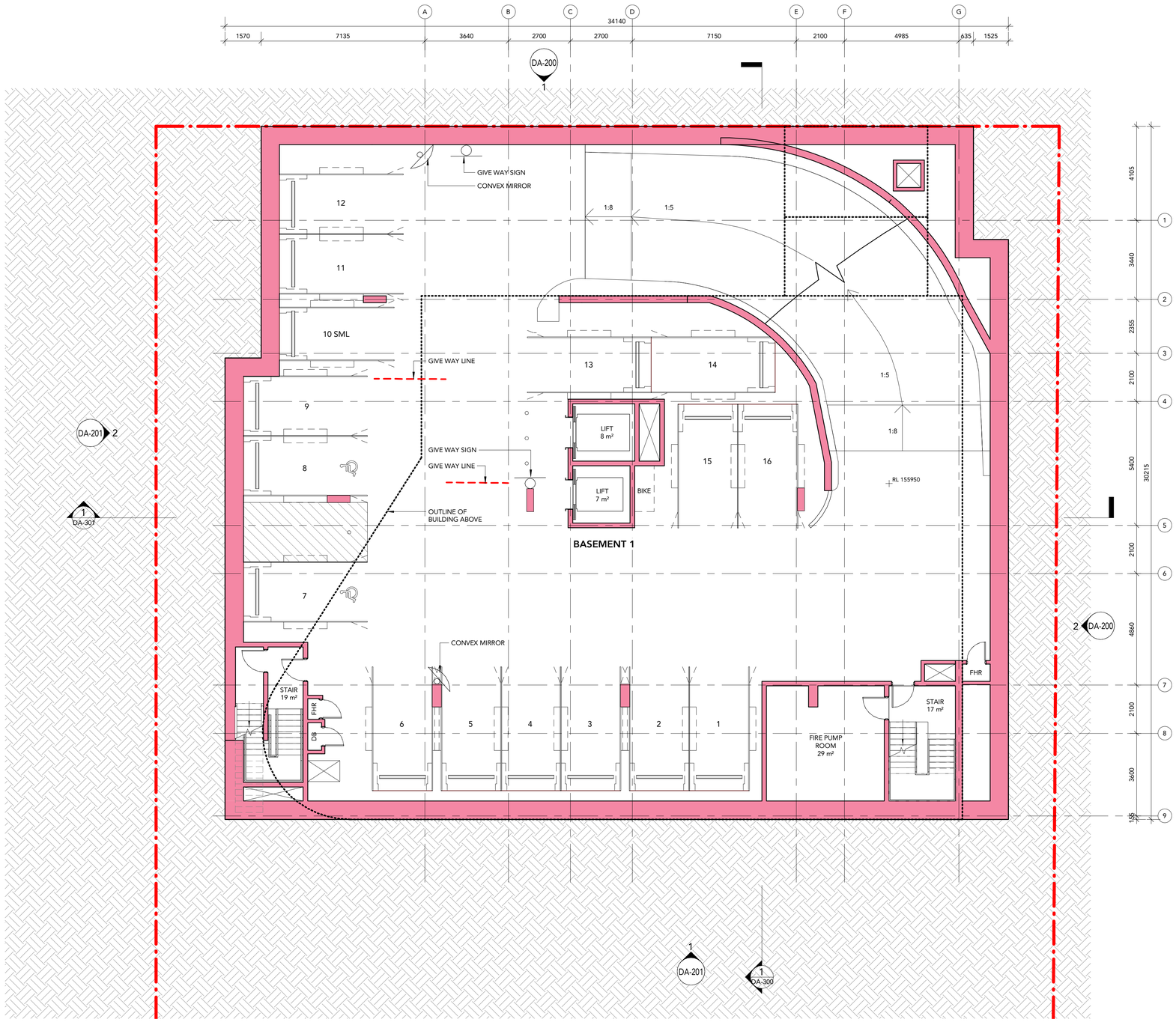
Reg Vic: 19340

Project:
Project Maui Oncology
Warringah Road & Wakehurst Parkway

Title:
FLOOR PLAN - BASEMENT 2

Project #:	Scale:	Drw:	Ckd:
856	As indicated @A1	Author	Checker

Drawing #: DA-101
Rev: 6



1 Floor Plan - Basement 1
Scale: 1 : 100

DRAWING STATUS:

DEVELOPMENT APPLICATION

Rev	Revision Description	Date
1	Preliminary DA Issue	23.08.19
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LEGENDS:

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- NEIGHBOURING EXISTING BUILDINGS
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- PROPOSED PLANTING
- DEMOLITION/EXCAVATION AREA

NOTE: EASEMENTS SUBJECT TO FINAL SURVEY

Client
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Alexandria NSW 2015

Builder
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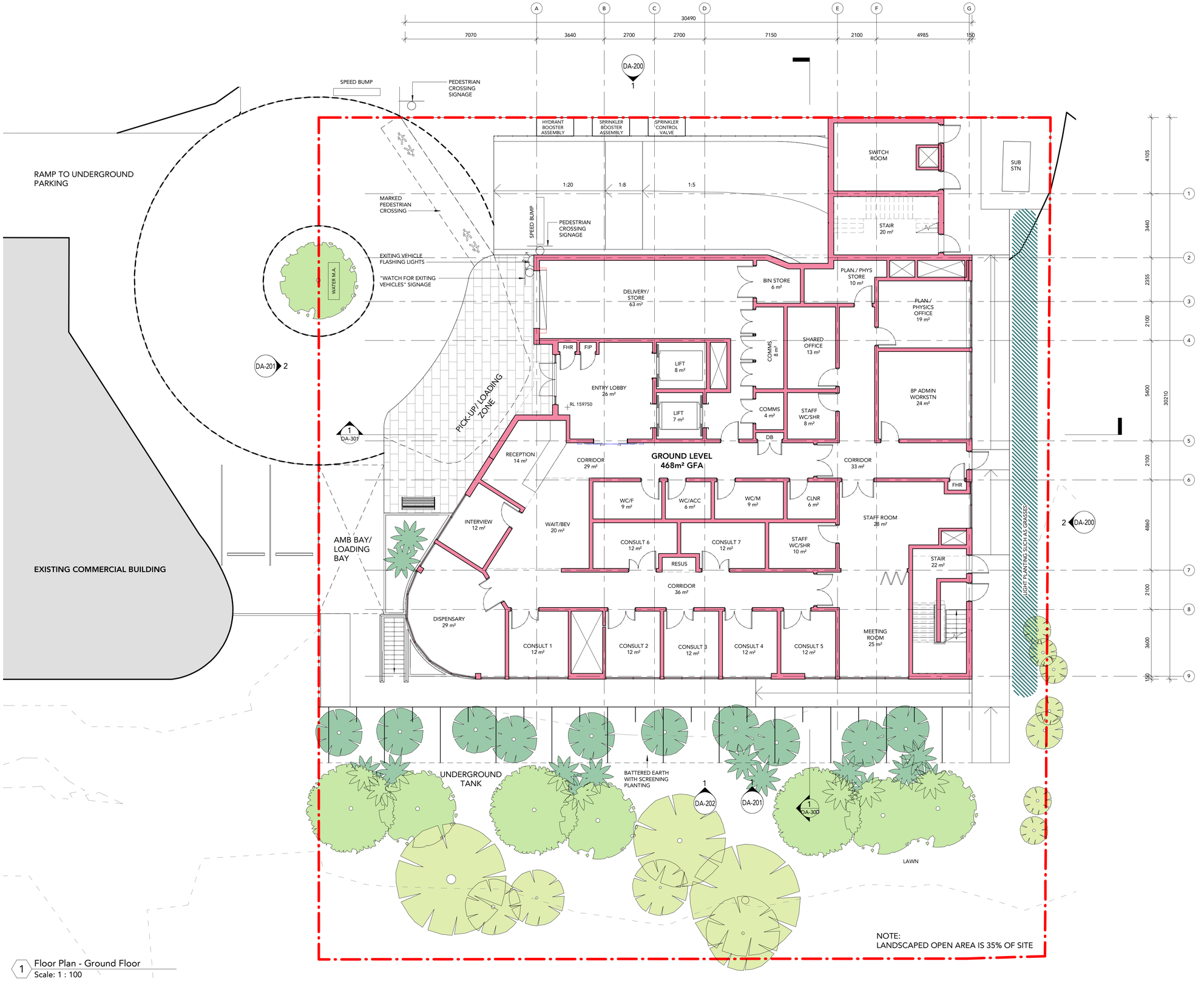
Reg Vic: 19340

Project:
Project Maui Oncology
Warringah Road & Wakehurst Parkway

Title:
FLOOR PLAN - BASEMENT 1

Project #:	Scale:	Dwg:	Chd:
856	As indicated @A1	Author	Checker

Drawing #: DA-102
Rev: 6



1 Floor Plan - Ground Floor
Scale: 1 : 100

DRAWING STATUS:

DEVELOPMENT APPLICATION

Rev	Revision Description	Date
1	Preliminary DA Issue	23.08.19
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LEGENDS:

- PROPOSED WALLS & FLOORS
- NEIGHBOURING EXISTING BUILDINGS
- EXISTING PLANTING
- PROPOSED PLANTING
- DEMOLITION/EXCAVATION AREA

NOTE: EASEMENTS SUBJECT TO FINAL SURVEY

Client
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Alexandria NSW 2015

Builder
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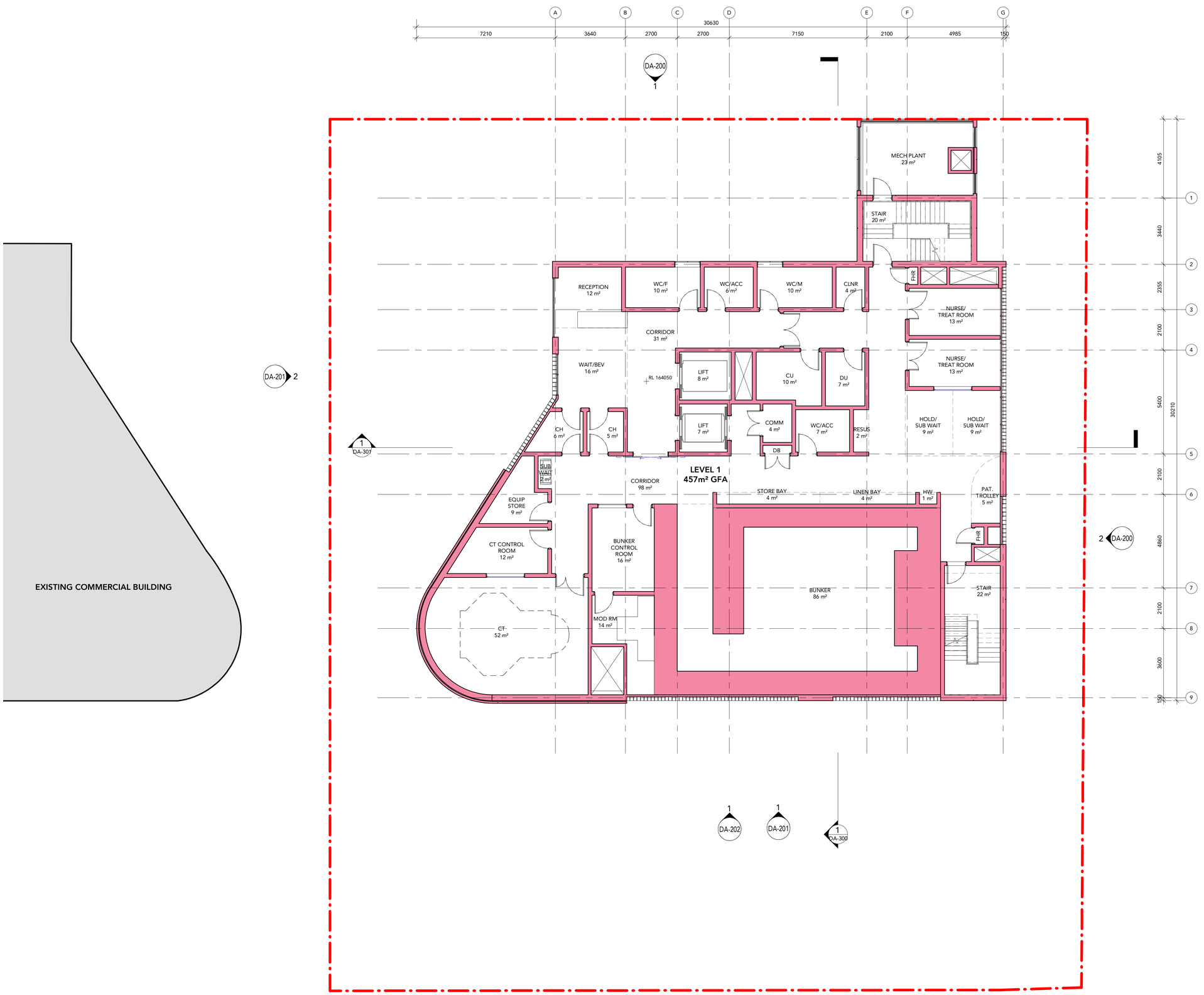
Reg Vic: 19340

Project:
Project Maui Oncology
Warringah Road & Wakehurst Parkway

Title:
FLOOR PLAN - GROUND

Project #:	Scale:	Drw:	Chk:
856	As indicated @A1	Author	Checker

Drawing #: DA-103
Rev: 6



EXISTING COMMERCIAL BUILDING

1 Floor Plan - Level 1
Scale: 1 : 100

DRAWING STATUS:

DEVELOPMENT APPLICATION

Rev	Revision Description	Date
1	Preliminary DA Issue	23.08.19
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LEGENDS:

- PROPOSED WALLS & FLOORS
- NEIGHBOURING EXISTING BUILDINGS
- EXISTING PLANTING
- PROPOSED PLANTING
- DEMOLITION/EXCAVATION AREA

NOTE: EASEMENTS SUBJECT TO FINAL SURVEY

Client
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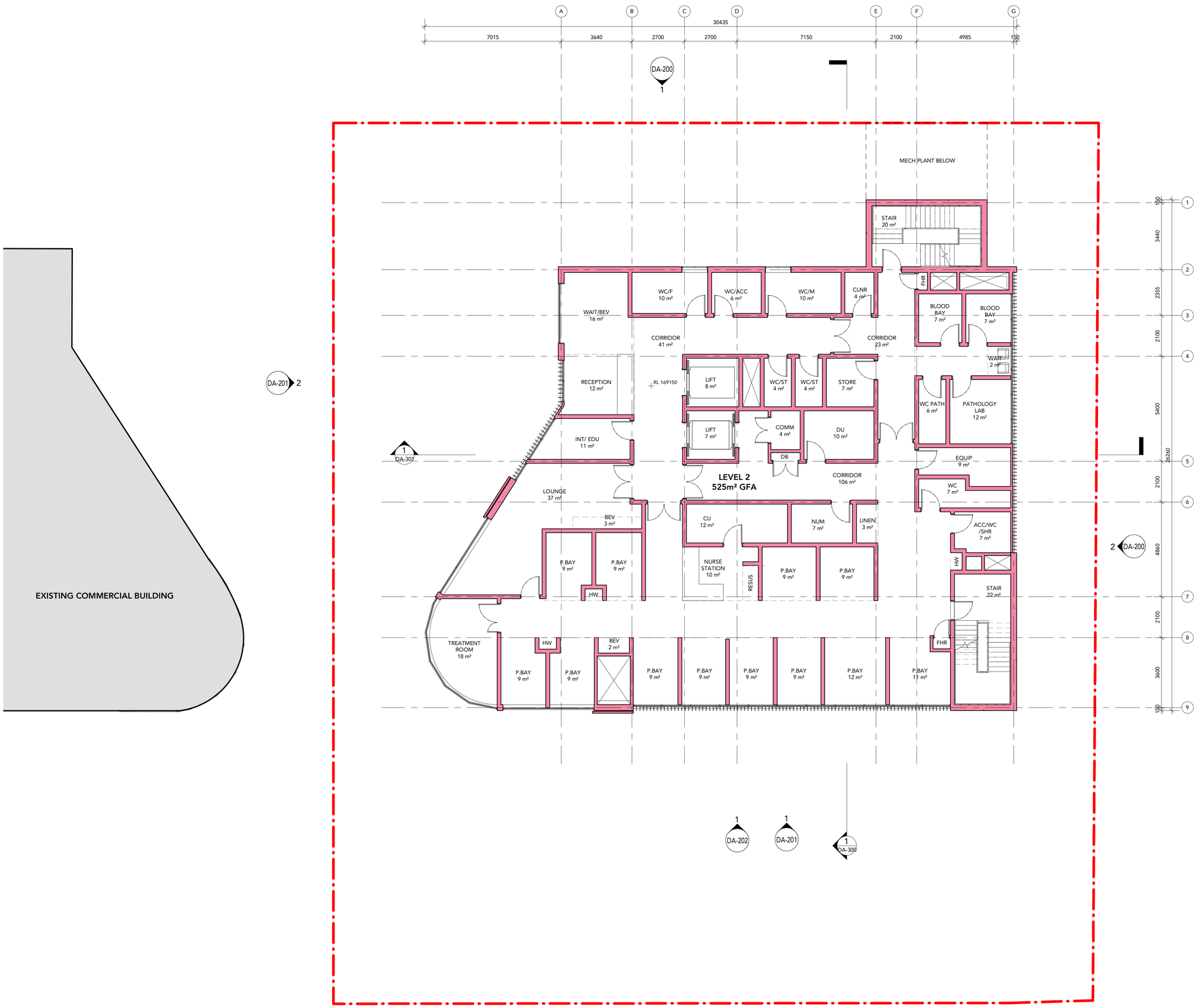
Project:
Project Maui Oncology
Warringah Road & Wakehurst Parkway

Title:
FLOOR PLAN - LEVEL 1

Project #:	Scale:	Drw:	Chd:
856	As indicated @A1	Author	Checker

Drawing #: DA-104
Rev: 4



1 Floor Plan - Level 2
Scale: 1 : 100

DRAWING STATUS:

DEVELOPMENT APPLICATION

Rev	Revision Description	Date
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LEGENDS:

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- NEIGHBOURING EXISTING BUILDINGS
- EXISTING PLANTING
- PROPOSED PLANTING
- DEMOLITION/EXCAVATION AREA

NOTE: EASEMENTS SUBJECT TO FINAL SURVEY

Client
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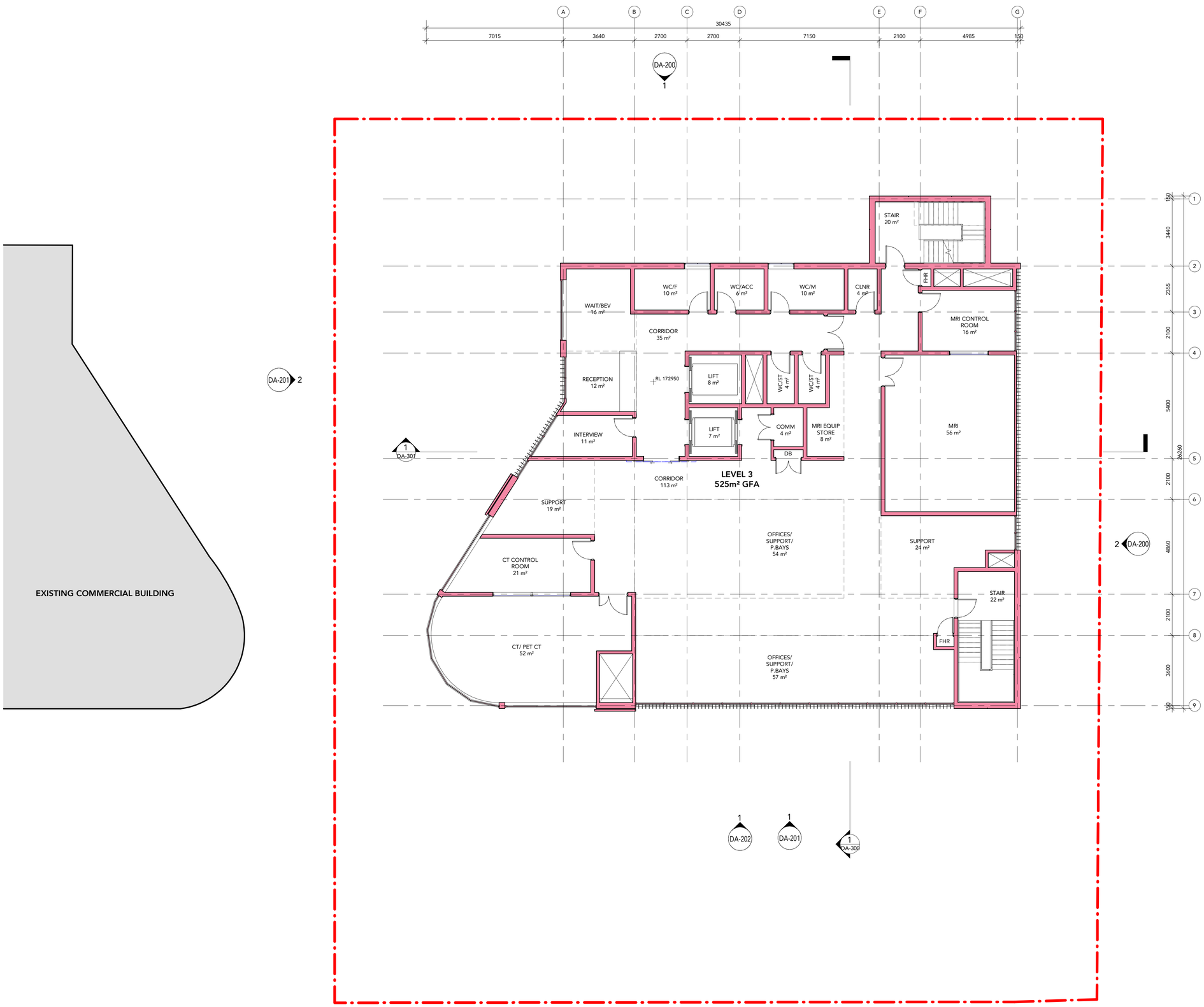
Reg Vic: 19340

Project:
Project Maui Oncology
Warringah Road & Wakehurst Parkway

Title:
FLOOR PLAN - LEVEL 2

Project #:	Scale:	Drw:	Chd:
856	As indicated @A1	Author	Checker

Drawing #: DA-105
Rev: 4



1 Floor Plan - Level 3
Scale: 1 : 100

DRAWING STATUS:

DEVELOPMENT APPLICATION

Rev	Revision Description	Date
1	Preliminary DA Issue	23.08.19
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3	ISSUE FOR DA	05.09.19
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LEGENDS:

- PROPOSED WALLS & FLOORS
- NEIGHBOURING EXISTING BUILDINGS
- EXISTING PLANTING
- PROPOSED PLANTING
- DEMOLITION/EXCAVATION AREA

NOTE: EASEMENTS SUBJECT TO FINAL SURVEY

Client
GenesisCare
11/41-43 Bourke Rd
Alexandria NSW 2015

Builder
Erilyan
1/27 Hotham Parade
Artarmon NSW 2064

0 1 2 3 4 5
SCALE 1:100

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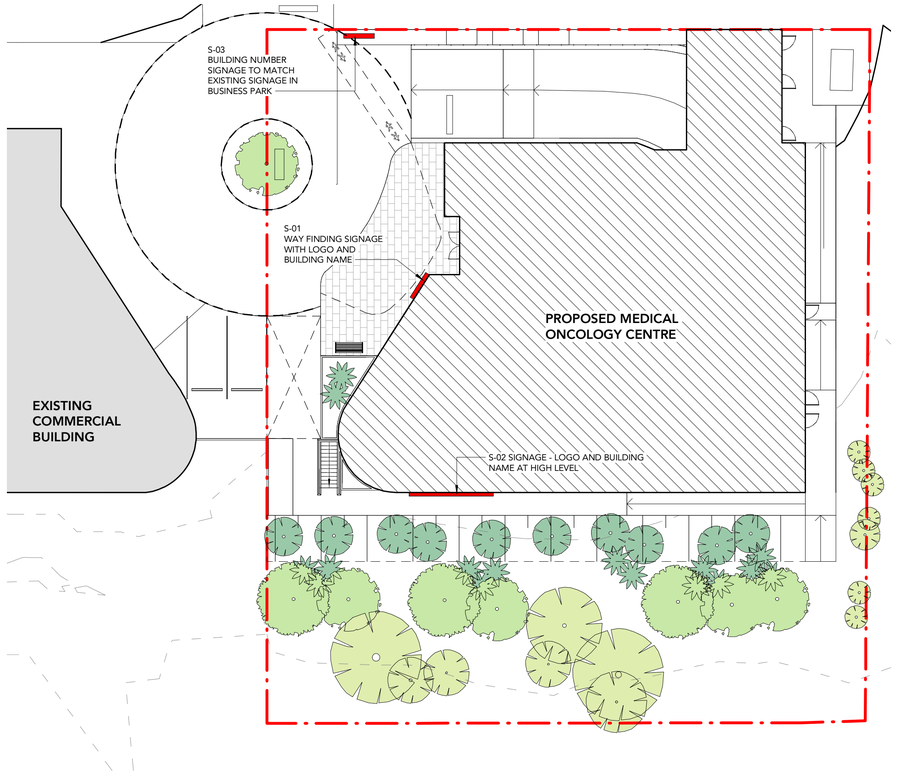
ABN: 72 104 833 507
Reg Vic: 19340

Project:
Project Maui Oncology
Warringah Road & Wakehurst Parkway

Title:
FLOOR PLAN - LEVEL 3

Project #:	Scale:	Drw:	Chd:
856	As indicated @A1	Author	Checker

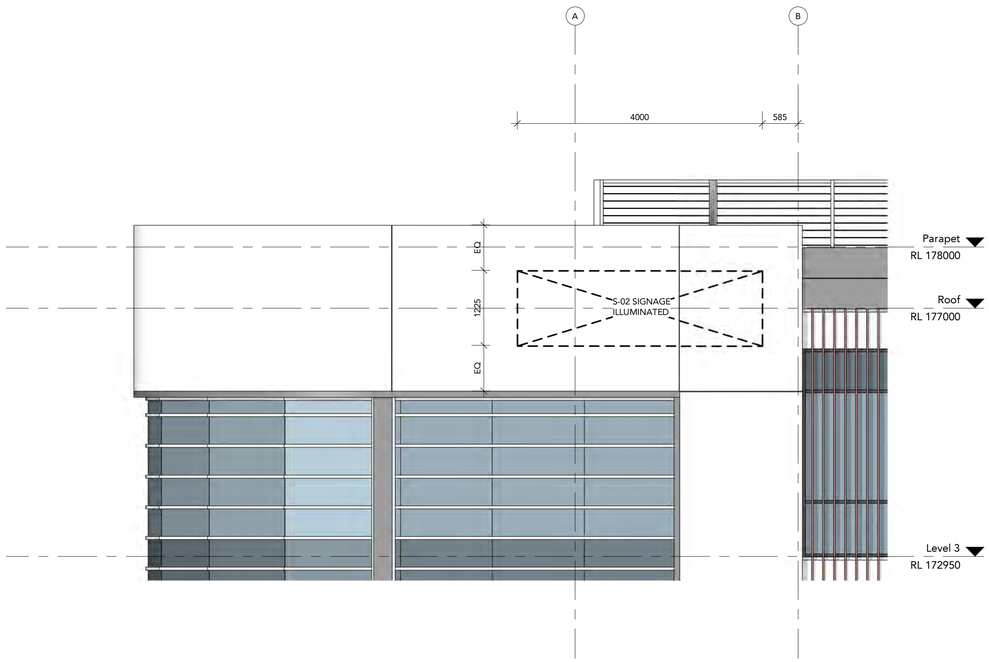
Drawing #: DA-106
Rev: 4



1 Floor Plan - Signage
Scale: 1 : 200

S-01 SIGNAGE - ILLUMINATED LOGO, IN WHITE 1500Wx460Hmm
S-02 SIGNAGE - ILLUMINATED LOGO, IN WHITE 4000Wx1225Hmm

S-03 SIGNAGE - BUSINESS PARK
BUILDING NUMBER



2 South Elevation - Signage
Scale: 1 : 50

3 West Elevation - Signage
Scale: 1 : 50

DRAWING STATUS:

DEVELOPMENT APPLICATION

Rev	Revision Description	Date
1	Draft DA Issue	30.08.19
2	ISSUE FOR DA	05.09.19
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Builder
Erilyan
1/27 Hotham Parade
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0 1 2 3 4 5 10
SCALE 1:200

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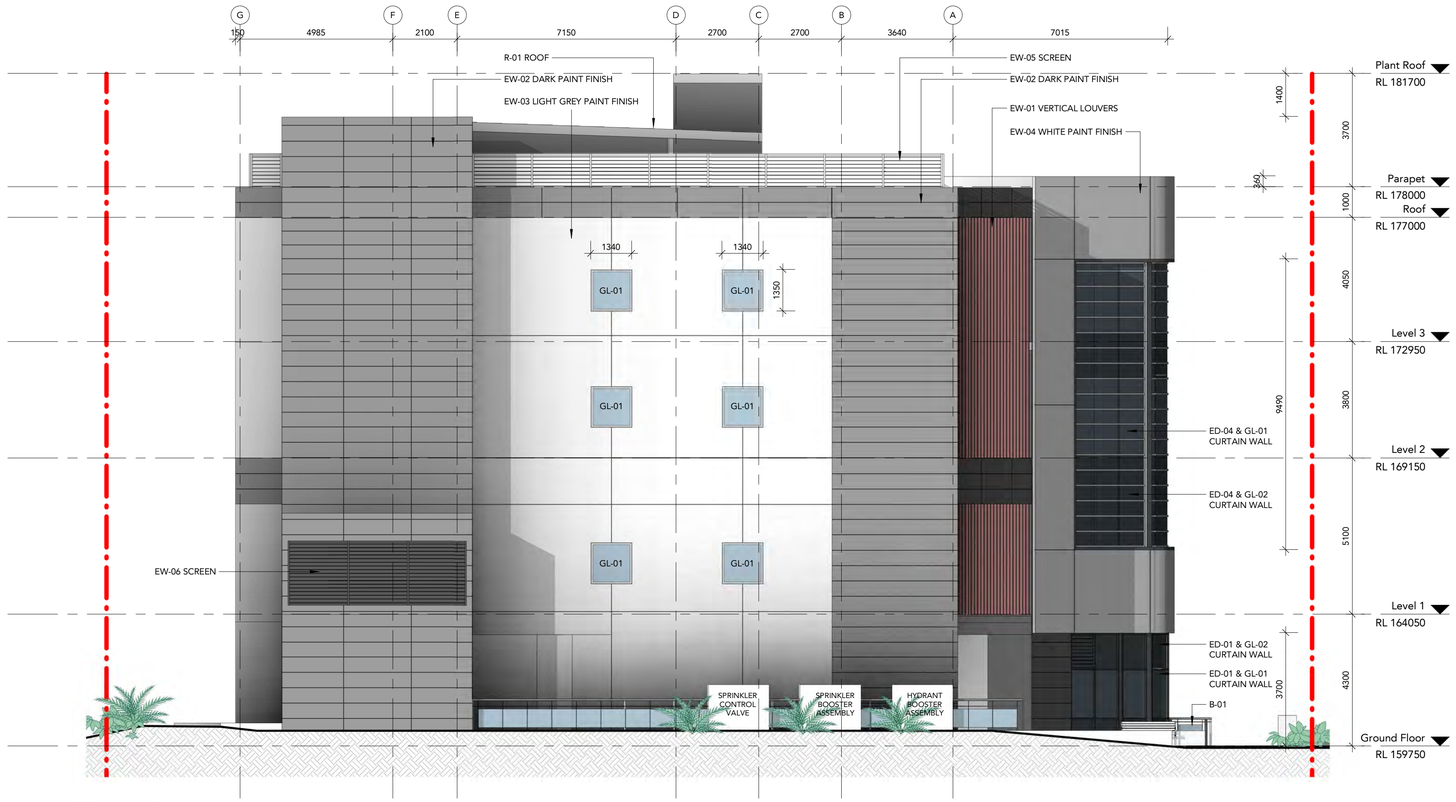
Reg Vic: 19340

Project:
Project Maui Oncology
Warringah Road & Wakehurst
Parkway

Title:
FLOOR PLAN - SIGNAGE

Project #:	Scale:	Drn:	Chk:
856	As indicated @A1	Author	Checker

Drawing #: DA-120
Rev: 4



1 North Elevation
Scale: 1 : 100

2 East Elevation
Scale: 1 : 100

DRAWING STATUS:

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1	Preliminary DA Issue	23.08.19
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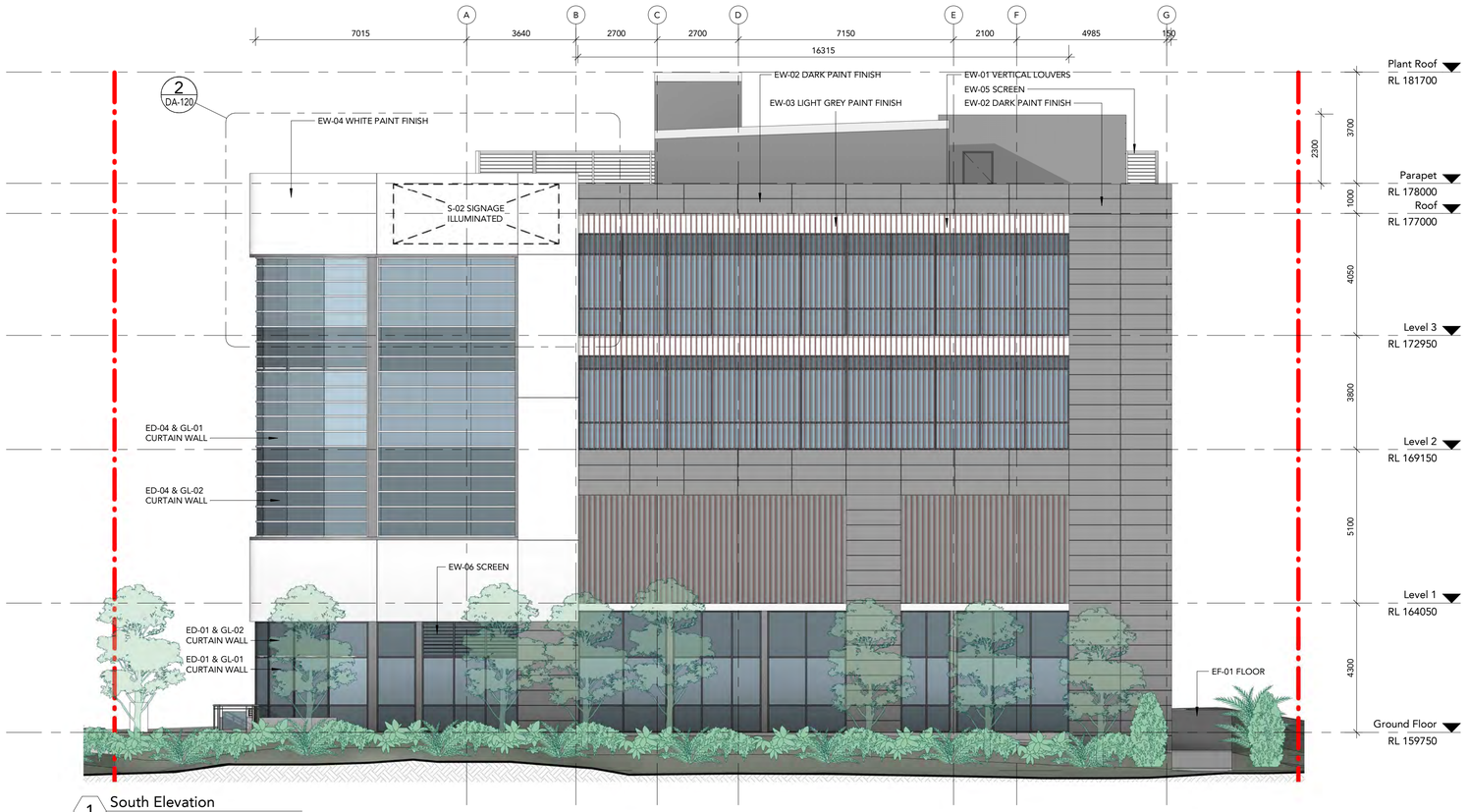
Project:
Project Maui Oncology
Warringah Road & Wakehurst Parkway

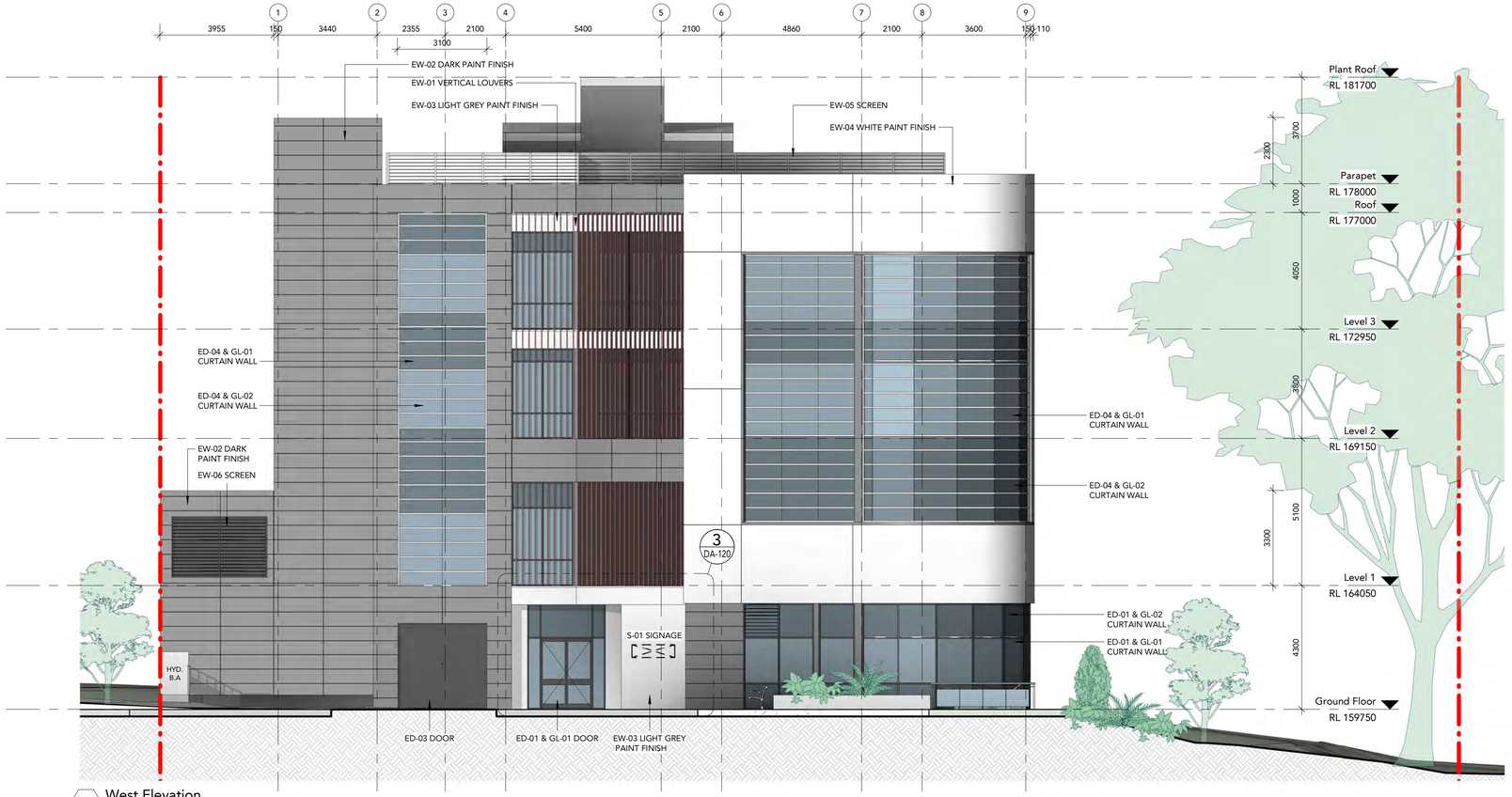
Title:
ELEVATIONS - SHEET 1

Project #:	Scale:	Drw:	Chk:
856	1 : 100 @A1	Author	Checker

Drawing #: DA-200
Rev: 4



1 South Elevation
Scale: 1 : 100



2 West Elevation
Scale: 1 : 100

DRAWING STATUS:

DEVELOPMENT APPLICATION

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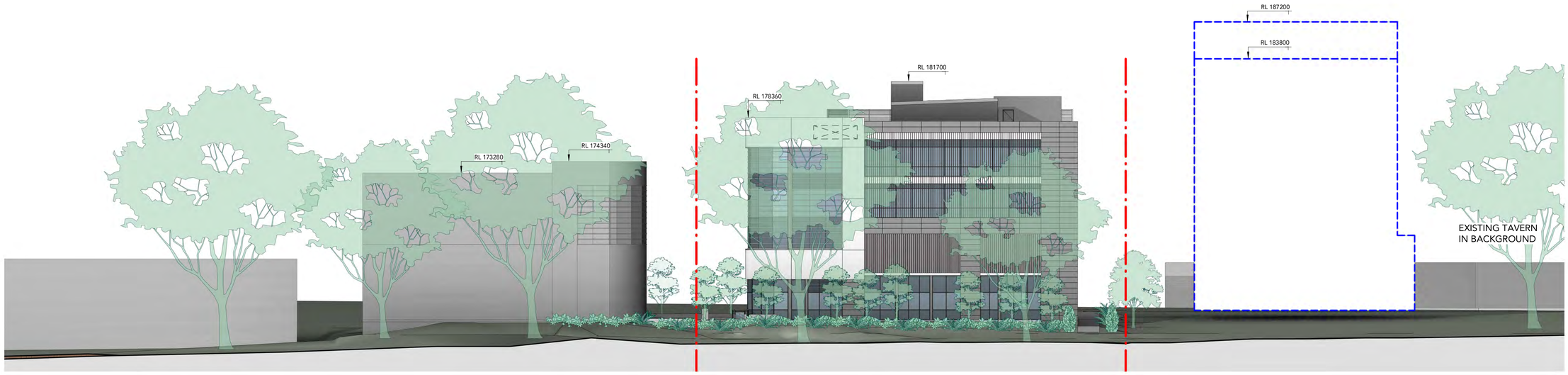
Project:
Project Maui Oncology
Warringah Road & Wakehurst Parkway

Title:
ELEVATIONS - SHEET 2

Project #:	Scale:	Drw:	Chk:
856	1 : 100 @A1	Author	Checker

Drawing #: DA-201
Rev: 4



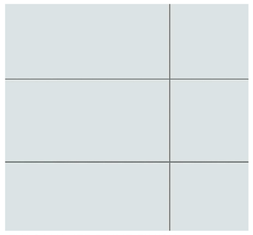
1 South Elevation - Warringah Road Streetscape
Scale: 1 : 200

EXTERNAL FINISHES


EW-01 VERTICAL LOUVERED GLADDING - TIMBER LOOK


EW-02 DARK GREY PAINT FINISH


EW-03 LIGHT GREY PAINT FINISH

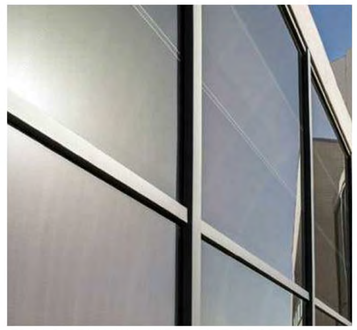

EW-04 WHITE PAINT FINISH

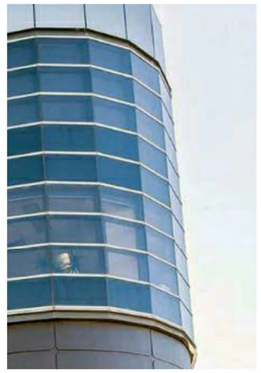


EW-05 DARK GREY LOUVERED SCREEN/ PANELS


EW-06 LIGHT GREY LOUVERED SCREEN


R-01 LIGHT GREY METAL ROOF


ED-01 CURTAIN WALL WITH A MIXTURE OF DARK TINTED GLASS PANELS (GL-01) AND OPAQUE PANELS (GL-02)


ED-02 CURTAIN WALL MATCH NEIGHBOURING BUILDING WITH A MIXTURE OF DARK TINTED GLASS PANELS (GL-01) AND OPAQUE PANELS (GL-02)

DRAWING STATUS:

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Project:
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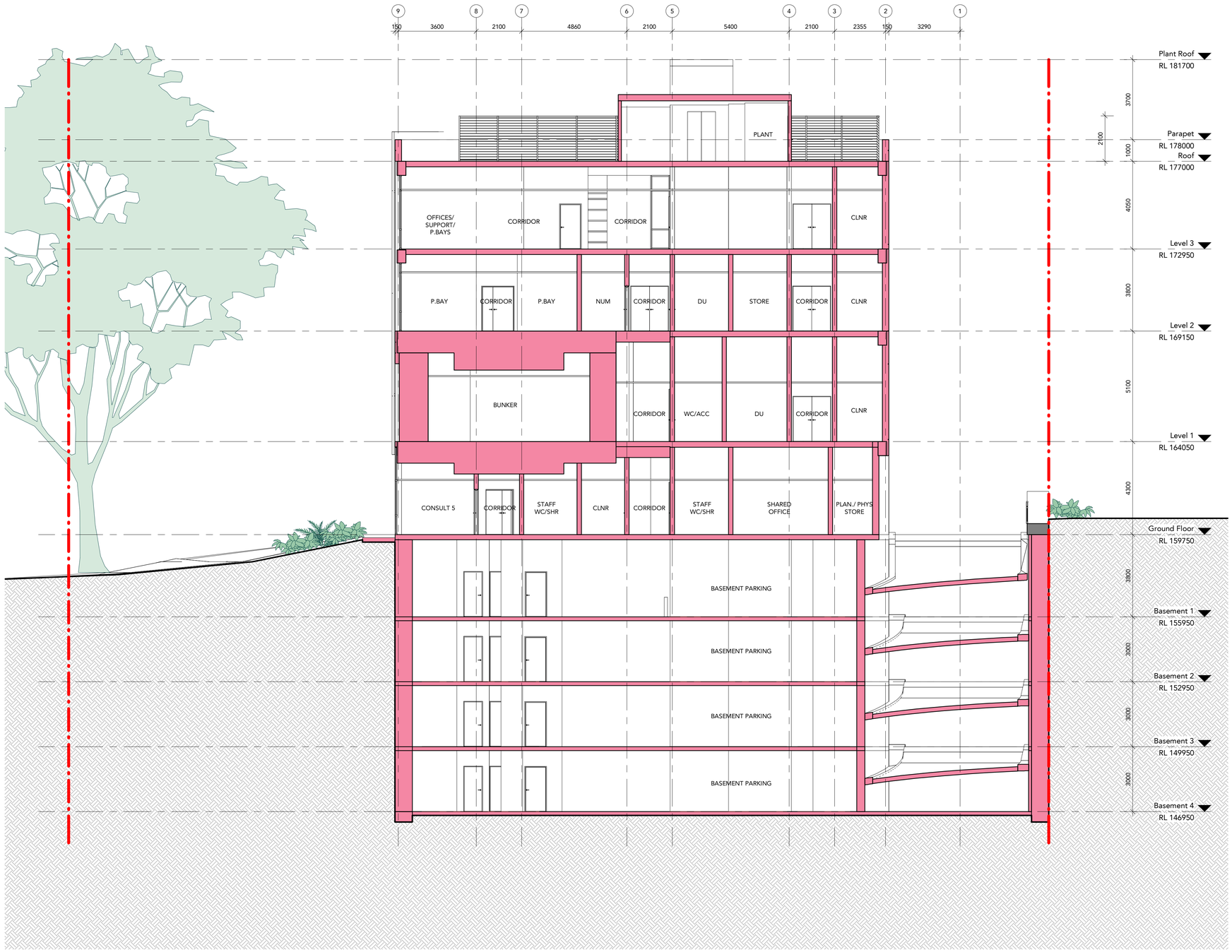
Warringah Road & Wakehurst Parkway

Title:
ELEVATIONS - SHEET 3

Project #:	Scale:	Drw:	Chd:
856	1 : 200 @A1	Author	Checker

Drawing #: DA-202
Rev: 3



1 Section 1
Scale: 1 : 100

NOTE:
IN REGARDS TO THE FL'S PLEASE REFER TO STATEMENT OF ENVIRONMENTAL EFFECTS

DRAWING STATUS:

DEVELOPMENT APPLICATION

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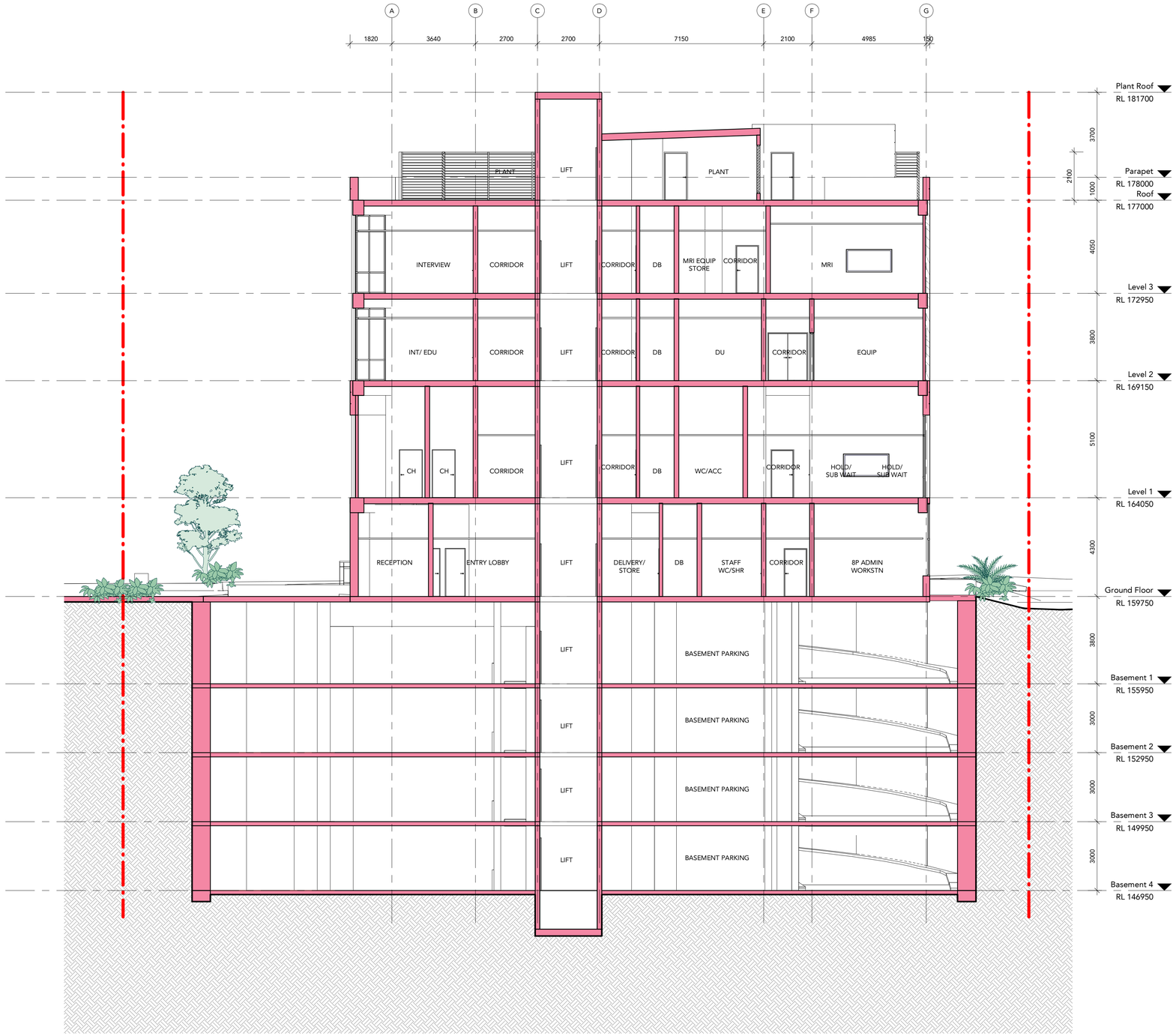
Project:
Project Maui Oncology
Warringah Road & Wakehurst Parkway

Title:
SECTIONS - SHEET 1

Project #:	Scale:	Drw:	Ckd:
856	1 : 100 @A1	Author	Checker

Drawing #: DA-300
Rev: 5



1 Section 2
Scale: 1 : 100

NOTE:
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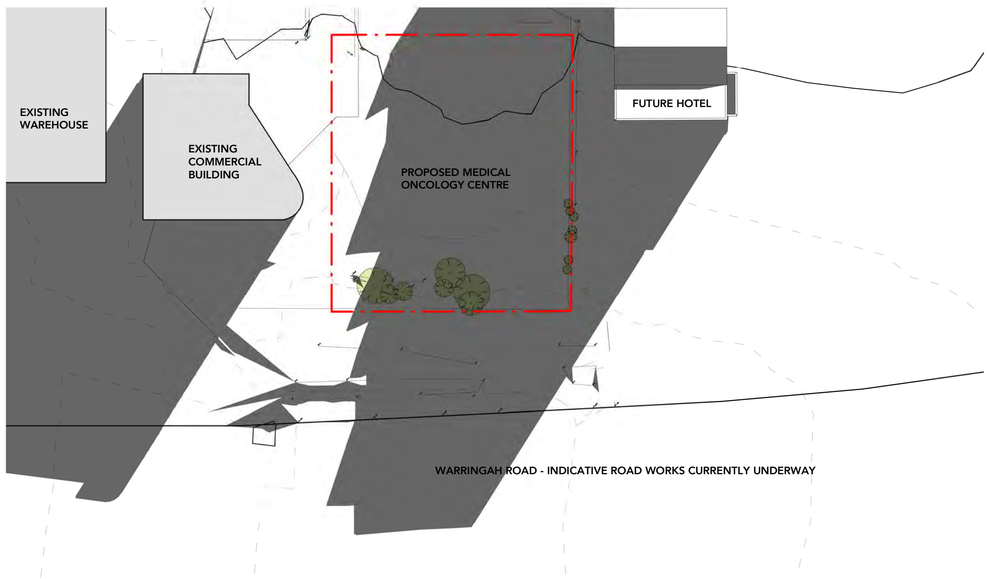
Project
Project Maui Oncology
Warringah Road & Wakehurst Parkway

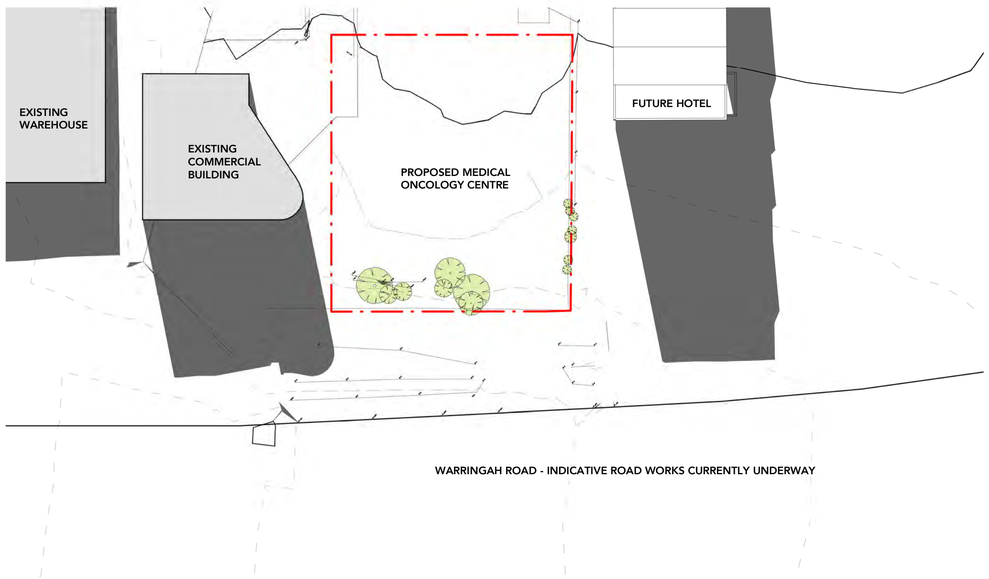
Title
SECTIONS - SHEET 2

Project #:	Scale:	Drw:	Chd:
856	1 : 100 @A1	Author	Checker

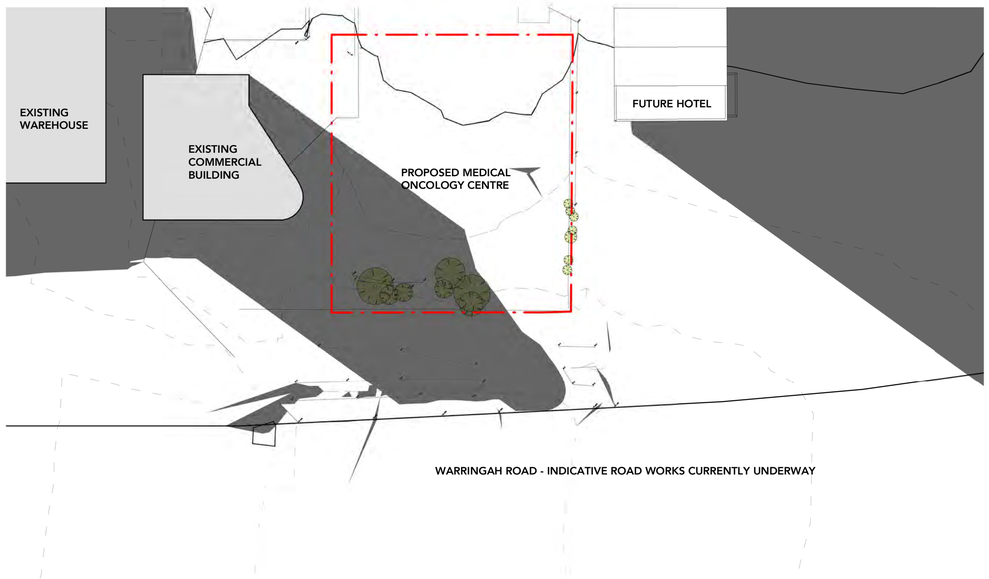
Drawing #: DA-301
Rev: 5



1 Shadow Diagram - 21st June 9am Existing
N.T.S



2 Shadow Diagram - 21st June 12pm Existing
N.T.S



3 Shadow Diagram - 21st June 3pm Existing
N.T.S

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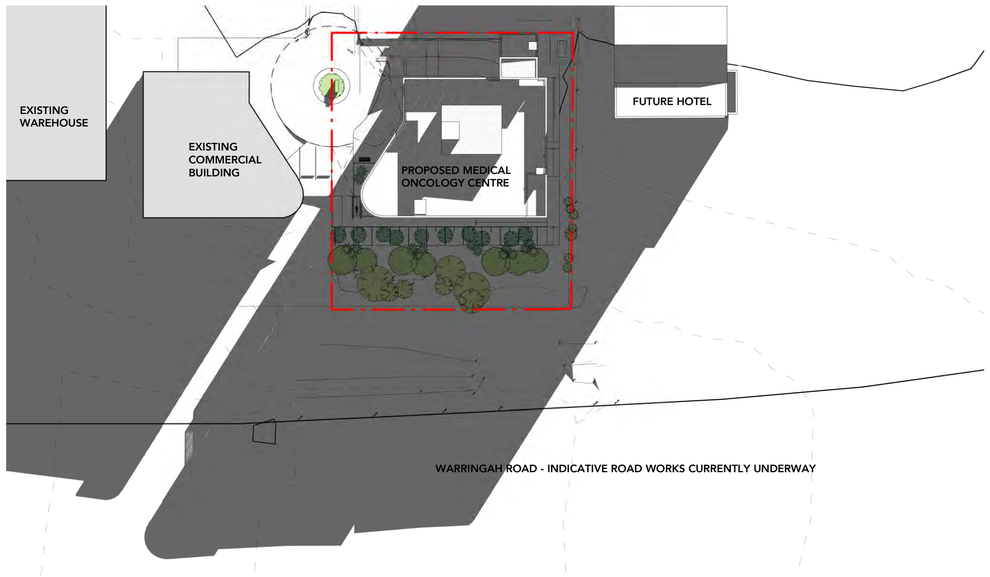
Project:
Project Maui Oncology
Warringah Road & Wakehurst Parkway

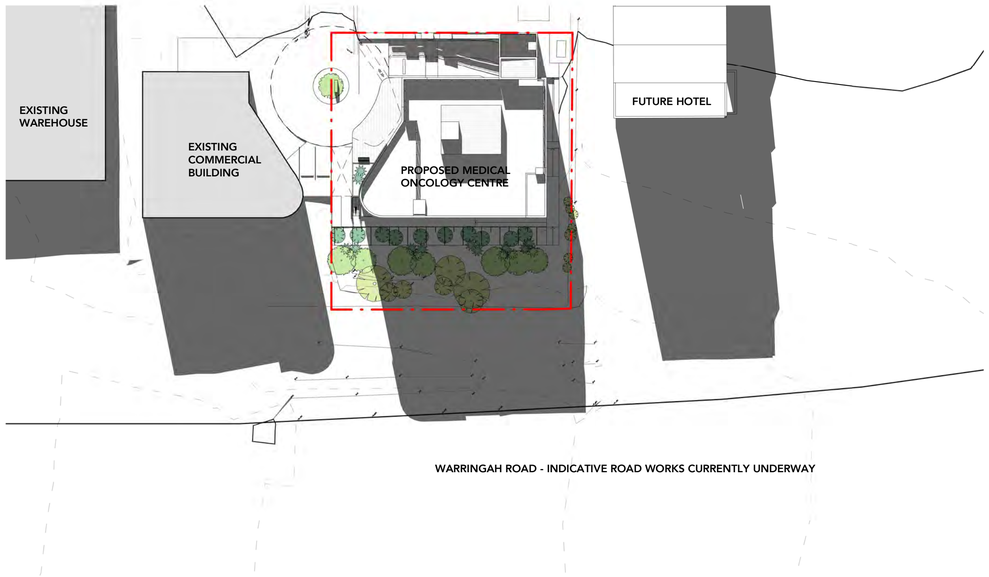
Title:
SHADOW STUDIES - SHEET 1

Project #:	Scale:	Drn:	Chk:
856	1 : 500 @A1	Author	Checker

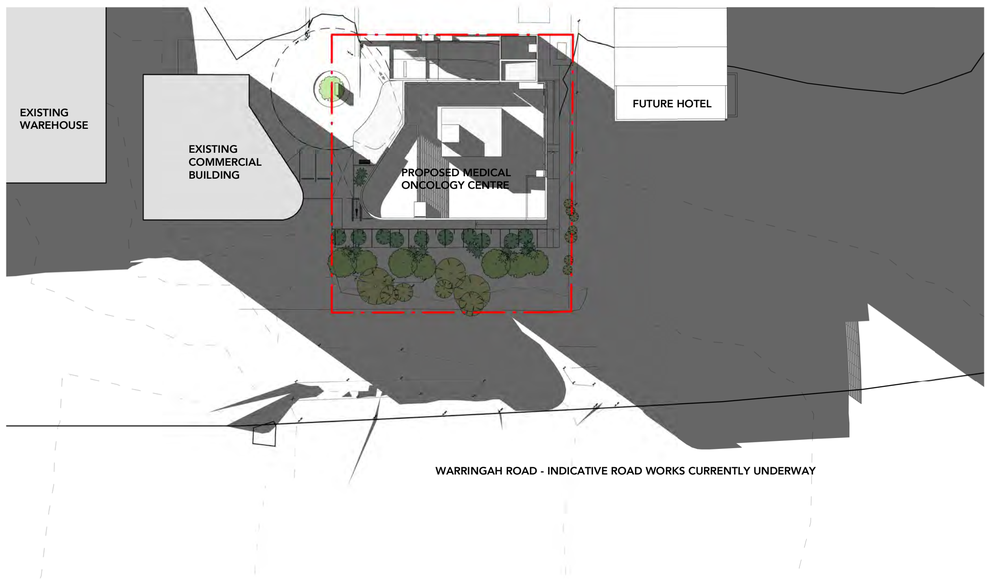
Drawing #: DA-800
Rev: 3



1 Shadow Diagram - 21st June 9am with Future Hotel
N.T.S



2 Shadow Diagram - 21st June 12pm with Future Hotel
N.T.S



3 Shadow Diagram - 21st June 3pm with Future Hotel
N.T.S

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Project:
Project Maui Oncology
Warringah Road & Wakehurst Parkway

Title:
SHADOW STUDIES - SHEET 2

Project #	Scale	Org.	Clnt.
856	1 : 500 @A1	Author	Checker

Drawing #: DA-801
Rev: 4

IMAGE 1 - VIEW FROM WARRINGAH ROAD
NOTE: EXISTING AND FUTURE BUILDINGS AND FINISHES ARE INDICATIVE BASED ON INFORMATION AVAILABLE

IMAGE 2 - VIEW FROM BUSINESS PARK
NOTE: EXISTING AND FUTURE BUILDINGS AND FINISHES ARE INDICATIVE BASED ON INFORMATION AVAILABLE

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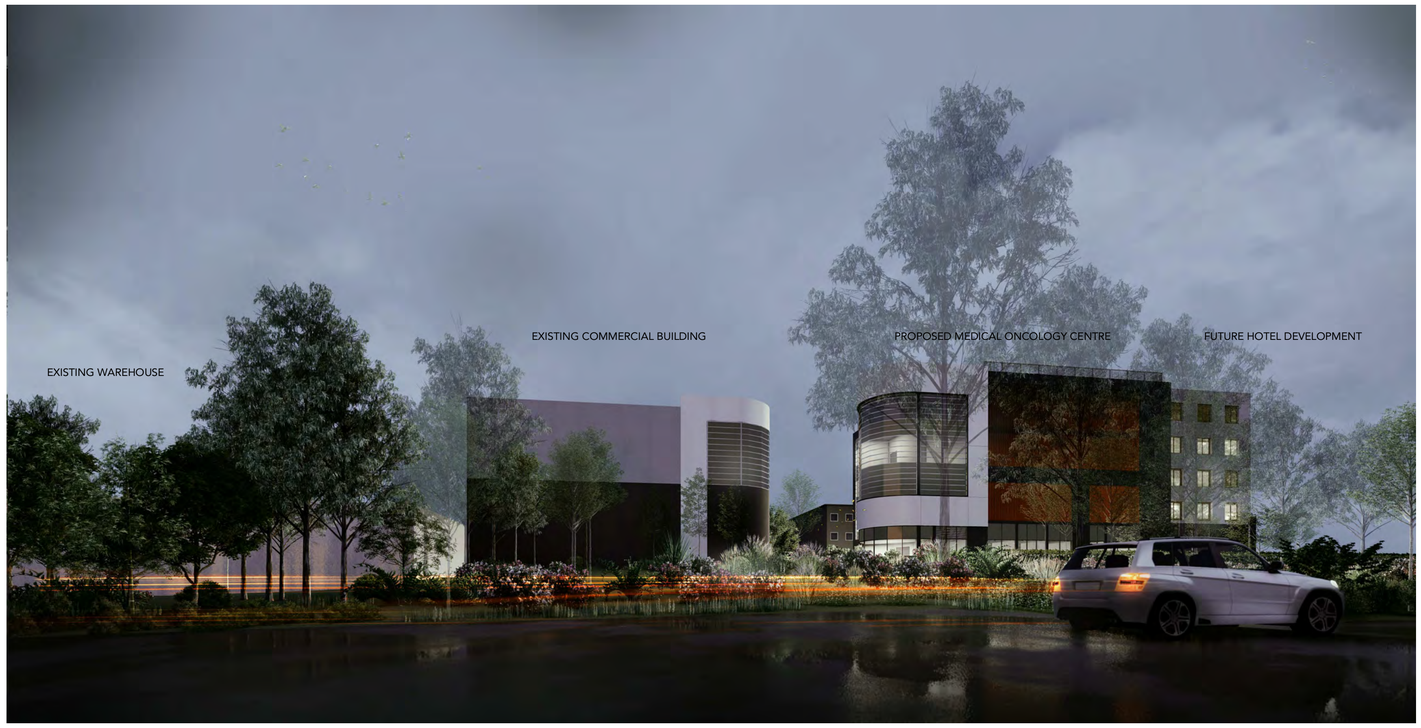
Title:
3D VIEWS

Project #:	Scale:	Drw:	Chk:
856	@A1	Author	Checker

Drawing #: DA-900
Rev: 4



PHOTOMONTAGE - VIEW 1 FROM WARRINGAH ROAD
NOTE: EXISTING AND FUTURE BUILDINGS AND FINISHES ARE INDICATIVE BASED ON INFORMATION AVAILABLE

PHOTOMONTAGE - VIEW 2 FROM WARRINGAH ROAD
NOTE: EXISTING AND FUTURE BUILDINGS AND FINISHES ARE INDICATIVE BASED ON INFORMATION AVAILABLE

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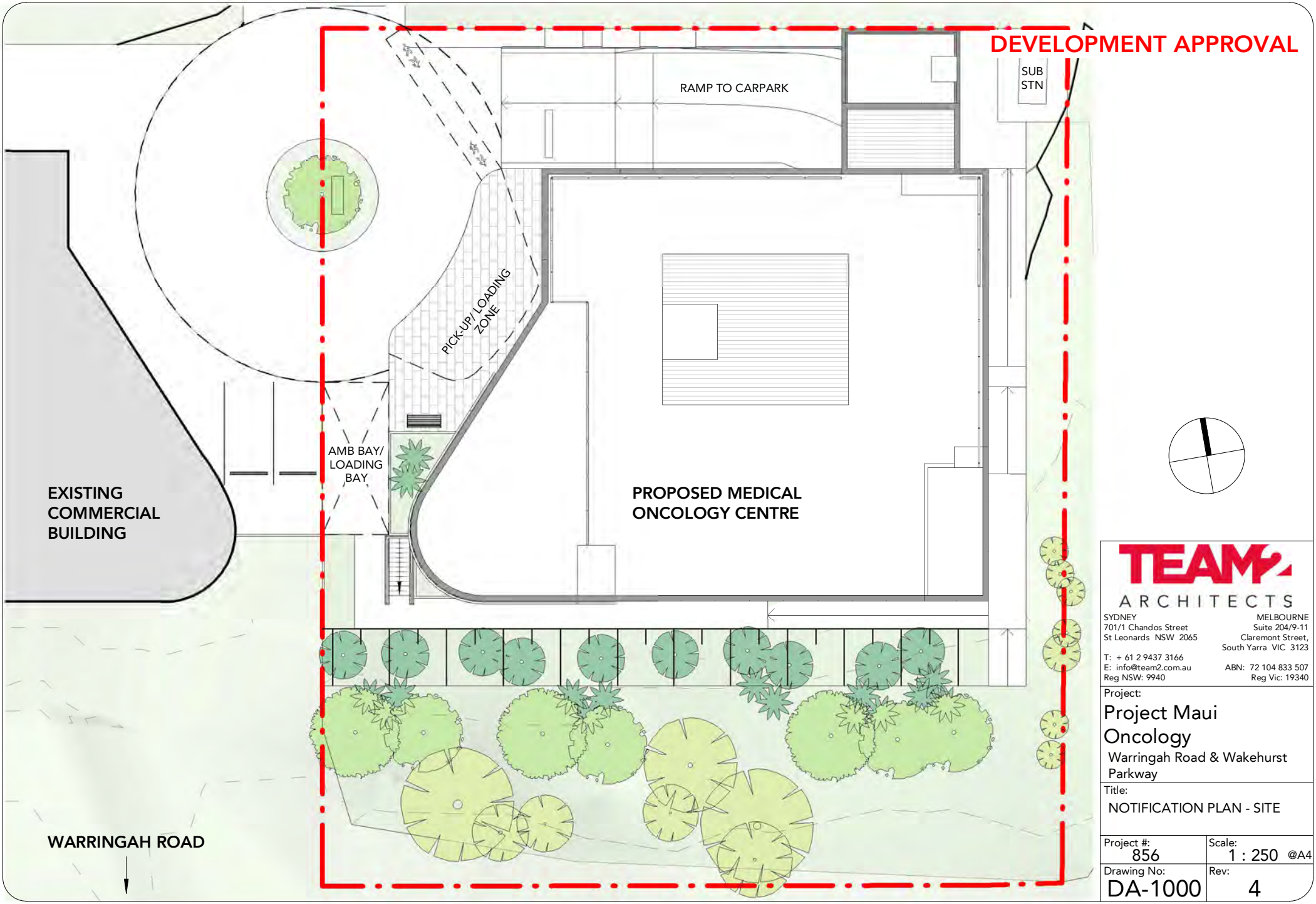
Title:
PHOTOMONTAGE

Project #:	Scale:	Drw:	Chd:
856	@A1	Author	Checker

Drawing #: DA-901
Rev: 4

DEVELOPMENT APPROVAL



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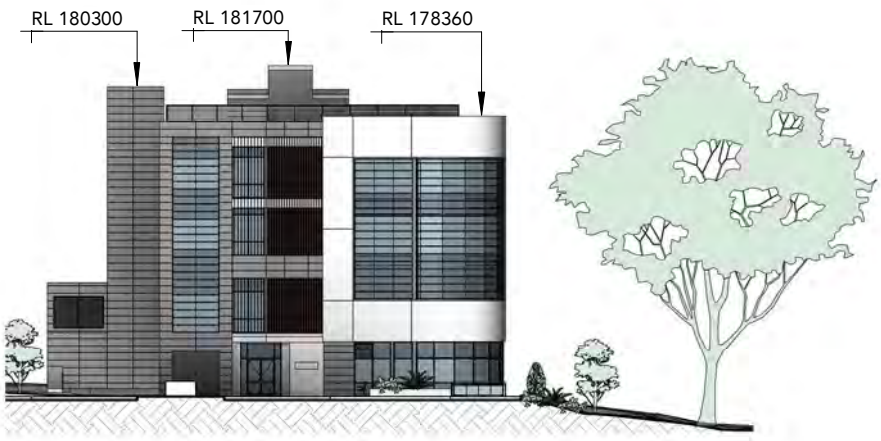
Project Maui Oncology
Warringah Road & Wakehurst Parkway

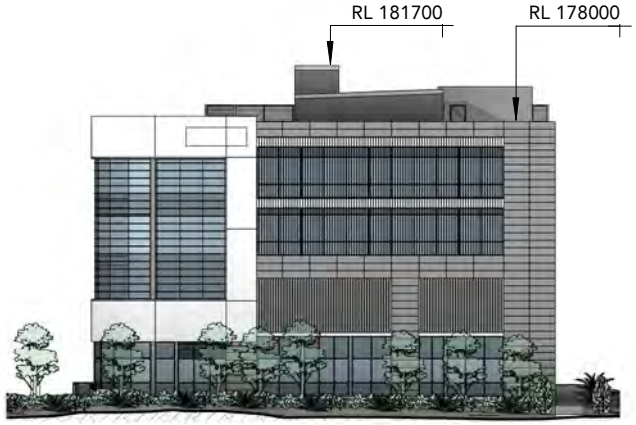
Title:
NOTIFICATION PLAN - SITE

Project #:	Scale:
856	1 : 250 @A4
Drawing No:	Rev:
DA-1000	4

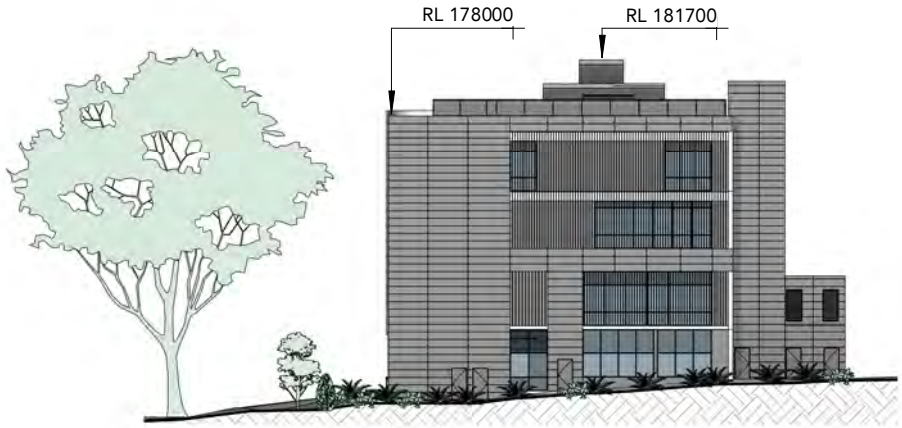
DEVELOPMENT APPROVAL



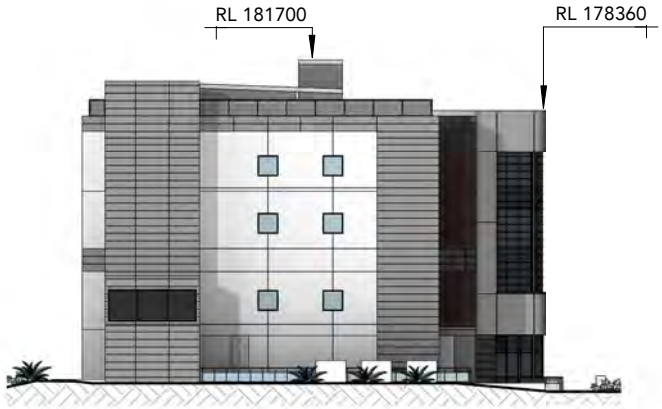
1 Notification - West Elevation
Scale: 1 : 500



2 Notification - South Elevation
Scale: 1 : 500



3 Notification - East Elevation
Scale: 1 : 500



4 Notification - North Elevation
Scale: 1 : 500

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Project Maui Oncology
Warringah Road & Wakehurst Parkway

Title:
NOTIFICATION PLAN - ELEVATIONS

Project #:	Scale:
856	1 : 500 @A4
Drawing No:	Rev:
DA-1001	3

Document Transmittal

Project: Project Maui Oncology

Project No.: 856

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DATE OF ISSUE

Day	23	28	28	30	30	3	5	6	6	27	4	9								
Month	8	8	8	8	8	9	9	9	9	11	12	12								
Year	19	19	19	19	19	19	19	19	19	19	19	19								
Initials	VM	VM	VM	VM	VM	VM	VM	VM	VM	VM	VM	VM								

DOCUMENTATION LIST

Sheet No.	Sheet Title	Size	Scale	Revision																		
DA-000	COVER SHEET	A1	1:50	1	2			3		4	5	5	6	7	8							
DA-010	SITE PLAN - EXISTING	A1	1:100	1				2		3				4	5							
DA-011	SITE PLAN - PROPOSED	A1	1:50, 1:100	1			2	3	4	5			6	7	8							
DA-012	SITE ANALYSIS PLAN	A1	NTS					1		2				3	3							
DA-015	SURVEY PLAN	A1	1:200	1				2		3				4	5							
DA-020	DEMOLITION PLAN	A1	1:50, 1:100					1		2				3	4							
DA-021	EXCAVATION PLAN	A1	1:50, 1:100					1		2				3	4							
DA-030	LANDSCAPE PLAN	A1	NTS					1														
DA-050	ROOF PLAN	A1	1:50, 1:100	1				2		3				4	4							
DA-099	FLOOR PLAN - BASEMENT 4	A1	1:50, 1:100											1	1							
DA-100	FLOOR PLAN - BASEMENT 3	A1	1:50, 1:100	1		2		3		4			5	6	6							
DA-101	FLOOR PLAN - BASEMENT 2	A1	1:50, 1:100	1		2		3		4			5	6	6							
DA-102	FLOOR PLAN - BASEMENT 1	A1	1:50, 1:100	1		2		3		4			5	6	6							
DA-103	FLOOR PLAN - GROUND	A1	1:50, 1:100	1		2		3		4			5	6	6							
DA-104	FLOOR PLAN - LEVEL 1	A1	1:50, 1:100	1				2		3				4	4							

Sheet No.	Sheet Title	Size	Scale	Revision																			
DA-105	FLOOR PLAN - LEVEL 2	A1	1:50, 1:100	1				2		3				4	4								
DA-106	FLOOR PLAN - LEVEL 3	A1	1:50, 1:100	1				2		3				4	4								
DA-120	FLOOR PLAN - SIGNAGE	A1	1:50, 1:200					1		2			3	4	4								
DA-200	ELEVATIONS - SHEET 1	A1	1:100	1				2		3				4	4								
DA-201	ELEVATIONS - SHEET 2	A1	1:100	1				2		3				4	4								
DA-202	ELEVATIONS - SHEET 3	A1	1:200					1		2				3	3								
DA-300	SECTIONS - SHEET 1	A1	1:100		1			2		3				4	5								
DA-301	SECTIONS - SHEET 2	A1	1:100		1			2		3				4	5								
DA-800	SHADOW STUDIES - SHEET 1	A1	1:500					1		2				3	3								
DA-801	SHADOW STUDIES - SHEET 2	A1	1:500					1							1								
DA-801	SHADOW STUDIES - SHEET 2	A1	1:500					1		2			3	4									
DA-900	3D VIEWS	A1	NTS					1		2	3	3		4	4								
DA-901	PHOTOMONTAGE	A1	NTS					1		2	3	3		4	4								
DA-1000	NOTIFICATION PLAN - SITE	A4	1:250					1		2			3	4	4								
DA-1001	NOTIFICATION PLAN - ELEVATIONS	A4	1:500					1		2				3	3								

REASON FOR ISSUE

P=prelim T=tender C=construction I=information AB=as builts CI=check in BA=building application DA=development application SO=sign off	P	P	P	P	P	P	DA	DA	DA	DA	DA	DA											

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Appendix D: Test pit Logs

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. TP101 1/1

DUPSW101: 0-0.1m

Client: ERILYAN PTY LTD

Project: PROPOSED MEDICAL CENTRE

Location: FOREST CENTRAL BUSINESS PARK, 49 FRENCHS FOREST RD, FRENCHS FOREST

Job No.: E32505BT **Method:** 450mm BUCKET **R.L. Surface:** N/A

Date: 20/11/19 **Datum:** -

Plant Type: 5T EXCAVATOR **Logged/Checked by:** S.W./M.D.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION							0			FILL: Gravelly sand, fine to medium grained, dark brown, fine to coarse grained sub-angular, trace of sandstone gravel, concrete and asphalt fragments.	D M			14.4kg BUCKET NO FCF ORGANIC ODOUR
							0.5			FILL: Silty clay, low to medium plasticity, light grey and red brown, trace of igneous and ironstone gravel, and asphalt fragments.	w<PL			9.4kg BUCKET NO FCF
							1			FILL: Silty sand, fine to medium grained, grey, trace of igneous and sandstone gravel, and asphalt fragments.	M w<PL			13.4kg BUCKET NO FCF RESIDUAL
							1.5		CI-CH	Silty CLAY: medium to high plasticity, light grey mottled yellow brown.				
										END OF TEST PIT AT 1.8m				
							2							
							2.5							
							3							
							3.5							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. TP102 1/1

DUPSW102: 0-0.2m

Client: ERILYAN PTY LTD

Project: PROPOSED MEDICAL CENTRE

Location: FOREST CENTRAL BUSINESS PARK, 49 FRENCHS FOREST RD, FRENCHS FOREST

Job No.: E32505BT **Method:** 450mm BUCKET **R.L. Surface:** N/A

Date: 20/11/19 **Datum:** -

Plant Type: 5T EXCAVATOR **Logged/Checked by:** S.W./M.D.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION							0			FILL: Silty clay, low to medium plasticity, dark brown, trace of igneous and ironstone gravel, concrete, asphalt fragments and ash.	w>PL			12.9kg BUCKET NO FCF
										FILL: Silty clay, low to medium plasticity, light grey and red brown, trace of ironstone gravel.				12.4kg BUCKET NO FCF
							0.5							
							1		CI-CH	Silty CLAY: medium to high plasticity, light grey mottled yellow brown.	w≈PL			RESIDUAL
							1.5			END OF TEST PIT AT 1.5m				
							2							
							2.5							
							3							
							3.5							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. TP103 1/1

DUPSW103: 0-0.2m

Client: ERILYAN PTY LTD

Project: PROPOSED MEDICAL CENTRE

Location: FOREST CENTRAL BUSINESS PARK, 49 FRENCHS FOREST RD, FRENCHS FOREST

Job No.: E32505BT **Method:** 450mm BUCKET **R.L. Surface:** N/A

Date: 20/11/19 **Datum:** -

Plant Type: 5T EXCAVATOR **Logged/Checked by:** S.W./M.D.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION							0			FILL: Silty clay, low to medium plasticity, brown, trace of igneous, ironstone and sandstone gravel, and ash.	w>PL			13.8kg BUCKET NO FCF ORGANIC ODOUR
							0.5			FILL: Silty clay, low to medium plasticity, light grey and red brown, trace of igneous and ironstone gravel.				13.1kg BUCKET NO FCF
							1		CI-CH	Silty CLAY: medium to high plasticity, light grey mottled yellow brown.	w<PL			RESIDUAL
							1.5			END OF TEST PIT 1.5m				
							2							
							2.5							
							3							
							3.5							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. TP104 1/1

DUPSW104: 0-0.1m

Client: ERILYAN PTY LTD

Project: PROPOSED MEDICAL CENTRE

Location: FOREST CENTRAL BUSINESS PARK, 49 FRENCHS FOREST RD, FRENCHS FOREST

Job No.: E32505BT **Method:** 450mm BUCKET **R.L. Surface:** N/A

Date: 20/11/19 **Datum:** -

Plant Type: 5T EXCAVATOR **Logged/Checked by:** S.W./M.D.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION							0			FILL: Silty clay, low to medium plasticity, red brown, trace of igneous, ironstone and sandstone gravel.	w<PL			13.1kg BUCKET NO FCF
										FILL: Silty sandy clay, low to medium plasticity, dark brown, with ironstone gravel, trace of igneous and sandstone gravel and ash.				14.7kg BUCKET NO FCF
							0.5			FILL: Silty clay, low to medium plasticity, light grey and red brown, trace of ironstone gravel and ash.				11.2kg BUCKET NO FCF
							1		CI-CH	Silty CLAY: medium to high plasticity, light grey mottled yellow brown.	w<PL			RESIDUAL
							1.5			END OF TEST PIT AT 1.6m				
							2							
							2.5							
							3							
							3.5							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. **TP105** **1/1**

Client: ERILYAN PTY LTD

Project: PROPOSED MEDICAL CENTRE

Location: FOREST CENTRAL BUSINESS PARK, 49 FRENCHS FOREST RD, FRENCHS FOREST

Job No.: E32505BT **Method:** 450mm BUCKET **R.L. Surface:** N/A

Date: 20/11/19 **Datum:** -

Plant Type: 5T EXCAVATOR **Logged/Checked by:** S.W./M.D.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION							0			FILL: Silty sand, low to medium plasticity, dark brown, trace of igneous and ironstone gravel, asphalt fragments and ash.	D			12.7KG BUCKET NO FCF
											w>PL			9.6KG BUCKET NO FCF
							0.5			FILL: Silty clay, low to medium plasticity, light grey and red brown, trace of igneous and ironstone gravel and ash.	D			14.8KG BUCKET NO FCF
									CI-CL	FILL: Silty sand, fine to medium grained, grey, trace of igneous gravel, asphalt fragments and ash.	w<PL			RESIDUAL
							1			Silty CLAY: medium to high plasticity, light grey and orange brown.				
										END OF TEST PIT AT 1.1m				
							1.5							
							2							
							2.5							
							3							
							3.5							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. **TP106** **1/1**

Client: ERILYAN PTY LTD

Project: PROPOSED MEDICAL CENTRE

Location: FOREST CENTRAL BUSINESS PARK, 49 FRENCHS FOREST RD, FRENCHS FOREST

Job No.: E32505BT **Method:** 450mm BUCKET **R.L. Surface:** N/A

Date: 20/11/19 **Datum:** -

Plant Type: 5T EXCAVATOR **Logged/Checked by:** S.W./M.D.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION	■		■		■		0			FILL: Silty clay, low to medium plasticity, light grey and red brown, trace of igneous and ironstone gravel, concrete, asphalt fragments and ash.	w<PL			13.2KG BUCKET NO FCF
	■		■				0.5		CI-CH	Silty CLAY: medium to high plasticity, light grey and yellow brown.	w<PL			RESIDUAL
							1							
										END OF TEST PIT AT 1.3m				
							1.5							
							2							
							2.5							
							3							
							3.5							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. **TP107** **1/1**

Client: ERILYAN PTY LTD

Project: PROPOSED MEDICAL CENTRE

Location: FOREST CENTRAL BUSINESS PARK, 49 FRENCHS FOREST RD, FRENCHS FOREST

Job No.: E32505BT **Method:** 450mm BUCKET **R.L. Surface:** N/A

Date: 20/11/19 **Datum:** -

Plant Type: 5T EXCAVATOR **Logged/Checked by:** S.W./M.D.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION							0			FILL: Gravelly sand, fine to medium grained, dark brown, fine to coarse grained igneous sub-angular igneous gravel, trace of ironstone gravel, concrete, brick and tile fragments.	D			13.3KG BUCKET NO FCF
							0.5			FILL: Silty clay, medium to high plasticity, brown, trace of igneous and ironstone gravel, concrete fragments, ash and slag.	w>PL			14.0KG BUCKET NO FCF
							1		CI-CH	Silty CLAY: medium to high plasticity, light grey mottled yellow brown.	w<PL			RESIDUAL
										END OF TEST PIT AT 1.3m				
							1.5							
							2							
							2.5							
							3							
							3.5							

ENVIRONMENTAL LOGS EXPLANATION NOTES

INTRODUCTION

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

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

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

DESCRIPTION AND CLASSIFICATION METHODS

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

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

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

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

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

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

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

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

INVESTIGATION METHODS

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

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

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

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

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

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

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

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

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

Standard Penetration Tests: Standard Penetration Tests (SPT) are used mainly in non-cohesive soils, but can also be used in cohesive soils, as a means of indicating density or strength and also of obtaining a relatively undisturbed sample. The test procedure is described in Australian Standard 1289.6.3.1–2004 (R2016) *'Methods of Testing Soils for Engineering Purposes, Soil Strength and Consolidation Tests – Determination of the Penetration Resistance of a Soil – Standard Penetration Test (SPT)'*.

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

The test results are reported in the following form:

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

  N = 13
  4, 6, 7

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

  N > 30
  15, 30/40mm

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

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

LOGS

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

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

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

GROUNDWATER

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

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

More reliable measurements can be made by installing standpipes which are read after the groundwater level has stabilised at intervals ranging from several days to perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from perched water tables or surface water.

FILL

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

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

LABORATORY TESTING

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

SYMBOL LEGENDS

SOIL


FILL


TOPSOIL


CLAY (CL, CI, CH)


SILT (ML, MH)


SAND (SP, SW)


GRAVEL (GP, GW)


SANDY CLAY (CL, CI, CH)


SILTY CLAY (CL, CI, CH)


CLAYEY SAND (SC)


SILTY SAND (SM)


GRAVELLY CLAY (CL, CI, CH)


CLAYEY GRAVEL (GC)


SANDY SILT (ML, MH)


PEAT AND HIGHLY ORGANIC SOILS (Pt)

ROCK


CONGLOMERATE


SANDSTONE


SHALE/MUDSTONE


SILTSTONE


CLAYSTONE


COAL


LAMINITE


LIMESTONE


PHYLLITE, SCHIST


TUFF


GRANITE, GABBRO


DOLERITE, DIORITE


BASALT, ANDESITE


QUARTZITE

OTHER MATERIALS


BRICKS OR PAVERS


CONCRETE


ASPHALTIC CONCRETE

CLASSIFICATION OF COARSE AND FINE GRAINED SOILS

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

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

Laboratory Classification Criteria

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

$$C_U = \frac{D_{60}}{D_{10}} \qquad and \qquad C_C = \frac{(D_{30})^2}{D_{10}\, D_{60}}$$

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

NOTES:

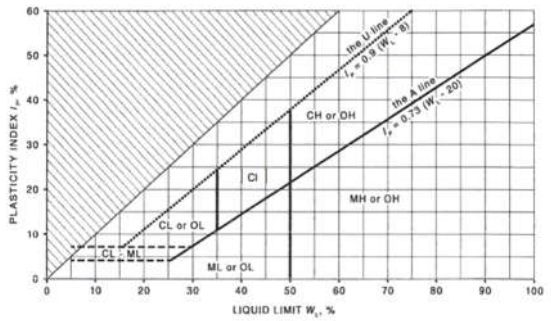
1 For a coarse grained soil with a fines content between 5% and 12%, the soil is given a dual classification comprising the two group symbols separated by a dash; for example, for a poorly graded gravel with between 5% and 12% silt fines, the classification is GP-GM.

2 Where the grading is determined from laboratory tests, it is defined by coefficients of curvature (C_c) and uniformity (C_u) derived from the particle size distribution curve.

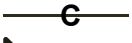
3 Clay soils with liquid limits > 35% and ≤ 50% may be classified as being of medium plasticity.

4 The U line on the Modified Casagrande Chart is an approximate upper bound for most natural soils.

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



LOG SYMBOLS

Log Column	Symbol	Definition
Groundwater Record		Standing water level. Time delay following completion of drilling/excavation may be shown.
		Extent of borehole/test pit collapse shortly after drilling/excavation.
		Groundwater seepage into borehole or test pit noted during drilling or excavation.
Samples	ES	Sample taken over depth indicated, for environmental analysis.
	U50	Undisturbed 50mm diameter tube sample taken over depth indicated.
	DB	Bulk disturbed sample taken over depth indicated.
	DS	Small disturbed bag sample taken over depth indicated.
	ASB	Soil sample taken over depth indicated, for asbestos analysis.
	ASS	Soil sample taken over depth indicated, for acid sulfate soil analysis.
	SAL	Soil sample taken over depth indicated, for salinity analysis.
Field Tests	N = 17 4, 7, 10	Standard Penetration Test (SPT) performed between depths indicated by lines. Individual figures show blows per 150mm penetration. 'Refusal' refers to apparent hammer refusal within the corresponding 150mm depth increment.
	N_c = 5 7 3R	Solid Cone Penetration Test (SCPT) performed between depths indicated by lines. Individual figures show blows per 150mm penetration for 60° solid cone driven by SPT hammer. 'R' refers to apparent hammer refusal within the corresponding 150mm depth increment.
	VNS = 25 PID = 100	Vane shear reading in kPa of undrained shear strength. Photoionisation detector reading in ppm (soil sample headspace test).
Moisture Condition (Fine Grained Soils)	$w > PL$ $w \approx PL$ $w < PL$ $w \approx LL$ $w > LL$	Moisture content estimated to be greater than plastic limit. Moisture content estimated to be approximately equal to plastic limit. Moisture content estimated to be less than plastic limit. Moisture content estimated to be near liquid limit. Moisture content estimated to be wet of liquid limit.
(Coarse Grained Soils)	D M W	DRY – runs freely through fingers. MOIST – does not run freely but no free water visible on soil surface. WET – free water visible on soil surface.
Strength (Consistency) Cohesive Soils	VS S F St VSt Hd Fr ( )	VERY SOFT – unconfined compressive strength ≤ 25kPa. SOFT – unconfined compressive strength > 25kPa and ≤ 50kPa. FIRM – unconfined compressive strength > 50kPa and ≤ 100kPa. STIFF – unconfined compressive strength > 100kPa and ≤ 200kPa. VERY STIFF – unconfined compressive strength > 200kPa and ≤ 400kPa. HARD – unconfined compressive strength > 400kPa. FRIABLE – strength not attainable, soil crumbles. Bracketed symbol indicates estimated consistency based on tactile examination or other assessment.
Density Index/ Relative Density (Cohesionless Soils)	VL L MD D VD ( )	**Density Index (I_D) Range (%)** / **SPT 'N' Value Range (Blows/300mm)** VERY LOOSE ≤ 15 / 0 – 4 LOOSE > 15 and ≤ 35 / 4 – 10 MEDIUM DENSE > 35 and ≤ 65 / 10 – 30 DENSE > 65 and ≤ 85 / 30 – 50 VERY DENSE > 85 / > 50 Bracketed symbol indicates estimated density based on ease of drilling or other assessment.
Hand Penetrometer Readings	300 250	Measures reading in kPa of unconfined compressive strength. Numbers indicate individual test results on representative undisturbed material unless noted otherwise.

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

Classification of Material Weathering

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

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

Rock Material Strength Classification

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

Appendix E: Laboratory Reports & COC Documents

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CERTIFICATE OF ANALYSIS 231315

Client Details

Client	Environmental Investigation Services
Attention	Katrina Taylor
Address	PO Box 976, North Ryde BC, NSW, 1670

Sample Details

Your Reference	**E32505BT, French Forest**
Number of Samples	44 Soil, 1 Water, 1 Material
Date samples received	18/11/2019
Date completed instructions received	18/11/2019

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

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

Report Details

Date results requested by	26/11/2019
Date of Issue	26/11/2019

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Asbestos Approved By
Analysed by Asbestos Approved Identifier: Matt Mansfield, Lucy Zhu
Authorised by Asbestos Approved Signatory: Lucy Zhu

Results Approved By
Jaimie Loa-Kum-Cheung, Metals Supervisor
Josh Williams, Senior Chemist
Lucy Zhu, Senior Asbestos Analyst

Authorised By

Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		231315-1	231315-6	231315-8	231315-9	231315-11
Your Reference	UNITS	TP101	TP102	TP102	TP103	TP103
Depth		0-0.1	0-0.2	0.9-1.1	0-0.2	0.8-1.0
Date Sampled		20/11/2019	20/11/2019	20/11/2019	20/11/2019	20/11/2019
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	22/11/2019	22/11/2019	22/11/2019	22/11/2019	22/11/2019
Date analysed	-	22/11/2019	22/11/2019	22/11/2019	22/11/2019	22/11/2019
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<3	<3	<3	<3	<3
Surrogate aaa-Trifluorotoluene	%	94	80	86	95	89

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		231315-13	231315-16	231315-19	231315-21	231315-24
Your Reference	UNITS	TP104	TP105	TP105	TP106	TP107
Depth		0.1-0.3	0-0.1	0.6-0.8	0.5-0.7	1.1-1.3
Date Sampled		20/11/2019	20/11/2019	20/11/2019	20/11/2019	20/11/2019
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	22/11/2019	22/11/2019	22/11/2019	22/11/2019	22/11/2019
Date analysed	-	22/11/2019	22/11/2019	22/11/2019	22/11/2019	22/11/2019
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<3	<3	<3	<3	<3
Surrogate aaa-Trifluorotoluene	%	87	78	89	100	83

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		231315-25	231315-28	231315-30	231315-32	231315-35
Your Reference	UNITS	DUPSW102	TBAM1	SP1-1	SP2-2	SP3-2
Depth		-	-	-	-	-
Date Sampled		20/11/2019	20/11/2019	20/11/2019	20/11/2019	20/11/2019
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	22/11/2019	22/11/2019	22/11/2019	22/11/2019	22/11/2019
Date analysed	-	22/11/2019	22/11/2019	22/11/2019	22/11/2019	22/11/2019
TRH C_6 - C_9	mg/kg	<25	[NA]	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	[NA]	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	[NA]	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<3	<3	<3	<3	<3
Surrogate aaa-Trifluorotoluene	%	87	105	99	100	94

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		231315-38	231315-41	231315-43	231315-44	231315-45
Your Reference	UNITS	SP4-2	SP5-2	SP6-1	SP7-1	SP8-1
Depth		-	-	-	-	-
Date Sampled		20/11/2019	20/11/2019	20/11/2019	20/11/2019	20/11/2019
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	22/11/2019	22/11/2019	22/11/2019	22/11/2019	22/11/2019
Date analysed	-	22/11/2019	22/11/2019	22/11/2019	22/11/2019	22/11/2019
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<3	<3	<3	<3	<3
Surrogate aaa-Trifluorotoluene	%	98	91	85	92	94

svTRH (C10-C40) in Soil						
Our Reference		231315-1	231315-6	231315-8	231315-9	231315-11
Your Reference	UNITS	TP101	TP102	TP102	TP103	TP103
Depth		0-0.1	0-0.2	0.9-1.1	0-0.2	0.8-1.0
Date Sampled		20/11/2019	20/11/2019	20/11/2019	20/11/2019	20/11/2019
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	22/11/2019	22/11/2019	22/11/2019	22/11/2019	22/11/2019
Date analysed	-	23/11/2019	23/11/2019	23/11/2019	23/11/2019	23/11/2019
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	260	<100	<100	110	<100
TRH C_{29} - C_{36}	mg/kg	730	<100	<100	190	690
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	750	<100	<100	240	650
TRH >C_{34} -C_{40}	mg/kg	900	<100	<100	240	140
Total +ve TRH (>C10-C40)	mg/kg	1,700	<50	<50	470	790
Surrogate o-Terphenyl	%	93	83	85	85	85

svTRH (C10-C40) in Soil						
Our Reference		231315-13	231315-16	231315-19	231315-21	231315-24
Your Reference	UNITS	TP104	TP105	TP105	TP106	TP107
Depth		0.1-0.3	0-0.1	0.6-0.8	0.5-0.7	1.1-1.3
Date Sampled		20/11/2019	20/11/2019	20/11/2019	20/11/2019	20/11/2019
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	22/11/2019	22/11/2019	22/11/2019	22/11/2019	22/11/2019
Date analysed	-	23/11/2019	23/11/2019	23/11/2019	23/11/2019	23/11/2019
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	120	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	260	130	<100	<100	<100
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	250	160	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	310	170	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	570	330	<50	<50	<50
Surrogate o-Terphenyl	%	86	97	81	92	83

svTRH (C10-C40) in Soil						
Our Reference		231315-25	231315-30	231315-32	231315-35	231315-38
Your Reference	UNITS	DUPSW102	SP1-1	SP2-2	SP3-2	SP4-2
Depth		-	-	-	-	-
Date Sampled		20/11/2019	20/11/2019	20/11/2019	20/11/2019	20/11/2019
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	22/11/2019	22/11/2019	22/11/2019	22/11/2019	22/11/2019
Date analysed	-	23/11/2019	23/11/2019	23/11/2019	23/11/2019	23/11/2019
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	270	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	410	<100	<100	<100
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	540	<100	<100	100
TRH >C_{34} -C_{40}	mg/kg	<100	490	<100	<100	130
Total +ve TRH (>C10-C40)	mg/kg	<50	1,000	<50	<50	230
Surrogate o-Terphenyl	%	82	92	85	85	88

svTRH (C10-C40) in Soil					
Our Reference		231315-41	231315-43	231315-44	231315-45
Your Reference	UNITS	SP5-2	SP6-1	SP7-1	SP8-1
Depth		-	-	-	-
Date Sampled		20/11/2019	20/11/2019	20/11/2019	20/11/2019
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	22/11/2019	22/11/2019	22/11/2019	22/11/2019
Date analysed	-	23/11/2019	23/11/2019	23/11/2019	23/11/2019
TRH C_{10} - C_{14}	mg/kg	<50	180	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	630	<100	140
TRH C_{29} - C_{36}	mg/kg	<100	1,000	<100	260
TRH >C_{10} -C_{16}	mg/kg	<50	240	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	240	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	1,200	<100	290
TRH >C_{34} -C_{40}	mg/kg	<100	1,300	<100	360
Total +ve TRH (>C10-C40)	mg/kg	<50	2,700	<50	650
Surrogate o-Terphenyl	%	82	111	85	86

PAHs in Soil						
Our Reference		231315-1	231315-6	231315-8	231315-9	231315-11
Your Reference	UNITS	TP101	TP102	TP102	TP103	TP103
Depth		0-0.1	0-0.2	0.9-1.1	0-0.2	0.8-1.0
Date Sampled		20/11/2019	20/11/2019	20/11/2019	20/11/2019	20/11/2019
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	22/11/2019	22/11/2019	22/11/2019	22/11/2019	22/11/2019
Date analysed	-	23/11/2019	23/11/2019	23/11/2019	23/11/2019	23/11/2019
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.1	<0.1	<0.1	0.1	0.2
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.4	<0.1	<0.1	0.2	<0.1
Pyrene	mg/kg	0.8	<0.1	<0.1	0.2	<0.1
Benzo(a)anthracene	mg/kg	0.3	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	0.4	<0.1	<0.1	0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	0.8	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	0.5	<0.05	<0.05	0.09	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	0.3	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	0.5	<0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	4.3	<0.05	<0.05	0.64	0.2
Benzo(a)pyrene TEQ calc (zero)	mg/kg	0.7	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	0.7	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	0.8	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	96	89	91	91	92

PAHs in Soil						
Our Reference		231315-13	231315-16	231315-19	231315-21	231315-24
Your Reference	UNITS	TP104	TP105	TP105	TP106	TP107
Depth		0.1-0.3	0-0.1	0.6-0.8	0.5-0.7	1.1-1.3
Date Sampled		20/11/2019	20/11/2019	20/11/2019	20/11/2019	20/11/2019
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	22/11/2019	22/11/2019	22/11/2019	22/11/2019	22/11/2019
Date analysed	-	23/11/2019	23/11/2019	23/11/2019	23/11/2019	23/11/2019
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.2	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.4	0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	0.4	0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	0.2	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	0.2	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	0.4	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	0.3	0.08	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	0.2	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	0.2	0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	2.5	0.4	<0.05	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	92	92	93	91	92

PAHs in Soil						
Our Reference		231315-25	231315-30	231315-32	231315-35	231315-38
Your Reference	UNITS	DUPSW102	SP1-1	SP2-2	SP3-2	SP4-2
Depth		-	-	-	-	-
Date Sampled		20/11/2019	20/11/2019	20/11/2019	20/11/2019	20/11/2019
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	22/11/2019	22/11/2019	22/11/2019	22/11/2019	22/11/2019
Date analysed	-	23/11/2019	23/11/2019	23/11/2019	23/11/2019	23/11/2019
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	0.4	0.3	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	0.5	0.3	<0.1	<0.1
Pyrene	mg/kg	<0.1	0.6	0.4	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	0.3	0.2	<0.1	<0.1
Chrysene	mg/kg	<0.1	0.3	0.2	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	0.4	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	0.3	0.2	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	0.4	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	3.3	1.6	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	89	98	95	94	96

PAHs in Soil					
Our Reference		231315-41	231315-43	231315-44	231315-45
Your Reference	UNITS	SP5-2	SP6-1	SP7-1	SP8-1
Depth		-	-	-	-
Date Sampled		20/11/2019	20/11/2019	20/11/2019	20/11/2019
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	22/11/2019	22/11/2019	22/11/2019	22/11/2019
Date analysed	-	23/11/2019	23/11/2019	23/11/2019	23/11/2019
Naphthalene	mg/kg	<0.1	0.3	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	0.5
Fluorene	mg/kg	<0.1	<0.1	<0.1	0.5
Phenanthrene	mg/kg	<0.1	0.5	0.2	2.9
Anthracene	mg/kg	<0.1	0.1	<0.1	0.7
Fluoranthene	mg/kg	<0.1	0.8	0.2	3.2
Pyrene	mg/kg	<0.1	0.8	0.2	2.6
Benzo(a)anthracene	mg/kg	<0.1	0.4	0.1	1.5
Chrysene	mg/kg	<0.1	0.5	0.1	1.4
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	0.6	<0.2	2
Benzo(a)pyrene	mg/kg	<0.05	0.4	0.1	0.97
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	0.2	<0.1	0.5
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	0.8	<0.1	0.6
Total +ve PAH's	mg/kg	<0.05	5.3	0.98	17
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	0.5	<0.5	1.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	0.6	<0.5	1.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	0.6	<0.5	1.5
Surrogate p-Terphenyl-d14	%	96	95	107	97

Organochlorine Pesticides in soil						
Our Reference		231315-6	231315-8	231315-11	231315-13	231315-16
Your Reference	UNITS	TP102	TP102	TP103	TP104	TP105
Depth		0-0.2	0.9-1.1	0.8-1.0	0.1-0.3	0-0.1
Date Sampled		20/11/2019	20/11/2019	20/11/2019	20/11/2019	20/11/2019
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	22/11/2019	22/11/2019	22/11/2019	22/11/2019	22/11/2019
Date analysed	-	23/11/2019	23/11/2019	23/11/2019	23/11/2019	23/11/2019
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	87	88	88	90	90

Organochlorine Pesticides in soil						
Our Reference		231315-19	231315-21	231315-24	231315-30	231315-32
Your Reference	UNITS	TP105	TP106	TP107	SP1-1	SP2-2
Depth		0.6-0.8	0.5-0.7	1.1-1.3	-	-
Date Sampled		20/11/2019	20/11/2019	20/11/2019	20/11/2019	20/11/2019
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	22/11/2019	22/11/2019	22/11/2019	22/11/2019	22/11/2019
Date analysed	-	23/11/2019	23/11/2019	23/11/2019	23/11/2019	23/11/2019
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	89	89	90	89	89

Organochlorine Pesticides in soil						
Our Reference		231315-35	231315-38	231315-41	231315-43	231315-44
Your Reference	UNITS	SP3-2	SP4-2	SP5-2	SP6-1	SP7-1
Depth		-	-	-	-	-
Date Sampled		20/11/2019	20/11/2019	20/11/2019	20/11/2019	20/11/2019
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	22/11/2019	22/11/2019	22/11/2019	22/11/2019	22/11/2019
Date analysed	-	23/11/2019	23/11/2019	23/11/2019	23/11/2019	23/11/2019
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	91	93	92	89	103

Organochlorine Pesticides in soil		
Our Reference		231315-45
Your Reference	UNITS	SP8-1
Depth		-
Date Sampled		20/11/2019
Type of sample		Soil
Date extracted	-	22/11/2019
Date analysed	-	23/11/2019
alpha-BHC	mg/kg	<0.1
HCB	mg/kg	<0.1
beta-BHC	mg/kg	<0.1
gamma-BHC	mg/kg	<0.1
Heptachlor	mg/kg	<0.1
delta-BHC	mg/kg	<0.1
Aldrin	mg/kg	<0.1
Heptachlor Epoxide	mg/kg	<0.1
gamma-Chlordane	mg/kg	<0.1
alpha-chlordane	mg/kg	<0.1
Endosulfan I	mg/kg	<0.1
pp-DDE	mg/kg	<0.1
Dieldrin	mg/kg	<0.1
Endrin	mg/kg	<0.1
Endosulfan II	mg/kg	<0.1
pp-DDD	mg/kg	<0.1
Endrin Aldehyde	mg/kg	<0.1
pp-DDT	mg/kg	<0.1
Endosulfan Sulphate	mg/kg	<0.1
Methoxychlor	mg/kg	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1
Surrogate TCMX	%	93

Organophosphorus Pesticides in Soil						
Our Reference		231315-6	231315-8	231315-11	231315-13	231315-16
Your Reference	UNITS	TP102	TP102	TP103	TP104	TP105
Depth		0-0.2	0.9-1.1	0.8-1.0	0.1-0.3	0-0.1
Date Sampled		20/11/2019	20/11/2019	20/11/2019	20/11/2019	20/11/2019
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	22/11/2019	22/11/2019	22/11/2019	22/11/2019	22/11/2019
Date analysed	-	23/11/2019	23/11/2019	23/11/2019	23/11/2019	23/11/2019
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	87	88	88	90	90

Organophosphorus Pesticides in Soil						
Our Reference		231315-19	231315-21	231315-24	231315-30	231315-32
Your Reference	UNITS	TP105	TP106	TP107	SP1-1	SP2-2
Depth		0.6-0.8	0.5-0.7	1.1-1.3	-	-
Date Sampled		20/11/2019	20/11/2019	20/11/2019	20/11/2019	20/11/2019
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	22/11/2019	22/11/2019	22/11/2019	22/11/2019	22/11/2019
Date analysed	-	23/11/2019	23/11/2019	23/11/2019	23/11/2019	23/11/2019
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	89	89	90	89	89

Organophosphorus Pesticides in Soil						
Our Reference		231315-35	231315-38	231315-41	231315-43	231315-44
Your Reference	UNITS	SP3-2	SP4-2	SP5-2	SP6-1	SP7-1
Depth		-	-	-	-	-
Date Sampled		20/11/2019	20/11/2019	20/11/2019	20/11/2019	20/11/2019
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	22/11/2019	22/11/2019	22/11/2019	22/11/2019	22/11/2019
Date analysed	-	23/11/2019	23/11/2019	23/11/2019	23/11/2019	23/11/2019
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	91	93	92	89	103

Organophosphorus Pesticides in Soil		
Our Reference		231315-45
Your Reference	UNITS	SP8-1
Depth		-
Date Sampled		20/11/2019
Type of sample		Soil
Date extracted	-	22/11/2019
Date analysed	-	23/11/2019
Dichlorvos	mg/kg	<0.1
Dimethoate	mg/kg	<0.1
Diazinon	mg/kg	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1
Ronnel	mg/kg	<0.1
Fenitrothion	mg/kg	<0.1
Malathion	mg/kg	<0.1
Chlorpyriphos	mg/kg	<0.1
Parathion	mg/kg	<0.1
Bromophos-ethyl	mg/kg	<0.1
Ethion	mg/kg	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1
Surrogate TCMX	%	93

PCBs in Soil						
Our Reference		231315-6	231315-8	231315-11	231315-13	231315-16
Your Reference	UNITS	TP102	TP102	TP103	TP104	TP105
Depth		0-0.2	0.9-1.1	0.8-1.0	0.1-0.3	0-0.1
Date Sampled		20/11/2019	20/11/2019	20/11/2019	20/11/2019	20/11/2019
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	22/11/2019	22/11/2019	22/11/2019	22/11/2019	22/11/2019
Date analysed	-	23/11/2019	23/11/2019	23/11/2019	23/11/2019	23/11/2019
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	87	88	88	90	90

PCBs in Soil						
Our Reference		231315-19	231315-21	231315-24	231315-30	231315-32
Your Reference	UNITS	TP105	TP106	TP107	SP1-1	SP2-2
Depth		0.6-0.8	0.5-0.7	1.1-1.3	-	-
Date Sampled		20/11/2019	20/11/2019	20/11/2019	20/11/2019	20/11/2019
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	22/11/2019	22/11/2019	22/11/2019	22/11/2019	22/11/2019
Date analysed	-	23/11/2019	23/11/2019	23/11/2019	23/11/2019	23/11/2019
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	89	89	90	89	89

PCBs in Soil						
Our Reference		231315-35	231315-38	231315-41	231315-43	231315-44
Your Reference	UNITS	SP3-2	SP4-2	SP5-2	SP6-1	SP7-1
Depth		-	-	-	-	-
Date Sampled		20/11/2019	20/11/2019	20/11/2019	20/11/2019	20/11/2019
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	22/11/2019	22/11/2019	22/11/2019	22/11/2019	22/11/2019
Date analysed	-	23/11/2019	23/11/2019	23/11/2019	23/11/2019	23/11/2019
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	91	93	92	89	103

PCBs in Soil		
Our Reference		231315-45
Your Reference	UNITS	SP8-1
Depth		-
Date Sampled		20/11/2019
Type of sample		Soil
Date extracted	-	22/11/2019
Date analysed	-	23/11/2019
Aroclor 1016	mg/kg	<0.1
Aroclor 1221	mg/kg	<0.1
Aroclor 1232	mg/kg	<0.1
Aroclor 1242	mg/kg	<0.1
Aroclor 1248	mg/kg	<0.1
Aroclor 1254	mg/kg	<0.1
Aroclor 1260	mg/kg	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1
Surrogate TCMX	%	93

Acid Extractable metals in soil						
Our Reference		231315-1	231315-6	231315-8	231315-9	231315-11
Your Reference	UNITS	TP101	TP102	TP102	TP103	TP103
Depth		0-0.1	0-0.2	0.9-1.1	0-0.2	0.8-1.0
Date Sampled		20/11/2019	20/11/2019	20/11/2019	20/11/2019	20/11/2019
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	22/11/2019	22/11/2019	22/11/2019	22/11/2019	22/11/2019
Date analysed	-	22/11/2019	22/11/2019	22/11/2019	22/11/2019	22/11/2019
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	39	10	10	19	13
Copper	mg/kg	35	7	<1	9	<1
Lead	mg/kg	18	14	8	14	8
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	21	5	<1	8	<1
Zinc	mg/kg	35	22	<1	18	1

Acid Extractable metals in soil						
Our Reference		231315-13	231315-16	231315-19	231315-21	231315-24
Your Reference	UNITS	TP104	TP105	TP105	TP106	TP107
Depth		0.1-0.3	0-0.1	0.6-0.8	0.5-0.7	1.1-1.3
Date Sampled		20/11/2019	20/11/2019	20/11/2019	20/11/2019	20/11/2019
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	22/11/2019	22/11/2019	22/11/2019	22/11/2019	22/11/2019
Date analysed	-	22/11/2019	22/11/2019	22/11/2019	22/11/2019	22/11/2019
Arsenic	mg/kg	<4	<4	6	<4	5
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	10	11	12	9	14
Copper	mg/kg	25	14	<1	<1	<1
Lead	mg/kg	9	15	10	12	14
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	8	8	<1	<1	1
Zinc	mg/kg	28	35	<1	<1	96

Acid Extractable metals in soil						
Our Reference		231315-25	231315-30	231315-32	231315-35	231315-38
Your Reference	UNITS	DUPSW102	SP1-1	SP2-2	SP3-2	SP4-2
Depth		-	-	-	-	-
Date Sampled		20/11/2019	20/11/2019	20/11/2019	20/11/2019	20/11/2019
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	22/11/2019	22/11/2019	22/11/2019	22/11/2019	22/11/2019
Date analysed	-	22/11/2019	22/11/2019	22/11/2019	22/11/2019	22/11/2019
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	5	24	9	<1	10
Copper	mg/kg	4	22	15	1	25
Lead	mg/kg	9	16	20	2	2
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	3	8	6	<1	31
Zinc	mg/kg	24	34	47	4	22

Acid Extractable metals in soil					
Our Reference		231315-41	231315-43	231315-44	231315-45
Your Reference	UNITS	SP5-2	SP6-1	SP7-1	SP8-1
Depth		-	-	-	-
Date Sampled		20/11/2019	20/11/2019	20/11/2019	20/11/2019
Type of sample		Soil	Soil	Soil	Soil
Date prepared	-	22/11/2019	22/11/2019	22/11/2019	22/11/2019
Date analysed	-	22/11/2019	22/11/2019	22/11/2019	22/11/2019
Arsenic	mg/kg	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	4	29	9	10
Copper	mg/kg	2	17	15	20
Lead	mg/kg	6	9	20	11
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	2	12	5	7
Zinc	mg/kg	9	16	53	27

Moisture						
Our Reference		231315-1	231315-6	231315-8	231315-9	231315-11
Your Reference	UNITS	TP101	TP102	TP102	TP103	TP103
Depth		0-0.1	0-0.2	0.9-1.1	0-0.2	0.8-1.0
Date Sampled		20/11/2019	20/11/2019	20/11/2019	20/11/2019	20/11/2019
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	22/11/2019	22/11/2019	22/11/2019	22/11/2019	22/11/2019
Date analysed	-	25/11/2019	25/11/2019	25/11/2019	25/11/2019	25/11/2019
Moisture	%	1.5	12	14	16	17

Moisture						
Our Reference		231315-13	231315-16	231315-19	231315-21	231315-24
Your Reference	UNITS	TP104	TP105	TP105	TP106	TP107
Depth		0.1-0.3	0-0.1	0.6-0.8	0.5-0.7	1.1-1.3
Date Sampled		20/11/2019	20/11/2019	20/11/2019	20/11/2019	20/11/2019
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	22/11/2019	22/11/2019	22/11/2019	22/11/2019	22/11/2019
Date analysed	-	25/11/2019	25/11/2019	25/11/2019	25/11/2019	25/11/2019
Moisture	%	12	11	19	19	19

Moisture						
Our Reference		231315-25	231315-30	231315-32	231315-35	231315-38
Your Reference	UNITS	DUPSW102	SP1-1	SP2-2	SP3-2	SP4-2
Depth		-	-	-	-	-
Date Sampled		20/11/2019	20/11/2019	20/11/2019	20/11/2019	20/11/2019
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	22/11/2019	22/11/2019	22/11/2019	22/11/2019	22/11/2019
Date analysed	-	25/11/2019	25/11/2019	25/11/2019	25/11/2019	25/11/2019
Moisture	%	12	6.2	7.9	0.99	1.6

Moisture					
Our Reference		231315-41	231315-43	231315-44	231315-45
Your Reference	UNITS	SP5-2	SP6-1	SP7-1	SP8-1
Depth		-	-	-	-
Date Sampled		20/11/2019	20/11/2019	20/11/2019	20/11/2019
Type of sample		Soil	Soil	Soil	Soil
Date prepared	-	22/11/2019	22/11/2019	22/11/2019	22/11/2019
Date analysed	-	25/11/2019	25/11/2019	25/11/2019	25/11/2019
Moisture	%	6.7	2.6	9.1	6.9

Asbestos ID - soils						
Our Reference		231315-6	231315-13	231315-16	231315-30	231315-32
Your Reference	UNITS	TP102	TP104	TP105	SP1-1	SP2-2
Depth		0-0.2	0.1-0.3	0-0.1	-	-
Date Sampled		20/11/2019	20/11/2019	20/11/2019	20/11/2019	20/11/2019
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	22/11/2019	22/11/2019	22/11/2019	22/11/2019	22/11/2019
Sample mass tested	g	Approx. 55g	Approx. 55g	Approx. 50g	Approx. 70g	Approx. 50g
Sample Description	-	Brown clayey soil & rocks	Brown clayey soil & rocks	Brown clayey soil & rocks	Brown clayey soil & rocks	Brown clayey soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected

Asbestos ID - soils						
Our Reference		231315-35	231315-38	231315-41	231315-43	231315-44
Your Reference	UNITS	SP3-2	SP4-2	SP5-2	SP6-1	SP7-1
Depth		-	-	-	-	-
Date Sampled		20/11/2019	20/11/2019	20/11/2019	20/11/2019	20/11/2019
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	22/11/2019	22/11/2019	22/11/2019	22/11/2019	22/11/2019
Sample mass tested	g	Approx. 60g	Approx. 80g	Approx. 45g	Approx. 55g	Approx. 55g
Sample Description	-	Assorted rocks	Brown clayey soil & rocks	Beige sandy soil & rocks	Brown clayey soil & rocks	Brown clayey soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected

Asbestos ID - soils		
Our Reference		231315-45
Your Reference	UNITS	SP8-1
Depth		-
Date Sampled		20/11/2019
Type of sample		Soil
Date analysed	-	22/11/2019
Sample mass tested	g	Approx. 65
Sample Description	-	Brown clayey soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected

Metals in TCLP USEPA1311						
Our Reference		231315-6	231315-8	231315-11	231315-13	231315-16
Your Reference	UNITS	TP102	TP102	TP103	TP104	TP105
Depth		0-0.2	0.9-1.1	0.8-1.0	0.1-0.3	0-0.1
Date Sampled		20/11/2019	20/11/2019	20/11/2019	20/11/2019	20/11/2019
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	25/11/2019	25/11/2019	25/11/2019	25/11/2019	25/11/2019
Date analysed	-	25/11/2019	25/11/2019	25/11/2019	25/11/2019	25/11/2019
pH of soil for fluid# determ.	pH units	9.3	5.9	5.5	10.4	9.6
pH of soil TCLP (after HCl)	pH units	1.8	1.7	1.7	1.9	1.9
Extraction fluid used	-	1	1	1	1	1
pH of final Leachate	pH units	5.1	5.0	5.0	5.7	5.4
Arsenic in TCLP	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Cadmium in TCLP	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Chromium in TCLP	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Lead in TCLP	mg/L	<0.03	<0.03	<0.03	<0.03	<0.03
Mercury in TCLP	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Nickel in TCLP	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02

Metals in TCLP USEPA1311				
Our Reference		231315-19	231315-21	231315-24
Your Reference	UNITS	TP105	TP106	TP107
Depth		0.6-0.8	0.5-0.7	1.1-1.3
Date Sampled		20/11/2019	20/11/2019	20/11/2019
Type of sample		Soil	Soil	Soil
Date extracted	-	25/11/2019	25/11/2019	25/11/2019
Date analysed	-	25/11/2019	25/11/2019	25/11/2019
pH of soil for fluid# determ.	pH units	5.6	5.1	6.5
pH of soil TCLP (after HCl)	pH units	1.7	1.7	1.7
Extraction fluid used	-	1	1	1
pH of final Leachate	pH units	5.0	5.0	5.0
Arsenic in TCLP	mg/L	<0.05	<0.05	<0.05
Cadmium in TCLP	mg/L	<0.01	<0.01	<0.01
Chromium in TCLP	mg/L	<0.01	<0.01	<0.01
Lead in TCLP	mg/L	<0.03	<0.03	<0.03
Mercury in TCLP	mg/L	<0.0005	<0.0005	<0.0005
Nickel in TCLP	mg/L	<0.02	<0.02	<0.02

PAHs in TCLP (USEPA 1311)						
Our Reference		231315-6	231315-8	231315-11	231315-13	231315-16
Your Reference	UNITS	TP102	TP102	TP103	TP104	TP105
Depth		0-0.2	0.9-1.1	0.8-1.0	0.1-0.3	0-0.1
Date Sampled		20/11/2019	20/11/2019	20/11/2019	20/11/2019	20/11/2019
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	25/11/2019	25/11/2019	25/11/2019	25/11/2019	25/11/2019
Date analysed	-	26/11/2019	26/11/2019	26/11/2019	26/11/2019	26/11/2019
Naphthalene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Acenaphthylene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Acenaphthene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Fluorene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Phenanthrene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Anthracene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Fluoranthene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Pyrene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Benzo(a)anthracene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Chrysene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Benzo(bjk)fluoranthene in TCLP	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002
Benzo(a)pyrene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Indeno(1,2,3-c,d)pyrene - TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Dibenzo(a,h)anthracene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Benzo(g,h,i)perylene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Total +ve PAH's	mg/L	NIL (+)VE	NIL (+)VE	NIL (+)VE	NIL (+)VE	NIL (+)VE
Surrogate p-Terphenyl-d14	%	95	85	70	96	95

PAHs in TCLP (USEPA 1311)				
Our Reference		231315-19	231315-21	231315-24
Your Reference	UNITS	TP105	TP106	TP107
Depth		0.6-0.8	0.5-0.7	1.1-1.3
Date Sampled		20/11/2019	20/11/2019	20/11/2019
Type of sample		Soil	Soil	Soil
Date extracted	-	25/11/2019	25/11/2019	25/11/2019
Date analysed	-	26/11/2019	26/11/2019	26/11/2019
Naphthalene in TCLP	mg/L	<0.001	<0.001	<0.001
Acenaphthylene in TCLP	mg/L	<0.001	<0.001	<0.001
Acenaphthene in TCLP	mg/L	<0.001	<0.001	<0.001
Fluorene in TCLP	mg/L	<0.001	<0.001	<0.001
Phenanthrene in TCLP	mg/L	<0.001	<0.001	<0.001
Anthracene in TCLP	mg/L	<0.001	<0.001	<0.001
Fluoranthene in TCLP	mg/L	<0.001	<0.001	<0.001
Pyrene in TCLP	mg/L	<0.001	<0.001	<0.001
Benzo(a)anthracene in TCLP	mg/L	<0.001	<0.001	<0.001
Chrysene in TCLP	mg/L	<0.001	<0.001	<0.001
Benzo(bjk)fluoranthene in TCLP	mg/L	<0.002	<0.002	<0.002
Benzo(a)pyrene in TCLP	mg/L	<0.001	<0.001	<0.001
Indeno(1,2,3-c,d)pyrene - TCLP	mg/L	<0.001	<0.001	<0.001
Dibenzo(a,h)anthracene in TCLP	mg/L	<0.001	<0.001	<0.001
Benzo(g,h,i)perylene in TCLP	mg/L	<0.001	<0.001	<0.001
Total +ve PAH's	mg/L	NIL (+)VE	NIL (+)VE	NIL (+)VE
Surrogate p-Terphenyl-d14	%	96	79	95

Asbestos ID - materials		
Our Reference		231315-46
Your Reference	UNITS	AMF1-SP1
Depth		-
Date Sampled		20/11/2019
Type of sample		Material
Date analysed	-	25/11/2019
Mass / Dimension of Sample	-	65x45x6mm
Sample Description	-	Beige layered fibre cement material
Asbestos ID in materials	-	No asbestos detected Organic fibres detected
Trace Analysis	-	No asbestos detected

BTEX in Water		
Our Reference		231315-29
Your Reference	UNITS	FRAM1
Depth		-
Date Sampled		20/11/2019
Type of sample		Water
Date extracted	-	25/11/2019
Date analysed	-	26/11/2019
Benzene	µg/L	<1
Toluene	µg/L	<1
Ethylbenzene	µg/L	<1
m+p-xylene	µg/L	<2
o-xylene	µg/L	<1
Surrogate Dibromofluoromethane	%	102
Surrogate toluene-d8	%	99
Surrogate 4-BFB	%	108

Method ID	Methodology Summary
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.
AT-008	Determination of VOCs sampled onto coconut shell charcoal sorbent tubes, that can be desorbed using carbon disulphide, and analysed by GC-MS.
EXTRACT.7	Toxicity Characteristic Leaching Procedure (TCLP) using Zero Headspace Extraction (zHE) using AS4439 and USEPA 1311.
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA latest edition, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Inorg-004	Toxicity Characteristic Leaching Procedure (TCLP) using in house method INORG-004. Please note that the mass used may be scaled down from the default based on sample mass available.
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Metals-020	Determination of various metals by ICP-AES.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Metals-021 CV-AAS	Determination of Mercury by Cold Vapour AAS.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD. Note, the Total +ve PCBs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PCBs" is simply a sum of the positive individual PCBs.
Org-012/017	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS and/or GC-MS/MS.

Method ID	Methodology Summary
Org-012/017	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-MS and/or GC-MS/MS. Note, the Total +ve reported DDD+DDE+DDT PQL is reflective of the lowest individual PQL and is therefore simply a sum of the positive individually report DDD+DDE+DDT.
Org-012/017	Leachates are extracted with Dichloromethane and analysed by GC-MS and/or GC-MS/MS.
Org-012/017	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS and/or GC-MS/MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'EQ PQL'values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'EQ zero'values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'EQ half PQL'values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-014	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	231315-8
Date extracted	-			22/11/2019	6	22/11/2019	22/11/2019		22/11/2019	22/11/2019
Date analysed	-			22/11/2019	6	22/11/2019	22/11/2019		22/11/2019	22/11/2019
TRH C_6 - C_9	mg/kg	25	Org-016	<25	6	<25	<25	0	99	103
TRH C_6 - C_{10}	mg/kg	25	Org-016	<25	6	<25	<25	0	99	103
Benzene	mg/kg	0.2	Org-016	<0.2	6	<0.2	<0.2	0	104	108
Toluene	mg/kg	0.5	Org-016	<0.5	6	<0.5	<0.5	0	97	101
Ethylbenzene	mg/kg	1	Org-016	<1	6	<1	<1	0	94	99
m+p-xylene	mg/kg	2	Org-016	<2	6	<2	<2	0	99	104
o-Xylene	mg/kg	1	Org-016	<1	6	<1	<1	0	95	101
naphthalene	mg/kg	1	Org-014	<1	6	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-016	94	6	80	89	11	101	101

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	32	22/11/2019	22/11/2019		[NT]	[NT]
Date analysed	-			[NT]	32	22/11/2019	22/11/2019		[NT]	[NT]
TRH C_6 - C_9	mg/kg	25	Org-016	[NT]	32	<25	<25	0	[NT]	[NT]
TRH C_6 - C_{10}	mg/kg	25	Org-016	[NT]	32	<25	<25	0	[NT]	[NT]
Benzene	mg/kg	0.2	Org-016	[NT]	32	<0.2	<0.2	0	[NT]	[NT]
Toluene	mg/kg	0.5	Org-016	[NT]	32	<0.5	<0.5	0	[NT]	[NT]
Ethylbenzene	mg/kg	1	Org-016	[NT]	32	<1	<1	0	[NT]	[NT]
m+p-xylene	mg/kg	2	Org-016	[NT]	32	<2	<2	0	[NT]	[NT]
o-Xylene	mg/kg	1	Org-016	[NT]	32	<1	<1	0	[NT]	[NT]
naphthalene	mg/kg	1	Org-014	[NT]	32	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-016	[NT]	32	100	96	4	[NT]	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	231315-8
Date extracted	-			22/11/2019	6	22/11/2019	22/11/2019		22/11/2019	22/11/2019
Date analysed	-			23/11/2019	6	23/11/2019	23/11/2019		23/11/2019	23/11/2019
TRH C_{10} - C_{14}	mg/kg	50	Org-003	<50	6	<50	<50	0	97	93
TRH C_{15} - C_{28}	mg/kg	100	Org-003	<100	6	<100	<100	0	108	100
TRH C_{29} - C_{36}	mg/kg	100	Org-003	<100	6	<100	<100	0	138	80
TRH >C_{10} -C_{16}	mg/kg	50	Org-003	<50	6	<50	<50	0	97	93
TRH >C_{16} -C_{34}	mg/kg	100	Org-003	<100	6	<100	<100	0	108	100
TRH >C_{34} -C_{40}	mg/kg	100	Org-003	<100	6	<100	<100	0	138	80
Surrogate o-Terphenyl	%		Org-003	83	6	83	82	1	96	85

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	32	22/11/2019	22/11/2019		[NT]	[NT]
Date analysed	-			[NT]	32	23/11/2019	23/11/2019		[NT]	[NT]
TRH C_{10} - C_{14}	mg/kg	50	Org-003	[NT]	32	<50	<50	0	[NT]	[NT]
TRH C_{15} - C_{28}	mg/kg	100	Org-003	[NT]	32	<100	<100	0	[NT]	[NT]
TRH C_{29} - C_{36}	mg/kg	100	Org-003	[NT]	32	<100	<100	0	[NT]	[NT]
TRH >C_{10} -C_{16}	mg/kg	50	Org-003	[NT]	32	<50	<50	0	[NT]	[NT]
TRH >C_{16} -C_{34}	mg/kg	100	Org-003	[NT]	32	<100	<100	0	[NT]	[NT]
TRH >C_{34} -C_{40}	mg/kg	100	Org-003	[NT]	32	<100	<100	0	[NT]	[NT]
Surrogate o-Terphenyl	%		Org-003	[NT]	32	85	88	3	[NT]	[NT]

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	231315-8
Date extracted	-			22/11/2019	6	22/11/2019	22/11/2019		22/11/2019	22/11/2019
Date analysed	-			23/11/2019	6	23/11/2019	23/11/2019		23/11/2019	23/11/2019
Naphthalene	mg/kg	0.1	Org-012/017	<0.1	6	<0.1	<0.1	0	116	112
Acenaphthylene	mg/kg	0.1	Org-012/017	<0.1	6	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-012/017	<0.1	6	<0.1	<0.1	0	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-012/017	<0.1	6	<0.1	<0.1	0	104	104
Phenanthrene	mg/kg	0.1	Org-012/017	<0.1	6	<0.1	<0.1	0	104	100
Anthracene	mg/kg	0.1	Org-012/017	<0.1	6	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-012/017	<0.1	6	<0.1	<0.1	0	106	100
Pyrene	mg/kg	0.1	Org-012/017	<0.1	6	<0.1	<0.1	0	108	104
Benzo(a)anthracene	mg/kg	0.1	Org-012/017	<0.1	6	<0.1	<0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-012/017	<0.1	6	<0.1	<0.1	0	114	130
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-012/017	<0.2	6	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-012/017	<0.05	6	<0.05	<0.05	0	112	106
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012/017	<0.1	6	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012/017	<0.1	6	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012/017	<0.1	6	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-012/017	96	6	89	93	4	100	96

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	32	22/11/2019	22/11/2019		[NT]	[NT]
Date analysed	-			[NT]	32	23/11/2019	23/11/2019		[NT]	[NT]
Naphthalene	mg/kg	0.1	Org-012/017	[NT]	32	<0.1	<0.1	0	[NT]	[NT]
Acenaphthylene	mg/kg	0.1	Org-012/017	[NT]	32	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-012/017	[NT]	32	<0.1	<0.1	0	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-012/017	[NT]	32	<0.1	<0.1	0	[NT]	[NT]
Phenanthrene	mg/kg	0.1	Org-012/017	[NT]	32	0.3	0.3	0	[NT]	[NT]
Anthracene	mg/kg	0.1	Org-012/017	[NT]	32	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-012/017	[NT]	32	0.3	0.4	29	[NT]	[NT]
Pyrene	mg/kg	0.1	Org-012/017	[NT]	32	0.4	0.4	0	[NT]	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-012/017	[NT]	32	0.2	0.2	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-012/017	[NT]	32	0.2	0.2	0	[NT]	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-012/017	[NT]	32	<0.2	0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-012/017	[NT]	32	0.2	0.1	67	[NT]	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012/017	[NT]	32	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012/017	[NT]	32	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012/017	[NT]	32	<0.1	0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-012/017	[NT]	32	95	98	3	[NT]	[NT]

QUALITY CONTROL: Organochlorine Pesticides in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	231315-8
Date extracted	-			22/11/2019	6	22/11/2019	22/11/2019		22/11/2019	22/11/2019
Date analysed	-			23/11/2019	6	23/11/2019	23/11/2019		23/11/2019	23/11/2019
alpha-BHC	mg/kg	0.1	Org-012/017	<0.1	6	<0.1	<0.1	0	112	110
HCB	mg/kg	0.1	Org-012/017	<0.1	6	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-012/017	<0.1	6	<0.1	<0.1	0	100	96
gamma-BHC	mg/kg	0.1	Org-012/017	<0.1	6	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-012/017	<0.1	6	<0.1	<0.1	0	100	96
delta-BHC	mg/kg	0.1	Org-012/017	<0.1	6	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-012/017	<0.1	6	<0.1	<0.1	0	108	104
Heptachlor Epoxide	mg/kg	0.1	Org-012/017	<0.1	6	<0.1	<0.1	0	106	104
gamma-Chlordane	mg/kg	0.1	Org-012/017	<0.1	6	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-012/017	<0.1	6	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-012/017	<0.1	6	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-012/017	<0.1	6	<0.1	<0.1	0	114	108
Dieldrin	mg/kg	0.1	Org-012/017	<0.1	6	<0.1	<0.1	0	134	100
Endrin	mg/kg	0.1	Org-012/017	<0.1	6	<0.1	<0.1	0	112	112
Endosulfan II	mg/kg	0.1	Org-012/017	<0.1	6	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-012/017	<0.1	6	<0.1	<0.1	0	106	102
Endrin Aldehyde	mg/kg	0.1	Org-012/017	<0.1	6	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-012/017	<0.1	6	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-012/017	<0.1	6	<0.1	<0.1	0	96	92
Methoxychlor	mg/kg	0.1	Org-012/017	<0.1	6	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-012/017	94	6	87	90	3	91	88

QUALITY CONTROL: Organochlorine Pesticides in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	32	22/11/2019	22/11/2019		[NT]	[NT]
Date analysed	-			[NT]	32	23/11/2019	23/11/2019		[NT]	[NT]
alpha-BHC	mg/kg	0.1	Org-012/017	[NT]	32	<0.1	<0.1	0	[NT]	[NT]
HCB	mg/kg	0.1	Org-012/017	[NT]	32	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-012/017	[NT]	32	<0.1	<0.1	0	[NT]	[NT]
gamma-BHC	mg/kg	0.1	Org-012/017	[NT]	32	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-012/017	[NT]	32	<0.1	<0.1	0	[NT]	[NT]
delta-BHC	mg/kg	0.1	Org-012/017	[NT]	32	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-012/017	[NT]	32	<0.1	<0.1	0	[NT]	[NT]
Heptachlor Epoxide	mg/kg	0.1	Org-012/017	[NT]	32	<0.1	<0.1	0	[NT]	[NT]
gamma-Chlordane	mg/kg	0.1	Org-012/017	[NT]	32	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-012/017	[NT]	32	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-012/017	[NT]	32	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-012/017	[NT]	32	<0.1	<0.1	0	[NT]	[NT]
Dieldrin	mg/kg	0.1	Org-012/017	[NT]	32	<0.1	<0.1	0	[NT]	[NT]
Endrin	mg/kg	0.1	Org-012/017	[NT]	32	<0.1	<0.1	0	[NT]	[NT]
Endosulfan II	mg/kg	0.1	Org-012/017	[NT]	32	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-012/017	[NT]	32	<0.1	<0.1	0	[NT]	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-012/017	[NT]	32	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-012/017	[NT]	32	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-012/017	[NT]	32	<0.1	<0.1	0	[NT]	[NT]
Methoxychlor	mg/kg	0.1	Org-012/017	[NT]	32	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-012/017	[NT]	32	89	92	3	[NT]	[NT]

QUALITY CONTROL: Organophosphorus Pesticides in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	231315-8
Date extracted	-			22/11/2019	6	22/11/2019	22/11/2019		22/11/2019	22/11/2019
Date analysed	-			23/11/2019	6	23/11/2019	23/11/2019		23/11/2019	23/11/2019
Dichlorvos	mg/kg	0.1	Org-012/017	<0.1	6	<0.1	<0.1	0	83	94
Dimethoate	mg/kg	0.1	Org-012/017	<0.1	6	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-012/017	<0.1	6	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos-methyl	mg/kg	0.1	Org-012/017	<0.1	6	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-012/017	<0.1	6	<0.1	<0.1	0	84	82
Fenitrothion	mg/kg	0.1	Org-012/017	<0.1	6	<0.1	<0.1	0	74	94
Malathion	mg/kg	0.1	Org-012/017	<0.1	6	<0.1	<0.1	0	102	102
Chlorpyriphos	mg/kg	0.1	Org-012/017	<0.1	6	<0.1	<0.1	0	96	92
Parathion	mg/kg	0.1	Org-012/017	<0.1	6	<0.1	<0.1	0	96	94
Bromophos-ethyl	mg/kg	0.1	AT-008	<0.1	6	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-012/017	<0.1	6	<0.1	<0.1	0	90	84
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-012/017	<0.1	6	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-012/017	94	6	87	90	3	91	88

QUALITY CONTROL: Organophosphorus Pesticides in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	32	22/11/2019	22/11/2019		[NT]	[NT]
Date analysed	-			[NT]	32	23/11/2019	23/11/2019		[NT]	[NT]
Dichlorvos	mg/kg	0.1	Org-012/017	[NT]	32	<0.1	<0.1	0	[NT]	[NT]
Dimethoate	mg/kg	0.1	Org-012/017	[NT]	32	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-012/017	[NT]	32	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos-methyl	mg/kg	0.1	Org-012/017	[NT]	32	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-012/017	[NT]	32	<0.1	<0.1	0	[NT]	[NT]
Fenitrothion	mg/kg	0.1	Org-012/017	[NT]	32	<0.1	<0.1	0	[NT]	[NT]
Malathion	mg/kg	0.1	Org-012/017	[NT]	32	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos	mg/kg	0.1	Org-012/017	[NT]	32	<0.1	<0.1	0	[NT]	[NT]
Parathion	mg/kg	0.1	Org-012/017	[NT]	32	<0.1	<0.1	0	[NT]	[NT]
Bromophos-ethyl	mg/kg	0.1	AT-008	[NT]	32	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-012/017	[NT]	32	<0.1	<0.1	0	[NT]	[NT]
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-012/017	[NT]	32	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-012/017	[NT]	32	89	92	3	[NT]	[NT]

QUALITY CONTROL: PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	231315-8
Date extracted	-			22/11/2019	6	22/11/2019	22/11/2019		22/11/2019	22/11/2019
Date analysed	-			23/11/2019	6	23/11/2019	23/11/2019		23/11/2019	23/11/2019
Aroclor 1016	mg/kg	0.1	Org-006	<0.1	6	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-006	<0.1	6	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-006	<0.1	6	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-006	<0.1	6	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-006	<0.1	6	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-006	<0.1	6	<0.1	<0.1	0	89	86
Aroclor 1260	mg/kg	0.1	Org-006	<0.1	6	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-006	94	6	87	90	3	91	88

QUALITY CONTROL: PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	32	22/11/2019	22/11/2019		[NT]	[NT]
Date analysed	-			[NT]	32	23/11/2019	23/11/2019		[NT]	[NT]
Aroclor 1016	mg/kg	0.1	Org-006	[NT]	32	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-006	[NT]	32	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-006	[NT]	32	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-006	[NT]	32	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-006	[NT]	32	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-006	[NT]	32	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1260	mg/kg	0.1	Org-006	[NT]	32	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-006	[NT]	32	89	92	3	[NT]	[NT]

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	231315-8
Date prepared	-			22/11/2019	6	22/11/2019	22/11/2019		22/11/2019	22/11/2019
Date analysed	-			22/11/2019	6	22/11/2019	22/11/2019		22/11/2019	22/11/2019
Arsenic	mg/kg	4	Metals-020	<4	6	<4	<4	0	109	91
Cadmium	mg/kg	0.4	Metals-020	<0.4	6	<0.4	<0.4	0	103	96
Chromium	mg/kg	1	Metals-020	<1	6	10	10	0	108	95
Copper	mg/kg	1	Metals-020	<1	6	7	8	13	103	99
Lead	mg/kg	1	Metals-020	<1	6	14	12	15	108	99
Mercury	mg/kg	0.1	Metals-021	<0.1	6	<0.1	<0.1	0	75	97
Nickel	mg/kg	1	Metals-020	<1	6	5	5	0	102	96
Zinc	mg/kg	1	Metals-020	<1	6	22	21	5	113	101

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	32	22/11/2019	22/11/2019		[NT]	[NT]
Date analysed	-			[NT]	32	22/11/2019	22/11/2019		[NT]	[NT]
Arsenic	mg/kg	4	Metals-020	[NT]	32	<4	<4	0	[NT]	[NT]
Cadmium	mg/kg	0.4	Metals-020	[NT]	32	<0.4	<0.4	0	[NT]	[NT]
Chromium	mg/kg	1	Metals-020	[NT]	32	9	9	0	[NT]	[NT]
Copper	mg/kg	1	Metals-020	[NT]	32	15	14	7	[NT]	[NT]
Lead	mg/kg	1	Metals-020	[NT]	32	20	16	22	[NT]	[NT]
Mercury	mg/kg	0.1	Metals-021	[NT]	32	<0.1	0.2	67	[NT]	[NT]
Nickel	mg/kg	1	Metals-020	[NT]	32	6	5	18	[NT]	[NT]
Zinc	mg/kg	1	Metals-020	[NT]	32	47	42	11	[NT]	[NT]

QUALITY CONTROL: Metals in TCLP USEPA1311						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	231315-8
Date extracted	-			25/11/2019	6	25/11/2019	25/11/2019		25/11/2019	25/11/2019
Date analysed	-			25/11/2019	6	25/11/2019	25/11/2019		25/11/2019	25/11/2019
Arsenic in TCLP	mg/L	0.05	Metals-020 ICP-AES	<0.05	6	<0.05	<0.05	0	111	108
Cadmium in TCLP	mg/L	0.01	Metals-020 ICP-AES	<0.01	6	<0.01	<0.01	0	107	102
Chromium in TCLP	mg/L	0.01	Metals-020 ICP-AES	<0.01	6	<0.01	<0.01	0	101	98
Lead in TCLP	mg/L	0.03	Metals-020 ICP-AES	<0.03	6	<0.03	<0.03	0	97	96
Mercury in TCLP	mg/L	0.0005	Metals-021 CV-AAS	<0.0005	6	<0.0005	<0.0005	0	116	95
Nickel in TCLP	mg/L	0.02	Metals-020 ICP-AES	<0.02	6	<0.02	<0.02	0	100	97

QUALITY CONTROL: PAHs in TCLP (USEPA 1311)						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	231315-8
Date extracted	-			25/11/2019	6	25/11/2019	25/11/2019		25/11/2019	25/11/2019
Date analysed	-			26/11/2019	6	26/11/2019	26/11/2019		26/11/2019	26/11/2019
Naphthalene in TCLP	mg/L	0.001	Org-012/017	<0.001	6	<0.001	<0.001	0	120	90
Acenaphthylene in TCLP	mg/L	0.001	Org-012/017	<0.001	6	<0.001	<0.001	0	[NT]	[NT]
Acenaphthene in TCLP	mg/L	0.001	Org-012/017	<0.001	6	<0.001	<0.001	0	[NT]	[NT]
Fluorene in TCLP	mg/L	0.001	Org-012/017	<0.001	6	<0.001	<0.001	0	114	94
Phenanthrene in TCLP	mg/L	0.001	Org-012/017	<0.001	6	<0.001	<0.001	0	98	104
Anthracene in TCLP	mg/L	0.001	Org-012/017	<0.001	6	<0.001	<0.001	0	[NT]	[NT]
Fluoranthene in TCLP	mg/L	0.001	Org-012/017	<0.001	6	<0.001	<0.001	0	90	100
Pyrene in TCLP	mg/L	0.001	Org-012/017	<0.001	6	<0.001	<0.001	0	94	100
Benzo(a)anthracene in TCLP	mg/L	0.001	Org-012/017	<0.001	6	<0.001	<0.001	0	[NT]	[NT]
Chrysene in TCLP	mg/L	0.001	Org-012/017	<0.001	6	<0.001	<0.001	0	124	118
Benzo(bjk)fluoranthene in TCLP	mg/L	0.002	Org-012/017	<0.002	6	<0.002	<0.002	0	[NT]	[NT]
Benzo(a)pyrene in TCLP	mg/L	0.001	Org-012/017	<0.001	6	<0.001	<0.001	0	96	94
Indeno(1,2,3-c,d)pyrene - TCLP	mg/L	0.001	Org-012/017	<0.001	6	<0.001	<0.001	0	[NT]	[NT]
Dibenzo(a,h)anthracene in TCLP	mg/L	0.001	Org-012/017	<0.001	6	<0.001	<0.001	0	[NT]	[NT]
Benzo(g,h,i)perylene in TCLP	mg/L	0.001	Org-012/017	<0.001	6	<0.001	<0.001	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-012/017	88	6	95	83	13	81	88

QUALITY CONTROL: BTEX in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date extracted	-			25/11/2019	[NT]	[NT]	[NT]	[NT]	25/11/2019	[NT]
Date analysed	-			26/11/2019	[NT]	[NT]	[NT]	[NT]	26/11/2019	[NT]
Benzene	µg/L	1	Org-016	<1	[NT]	[NT]	[NT]	[NT]	122	[NT]
Toluene	µg/L	1	Org-016	<1	[NT]	[NT]	[NT]	[NT]	124	[NT]
Ethylbenzene	µg/L	1	Org-016	<1	[NT]	[NT]	[NT]	[NT]	118	[NT]
m+p-xylene	µg/L	2	Org-016	<2	[NT]	[NT]	[NT]	[NT]	119	[NT]
o-xylene	µg/L	1	Org-016	<1	[NT]	[NT]	[NT]	[NT]	118	[NT]
Surrogate Dibromofluoromethane	%		Org-016	103	[NT]	[NT]	[NT]	[NT]	100	[NT]
Surrogate toluene-d8	%		Org-016	99	[NT]	[NT]	[NT]	[NT]	101	[NT]
Surrogate 4-BFB	%		Org-016	107	[NT]	[NT]	[NT]	[NT]	101	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sam

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Report Comments

Asbestos: Excessive sample volume was provided for asbestos analysis. A portion of the supplied sample was sub-sampled according to Envirolab procedures. We cannot guarantee that this sub-sample is indicative of the entire sample. Envirolab recommends supplying 40-50g (50mL) of sample in its own container as per AS4964-2004.
Note: Samples 231315-6, 13, 16, 30, 32, 35, 38, 41, 43, 44, 45 were sub-sampled from bags provided by the client.

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SAMPLE RECEIPT ADVICE

Client Details

Client	Environmental Investigation Services
Attention	Katrina Taylor

Sample Login Details

Your reference	E32505BT, French Forest
Envirolab Reference	231315
Date Sample Received	18/11/2019
Date Instructions Received	18/11/2019
Date Results Expected to be Reported	26/11/2019

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	44 Soil, 1 Water, 1 Material
Turnaround Time Requested	3 days
Temperature on Receipt (°C)	18.1
Cooling Method	Ice Pack
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

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Analysis Underway, details on the following page:

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Sample ID	vTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Organochlorine Pesticides in soil	Organophosphorus Pesticides in Soil	PCBsin Soil	Acid Extractable metalsin soil	Asbestos ID - soils	Metals in TCLP USEPA1311	Naphthalene in TCLP	Acenaphthylene in TCLP	Acenaphthene in TCLP	Fluorene in TCLP	Phenanthrene in TCLP	Anthracene in TCLP	Fluoranthene in TCLP	Pyrene in TCLP	Benzo(a)anthracene in TCLP	Chrysene in TCLP	Benzo(bjk)fluoranthene in TCLP	Benzo(a)pyrene in TCLP	Indeno(1,2,3-c,d)pyrene - TCLP	Dibenzo(a,h)anthracene in TCLP	Benzo(g,h,i)perylene in TCLP	Total +vePAH's	Surrogate p-Terphenyl-d14	Asbestos ID - materials	BTEX in Water	On Hold
TP101-0-0.1	✓	✓	✓				✓																					
TP101-0.1-0.3																												✓
TP101-0.3-0.5																												✓
TP101-1.2-1.3																												✓
TP101-1.3-1..5																												✓
TP102-0-0.2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
TP102-0.2-0.5																												✓
TP102-0.9-1.1	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
TP103-0-0.2	✓	✓	✓				✓																							
TP103-0.3-0.5																												✓
TP103-0.8-1.0	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
TP104-0-0.1																												✓
TP104-0.1-0.3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
TP104-0.6-0.8																												✓
TP104-1.0-1.2																												✓
TP105-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
TP105-0.1-0.3																												✓
TP105-0.4-0.6																												✓
TP105-0.6-0.8	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
TP106 -0-0.2																												✓

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Sample ID	vTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Organochlorine Pesticides in soil	Organophosphorus Pesticides in Soil	PCBsin Soil	Acid Extractable metalsin soil	Asbestos ID - soils	Metals in TCLP USEPA1311	Naphthalene in TCLP	Acenaphthylene in TCLP	Acenaphthene in TCLP	Fluorene in TCLP	Phenanthrene in TCLP	Anthracene in TCLP	Fluoranthene in TCLP	Pyrene in TCLP	Benzo(a)anthracene in TCLP	Chrysene in TCLP	Benzo(bjk)fluoranthene in TCLP	Benzo(a)pyrene in TCLP	Indeno(1,2,3-c,d)pyrene - TCLP	Dibenzo(a,h)anthracene in TCLP	Benzo(g,h,i)perylene in TCLP	Total +vePAH's	Surrogate p-Terphenyl-d14	Asbestos ID - materials	BTEX in Water	On Hold
TP106 -0.5-0.7	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
TP107-0-0.2																													✓
TP107-0.8-1.0																													✓
TP107-1.1-1.3	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
DUPSW102	✓	✓	✓				✓																							
DUPSW103																														✓
DUPSW104																														✓
TBAM1	✓																													
FRAM1																												✓		
SP1-1	✓	✓	✓	✓	✓	✓	✓	✓																						
SP2-1																														✓
SP2-2	✓	✓	✓	✓	✓	✓	✓	✓																						
SP2-3																														✓
SP3-1																														✓
SP3-2	✓	✓	✓	✓	✓	✓	✓	✓																						
SP3-3																														✓
SP4-1																														✓
SP4-2	✓	✓	✓	✓	✓	✓	✓	✓																						
SP4-3																														✓
SP5-1																														✓

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Sample ID	vTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Organochlorine Pesticides in soil	Organophosphorus Pesticides in Soil	PCBsin Soil	Acid Extractable metalsin soil	Asbestos ID - soils	Metals in TCLP USEPA1311	Naphthalene in TCLP	Acenaphthylene in TCLP	Acenaphthene in TCLP	Fluorene in TCLP	Phenanthrene in TCLP	Anthracene in TCLP	Fluoranthene in TCLP	Pyrene in TCLP	Benzo(a)anthracene in TCLP	Chrysene in TCLP	Benzo(bjk)fluoranthene in TCLP	Benzo(a)pyrene in TCLP	Indeno(1,2,3-c,d)pyrene - TCLP	Dibenzo(a,h)anthracene in TCLP	Benzo(g,h,i)perylene in TCLP	Total +vePAH's	Surrogate p-Terphenyl-d14	Asbestos ID - materials	BTEX in Water	On Hold
SP5-2	✓	✓	✓	✓	✓	✓	✓	✓																				
SP5-3																												✓
SP6-1	✓	✓	✓	✓	✓	✓	✓	✓																				
SP7-1	✓	✓	✓	✓	✓	✓	✓	✓																				
SP8-1	✓	✓	✓	✓	✓	✓	✓	✓																				
AMF1-SP1																										✓		

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.

Requests for longer term sample storage must be received in writing.

Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.

TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

SAMPLE AND CHAIN OF CUSTODY FORM

TO:		FROM:
ENVIROLAB SERVICES PTY LTD 12 ASHLEY STREET CHATSWOOD NSW 2067 P: (02) 99106200 F: (02) 99106201 Attention: Aileen	EIS Job Number: E32505BT Date Results Required: 3 Days Page: 1	JKEnvironments REAR OF 115 WICKS ROAD MACQUARIE PARK, NSW 2113 P: 02-9888 5000 F: 02-9888 5001 Attention: Katrina Taylor

Location:	Frenchs Forest	Sample Preserved in Esky on Ice
Sampler:	AM/SW	Tests Required

Date Sampled	Lab Ref:	Sample Number	Depth (m)	Sample Container	PID	Sample Description	Combo 13a	Combo 13	Asbestos (Detection)	pH, CEC and clay content	Combo 3	BTEX
20.11.19	1	TP101	0-0.1	G, A	0.4	Fill: Gravelly Sand					X	
20.11.19	2	TP101	0.1-0.3	G, A	0	Fill: Gravelly Sand						
20.11.19	3	TP101	0.3-0.5	G, A	0	Fill: Silty Clay						
20.11.19	4	TP101	1.2-1.3	G, A	0	Fill: Silty Sand						
20.11.19	5	TP101	1.3-1..5	G, A	0	Silty Clay						
20.11.19	6	TP102	0-0.2	G, A	0	Fill: Silty Clay	X					
20.11.19	7	TP102	0.2-0.5	G, A	0	Fill: Silty Clay						
20.11.19	8	TP102	0.9-1.1	G, A	0	Silty Clay		X				
20.11.19	9	TP103	0-0.2	G, A	0.4	Fill: Silty Clay					X	
20.11.19	10	TP103	0.3-0.5	G, A	0	Fill: Silty Clay						
20.11.19	11	TP103	0.8-1.0	G, A	0	Silty Clay		X				
20.11.19	12	TP104	0-0.1	G, A	0	Fill: Silty Clay						
20.11.19	13	TP104	0.1-0.3	G, A	0	Fill: Silty Sandy Clay	X					
20.11.19	14	TP104	0.6-0.8	G, A	0	Fill: Silty Clay						
20.11.19	15	TP104	1.0-1.2	G, A	0	Silty Clay						
20.11.19	16	TP105	0-0.1	G, A	0	Fill: Silty Sand	X					
20.11.19	17	TP105	0.1-0.3	G, A	0	Fill: Silty Clay						
20.11.19	18	TP105	0.4-0.6	G, A	0	Fill: Silty Sand						
20.11.19	19	TP105	0.6-0.8	G, A	0	Silty Clay		X				
20.11.19	20	TP106	0-0.2	G, A	0	Fill: Silty Clay						
20.11.19	21	TP106	0.5-0.7	G, A	0	Silty Clay		X				
20.11.19	22	TP107	0-0.2	G, A	0	Fill: Gravelly Sand						
20.11.19	23	TP107	0.8-1.0	G, A	0	Fill: Silty Clay						
20.11.19	24	TP107	1.1-1.3	G, A	0	Silty Clay		X				
20.11.19	—	DUPSW101	-	G	-	DUP Soil					X	

ENVIROLAB

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

Job No: 231315
Date Received: 21/11/19
Time Received: 1454
Received by: SB
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

Remarks (comments/detection limits required):

Sample Containers:
G - 250mg Glass Jar
A - Ziplock Asbestos Bag
P - Plastic Bag

Relinquished By:	Date:	Time:	Received By:	Date:
		1454	SB	21/11/19

231315

SAMPLE AND CHAIN OF CUSTODY FORM

TO:		FROM:
ENVIROLAB SERVICES PTY LTD 12 ASHLEY STREET CHATSWOOD NSW 2067 P: (02) 99106200 F: (02) 99106201 Attention: Aileen	EIS Job Number: E32505BT Date Results Required: 3 Days Page: 2	JKEnvironments REAR OF 115 WICKS ROAD MACQUARIE PARK, NSW 2113 P: 02-9888 5000 F: 02-9888 5001 Attention: Katrina Taylor

Location:	Frenchs Forest						Sample Preserved in Esky on Ice											
Sampler:	AM/SW						Tests Required											
Date Sampled	Lab Ref:	Sample Number	Depth (m)	Sample Container	PID	Sample Description	Combo 13a	Combo 6a	Asbestos (Detection)	pH, CEC and clay content	Combo 3	BTEX						
20.11.19	25	DUPSW102	-	G	-	DUP Soil					X							
20.11.19	26	DUPSW103	-	G	-	DUP Soil												
20.11.19	27	DUPSW104	-	G	-	DUP Soil												
20.11.19	28	TBAM1	-	G	-	Trip Blank Soil						X						
20.11.19	29	FRAM1	-	2 x V	-	Field Rinsate						X						
20.11.19	30	SP1-1	-	G, A	0	Fill: Gravelly Sand		X										
20.11.19	31	SP2-1	-	G, A	0	Fill: Silty Sand												
20.11.19	32	SP2-2	-	G, A	0.2	Fill: Silty Sand		X										
20.11.19	33	SP2-3	-	G, A	0.1	Fill: Silty Sand												
20.11.19	34	SP3-1	-	G, A	0	Fill: Sandy Gravel												
20.11.19	35	SP3-2		G, A	0	Fill: Sandy Gravel		X										
20.11.19	36	SP3-3	-	G, A	0	Fill: Sandy Gravel												
20.11.19	37	SP4-1	-	G, A	0	Fill: Sandy Gravel												
20.11.19	38	SP4-2	-	G, A	0	Fill: Sandy Gravel		X										
20.11.19	39	SP4-3		G, A	0	Fill: Sandy Gravel												
20.11.19	40	SP5-1	-	G, A	0	Sand												
20.11.19	41	SP5-2	-	G, A	0	Sand		X										
20.11.19	42	SP5-3	-	G, A	0	Sand												
20.11.19	43	SP6-1		G, A	0	Fill: Sandy Gravel		X										
20.11.19	44	SP7-1	-	G, A	0.1	Fill: Gravelly Sand		X										
20.11.19	45	SP8-1	-	G, A	0.1	Fill: Gravelly Sand		X										
20.11.19	46	AMF1-SP1	-	A	-	Fragment			X									

Remarks (comments/detection limits required):	Sample Containers: G - 250mg Glass Jar A - Ziplock Asbestos Bag P - Plastic Bag

Relinquished By:	Date:	Time:	Received By:	Date:

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CERTIFICATE OF ANALYSIS 19090

Client Details

Client	JK Environments
Attention	Katrina Taylor
Address	PO Box 976, North Ryde BC, NSW, 1670

Sample Details

Your Reference	**E32505BT**
Number of Samples	1 Soil
Date samples received	26/11/2019
Date completed instructions received	26/11/2019

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Report Details

Date results requested by	27/11/2019
Date of Issue	27/11/2019

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Results Approved By
Chris De Luca, Operations Manager

Authorised By

Pamela Adams, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil		
Our Reference		19090-1
Your Reference	UNITS	DUPSW101
Date Sampled		20/11/2019
Type of sample		Soil
Date extracted	-	26/11/2019
Date analysed	-	27/11/2019
vTRH C_6 - C_9	mg/kg	<25
vTRH C_6 - C_{10}	mg/kg	<25
TRH C_6 - C_{10} less BTEX (F1)	mg/kg	<25
Benzene	mg/kg	<0.2
Toluene	mg/kg	<0.5
Ethylbenzene	mg/kg	<1
m+p-xylene	mg/kg	<2
o-Xylene	mg/kg	<1
Naphthalene	mg/kg	<1
Total +ve Xylenes	mg/kg	<1
Surrogate aaa-Trifluorotoluene	%	88

TRH Soil C10-C40 NEPM		
Our Reference	UNITS	19090-1
Your Reference		DUPSW101
Date Sampled		20/11/2019
Type of sample		Soil
Date extracted	-	26/11/2019
Date analysed	-	27/11/2019
TRH C_{10} - C_{14}	mg/kg	<50
TRH C_{15} - C_{28}	mg/kg	190
TRH C_{29} - C_{36}	mg/kg	730
Total +ve TRH (C10-C36)	mg/kg	920
TRH >C_{10} -C_{16}	mg/kg	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50
TRH >C_{16} -C_{34}	mg/kg	590
TRH >C_{34} -C_{40}	mg/kg	940
Total +ve TRH (>C10-C40)	mg/kg	1,500
Surrogate o-Terphenyl	%	90

PAHs in Soil		
Our Reference		19090-1
Your Reference	UNITS	DUPSW101
Date Sampled		20/11/2019
Type of sample		Soil
Date extracted	-	27/11/2019
Date analysed	-	27/11/2019
Naphthalene	mg/kg	<0.1
Acenaphthylene	mg/kg	0.1
Acenaphthene	mg/kg	<0.1
Fluorene	mg/kg	<0.1
Phenanthrene	mg/kg	0.2
Anthracene	mg/kg	<0.1
Fluoranthene	mg/kg	0.3
Pyrene	mg/kg	0.6
Benzo(a)anthracene	mg/kg	0.2
Chrysene	mg/kg	0.2
Benzo(b,j&k)fluoranthene	mg/kg	0.4
Benzo(a)pyrene	mg/kg	0.24
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1
Benzo(g,h,i)perylene	mg/kg	0.2
Total +ve PAH's	mg/kg	2.5
Benzo(a)pyrene TEQ calc (Zero)	mg/kg	<0.5
Benzo(a)pyrene TEQ calc (Half)	mg/kg	<0.5
Benzo(a)pyrene TEQ calc (PQL)	mg/kg	<0.5
Surrogate p-Terphenyl-d_{14}	%	104

Acid Extractable metals in soil		
Our Reference		19090-1
Your Reference	UNITS	DUPSW101
Date Sampled		20/11/2019
Type of sample		Soil
Date digested	-	27/11/2019
Date analysed	-	27/11/2019
Arsenic	mg/kg	<4
Cadmium	mg/kg	<0.4
Chromium	mg/kg	26
Copper	mg/kg	74
Lead	mg/kg	19
Mercury	mg/kg	<0.1
Nickel	mg/kg	20
Zinc	mg/kg	31

Moisture		
Our Reference		19090-1
Your Reference	UNITS	DUPSW101
Date Sampled		20/11/2019
Type of sample		Soil
Date prepared	-	26/11/2019
Date analysed	-	27/11/2019
Moisture	%	2.8

Method ID	Methodology Summary
Inorg-008	Moisture content determined by heating at 105 deg C for a minimum of 12 hours.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.
Metals-021 CV-AAS	Determination of Mercury by Cold Vapour AAS.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'EQ PQL'values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'EQ zero'values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'EQ half PQL'values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-014	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			26/11/2019	[NT]	[NT]	[NT]	[NT]	26/11/2019	[NT]
Date analysed	-			27/11/2019	[NT]	[NT]	[NT]	[NT]	27/11/2019	[NT]
vTRH C_6 - C_9	mg/kg	25	Org-016	<25	[NT]	[NT]	[NT]	[NT]	90	[NT]
vTRH C_6 - C_{10}	mg/kg	25	Org-016	<25	[NT]	[NT]	[NT]	[NT]	91	[NT]
Benzene	mg/kg	0.2	Org-016	<0.2	[NT]	[NT]	[NT]	[NT]	76	[NT]
Toluene	mg/kg	0.5	Org-016	<0.5	[NT]	[NT]	[NT]	[NT]	96	[NT]
Ethylbenzene	mg/kg	1	Org-016	<1	[NT]	[NT]	[NT]	[NT]	89	[NT]
m+p-xylene	mg/kg	2	Org-016	<2	[NT]	[NT]	[NT]	[NT]	95	[NT]
o-Xylene	mg/kg	1	Org-016	<1	[NT]	[NT]	[NT]	[NT]	94	[NT]
Naphthalene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-016	94	[NT]	[NT]	[NT]	[NT]	93	[NT]

QUALITY CONTROL: TRH Soil C10-C40 NEPM					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			26/11/2019	[NT]	[NT]	[NT]	[NT]	26/11/2019	[NT]
Date analysed	-			27/11/2019	[NT]	[NT]	[NT]	[NT]	27/11/2019	[NT]
TRH C_{10} - C_{14}	mg/kg	50	Org-003	<50	[NT]	[NT]	[NT]	[NT]	84	[NT]
TRH C_{15} - C_{28}	mg/kg	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	82	[NT]
TRH C_{29} - C_{36}	mg/kg	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	93	[NT]
TRH >C_{10} -C_{16}	mg/kg	50	Org-003	<50	[NT]	[NT]	[NT]	[NT]	84	[NT]
TRH >C_{16} -C_{34}	mg/kg	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	82	[NT]
TRH >C_{34} -C_{40}	mg/kg	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	93	[NT]
Surrogate o-Terphenyl	%		Org-003	86	[NT]	[NT]	[NT]	[NT]	83	[NT]

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			27/11/2019	[NT]	[NT]	[NT]	[NT]	27/11/2019	[NT]
Date analysed	-			27/11/2019	[NT]	[NT]	[NT]	[NT]	27/11/2019	[NT]
Naphthalene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	110	[NT]
Acenaphthylene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	106	[NT]
Acenaphthene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	104	[NT]
Phenanthrene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	102	[NT]
Anthracene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	110	[NT]
Pyrene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	100	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	122	[NT]
Benzo(b,j&k)fluoranthene	mg/kg	0.2	Org-012	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-012	<0.05	[NT]	[NT]	[NT]	[NT]	96	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate p-Terphenyl-d_{14}	%		Org-012	94	[NT]	[NT]	[NT]	[NT]	98	[NT]

QUALITY CONTROL: Acid Extractable metals in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date digested	-			27/11/2019	[NT]	[NT]	[NT]	[NT]	27/11/2019	[NT]
Date analysed	-			27/11/2019	[NT]	[NT]	[NT]	[NT]	27/11/2019	[NT]
Arsenic	mg/kg	4	Metals-020 ICP-AES	<4	[NT]	[NT]	[NT]	[NT]	119	[NT]
Cadmium	mg/kg	0.4	Metals-020 ICP-AES	<0.4	[NT]	[NT]	[NT]	[NT]	116	[NT]
Chromium	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	[NT]	[NT]	113	[NT]
Copper	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	[NT]	[NT]	115	[NT]
Lead	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	[NT]	[NT]	109	[NT]
Mercury	mg/kg	0.1	Metals-021 CV-AAS	<0.1	[NT]	[NT]	[NT]	[NT]	93	[NT]
Nickel	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	[NT]	[NT]	114	[NT]
Zinc	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	[NT]	[NT]	115	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Envirolab Services Pty Ltd
ABN 37 112 535 645 - 002
25 Research Drive Croydon South VIC 3136
ph 03 9763 2500 fax 03 9763 2633
melbourne@envirolab.com.au
www.envirolab.com.au

SAMPLE RECEIPT ADVICE

Client Details

Client	JK Environments
Attention	Katrina Taylor

Sample Login Details

Your reference	E32505BT
Envirolab Reference	19090
Date Sample Received	26/11/2019
Date Instructions Received	26/11/2019
Date Results Expected to be Reported	27/11/2019

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	1 Soil
Turnaround Time Requested	24hr
Temperature on Receipt (°C)	13.0
Cooling Method	Ice Pack
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Pamela Adams	Analisa Mathrick
Phone: 03 9763 2500	**Phone: 03 9763 2500**
Fax: 03 9763 2633	**Fax: 03 9763 2633**
Email: padams@envirolab.com.au	**Email: amathrick@envirolab.com.au**

Analysis Underway, details on the following page:

Envirolab Services Pty Ltd
ABN 37 112 535 645 - 002
25 Research Drive Croydon South VIC 3136
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Sample ID	vTRH(C6-C10)/BTEXN in Soil	TRH Soil C10-C40 NEPM	PAHs in Soil	Acid Extractable metalsin soil
DUPSW101	✓	✓	✓	✓

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.
Requests for longer term sample storage must be received in writing.
Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.

SAMPLE AND CHAIN OF CUSTODY FORM

TO:		FROM:
ENVIROLAB SERVICES PTY LTD 12 ASHLEY STREET CHATSWOOD NSW 2067 P: (02) 99106200 F: (02) 99106201 Attention: Aileen	EIS Job Number: E32505BT Date Results Required: 3 Days Page: 1	JKEnvironments REAR OF 115 WICKS ROAD MACQUARIE PARK, NSW 2113 P: 02-9888 5000 F: 02-9888 5001 Attention: Katrina Taylor

Location:	Frenchs Forest	Sample Preserved in Esky on Ice
Sampler:	AM/SW	Tests Required

Date Sampled	Lab Ref:	Sample Number	Depth (m)	Sample Container	PID	Sample Description	Combo 13a	Combo 13	Asbestos (Detection)	pH, CEC and clay content	Combo 3	BTEX
20.11.19	1	TP101	0-0.1	G, A	0.4	Fill: Gravelly Sand					X	
20.11.19	2	TP101	0.1-0.3	G, A	0	Fill: Gravelly Sand						
20.11.19	3	TP101	0.3-0.5	G, A	0	Fill: Silty Clay						
20.11.19	4	TP101	1.2-1.3	G, A	0	Fill: Silty Sand						
20.11.19	5	TP101	1.3-1..5	G, A	0	Silty Clay						
20.11.19	6	TP102	0-0.2	G, A	0	Fill: Silty Clay	X					
20.11.19	7	TP102	0.2-0.5	G, A	0	Fill: Silty Clay						
20.11.19	8	TP102	0.9-1.1	G, A	0	Silty Clay		X				
20.11.19	9	TP103	0-0.2	G, A	0.4	Fill: Silty Clay					X	
20.11.19	10	TP103	0.3-0.5	G, A	0	Fill: Silty Clay						
20.11.19	11	TP103	0.8-1.0	G, A	0	Silty Clay		X				
20.11.19	12	TP104	0-0.1	G, A	0	Fill: Silty Clay						
20.11.19	13	TP104	0.1-0.3	G, A	0	Fill: Silty Sandy Clay	X					
20.11.19	14	TP104	0.6-0.8	G, A	0	Fill: Silty Clay						
20.11.19	15	TP104	1.0-1.2	G, A	0	Silty Clay						
20.11.19	16	TP105	0-0.1	G, A	0	Fill: Silty Sand	X					
20.11.19	17	TP105	0.1-0.3	G, A	0	Fill: Silty Clay						
20.11.19	18	TP105	0.4-0.6	G, A	0	Fill: Silty Sand						
20.11.19	19	TP105	0.6-0.8	G, A	0	Silty Clay		X				
20.11.19	20	TP106	0-0.2	G, A	0	Fill: Silty Clay						
20.11.19	21	TP106	0.5-0.7	G, A	0	Silty Clay		X				
20.11.19	22	TP107	0-0.2	G, A	0	Fill: Gravelly Sand						
20.11.19	23	TP107	0.8-1.0	G, A	0	Fill: Silty Clay						
20.11.19	24	TP107	1.1-1.3	G, A	0	Silty Clay		X				
20.11.19	—	DUPSW101	-	G	-	DUP Soil					X	

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

Job No: 231315
Date Received: 21/11/19
Time Received: 1454
Received by: SB
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

Relinquished by: ELS/JKE
CLAIRE MCKENZIE
25/11/19 1200
Claire McKenzie.

Envirolab Services
25 Research Drive
Croydon South VIC 3136
Ph: (03) 9763 2500

Job No: 190891090
Date Received: 26/11/19
Time Received: 12:50 pm
Received By: KS
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

13.0°C

Remarks (comments/detection limits required):

Sample Containers:
G - 250mg Glass Jar
A - Ziplock Asbestos Bag
P - Plastic Bag

Relinquished By:	Date:	Time:	Received By:	Date:
		1454	SB	21/11/19

Appendix F: Report Explanatory Notes

Standard Sampling Procedure

These protocols specify the basic procedures to be used when sampling soils or groundwater for environmental site assessments undertaken by JKE. The purpose of these protocols is to provide standard methods for: sampling, decontamination procedures for sampling equipment, sample preservation, sample storage and sample handling. Deviations from these procedures must be recorded.

A. Soil Sampling

- Prepare a borehole/test pit log or made a note of the sample description for stockpiles.
- Layout sampling equipment on clean plastic sheeting to prevent direct contact with ground surface. The work area should be at a distance from the drill rig/excavator such that the machine can operate in a safe manner.
- Ensure all sampling equipment has been decontaminated prior to use.
- Remove any surface debris from the immediate area of the sampling location.
- Collect samples and place in glass jar with a Teflon seal. This should be undertaken as quickly as possible to prevent the loss of any volatiles. If possible, fill the glass jars completely.
- Collect samples for asbestos analysis and place in a zip-lock plastic bag.
- Label the sampling containers with the JKE job number, sample location (eg. BH1), sampling depth interval and date. If more than one sample container is used, this should also be indicated (eg. 2 = Sample jar 1 of 2 jars).
- Photoionisation detector (PID) screening of volatile organic compounds (VOCs) should be undertaken on samples using the soil sample headspace method. Headspace measurements are taken following equilibration of the headspace gasses in partly filled zip-lock plastic bags. PID headspace data is recorded on the borehole/test pit log and the chain of custody forms.
- Record the lithology of the sample and sample depth on the borehole/test pit log generally in accordance with AS1726-2017[12].
- Store the sample in a sample container cooled with ice or chill packs. On completion of the sampling the sample container should be delivered to the lab immediately or stored in the refrigerator prior to delivery to the lab. All samples are preserved in accordance with the standards outlined in the report.
- Check for the presence of groundwater after completion of each borehole using an electronic dip metre or water whistle. Boreholes should be left open until the end of fieldwork where it is safe to do so. All groundwater levels in the boreholes should be rechecked on the completion of the fieldwork.
- Backfill the boreholes/test pits with the excavation cuttings or clean sand prior to leaving the site.

B. Decontamination Procedures for Soil Sampling Equipment

- All sampling equipment should be decontaminated between every sampling location. This excludes single use PVC tubing used for push tubes etc. Equipment and materials required for the decontamination include:
  - Phosphate free detergent (Decon 90);
  - Potable water;
  - Stiff brushes; and
  - Plastic sheets.
- Ensure the decontamination materials are clean prior to proceeding with the decontamination.
- Fill both buckets with clean potable water and add phosphate free detergent to one bucket.
- In the bucket containing the detergent, scrub the sampling equipment until all the material attached to the equipment has been removed.
- Rinse sampling equipment in the bucket containing potable water.

[12] Standards Australia, (2017), *Geotechnical Site Investigations.* (AS1726-2017)

- Place cleaned equipment on clean plastic sheets.

If all materials are not removed by this procedure, high-pressure water cleaning is recommended. If any equipment is not completely decontaminated by both these processes, then the equipment should not be used until it has been thoroughly cleaned.

QA/QC Definitions

The QA/QC terms used in this report are defined below. The definitions are in accordance with US EPA publication SW-846, entitled *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (1994)[13] methods and those described in *Environmental Sampling and Analysis, A Practical Guide,* (1991)[14]. The NEPM (2013) is consistent with these documents.

A. Practical Quantitation Limit (PQL), Limit of Reporting (LOR) & Estimated Quantitation Limit (EQL)

These terms all refer to the concentration above which results can be expressed with a minimum 95% confidence level. The laboratory reporting limits are generally set at ten times the standard deviation for the Method Detection Limit for each specific analyte. For the purposes of this report the LOR, PQL, and EQL are considered to be equivalent.

When assessing laboratory data it should be borne in mind that values at or near the PQL have two important limitations: *"The uncertainty of the measurement value can approach, and even equal, the reported value. Secondly, confirmation of the analytes reported is virtually impossible unless identification uses highly selective methods. These issues diminish when reliably measurable amounts of analytes are present. Accordingly, legal and regulatory actions should be limited to data at or above the reliable detection limit*" (Keith, 1991).

B. Precision

The degree to which data generated from repeated measurements differ from one another due to random errors. Precision is measured using the standard deviation or Relative Percent Difference (RPD).

C. Accuracy

Accuracy is a measure of the agreement between an experimental result and the true value of the parameter being measured (i.e. the proximity of an averaged result to the true value, where all random errors have been statistically removed). The assessment of accuracy for an analysis can be achieved through the analysis of known reference materials or assessed by the analysis of surrogates, field blanks, trip spikes and matrix spikes. Accuracy is typically reported as percent recovery.

D. Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represents a characteristic of a population, parameter variations at a sampling point, or an environmental condition. Representativeness is primarily dependent upon the design and implementation of the sampling program. Representativeness of the data is partially ensured by the avoidance of contamination, adherence to sample handing and analysis protocols and use of proper chain-of-custody and documentation procedures.

E. Completeness

Completeness is a measure of the number of valid measurements in a data set compared to the total number of measurements made and overall performance against DQIs. The following information is assessed for completeness:

- Chain-of-custody forms;
- Sample receipt form;
- All sample results reported;

[13] US EPA, (1994). *SW-846: Test Methods for Evaluating Solid Waste, Physical/Chemical Methods.* (US EPA SW-846)

[14] Keith., H, (1991). *Environmental Sampling and Analysis, A Practical Guide*

- All blank data reported;
- All laboratory duplicate and RPDs calculated;
- All surrogate spike data reported;
- All matrix spike and lab control spike (LCS) data reported and RPDs calculated;
- Spike recovery acceptable limits reported; and
- NATA stamp on reports.

F. Comparability

Comparability is the evaluation of the similarity of conditions (e.g. sample depth, sample homogeneity) under which separate sets of data are produced. Data comparability checks include a bias assessment that may arise from the following sources:

- Collection and analysis of samples by different personnel; Use of different techniques;
- Collection and analysis by the same personnel using the same methods but at different times; and
- Spatial and temporal changes (due to environmental dynamics).

G. Blanks

The purpose of laboratory and field blanks is to check for artefacts and interferences that may arise during sampling, transport and analysis.

H. Matrix Spikes

Samples are spiked with laboratory grade standards to detect interactive effects between the sample matrix and the analytes being measured. Matrix Spikes are reported as a percent recovery and are prepared for 1 in every 20 samples. Sample batches that contain less than 20 samples may be reported with a Matrix Spike from another batch. The percent recovery is calculated using the formula below. Acceptable recovery limits are 70% to 130%.

$$\frac{\text{(Spike Sample Result – Sample Result) x 100}}{\text{Concentration of Spike Added}}$$

I. Surrogate Spikes

Samples are spiked with a known concentration of compounds that are chemically related to the analyte being investigated but unlikely to be detected in the environment. The purpose of the Surrogate Spikes is to check the accuracy of the analytical technique. Surrogate Spikes are reported as percent recovery.

J. Duplicates

Laboratory duplicates measure precision, expressed as Relative Percent Difference. Duplicates are prepared from a single field sample and analysed as two separate extraction procedures in the laboratory. The RPD is calculated using the formula where D1 is the sample concentration and D2 is the duplicate sample concentration:

$$\frac{(D1 - D2) \times 100}{\{(D1 + D2)/2\}}$$

Appendix G: Data (QA/QC) Evaluation

Data (QA/QC) Evaluation

A. INTRODUCTION

This Data (QA/QC) Evaluation forms part of the validation process for the DQOs documented in Section 4.1 of this report. Checks were made to assess the data in terms of precision, accuracy, representativeness, comparability and completeness. These 'PARCC' parameters are referred to collectively as DQIs and are defined in the Report Explanatory Notes attached in the report appendices.

1. Field and Laboratory Considerations

The quality of the analytical data produced for this project has been considered in relation to the following:

- Sample collection, storage, transport and analysis;
- Laboratory PQLs;
- Field QA/QC results; and
- Laboratory QA/QC results.

2. Field QA/QC Samples and Analysis

A summary of the field QA/QC samples collected and analysed for this assessment is provided in the following table:

Sample Type	Sample Identification	Frequency (of Sample Type)	Analysis Performed
Intra-laboratory duplicate (soil)	DUPSW102 (primary sample TP102 0.0-0.2m)	Approximately 6% of primary samples	Heavy metals, TRH/BTEX and PAHs
Inter-laboratory duplicate (soil)	DUPSW101 (primary sample TP101 0.0-0.1m)	Approximately 6% of primary samples	Heavy metals, TRH/BTEX and PAHs
Trip blank (soil)	TBAM1 (20 November 2019)	One for the assessment to demonstrate adequacy of storage and transport methods	BTEX
Rinsate (soil excavator bucket)	FRAM1 (20 November 2019)	One for the assessment to demonstrate adequacy of decontamination methods	TRH/BTEX

The results for the field QA/QC samples are detailed in the laboratory summary tables (Table I1 to Table K inclusive) attached to the assessment report and are discussed in the subsequent sections of this Data (QA/QC) Evaluation report.

3. Data Assessment Criteria

JKE adopted the following criteria for assessing the field and laboratory QA/QC analytical results:

Field Duplicates

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

Field/Trip Blanks and Rinsates

Acceptable targets for blank and rinsate samples in this report will be less than the PQL for organic analytes. Metals will be considered on a case-by-case basis with regards to typical background concentrations in soils and published drinking water guidelines for waters.

Laboratory QA/QC

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

A summary of the acceptable limits adopted by the primary laboratory (Envirolab) is provided below:

RPDs

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

Laboratory Control Samples (LCS) and Matrix Spikes

- 70-130% recovery acceptable for metals and inorganics;
- 60-140% recovery acceptable for organics; and
- 10-140% recovery acceptable for VOCs.

Surrogate Spikes

- 60-140% recovery acceptable for general organics; and
- 10-140% recovery acceptable for VOCs.

Method Blanks

- All results less than PQL.

B. DATA EVALUATION

1. Sample Collection, Storage, Transport and Analysis

Samples were collected by trained field staff in accordance with the JKE SSP. The SSP was developed to be consistent with relevant guidelines, including NEPM (2013) and other guidelines made under the CLM Act 1997.

Appropriate sample preservation, handling and storage procedures were adopted. Laboratory analysis was undertaken within generally specified holding times in accordance with Schedule B(3) of NEPM (2013) and the laboratory NATA accredited methodologies.

JKE note that the temperature on receipt of soil samples was reported to be up to 18.1°C. JKE understand that the temperature is measured at the laboratory using an infrared temperature probe by scanning the outside of the sample container (i.e. one sample jar/container at the time of registering the samples). This procedure is not considered to be robust as there is a potential for the outside of the jar to warm to ambient temperature, or at least to increase from that of the internal contents, relatively quickly. On this basis, JKE are of the opinion that the temperatures reported on the Sample Receipts are unlikely to be reliable or representative of the overall batch.

Review of the project data also indicated that:

- COC documentation was adequately maintained;
- Sample receipt advice documentation was provided for all sample batches;
- All analytical results were reported; and
- Consistent units were used to report the analysis results.

2. Laboratory PQLs

Appropriate PQLs were adopted for the analysis and all PQLs were below the SAC.

3. Field QA/QC Sample Results

Field Duplicates

The results indicated that field precision was acceptable. RPD non-conformances were reported for some analytes as discussed below:

- Elevated RPDs were reported for chromium, copper and several PAH compounds in DUPSW102/TP102 (0.0-0.2m); and
- Elevated RPDs were reported for chromium, copper, lead and nickel in DUPSW101/TP101 (0.0-0.1m).

Values outside the acceptable limits have been attributed to sample heterogeneity and the difficulties associated with obtaining homogenous duplicate samples of heterogeneous matrices. There is a higher risk of RPDs being outside of the acceptable limit when there are small differences in the measured concentrations in the primary and duplicate sample. Small differences can in the measured concentrations can have a disproportionate impact on the RPD. As both the primary and duplicate sample results were less than the SAC, the exceedances are not considered to have had an adverse impact on the data set as a whole.

Field/Trip Blanks

During the investigation, one soil trip blank was placed in the esky during sampling and transported back to the laboratory. The results were all less than the PQLs, therefore cross contamination between samples that may have significance for data validity did not occur.

Rinsates

All results were below the PQL. This indicated that cross-contamination artefacts associated with sampling equipment were not present and the potential for cross-contamination to have occurred was low.

4. Laboratory QA/QC

The analytical methods implemented by the laboratory were performed in accordance with their NATA accreditation and were consistent with Schedule B(3) of NEPM (2013). The frequency of data reported for the laboratory QA/QC (i.e. duplicates, spikes, blanks, LCS) was considered to be acceptable for the purpose of this assessment.

C. DATA QUALITY 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.

Appendix H: Guidelines and Reference Documents

Canadian Council of Ministers of the Environment, (1999). Canadian soil quality guidelines for the protection of environmental and human health: Benzo(a)Pyrene (1997)

CRC Care, (2011). Technical Report No. 10 – Health screening levels for hydrocarbons in soil and groundwater Part 1: Technical development document

Contaminated Land Management Act 1997 (NSW)

Department of Land and Water Conservation, (1997). 1:25,000 Acid Sulfate Soil Risk Map Series

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

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