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THE TRUSTEE FOR MHA PBR ANNANDALE UNIT TRUST

Acid Sulfate Soil Management Plan

122-128 & 130 Pyrmont Bridge Road and 206 Parramatta Road, Annandale NSW

E25196.E14_Rev0
16 June 2021

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1. Introduction

1.1 Background

EI Australia (EI) was engaged by The Trustee for MHA PBR Annandale Unit Trust to prepare an Acid Sulfate Soils Management Plan (ASSMP) for the property located at 122-128 & 130 Pyrmont Bridge Road and 206 Parramatta Road, Annandale NSW ('the site'). This report has been prepared to assist with management of acid sulfate soils (ASS), should it be encountered during the proposed redevelopment of the site and will be submitted in support of a Development Application (DA) to Inner West Council.

As shown in **Figure 1** and **Figure 2**, the site covers an area of 2,623 m^2 and is located about 4 km south-west of the Sydney central business district, within the Local Government Area of the Inner West Council. The site is further identified as Lot 1 in DP 539271, Lot 100 DP1101482, Lots 3/1, 4/1, 5/1, 6/1 and 12 in DP 976387.

1.2 Proposed Development

The following documents, supplied by the Client, were used to assist with the preparation of this report:

- Architectural drawings prepared by BVN (2021) Camperdown Medical Facility – Urban Design Report, dated May 2021 (Drawing No. AR-D-XX-00, Issue B, BVN Project Number s1611019, dated 11 May 2021).

Based on the provided documents, EI understands that the proposed development involves the demolition of the existing site structures and the construction of an eight-storey medical facility building overlying two basement levels. The lowest basement level is proposed to have a Finished Floor Level (FFL) of RL +6.47m. A Bulk Excavation Level (BEL) of RL +6.17mAHD is assumed, which includes allowance for the construction of the basement slab. Locally deeper excavations may be required for footings, lift overrun pits, crane pads, and service trenches.

1.3 Project Objectives

The objective of this ASSMP is to provide the framework for the management and monitoring of the impacts of Acid Sulfate Soils (ASS), throughout the construction and operation phases of the project, in accordance with the *Acid Sulfate Soils Manual* (ASSMAC, 1998).

1.4 Scope of Works

To achieve the above objectives, the scopes of works are as follows:

- A description of the soil attributes of the site;
- A description of the potential impacts caused by the proposed construction activities;
- A description of the measures and procedures to be undertaken in the ASS area which when implemented will prevent, control or minimise the generation or escape of acid leachate into the surrounding environment;
- A focussed monitoring program covering soils, surface waters, and groundwater;
- A description of the contingency procedures to be implemented in the case of failure of management procedures; and
- A record of consultation with co-ordinating authorities.

2. Desktop Review

2.1 Property Identification, Location and Physical Setting

The site identification details and associated information are presented in **Table 2-1**, while the site locality is shown in **Figure 1**.

Table 2-1 Site Identification, Location and Zoning

Attribute	Description
Street Address	122-128 & 130 Pyrmont Bridge Road and 206 Parramatta Road, Annandale NSW
Location Description	The site is an irregular shaped block bounded by Pyrmont Bridge Road and Parramatta Road to the south followed by commercial properties, Commercial properties to the north, east and west Approximate coordinates for the south-western corner (datum GDA2020-MGA56): Easting: 331075.701 Northing: 6248842.427 (Source: http://maps.six.nsw.gov.au).
Site Area	Approximately 1,086.4 m^2
Lots and Deposited Plans (DPs)	Lot 1 in DP 539271, Lot 100 DP1101482, Lots 3/1, 4/1, 5/1, 6/1 and 12 in DP 976387.
Local Government Authority	Inner West Council
Current Zoning	IN2– Light Industrial (Leichhardt Local Environment Plan 2013)
Brief Site Description	The site is an irregular shape block of land, which is occupied by commercial / industrial warehouses. Hardstand concrete is expected to cover a vast majority of the site.

2.2 Regional Setting

Local topography, geology, soil landscape and hydrogeological information are summarised in **Table 2-2**.

Table 2-2 Topographical, Geological, Soil Landscape and Hydrogeological Information

Attribute	Description
Topography	The site is relative flat, with a slight incline dipping west with an elevation of approximately 16 m AHD to the east to 15 m AHD to the west.
Site Drainage	Main drainage pathway for stormwater on site is anticipated to be overland flow to the various stormwater pits and strip gutters present within the site and on nearby streets, which then discharge to the municipal stormwater system.
Regional Geology	Information on regional sub-surface conditions, referenced from the Department of Mineral Resources Geological Map Sydney 1:100,000 Geological Series Sheet indicates that the site is within Triassic-aged (Rh) which typically comprises of medium to coarse grained quartz sandstone, with very minor shale and laminate lenses (Hawksbury Sandstone).
Soil Landscape	The Soil Conservation Service of NSW Soil Landscapes of the Sydney

Attribute	Description
	1:100,000 Sheet (Chapman and Murphy, 1989) indicates that the site overlies Gymea (gy) erosional soils The Gymea landscape typically includes undulating to rolling rises and low hills on the Hawksbury sandstone. Local relief 20-80m, slopes 10-25% and rock outcrop <25%. The Gymea soils typically include shallow to moderately deep (30-100 cm) Yellow Earths and Earth Sands on crests and inside of beaches. Siliceous Sands in leading edges of beaches, localised Gleyed Pozolic soils and yellow Pozolic soils on shale lenses.
Soil Profile	Based on a review of the previous geotechnical investigations (JK Environment 2021), the subsurface strata typically comprises: ▪ Fill: sand, silty sand and gravelly silty sand with inclusions of igneous and sandstone gravels, concrete fragments and clay nodules extending to a depths of approximately 0.3 – 0.6 m Below ground Level (BGL) ▪ Residual soils (Natural): Silty sandy clay below fill in discrete locations; and ▪ Sandstone bedrock (Hawksbury sandstone) at depths of 0.3 – 0.8 m BGL.
Depth to Groundwater	Groundwater was not encountered during the drilling of boreholes (JK Environments, 2021).
Nearest Surface Water Feature	Sydney Harbour, located approximately 1.66 km north of the site, forms the nearest receiving surface water body in relation to the site.
Anticipated Groundwater Flow Direction	Groundwater flow direction in the vicinity of the site is inferred to be in a northern direction, generally towards Sydney Harbour.

2.3 Acid Sulfate Soils

Acid Sulfate Soils (ASS) are naturally occurring sediments containing iron sulphides. Sediments containing ASS may have been deposited in estuarine conditions previously existing in the general area of the subject site. As ASS comprise natural geological materials, their occurrence is not related to site boundaries or anthropogenic contamination, but rather extend across areas/regions previously suitable for their deposition.

When ASS are exposed to air (e.g. due to bulk excavation or dewatering), oxygen reacts with iron sulphides in the sediment, producing sulphuric acid. This acid can sometimes be produced in large quantities and drain into waterways causing severe short and long term socio-economic and environmental impacts, including damage to manmade structures and natural ecosystems.

ASS can either be classified as actual acid sulphate soils (AASS) within which are materials that have already reacted with oxygen to produce acid, or potential acid sulfate soils (PASS) with which are materials that contain iron sulphide, but have not been exposed to oxygen (e.g. soils below the water table) and therefore have not produced sulphuric acid (although they have the potential to do so).

2.4 Acid Sulfate Soil Risk Map

With reference to the Leichhardt Bay Acid Sulfate Soil Risk Map (1:25,000 scale; Murphy, 1997), the subject land lies within the map class description of disturbed terrain, greater than 4 m below the ground surface.

The Rockdale LEP 2013 Acid Sulfate Soils Map shows that the site lies within an area mapped as “Class 3 and 5 Acid Sulfate Soils”. JK Environments (2021) borehole logs identified shallow bedrock situated almost directly beneath the fill materials identified, with the exception of residual natural soils present within BH2. No marine sediments or other indications of ASS were identified by JK Environments (2021), thus the probability of encountering ASS within the site is considered extremely low.

3. Acid Sulfate Soil Management

3.1 Additional Investigation

Due to the limited access to site soils, an additional investigation is required following demolition works to ensure ASSs are not present within site soils. Soil materials onsite will be assessed for acid sulfate soils through pH (field) and pH (fox) analysis as a preliminary indicator. If the preliminary screening results are indicative of acid sulfate soils, supplementary assessment will be conducted by the Chromium Reducible Sulfur (S_{CR}) and/or Suspension Peroxide Oxidation Combined Acidity and Sulphate (SPOCAS) analytical method, which will determine ASS risk, and establish required rates of liming for neutralisation purpose.

Soil and/or sediment samples should be collected at 0.5 m increments and at recognised soil horizon changes during advancement. Sampling will be conducted 1.0m below the maximum depth of excavation or until bedrock is encountered. Soils should be assessed in the field with regard to indicators of ASS by an experienced and qualified Environmental Scientist / Engineer. Such indicators may include some or all of the following:

- Dark blue/grey (sometimes black) clays/sands;
- Mottled or blotched yellow colouring within natural soils;
- Remnants of plants/grasses/shells within natural soils;
- A ‘rotten eggs’ type odour may emit from the soils; and
- A field pH of <4.0.

3.1.1 Action Criteria

ASSMAC (1998) provides action criteria that trigger management requirements for ASS, and these action criteria are broken down into three broad texture categories, as identified in **Table 3-1**. For this site, the action criteria for disturbance of more than 1000 tonnes of coarse textured materials are to be adopted.

Table 3-1 Summary of ASSMAC (1998) Action Criteria

Texture	Approximate Clay Content	Sulphur Trail (Spos%)	Acid Trail TPA /TSA (Mol H+/tonne)
< 1000 Tonnes of Material Disturbed			
Coarse Texture Sands to Loamy Sands	<5.0%	0.03	18
Medium Texture Sandy Loams to Light Clays	5-40%	0.06	36
Fine Texture Medium to Heavy Clays and Silty Clays	>40%	0.1	62
> 1000 Tonnes of Material Disturbed			

Texture	Approximate Clay Content	Sulphur Trail (Spos%)	Acid Trail TPA /TSA (Mol H+/tonne)
Coarse Texture Sands to Loamy Sands	<5.0%	0.03	18
Medium Texture Sandy Loams to Light Clays	5-40%	0.03	18
Fine Texture Medium to Heavy Clays and Silty Clays	>40%	0.03	18

For environmental protection purposes, the highest result from either the sulfur or the acid trail are to be used to confirm the presence of ASS (i.e. to determine if further action, or management, is required), unless mitigating factors apply (e.g. the quantity, fineness and reactivity of neutralising material, such as shell).

Following collection and interpretation of the additional ASS information, handling and management measures described in the following sections should be reviewed and amended by the environmental consultant to ensure that most satisfactory methods are proposed for soil disturbance works.

3.2 Extent of Soil Disturbance during Proposed Redevelopment

It is understood that the site redevelopment involves the demolition of the existing site structures and the construction of an eight-storey medical building overlying double level basement levels.

The following activities may therefore have an impact on PASS (should it be present):

- Disturbance or exposure of soils and sediments during bulk (basement) excavation;
- Piling works; and
- Localised groundwater dewatering.

3.3 Potential Environmental Impacts

The site lies within disturbed terrain and a Class 3 & 5 ASS area. EI consider there is a risk of encountering actual ASS (AASS) and / or potential ASS (PASS) in deeper soils, and further investigation is required to identify ASS on site.

Soils identified as ASS will require appropriate management (see **Section 3.4** to **Section 3.7**) to minimise environmental impacts that are likely caused by soil and groundwater disturbance during the construction activities.

Soil management options commonly adopted for ASS comprise (WA DER, 2015):

- Avoidance, or minimisation of ASS disturbance;
- Soil neutralisation (typically with lime);
- Strategic reburial under water; and
- Off-site ASS treatment and disposal.

The following issues will need to be considered during construction in a potential ASS environment:

- Exposure and oxidation of excavated (stockpiled) material and generation of acid leachate;
- Release of acidic surface and groundwater(s) during the excavation; and
- Ongoing oxidation of excess ASS generated by excavations and consequential generation of acidic groundwater.

The extent of any associated adverse impacts will depend on the following factors:

- Volume of excavated soil identified as being ASS;
- Physical characteristics of the ASS, such as grain size and natural buffering capacity;
- Time that ASS are exposed to air; and
- Rate of oxidation and transport of the oxidation products.

Effective control of these potential impacts will rely on adequate identification and appropriate management, including a monitoring program. An effective monitoring program, combined with planned maintenance and appropriate contingencies, will ensure there is no incremental contribution of acid leachates during construction.

Should ASS be identified in materials to be excavated, all disturbed ASS should either be neutralised and disposed off-site to a licensed facility, or disposed to a licensed waste handling facility and placed below the water table. Management and treatment requirements are further discussed in **Section 3.4** to **Section 3.7**. No ASS should be used for structural or general filling above the groundwater table without prior neutralisation and validation of successful neutralisation.

Inadequate identification, management, and monitoring will result in detectable incremental impacts. Many aquatic and marine organisms are extremely sensitive to acid drainage; as a result, the acid leachates released may have serious environmental impacts including:

- Aluminium and iron dissolved in acid leachates can be poisonous to both aquatic and terrestrial life forms;
- Sulfate salts released can increase the salinity of freshwater; and
- Acidic sediment may “fix” phosphates and other nutrients which prevents their uptake by plants.

3.4 Disposal of Potential Acid Sulfate Soils below the Water Table

In accordance with the EPA (2014) *Waste Classification Guidelines Part 4: Acid Sulfate Soils*, potential ASS may be disposed of in water below the permanent water table, provided:

- This occurs before they have had a chance to oxidise, i.e. within 24 hours of excavation;
- They meet the definition of ‘virgin excavated natural material’ (VENM) under the *Protection of the Environment Operations Act 1997*, even though they contain sulfidic ores or soils; and
- Landfills must be licensed by NSW EPA to dispose of potential ASS below the water table.

Potential ASS must be disposed of within 8 hours of their receipt at a landfill and kept wet at all times until their burial at least 2.0 metres below the lowest historical level of the water table at the disposal site. It is understood that PASS shall be disposed below the water table at the receiving landfill facility, as required.

3.4.1 Process for Excavation of PASS

Excavation shall proceed in stages, as follows:

- The site surface shall be stripped and prepared; any existing fill materials shall be excavated and removed or stored separately in covered stockpiles;
- Surface fill shall be stripped and removed and care must be taken to ensure that no surface fill material is mixed with PASS material below. The sides of the excavation shall also be stripped a further 200 mm laterally to ensure potential fill soils do not fall into the pit and cross contaminate PASS materials below;
- Once fill material is removed, the surface shall be inspected by a qualified environmental consultant and a representative of the receiving landfill facility, prior to excavation of PASS;
- When surface clearance is granted, PASS materials shall be excavated to the required depth and loaded directly onto waiting trucks. Each truckload shall be inspected and verification testing for pH shall be carried out to confirm soil pH does not fall below pH 5.5 prior to leaving the site; and
- Verification testing is required to demonstrate that materials with existing acidity are not being reburied. Should field pH fall below pH 5.5, the materials from that truck are to remain on-site and lime neutralisation techniques are to be implemented, as discussed in **Section 3.4**.

3.4.2 Transportation

Transport of PASS material to the receiving landfill facility shall take place immediately. If this is not possible, PASS soils shall be stockpiled and immediately covered. Stockpiled PASS materials must leave the site within 12 hours of excavation otherwise lime neutralisation techniques shall proceed as discussed in **Section 3.5**.

3.4.3 Documentation

Documentation must be provided to the occupier of the landfill for each truckload of PASS received, indicating that the soil excavation, transport and handling have been in accordance with ASSMAC (1998), thus preventing the generation of acid.

The occupier of the disposal site must also test the pH of each load of soil received immediately prior to its placement under water using the test method(s) in ASSMAC (1998) (Methods 21A and/or 21AF). These details, together with the pH of the soil recorded at the time of its extraction, must be retained by the occupier of the landfill site.

Soil that has dried out, undergone any oxidation of its sulfidic minerals, or which has a pH of less than pH 5.5 must be treated by neutralisation and disposed of at a landfill that can lawfully accept it.

The pH of the water at the landfill into which the potential ASS is placed must not be less than pH 5.5 at any time. Landfill licence conditions require the occupiers of potential ASS disposal sites to regularly monitor the pH of ground and surface waters at their premises.

3.5 Disposal of Potential Acid Sulfate Soils Above the Water Table

The total volume of PASS to be excavated or disturbed during the development program shall be stockpiled separately within designated areas, and treated (limed) immediately. More specifically, the management procedures are:

- For treatment of large volumes of material by mechanical application of neutralisation materials, treatment should be carried out on a treatment pad, with adequate sediment erosion control measures in place;

- Excavated PASS shall be stockpiled upon the treatment pad area. The treatment pad should consist of a minimum 300 mm thickness of compacted crushed limestone, or other appropriate neutralisation material. The level of compaction used should produce an appropriately low permeability base to prevent infiltration of leachate. The treatment pad should be bunded with a minimum 150 mm high perimeter of compacted, crushed limestone to contain potential leachate runoff within the treatment pad area and prevent surface water runoff from entering the treatment pad area. Lime shall be spread evenly upon the excavated materials, and thoroughly mixed; and
- Following treatment, soils should be chemically assessed and waste classified for offsite disposal in accordance with the EPA (2014) *Waste Classification Guidelines*.

In addition, the following management strategies shall also be considered and implemented, as required, to manage risk:

- Installation of leachate collection and treatment systems;
- Construction of supplementary erosion and sediment control structures.

If lime treatment on freshly excavated PASS cannot be performed immediately, plastic sheeting shall be placed over the stockpile to reduce oxidation, and the following shall be adopted:

- For every day a stockpile remains on-site, representative samples will be monitored for pH; where pH falls below pH 5.5, lime will be applied for neutralisation purposes; and
- On-site neutralisation of acidic soils (<pH 5.5) will be carried out using powdered, agricultural lime.

3.5.1 Determination of Lime Requirement

The quantity of lime required to neutralise the theoretical maximum amount of acid that could be generated from complete oxidation of the ASS is to be established at the conclusion of additional investigation, as discussed in **Section 3.1**.

3.5.2 Method of Neutralisation

In order to facilitate mixing, the soils should be thinly spread (<0.5 m). Lime should be added by hand and/or excavator bucket, followed by mixing using light-weight rotators and/or shovels.

Field pH testing on representative samples should be performed to ensure that sufficient neutralisation has occurred (i.e. pH is >pH 5.5), prior to disposal.

3.6 Management of In-situ Acid Sulfate Soils

Potential ASS which becomes exposed (oxidised) on excavation surfaces may produce acid. This corresponds to natural soil below the depth of site fill at the subject site. For every day that such an excavated surface is in an exposed state, pH values shall be monitored from representative samples. Where soil pH levels falls below pH 5.5, lime will be applied to the potential ASS horizon(s) following the methodology presented in **Section 3.5**. Plastic sheeting can be placed over the corresponding surface (where possible) to reduce the oxidation rate.

3.7 Groundwater Management and Disposal

3.7.1 Groundwater Management

The removal (pumping) of any groundwater from an excavation area may cause alterations to the existing groundwater table. Extracted groundwater should be pumped to a holding vessel for assessment of pH characteristics during the dewatering process. Extracted water should be treated with hydrated lime to display a pH level of pH 6-8, prior to off-site disposal. Powdered agricultural lime should be added to the water by hand and/or excavator bucket and mixed.

Field pH testing on representative samples should be performed to ensure that sufficient neutralisation has occurred, prior to disposal.

In addition to the above, an appropriately designed truck wash area will be required to capture liquids and solids generated, prior to vehicles exiting the site. Treatment and neutralisation of solids and liquids shall be in accordance with **Section 3.5.2** and above, respectively.

3.7.2 Groundwater Disposal

It is anticipated that extracted groundwater from the dewatering process will be disposed to the municipal stormwater system. Any permits / licences from Council and Water NSW shall be obtained prior to discharging to the municipal stormwater system.

Water for disposal will be tested routinely (weekly intervals) for the duration of dewatering activities, to ensure that no change to the quality of water entering the stormwater system, with the results made available to Council or Water NSW on request. Should it be found that groundwater quality is not suitable for disposal to the stormwater system, groundwater treatment or a Sydney Water permit to dispose to sewer shall be required prior to disposal.

Water quality monitoring for disposal to the municipal stormwater system shall include the following:

- Daily monitoring of field parameters (pH, electrical conductivity, dissolved oxygen, temperature and turbidity) in the treated discharge water using data logging equipment;
- Weekly sampling and laboratory analysis of treated groundwater water for a range of relevant analytical parameters (i.e. to be specified in the Dewatering Management Plan). Laboratory results should be compared to freshwater trigger values provided in Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG, 2018) for slightly - moderately disturbed systems to provide a 95% level of species protection. Weekly sampling shall be performed by a suitably qualified Environmental Consultant and submitted to a NATA accredited laboratory for analysis of the above parameters, depending on the time frame required to complete the works.

3.8 Risk Management

This management plan has been based on the assumption that PASS is present in natural soils below the depth of filling soils, and will be disturbed and exposed during the proposed development. Should the actual amounts of ASS significantly differ from those in this document, management techniques may need to be revised.

During the proposed excavations, it is recommended that site inspections be conducted by a qualified environmental consultant/engineer, in order to supervise the works and check that the assumptions made in the report are consistent with field evidence. The qualified environmental consultant/engineer should ensure:

- Soils indicative of potential ASS materials are adequately managed; and
- Adequate testing of excavated / exposed PASS is performed to establish liming requirements.

All contractors must employ best practices in managing any off-site water and soil quality impacts during site redevelopment. All waste materials must be chemically assessed and waste classified under the EPA (2014) *Waste Classification Guidelines*, prior to off-site disposal to appropriate landfill facilities.

3.9 Contingency Planning

A contingency plan is detailed below in **Table 3-2**. The plan provides a list of potential events that may arise during bulk excavation and the actions to be undertaken if unexpected conditions occur.

Table 3-2 Contingency Plan

Unexpected Condition	Action
Potential ASS identified at unexpected depths	Stop excavations; Have material assess by an environmental consultant for the presence of ASS; and Follow management procedures adopted in the ASSMP.
Neutralisation of ASS was not effective	Re-assess liming rates and add additional lime to material; and Re-test material to check neutralisation.
Neutralisation of ASS indicates that too much lime has been added and soils are alkaline	Remediate soils before use; Remediation comprises mixing additional ASS with the material, i.e. use excess lime to neutralise more ASS; and Re-test material to check neutralisation.
Bunded PASS treatment area is damaged	Repair bund as soon as practicable; Clean-up any PASS that escaped the treatment area and place back into the treatment area; and Check surrounding area for impact from the PASS or leachate, and undertake remedial action as required.
Groundwater level falls below the top of areas defined as containing PASS	Stop dewatering; Review PASS exposure by checking the ASS and Non-ASS interface in the affected area; Determine potential causes by reviewing construction practises, weather, baseline groundwater monitoring data, and performing additional groundwater monitoring as necessary on groundwater monitoring present at the site; Review and confirm mitigation measures to be implemented, including: Maintain PASS soil moisture levels through targeted groundwater recharge; Adjusting the construction activities or schedule; and Treatment of additional PASS in treatment area.

4. Consultation and Records

During ASS management, regard must be given to the needs of the following organisations:

- NSW Environment Protection Authority, concerning their requirements with respect to the various contamination control issues associated with the project and the detail required in the ASSMP;
- WaterNSW, for dewatering conditions and permit; and
- Inner West Council, for DA compliance and the handling requirement for ASS situations.

A file will be established to store all hard copy records associated with ASS management for the project. All analysis and monitoring information will be stored electronically to permit ease of access and data interpretation.

5. Statement of Limitations

The findings presented in this plan are derived from previous site investigations, which included borehole drilling and sampling and analysis of site soils. Due to the nature of bore drilling and soil sampling from point locations, it is considered likely that all variations in subsurface conditions across a site cannot be fully defined, no matter how comprehensive the field investigation program.

While normal assessments of data reliability have been made, EI assumes no responsibility or liability for errors in any data obtained from previous assessments conducted on site, regulatory agencies (e.g. Council, EPA), statements from sources outside of EI, or developments resulting from situations outside the scope of works of this project.

Despite all reasonable care and diligence, the ground conditions encountered and concentrations of contaminants measured may not be representative of conditions between the locations sampled and investigated. In addition, site characteristics may change at any time in response to variations in natural conditions, chemical reactions and other events (e.g. groundwater movement and/or spillages of contaminating substances). These changes may occur subsequent to EI's investigations and assessment.

Neither EI, nor any other reputable consultant, can provide unqualified warranties nor does EI assume any liability for site conditions not observed or accessible during the time of the investigations.

This plan was prepared for the above named client and no responsibility is accepted for use of any part of this report in any other context or for any other purpose or by other third parties. This report does not purport to provide legal advice.

This plan and associated documents remain the property of EI subject to payment of all fees due for this assessment. The plan shall not be reproduced except in full and with prior written permission by EI.

REFERENCES

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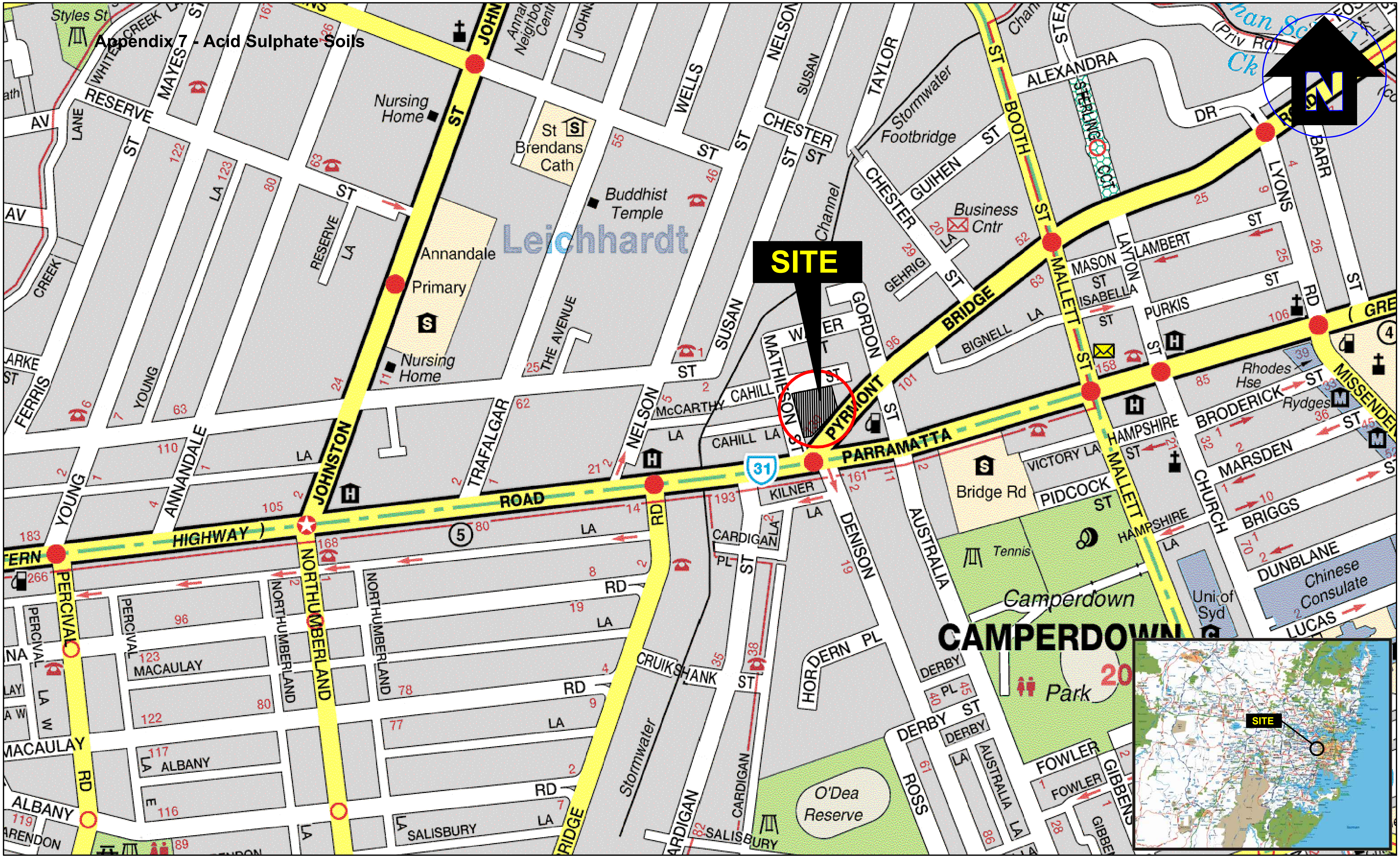
ABBREVIATIONS

AASS	Actual acid sulfate soils
AHD	Australian Height Datum
ASS	Acid sulfate soils
ASSMAC	Acid Sulfate Soil Management Advisory Committee (ASSMAC)
BGL	Below Ground Level
BEGL	Below Existing Ground Level
BH	Borehole
COC	Chain of Custody
DA	Development Application
DP	Deposited Plan
EI	EI Australia
EPA	Environmental Protection Authority
km	Kilometres
m	Metres
mAHD	Metres relative to Australian Height Datum
mBGL	Metres below ground level
mBEGL	Metres below existing ground level
NATA	National Association of Testing Authorities, Australia
NSW	New South Wales
OEH	Office of Environment and Heritage, NSW (formerly DEC, DECC, DECCW)
PASS	Potential acid sulfate soils
pH	Measure of the acidity or basicity of an aqueous solution
PQL	Practical Quantitation Limit
QA/QC	Quality Assurance / Quality Control
SRA	Sample receipt advice (document confirming laboratory receipt of samples)

Appendix A – Figures

Appendix 7 - Acid Sulphate Soils



Drawn:	L.C.	
Approved:	E.W.	
Date:	16-06-21	
Scale:	Not To Scale	

The Trustee for MHA PBR Annandale Unit Trust

Acid Sulfate Soil Management Plan

122-128 & 130 Pyrmont Bridge Road & 206 Parramatta Road, Annandale, NSW

Site Locality Plan

Figure: 1

Project: E25196 E14_Rev0

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Practical Solutions for Built Environments
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Appendix 7 - Acid Sulphate Soils

LEGEND

Approximate site boundary

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Date:	16-06-21

The Trustee for MHA PBR Annandale Unit Trust

Acid Sulfate Soil Management Plan

122-128 & 130 Pyrmont Bridge Road & 206 Parramatta Road, Annandale, NSW

Site Layout Plan

Figure: 2

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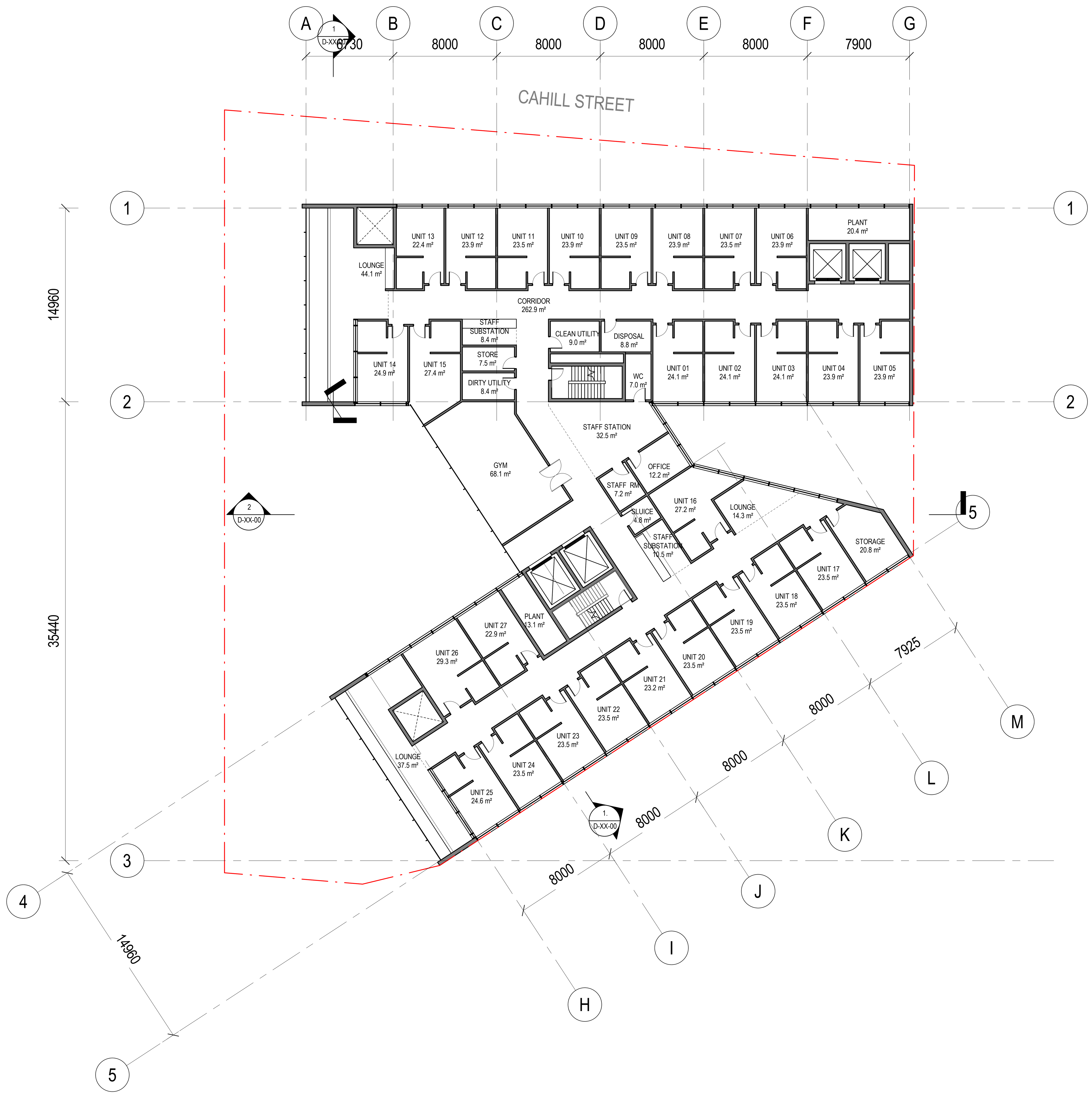
Appendix B – Proposed Development Plans

PRELIMINARY

HEALTH FACILITY



LEVEL 06 - ROOM SCHEDULE		
Name	Count	Area
CLEAN UTILITY	1	9.0 m²
CORRIDOR	1	262.9 m²
DIRTY UTILITY	1	8.4 m²
DISPOSAL	1	8.8 m²
FIRE STAIR	1	14.6 m²
GYM	1	68.1 m²
LIFT	1	9.6 m²
LIFT	1	9.6 m²
LIFT	1	13.6 m²
LOUNGE	1	14.3 m²
LOUNGE	1	44.1 m²
LOUNGE	1	37.5 m²
OFFICE	1	12.2 m²
PLANT	1	20.4 m²
PLANT	1	13.1 m²
SLUICE	1	4.8 m²
STAFF RM	1	7.2 m²
STAFF STATION	1	32.5 m²
STAFF SUBSTATION	1	8.4 m²
STAFF SUBSTATION	1	10.5 m²
STORAGE	1	20.8 m²
STORE	1	7.5 m²
UNIT 01	1	24.1 m²
UNIT 02	1	24.1 m²
UNIT 03	1	24.1 m²
UNIT 04	1	23.9 m²
UNIT 05	1	23.9 m²
UNIT 06	1	23.9 m²
UNIT 07	1	23.5 m²
UNIT 08	1	23.9 m²
UNIT 09	1	23.5 m²
UNIT 10	1	23.9 m²
UNIT 11	1	23.5 m²
UNIT 12	1	23.9 m²
UNIT 13	1	22.4 m²
UNIT 14	1	24.9 m²
UNIT 15	1	27.4 m²
UNIT 16	1	27.2 m²
UNIT 17	1	23.5 m²
UNIT 18	1	23.5 m²
UNIT 19	1	23.5 m²
UNIT 20	1	23.5 m²
UNIT 21	1	23.2 m²
UNIT 22	1	23.5 m²
UNIT 23	1	23.5 m²
UNIT 24	1	23.5 m²
UNIT 25	1	24.6 m²
UNIT 26	1	29.3 m²
UNIT 27	1	22.9 m²
WC	1	7.0 m²

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NOTE

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A	11/09/2020	DRAFT FOR REVIEW
B	30/04/2021	FEASIBILITY STUDY
C	11/05/2021	URBAN GROWTH REPORT

KEY PLAN

URBAN PLANNERS
MICHAEL FILE

SURVEYORS
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CONSULTANT

CONSULTANT

CLIENT
MHA

CLIENT NUMBER

PROJECT MANAGER

PROJECT
CAMPERDOWN PLANNIG PROPOSAL
CNR PARRAMATTA ROAD & PYRMONT BRIDGE ROAD, CAMPERDOWN, NSW, AUSTRALIA

BVN PROJECT NUMBER
s1611019

TRUE NORTH PROJECT NORTH

GRAPHIC SCALE
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SCALE
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STATUS
CONCEPT DESIGN

DRAWING
FLOOR PLAN - LEVEL 06 - REHAB UNIT

DRAWING NUMBER
AR-B-10-06

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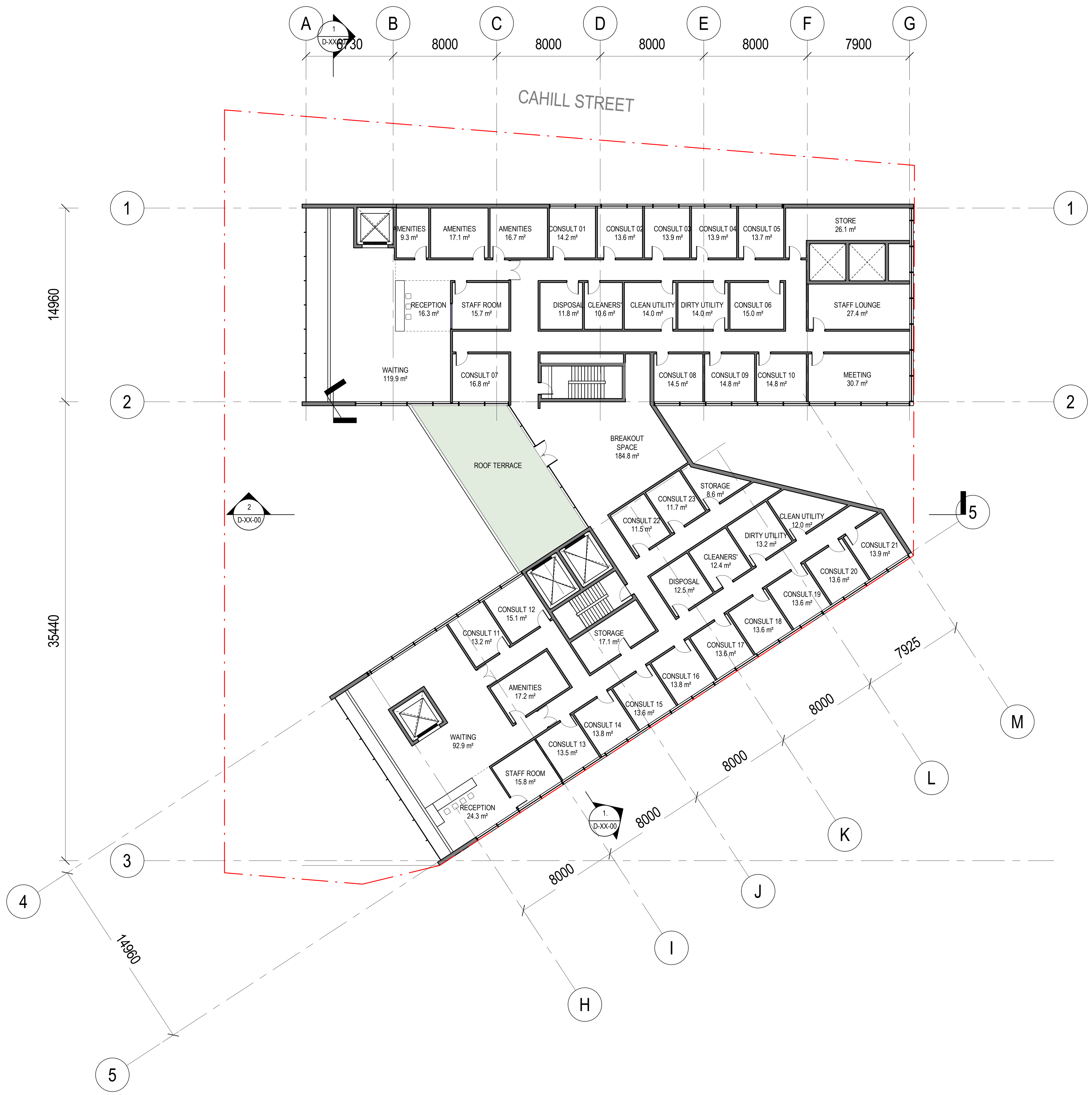
PRELIMINARY

HEALTH FACILITY



LEVEL 07 - ROOM SCHEDULE		
Name	Count	Area
AMENITIES	1	9.3 m²
AMENITIES	1	17.1 m²
AMENITIES	1	16.7 m²
AMENITIES	1	17.2 m²
BREAKOUT SPACE	1	118.9 m²
CLEAN UTILITY	1	14.0 m²
CLEAN UTILITY	1	12.0 m²
CLEANERS'	1	10.6 m²
CLEANERS'	1	12.4 m²
CONSULT 01	1	14.2 m²
CONSULT 02	1	13.6 m²
CONSULT 03	1	13.9 m²
CONSULT 04	1	13.9 m²
CONSULT 05	1	13.7 m²
CONSULT 06	1	15.0 m²
CONSULT 07	1	16.8 m²
CONSULT 08	1	14.5 m²
CONSULT 09	1	14.8 m²
CONSULT 10	1	14.8 m²
CONSULT 11	1	13.2 m²
CONSULT 12	1	15.1 m²
CONSULT 13	1	13.5 m²
CONSULT 14	1	13.8 m²
CONSULT 15	1	13.6 m²
CONSULT 16	1	13.8 m²
CONSULT 17	1	13.6 m²
CONSULT 18	1	13.6 m²
CONSULT 19	1	13.6 m²
CONSULT 20	1	13.6 m²
CONSULT 21	1	13.9 m²
DIRTY UTILITY	1	14.0 m²
DIRTY UTILITY	1	13.2 m²
DISPOSAL	1	11.8 m²
DISPOSAL	1	12.5 m²
MEETING	1	30.7 m²
RECEPTION	1	16.3 m²
RECEPTION	1	24.3 m²
STAFF LOUNGE	1	27.4 m²
STAFF ROOM	1	15.7 m²
STAFF ROOM	1	15.8 m²
STORAGE	1	17.1 m²
STORE	1	26.1 m²
WAITING	1	119.9 m²
WAITING	1	92.9 m²

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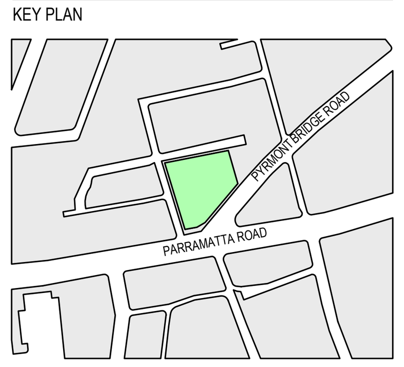

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STATUS
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DRAWING
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AR-B-10-07

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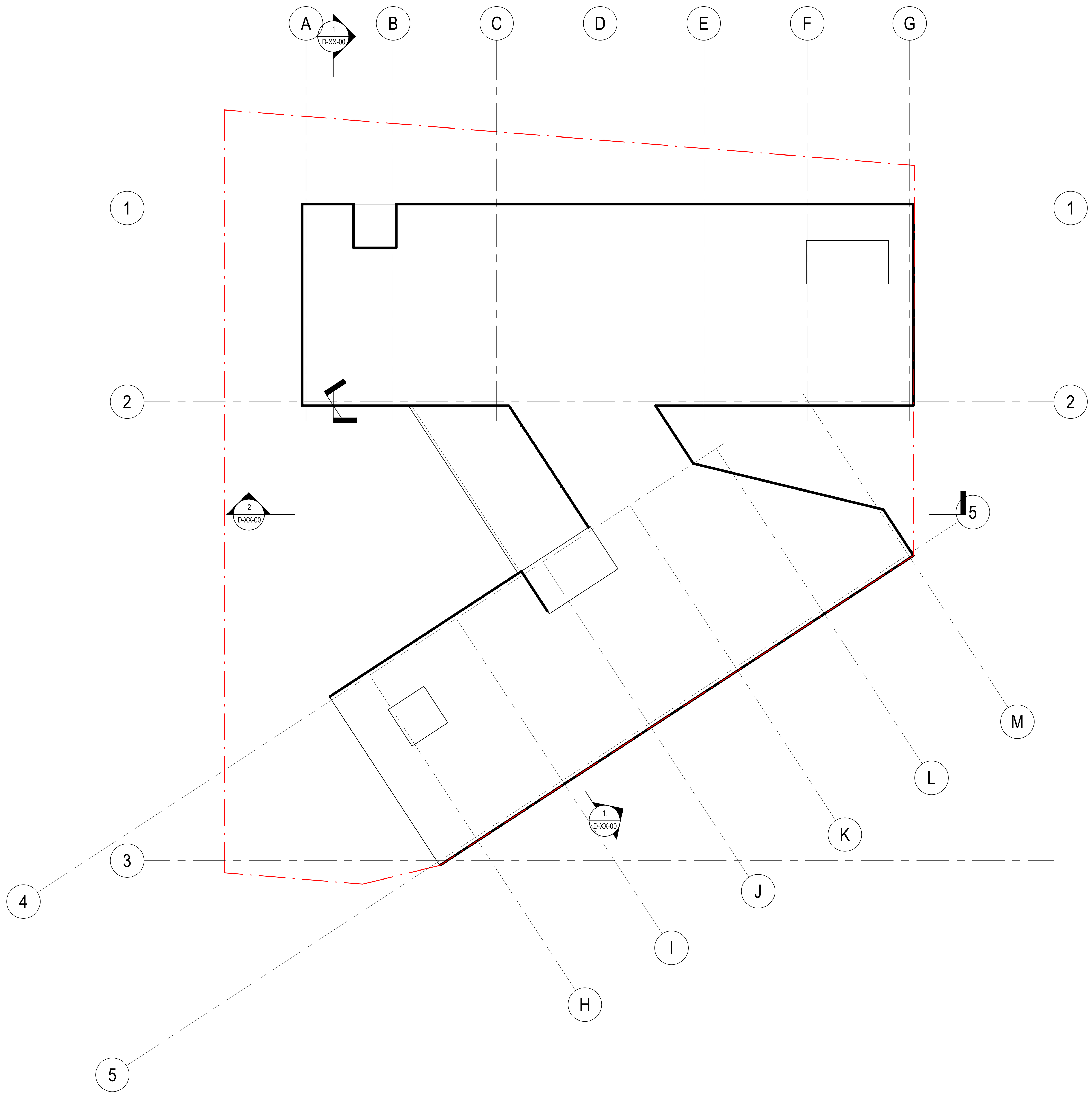
PRELIMINARY HEALTH FACILITY



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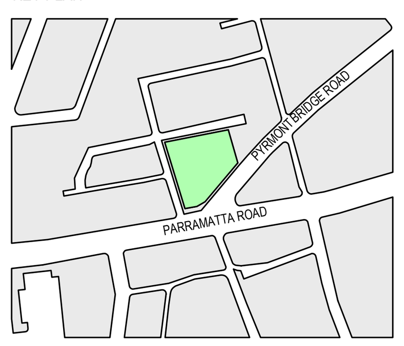

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STATUS
CONCEPT DESIGN

DRAWING
FLOOR PLAN - LEVEL 08 - ROOFTOP

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AR-B-10-08

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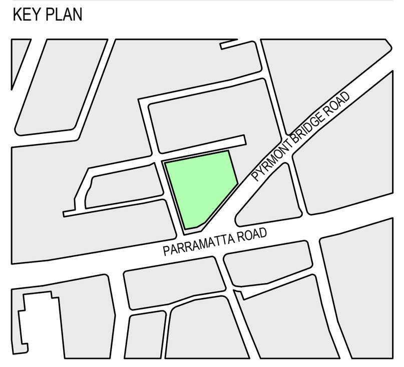

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STATUS
CONCEPT DESIGN

DRAWING
SECTION 01

DRAWING NUMBER
AR-D-XX-00

ISSUE
B

Document Set ID: 35047373
Version: 1, Version Date: 30/06/2021

1 C-XX-550 LEVEL 00
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2 C-XX-550 LEVEL 01
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3 C-XX-550 LEVEL 02
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4 C-XX-550 LEVEL 03
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6 C-XX-550 LEVEL 05
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7 C-XX-550 LEVEL 06
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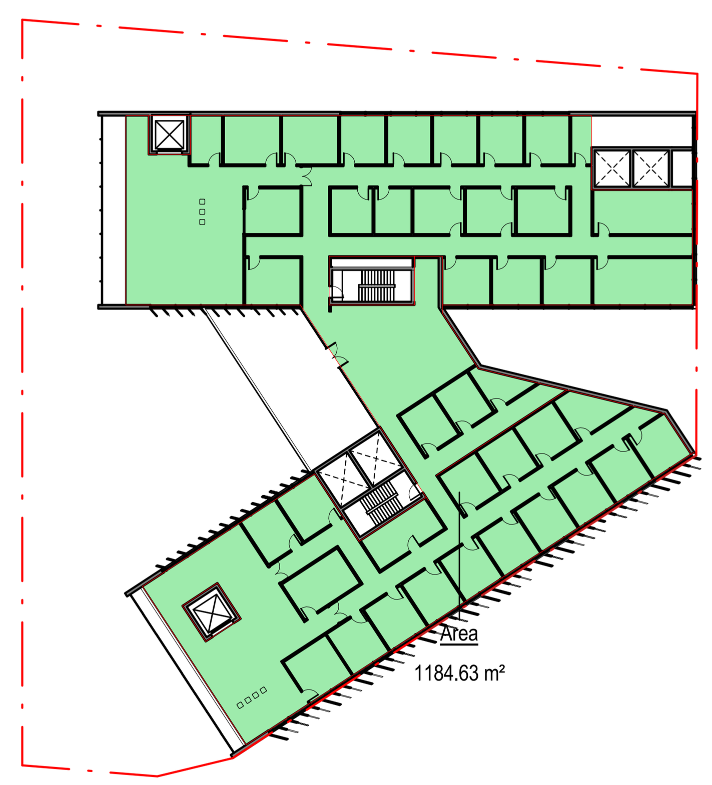

8 C-XX-550 LEVEL 07
1 : 500

PRELIMINARY

Area Schedule (GFA)	
Level	Area
LEVEL 00	1356.62 m²
LEVEL 01	1366.43 m²
LEVEL 02	1292.81 m²
LEVEL 03	1286.92 m²
LEVEL 04	1258.87 m²
LEVEL 05	1258.87 m²
LEVEL 06	1258.87 m²
LEVEL 07	1184.63 m²
	10264.02 m²

HEALTH FACILITY

GFA - Sydney LEP 2012

Gross floor area means the sum of the floor area of each floor of a building measured from the internal face of external walls, or from the internal face of walls separating the building from any other building, measured at a height of 1.4 metres above the floor, and includes:
(a) the area of a mezzanine, and
(b) habitable rooms in a basement or an attic, and
(c) any shop, auditorium, cinema, and the like, in a basement or attic,

but excludes:
(d) any area for common vertical circulation, such as lifts and stairs, and
(e) any basement:
(i) storage, and
(ii) vehicular access, loading areas, garbage and services, and
(f) plant rooms, lift towers and other areas used exclusively for mechanical services or ducting, and
(g) car parking to meet any requirements of the consent authority (including access to that car parking), and
(h) any space used for the loading or unloading of goods (including access to it), and
(i) terraces and balconies with outer walls less than 1.4 metres high, and
(j) voids above a floor at the level of a storey or storey above.

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MICHAEL FILE

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CONSULTANT

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PROJECT
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CNR PARRAMATTA ROAD & PYRMONT BRIDGE ROAD, CAMPERDOWN, NSW, AUSTRALIA

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s1611019

TRUE NORTH PROJECT NORTH

GRAPHIC SCALE
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SCALE
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STATUS
CONCEPT DESIGN

DRAWING
HEALTH FACILITY - GFA PLANS

DRAWING NUMBER
AR-R-XX-551

ISSUE
D

Appendix C – Previous Report

REPORT TO

MHA PBR Pty Ltd

ON

LIMITED ENVIRONMENTAL AND HAZARDOUS MATERIALS ASSESSMENT

FOR

DUE DILIGENCE

AT

122-128 & 130 PYRMONT BRIDGE ROAD AND 206 PARRAMATTA ROAD, ANNANDALE, NSW

Date: 28 January 2021
Ref: E33770PArpt-DRAFT

JKEnvironments
www.jkenvironments.com.au

T: +61 2 9888 5000
JK Environments Pty Ltd
ABN 90 633 911 403

Report prepared by:

Anthony Barkway
Senior Environmental Engineer

Report reviewed by:

Brendan Page
Principal Associate | Environmental Scientist

For and on behalf of
JKE
PO BOX 976
NORTH RYDE BC NSW 1670

DOCUMENT REVISION RECORD

Report Reference	Report Status	Report Date
E33770PArpt	DRAFT Report	28 January 2021

This Report (which includes all attachments and annexures) has been prepared by JKE for the Client, and is intended for the use only by that Client.

This Report has been prepared pursuant to a contract between JKE and the Client and is therefore subject to:

a) JKE's proposal in respect of the work covered by the Report;
b) The limitations defined in the client's brief to JKE; and
c) The terms of contract between JKE and the Client, including terms limiting the liability of JKE.

If the Client, or any person, provides a copy of this Report to any third party, such third party must not rely on this Report, except with the express written consent of JKE which, if given, will be deemed to be upon the same terms, conditions, restrictions and limitations as apply by virtue of (a), (b), and (c) above.

Any third party who seeks to rely on this Report without the express written consent of JKE does so entirely at their own risk and to the fullest extent permitted by law, JKE accepts no liability whatsoever, in respect of any loss or damage suffered by any such third party.

Executive Summary

MHA PBR Pty Ltd ('the client') commissioned JK Environments (JKE) to undertake a Limited Environmental and Hazardous Materials Assessment at 122-130 Pyrmont Bridge Road and 206 Parramatta Road, Annandale, NSW ('the site'). The purpose of this assessment is to make a preliminary evaluation of site contamination and to assess the potential for hazardous building materials to be present onsite for due diligence purposes, prior to acquisition. The site location is shown on Figure 1 and the investigation was confined to the site boundaries as shown on Figure 2.

The primary aims of the assessment were to identify any past or present potentially contaminating activities at the site, identify the potential for site contamination, make a preliminary assessment of the soil and groundwater contamination conditions and to identify hazardous materials present within the site buildings. The scope of work included the following:

- Review of site information, including background and site history information from various sources outlined in the report;
- Site walkover inspection including inspection of safely accessible building areas for the presence and condition of hazardous buildings materials;
- Preparation of a preliminary CSM;
- Design and implementation of a sampling and analysis program;
- Evaluation of the analytical results with reference to relevant NSW EPA endorsed guidelines; and
- Preparation of a report detailing the works undertaken and presenting the findings of this assessment, and an indication on potential capital expenditure required to further investigate the site.

The assessment included a review of historical information, soil sampling from five boreholes and groundwater sampling from two monitoring wells installed onsite. Parts of the site are currently used as commercial retail tenancies (i.e. "Energy Shop Australia" and "Olde English Tiles") and as music tutoring premises including car parking to the east. The site has historically been used for various commercial/industrial activities including dry cleaners and electroplating. Commercial/industrial activities were also identified for the neighbouring properties including service station, dry cleaners and mechanical workshops etc.

This assessment identified asbestos in soil, along with some heavy metals and hydrocarbons that exceeded the ecological-based site assessment criteria (SAC). Hydrocarbons in the form of volatile total recoverable hydrocarbons (TRHs) and chlorinated volatile organic compounds (VOCs) were also identified in groundwater, with the TRH concentrations exceeding the human health-based SAC. Risks from asbestos and the ecological risks associated with heavy metals and TRHs in soil were assessed to be low in the context of the existing land use/site layout as there is currently no complete exposure pathway. A potential pathway exists in relation to exposure to vapours from volatile contaminants in soil and/or groundwater. This warrants further investigation for due diligence purposes. It is also anticipated that further detailed investigation will be necessary prior to any site redevelopment.

JKE recommends the following:

- A detailed hazardous materials assessment should be undertaken to confirm the presence and extent of all hazardous building materials present on site. A Hazardous Materials Register and Management Plan should be produced for all properties comprising the site following this assessment, in order to comply with currently endorsed regulations, codes and guidelines;
- Should refurbishment or demolition works be proposed, a destructive hazardous building materials survey should be undertaken prior to any demolition works taking place. Any proposed demolition works are to be complete with regards to the hazardous building materials report and all relevant codes, guidelines and standards. Clearance certificates are to be issued following removal of any hazardous building materials;
- Undertake a due diligence soil vapour investigation to determine the potential human health risks associated with vapour intrusion;
- Complete Detailed Site Investigation (DSI) as required for any future proposed development on site;
- Complete an ASS assessment as required for any future proposed development on site;
- Asbestos control measures will be required to be implemented for any works across the site which require penetration of the concrete slab/pavement. Control measures including preparation of a work specific Asbestos Management Plan (AMP) and engaging a specialist (i.e. licensed asbestos assessor) to assist with its

implementation, air monitoring for potential asbestos fibres during the works and use of appropriate personal protective equipment are recommended.

Indicative capital expenditure forecast is included in Section 11.1.

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

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**
Ecological Screening Level	**ESL**
Environmental Management Plan	**EMP**
Excavated Natural Material	**ENM**
Environment Protection Authority	**EPA**
Environmental Site Assessment	**ESA**
Fibre Cement Fragment(s)	**FCF**
Fibre Cement Sheet	**FCS**
Health Investigation Level	**HILs**
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**
Potential Asbestos Containing Materials	**PACM**
Polychlorinated Biphenyls	**PCBs**
Person Conducting a Business or Undertaking	**PCBU**
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**
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

MHA PBR Pty Ltd ('the client') commissioned JK Environments (JKE) to undertake a Limited Environmental and Hazardous Materials Assessment at 122-130 Pyrmont Bridge Road and 206 Parramatta Road, Annandale, NSW ('the site'). The purpose of this assessment is to make a preliminary evaluation of site contamination and to assess the potential for hazardous building materials to be present onsite for due diligence purposes, prior to acquisition. The site location is shown on Figure 1 and the investigation was confined to the site boundaries as shown on Figure 2.

1.1 Aims and Objectives

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

- Provide an appraisal of the past site use(s) based on a review of historical records;
- Assess the current site conditions and use(s) via a site walkover inspection;
- Identify potential contamination sources/areas of environmental concern (AEC) and contaminants of potential concern (CoPC);
- Assess the soil and groundwater contamination conditions via implementation of a preliminary sampling and analysis program;
- Prepare a preliminary conceptual site model (CSM);
- Assess the potential risks posed by contamination to the receptors identified in the CSM;
- Assess the presence and condition of hazardous building materials on site; and
- Assess the need for additional investigation or management as part of the due diligence.

1.2 Scope of Work

The assessment was undertaken generally in accordance with a JKE proposal (Ref: EP53312PArev1) of 6 January 2021 and a Consultancy Services Agreement executed by the client, dated12 January 2021. The scope of work included the following:

- Review of site information, including background and site history information from various sources outlined in the report;
- Site walkover inspection including inspection of safely accessible building areas for the presence and condition of hazardous buildings materials;
- Preparation of a preliminary CSM;
- Design and implementation of a sampling and analysis program;
- Evaluation of the analytical results with reference to relevant NSW EPA endorsed guidelines; and
- Preparation of a report detailing the works undertaken and presenting the findings of this assessment, and an indication on potential capital expenditure required to further investigate the site.

2 SITE INFORMATION

2.1 Site Identification

Table 2-1: Site Identification

Current Site Owner (certificate of title):	Zac One Pty Ltd, 130 PBR Pty Ltd and Camperdown Administration Pty Ltd
Site Address:	122-128 & 130 Pyrmont Bridge Road, Annandale, NSW
Lot & Deposited Plan:	Lots 3, 4, 5, 6 and 12 in DP 976387; Lot 100 in DP 1101482; and Lot 1 in DP 539271
Current Land Use:	Commercial
Local Government Authority:	Inner West Council
Current Zoning:	IN2 – Light Industrial
Site Area (m^2) (approx.):	2,624
RL (AHD in m) (approx.):	14-16
Geographical Location (decimal degrees) (approx.):	Latitude: -33.886897 Longitude: 151.173508
Site Location Plan:	Figure 1
Sample Location Plan:	Figure 2
Contamination Location Plan	Figure 3

2.2 Site Location and Regional Setting

The site is located in a predominantly light industrial/commercial/residential area of Annandale and is bound by Pyrmont Bridge Road to the south-east, commercial buildings to the east/north-east, Cahill Street to the north, Mathieson Street to the west and Parramatta Road to the south. The site is located approximately 80m to the east of Johnstons Creek.

2.3 Topography

The regional topography is characterised by a west/north-west facing hillside that falls towards Johnstons Creek. The site has a gentle slope towards the north-west at approximately 3°. Parts of the site appeared to have been levelled to account for the slope and accommodate the existing buildings.

2.4 Site Inspection

A walkover inspection of the site was undertaken by JKE on 15 January 2021. The inspection was limited to accessible areas of the site and immediate surrounds. Selected site photographs obtained during the inspection are attached in the appendices.

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

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

At the time of the inspection, the site comprised three adjoining commercial properties which were mainly occupied by retail tenancies including: “Energy Shop Australia” – heating/cooling/hot water systems specialists (206 Parramatta Road), “Olde English Tiles” – home tiles and finishes sales shop and warehouse (130 Pyrmont Bridge Road), music tutoring premises including on-grade car parking area (122-128 Pyrmont Bridge Road). Some of the above ground floor areas within buildings on site were used as residences and were not accessed during our inspection.

2.4.2 Buildings, Structures and Roads

The site was occupied by three double storey commercial buildings adjoining each other and built predominantly to their property boundaries. The eastern part of the site area was a secure fenced, on-grade car parking area.

Inspection of internal accessible building areas for the purposes of hazardous materials assessment is described further in Section 9 of this report.

2.4.3 Presence of Drums/Chemical Storage and Waste

Minor quantities (<1,000 Litres in total) of various general and domestic use cleaning chemicals were identified within various parts of the buildings on site. Most of these chemicals were stored within dedicated areas and no evidence of any major associated chemical spills or leaks were identified.

2.4.4 Evidence of Cut and Fill

Fill material is expected to be present across the site associated with developed areas such as beneath the existing buildings and pavements.

2.4.5 Visible or Olfactory Indicators of Contamination (odours, spills etc)

Two reinstated concreted core hole locations were identified in the vicinity of BH3/MW3 (Refer Figure 2) at 206 Parramatta Road within the internal customer parking area which suggests that this area was previously investigated. No pertaining information/reports were made available for our review as part of this assessment.

2.4.6 Drainage and Services

Surface water was not expected to accumulate at the site due to the presence of drainage in the form of stormwater inlets in various parts of the site area. The majority of surface water runoff is expected to eventuate at the bounding street frontages and ultimately discharged into the municipal stormwater system.

2.4.7 Sensitive Environments

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

2.5 Surrounding Land Use

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

- North – Cahill Street, across which were commercial and residential type properties including "VG Group" car detailing, "Simply Seated" event hire warehouse etc;
- South – Parramatta Road to the south across which whee mixed residential/commercial properties, and Pyrmont Bridge Road to the south-east across which was "7-Eleven" service station site;
- East – three storey commercial building tenanted by "Persian Carpet Gallery" shop on the ground floor and learning centre on the second; and
- West – Car servicing and mechanical repairs workshop ("Harold Park Repairs") and residential type properties.

JKE are of the opinion that the adjacent "7-Eleven" service station to the south-east, car detailing shop (i.e. "VG Group") to the north-east and the mechanical workshop ("Harold Park Repairs") to the west/south-west of the site are all considered to be potential off-site sources of contamination as these properties are located within 20m of the site boundary and are either up-gradient or cross-gradient of the site.

2.6 Underground Services

The 'Dial Before You Dig' (DBYD) plans were reviewed for the assessment in order to establish whether any major underground services exist at the site or in the immediate vicinity that could act as a preferential pathway for contamination migration. Major services were not identified that would be expected to act as preferential pathways for contamination migration.

2.7 Section 10.7 Planning Certificate

The section 10.7 (2 and 5) planning certificates were reviewed for the assessment. Copies of the certificates were made available as part of "Call Option" documents for each of the three properties comprising the site. A summary of the relevant information is outlined below:

- The land is not deemed to be: significantly contaminated; subject to a management order; subject of an approved voluntary management proposal; or subject to an on-going management order under the provisions of the CLM Act 1997;
- The land is not the subject of a Site Audit Statement (SAS); and
- The land is not located in a heritage conservation area.

3 GEOLOGY AND HYDROGEOLOGY

3.1 Regional Geology

Regional geological information was reviewed for the assessment. The information was sources from the Lotsearch report attached in the appendices. The report indicates that the site is underlain by Hawkesbury Sandstone, which typically consists of medium to coarse grained quartz sandstone with minor shale and laminite lenses.

3.2 Acid Sulfate Soil (ASS) Risk and Planning

A review of the acid sulfate soil (ASS) risk map prepared by Department of Land and Water Conservation (1997)[1] indicated that the site is located in an area classed as 'disturbed terrain'. Soil investigations are required to assess these areas for ASS potential.

ASS information presented in the Lotsearch report indicated that the site is located within Classes 3 and 5 ASS risk areas. Works in a Class 3 risk area that could pose an environmental risk in terms of ASS include works at depths beyond 1m below existing ground level or works by which the water table is likely to be lowered beyond 1m below existing ground level. Whilst works in a Class 5 risk area that could pose an environmental risk in terms of ASS include works within 500m of adjacent Class 1,2,3,4 land which are likely to lower the water table below 1m AHD on the adjacent Class 1,2,3,4 land.

3.3 Hydrogeology

Hydrogeological information presented in the Lotsearch report indicated that the regional aquifer on-site and in the areas immediately surrounding the site includes porous, extensive highly productive aquifers. There was a total of 10 registered bores within the report buffer of 1,000m. In summary:

- The nearest registered bore was located approximately 375m from the site. This was utilised for monitoring purposes;
- All of the bores were registered for monitoring purposes;
- There were no nearby bores (i.e. within 1,000m) registered for domestic or irrigation uses; and
- The drillers log information from the closest registered bores typically identified fill and clay soil to depths of 1.75-8.7m, underlain by sandstone or shale bedrock. Standing water levels (SWLs) in the bores ranged from 1.75m below ground level (BGL) to 2.4mBGL.

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

Considering the local topography and surrounding land features, JKE anticipate groundwater to flow north-west towards the Johnstons Creek.

[1] Department of Land and Water Conservation, (1997). *1:25,000 Acid Sulfate Soil Risk Map (Series 9130S3, Ed 2)*

4 SITE HISTORY INFORMATION

4.1 Review of Historical Aerial Photographs

Historical aerial photographs were reviewed for the assessment. The information was sourced for the Lotsearch report. JKE has reviewed the photographs, and summarised relevant information in the following table:

Table 4-1: Summary of Historical Aerial Photographs

Year	Details
1930	**On-site:** The site appeared to be occupied by a number of commercial/industrial buildings. Due to poor quality of this image further details could not be evaluated. **Off-site:** Surrounding properties appeared to be similar to the site occupied by buildings and most likely commercial/industrial in nature.
1943	**On-site:** The site appeared to comprise a number of adjoining properties occupied by buildings built to the property boundaries. Buildings across the central and western parts of the site appeared to be commercial/industrial in nature and are similar to the ones currently present. The eastern part of the site appeared to be occupied by a number of residential type terraces. **Off-site:** Surrounding properties appeared to be a mixture of commercial/industrials type properties which where situated to the north, north-west, south-east and south-west of the site, and residential properties elsewhere.
1951	The site and surrounding features appeared generally similar to the previous photograph.
1955	The site and surrounding features appeared generally similar to the previous photograph.
1961	**On-site:** The eastern part of the site appeared to have been redeveloped and used as an on-grade parking area. **Off-site:** The property to the south-east across Pyrmont Bridge Road appeared to have been redeveloped into a service station. Neighbouring land to the east appeared to be occupied by a commercial/industrial building.
1965	The site and surrounding features appeared generally similar to the previous photograph.
1970	Land further to the north-east across and bounding Cahill Street appeared to be under redevelopment.
1978	Properties to the north-east and east of the site appeared to have been redeveloped occupied by commercial/industrial buildings. The property to the south-east appeared to have also been redeveloped, remaining in operation as a service station.
1982	Commercial/industrial type building appeared to have been developed on the property to the north-west of the site. The site and remaining surrounding features appeared generally similar to the previous photograph.
1986	The site and surrounding features appeared generally similar to the previous photograph.
1991	The site and surrounding features appeared generally similar to the previous photograph.
1994	The site and surrounding features appeared generally similar to the previous photograph.

Year	Details
2000	**On-site:** Refurbishment works including roof replacement were noted for some of the buildings on site. The small building previously present in the northern part of the site (i.e. 130 Pyrmont Bridge Road) appeared to have been demolished and the area was vacant. **Off-site:** The surrounding features appeared generally similar to the previous photograph.
2009	A new commercial building appeared to have been constructed on neighbouring property to the north/north-west across Cahill Street. The site and remaining surrounding features appeared generally similar to the previous photograph.
2015	A number of multi-storey commercial/residential type building appeared to have been developed to the south across Parramatta Road. No other significant changes were noted.
2020	The site and surrounding features appeared generally similar to the previous photograph.

4.2 Review of Historical Land Title Records

Historical land title records were reviewed for the assessment. The record search was undertaken by InfoTrack Pty Ltd. Copies of the title records are attached in the appendices. The title records indicate the following:

- Commercial corporate entities owned most lots comprising the site since at least 1950s.
- The western (206 Parramatta Road) and central (130 Pyrmont Bridge Road) parts of the site identified as Lot 1 in DP 539271 and Lot 100 in DP 1101482 respectively were noted to have been under the ownership of Lawrence Dry Cleaners Pty Ltd from 1955 through to 1969; and
- The lots comprising the site were under the ownership of their current registered proprietors from between 2005 and 2016.

The historical land title records identified dry cleaner activities attributed to areas of the site currently identified as Lot 1 in DP 539271 (206 Parramatta Road) and Lot 100 in DP 1101482 (130 Pyrmont Bridge Road) between 1955 and 1969 which potentially could have resulted in contamination of the land.

4.3 Review of Council Records

A search of council records is currently underway. The results will be summarised in a separate letter when received.

4.4 NSW EPA and Department of Defence Records

A review of the NSW EPA and Department of Defence databases was undertaken for the assessment. Information from the following databases were sourced from the Lotsearch report:

- Records maintained in relation to contaminated land under Section 58 of the CLM Act 1997;
- Records of sites notified in accordance with the Guidelines on the Duty to Report Contamination under Section 60 of the CLM Act 1997 (2015)[2];

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

- Licensed activities under the Protection of the Environment Operations Act (1997)[3];
- Sites being investigated under the NSW EPA per-and polyfluoroalkyl substances (PFAS) investigation program;
- Sites being investigated by the Department of Defence for PFAS contamination; and
- Sites being managed by the Department of Defence for PFAS contamination.

The search included the site and surrounding areas in the report buffer. A summary of the key relevant information is provided below:

Table 4-2: NSW EPA and Department of Defence Records

Records	On-site	Off-site
Records under Section 58 of the CLM Act 1997	None	There were four properties listed in the report buffer one of which was a 7-Eleven service station located approximately 20m to the east and up-gradient of the site. It was indicated that regulation under the CLM Act is not required for this property. However due to the on-going use as a service station this property is considered to represent a potential off-site source of contamination.
Records under the Duty to Report Contamination under Section 60 of the CLM Act 1997	None	None
Licences under the POEO Act 1997	None	None
Records relating to the NSW EPA PFAS Investigation Program	None	None
Records relating to the Department of Defence PFAS management and investigation programs	None	None

4.5 Historical Business Directory and Additional Lotsearch Information

Historical business records and other relevant information were reviewed for the assessment. The information was sourced from the Lotsearch report and summarised in the following table:

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

Table 4-3: Historical Business Directory and other Records

Records	On-site	Off-site
Historical dry cleaners, motor garages and service stations	A dry cleaner (Lawrence Dry Cleaners) was noted to have historically been operating in the central/western parts of the site (i.e. 130 Pyrmont Bridge Road) between 1958 and until at least 1972.	A dry cleaner (Lawrence Dry Cleaners) was also noted to have historically operated from neighbouring property (208 Parramatta Road) situated approximately 9m south-west of the site between 1948 and until at least 1962. There were a number of motor garages/service stations as well as dry cleaners identified within the report buffer between 1948-1993. Twenty-four were identified within 250m radius of the site. to the north, north-west, west, south-west, south and south-east. Due to the distance and down-gradient location most of these properties are not considered to represent an off-site source of contamination. However, some up-gradient and cross-gradient properties may present a potential area of concern (i.e. to the south-east, south and south-west).
Other historical businesses that could represent potential sources of contamination	Various identified historical commercial/industrial activities including electroplating (1950-1961).	Various historical commercial/industrial activities.
National waste management site database	None	None
National liquid fuel facilities	None	One active petrol station "7-Eleven" was listed located approximately 20m east of the site and is considered to represent an off-site source of contamination.
Mapped heritage items	None	Various heritage items were mapped in the report buffer. These are not considered to have any relevance in the context of this assessment.
Mapped ecological constraints	None	Various ecological items were mapped in the report buffer These are not considered to have any relevance in the context of this assessment.
Mapped naturally occurring asbestos	None	None

4.6 Summary of Site History Information

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

Table 4-4: Summary of Historical Land Uses / Activities

Year(s)	On-site - Potential Land Use / Activities	Off-site - Potential Land Use / Activities
1930-Current	The majority of the site area appeared to have been commercial/industrial in nature since at least 1930s. Some identified uses which could have potentially resulted in contamination included: dry cleaners (1958-1972), electroplating (1950-1961) and other commercial/industrial activities. The eastern part of the site appeared to have been residential in nature until it was redeveloped and used as an on-grade car parking area from 1961.	Surrounding properties appeared to be similar to the site mostly commercial/industrial in nature since at least 1930s with some residential land uses also noted to be present. Some of the identified current/historical uses on neighbouring properties which could potentially present a risk of contamination include: “7-Eleven” service station located 20m to the south-east, “VG Group” car detailing shop 20m to the north-east, “Harold Park Repairs” mechanical workshop and historical dry cleaners on the property 9m to the west/south-west.

4.7 Integrity of Site History Information

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

5 PRELIMINARY CONCEPTUAL SITE MODEL

NEPM (2013) defines a CSM as a representation of site related information regarding contamination sources, receptors and exposure pathways between those sources and receptors. The CSM for the site is presented in the following sub-sections and is based on the site information (including the site inspection information) and the review of site history information. Reference should also be made to the figures attached in the appendices.

5.1 Potential Contamination Sources/AEC and CoPC

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

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

Source / AEC	CoPC
Fill material – The site appears to have been historically filled to achieve the existing levels. The fill may have been imported from various sources and could be contaminated.	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. Total phenol has also been considered at the request of the client.
Historical commercial/industrial activities across the site – potentially contaminating activities historically took place across parts of the site including dry cleaners, electroplating etc.	Heavy metals, TRH, BTEX, PAHs, PCBs and Volatile Organic Compounds (VOCs), including chlorinated solvents.
Hazardous Building Material – Hazardous building materials may be present as a result of former building and demolition activities. These materials may also be present in the existing buildings/structures on site.	Asbestos, lead and PCBs
Use of pesticides – Pesticides may have been used beneath the buildings and/or around the site.	Heavy metals and OCPs
Off-site commercial/industrial activities on neighbouring properties – current/historical potentially contaminating activities were identified for neighbouring properties including: “7-Eleven” service station (20m to the south-east), “Harold Park Repairs” mechanical workshop (20m to the west), “VG Group” car detailing (20m to the north-east), historical dry cleaners (9m to the west) etc. Fuels, oils and solvents may have been used during these activities.	Heavy metals, TRH, BTEX, PAHs and VOCs.

5.2 Affected Media, Receptors and Exposure Pathways

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

Table 5-2: CSM

Affected media	Soil, groundwater and soil vapour have been identified as potentially affected media.
Receptor identification	The proposed land use has not been confirmed, therefore we have assumed a potentially sensitive future scenario which may include mixed use, including residential. Human receptors include site occupants/users (including adults and children), construction workers and intrusive maintenance workers. Off-site human receptors include adjacent land users. Ecological receptors include terrestrial organisms and plants within unpaved site areas (i.e. future proposed landscaped areas if any), and freshwater ecology in Johnstons Creek.
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, VOCs including chlorinated solvents and BTEX). The potential for exposure would typically be associated primarily with the development/excavation works, and current/future uses of the site. Potential exposure pathways for ecological receptors include primary/direct contact and ingestion. Exposure during current site use could occur via inhalation of vapours within enclosed spaces (i.e. within currently present buildings). There is currently no exposed soil. Exposure during future site use could occur via direct contact with soil in unpaved areas such as gardens/landscaping areas, inhalation of airborne asbestos fibres during soil disturbance, or inhalation of vapours within enclosed spaces such as buildings and basements. Exposure to groundwater may potentially occur through direct migration and potential exposure to groundwater seepage within future basements on site. Exposure to groundwater could also occur in Johnstons Creek through direct migration, however, connectivity between the aquifer and the creek has not been confirmed at this time. Groundwater has the potential to enter the creek via the stormwater system (which is expected to discharge into the creek) in a drained basement scenario and/or a situation where groundwater seepage is captured and discharged to stormwater.
Potential exposure mechanisms	The following have been identified as potential exposure mechanisms for site contamination: • Vapour intrusion into site buildings and/or potential future proposed basements (either from soil contamination or volatilisation of contaminants from groundwater); • Contact (dermal, ingestion or inhalation) with exposed soils (i.e. potentially in future proposed landscaped areas and/or unpaved areas); and • Migration of groundwater off-site and into nearby water bodies, including aquatic ecosystems.

Presence of preferential pathways for contaminant movement	Generally speaking, local underground services such stormwater and services cable trenches/pipes have the potential to act as preferential pathways for contaminant migration at the site. However, the potential for migration would depend on the fate and transport properties of the CoPC. Major services including sewer and stormwater mains, high-voltage power and/or major telecommunications were not shown on the DBYD plans traversing the site.

6 SAMPLING, ANALYSIS AND QUALITY PLAN

6.1 Data Quality Objectives (DQO)

Data Quality Objectives (DQOs) were developed to define the type and quality of data required to achieve the project objectives outlined in Section 1.1. 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)[4]. The seven-step DQO approach for this project is outlined in the following sub-sections.

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

6.1.1 Step 1 - State the Problem

Preliminary CSM presented in this report identified potential sources of contamination/AEC at the site that may pose a risk to human health and the environment. Investigation data was required to assess the contamination status of the site and risks posed by CoPC in the context of ongoing commercial/industrial land use and potential future re-development including for a more sensitive land use such as residential/private health care facility, as part of the due diligence.

A hazardous building materials assessment is also required as part of the due diligence program.

The scope of the assessment was constrained by the due diligence timeline imposed by the client.

6.1.2 Step 2 - Identify the Decisions of the Study

The objectives of the assessment are outlined in Section 1.1. The decisions to be made reflect these objectives and are as follows:

- Did the site inspection, or does the historical information identify potential contamination sources/AEC at the site?
- Are any results above the Site Assessment Criteria (SAC)?
- Do potential risks associated with contamination exist, and if so, what are they?
- Is there a need for additional investigations and/or management with regards to contamination as part of the due diligence.

6.1.3 Step 3 - Identify Information Inputs

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

- Site information, including site observations and site history documentation;
- Sampling of potentially affected media, including soil and groundwater. Soil vapour assessment was outside the scope of this initial due diligence assessment;
- Observations of sub-surface variables such as soil type, photo-ionisation detector (PID) concentrations, odours and staining, and groundwater physiochemical parameters;

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

- Laboratory analysis of soils and groundwater for the CoPC identified in the CSM; and
- Field and laboratory QA/QC data.

6.1.4 Step 4 - Define the Study Boundary

The sampling will be confined to the site boundaries as shown in Figure 2 and will be limited vertically to a depth of 5.5mBGL achieved during drilling (spatial boundary). The sampling was completed on 12 January 2021 and 15 January 2021 (temporal boundary). The assessment of potential risk to adjacent land users has been made based on data collected within the site boundary.

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

6.1.5.1 Tier 1 Screening Criteria

The laboratory data will be assessed against relevant Tier 1 screening criteria (referred to as SAC), as outlined in Section 7. SAC exceedances 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 reported as either above or below the SAC. Statistical evaluation of the dataset via calculation of mean values and/or 95% upper confidence limit (UCL) values has not been undertaken due to the spatial distribution of the data and the number of samples submitted for analysis.

6.1.5.2 Field and Laboratory QA/QC

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

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

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

6.1.5.3 Appropriateness of Practical Quantitation Limits (PQLs)

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

6.1.6 Step 6 – Specify Limits on Decision Errors

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

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

6.1.7 Step 7 - Optimise the Design for Obtaining Data

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

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

6.2 Soil Sampling Plan and Methodology

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

Table 6-1: Soil Sampling Plan and Methodology

Aspect	Input
Sampling Density	Samples were collected from five locations as shown on the attached Figure 2. Based on the site area (2,624m^2), this number of locations corresponded to a sampling density of approximately one sample per 525m^2. The sampling plan was designed for due diligence purposes only and does not meet the minimum sampling density for hotspot identification, as outlined in the NSW EPA Contaminated Sites Sampling Design Guidelines (1995)[5].
Sampling Plan	The sampling locations were placed on a judgemental sampling plan and were broadly positioned for site coverage, taking into consideration areas that were not easily accessible. This sampling plan was considered suitable to make a preliminary assessment of potential risks associated with the AEC and CoPC identified in the CSM, and assess whether further investigation is warranted.
Set-out and Sampling Equipment	Sampling locations were set out using a tape measure. In-situ sampling locations were checked for underground services by an external contractor prior to sampling. Samples were collected using a drill rig equipped with spiral flight augers. Soil samples were obtained from a Standard Penetration Test (SPT) split-spoon sampler, or directly from the auger when conditions did not allow use of the SPT sampler.
Sample Collection and Field QA/QC	Soil samples were obtained on 12 January 2021 in accordance with standard field procedures. 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.

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

Aspect	Input
	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. The field splitting procedure included splitting the soil by hand and alternately filling the sampling containers to obtain a representative split sample.
Field Screening	A portable Photoionisation Detector (PID) fitted with a 10.6mV lamp was used to screen the samples for the presence of volatile organic compounds (VOCs). PID screening for VOCs was undertaken on soil samples using the soil sample headspace method. VOC data was obtained from partly filled zip-lock plastic bags following equilibration of the headspace gases. PID calibration records are maintained on file by JKE. Fill/spoil at the sampling locations was visually inspected during the works for the presence of fibre cement fragments.
Decontamination and Sample Preservation	Sampling personnel used disposable nitrile gloves during sampling activities. Soil samples were preserved by immediate storage in an insulated sample container with ice or ice bricks. On completion of the fieldwork, the samples were stored temporarily in fridges in the JKE warehouse before being delivered in the insulated sample container to a NATA registered laboratory for analysis under standard chain of custody (COC) procedures.

6.3 Groundwater Sampling Plan and Methodology

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

Table 6-2: Groundwater Sampling Plan and Methodology

Aspect	Input
Sampling Plan	Groundwater monitoring wells were installed in BH2 (MW2) and BH3 (MW3). The wells were positioned to gain a snap-shot of the groundwater conditions. Considering the topography and the location of the nearest down-gradient water body, MW2 was considered to be in the up-gradient area of the site and would be expected to provide an indication of groundwater flowing onto (beneath) the site from the east. MW3 was considered to be in the intermediate to down-gradient area of the site and would be expected to provide an indication of groundwater flowing across (beneath) the site and beyond the down-gradient site boundary.
Monitoring Well Installation Procedure	The monitoring well construction details are documented on the appropriate borehole logs attached in the appendices. The monitoring wells were installed to depths of approximately 3.37-5.36m below ground level where auger refusal was met in bedrock. The wells were generally constructed as follows: • 50mm diameter Class 18 PVC (machine slotted screen) was installed in the lower section of the well to intersect groundwater; • 50mm diameter Class 18 PVC casing was installed in the upper section of the well (screw fixed); • A 2mm sand filter pack was used around the screen section for groundwater infiltration; • A hydrated bentonite seal/plug was used on top of the sand pack to seal the well; and • A gatic cover was installed at the surface with a concrete plug to limit the inflow of surface water.
Monitoring Well Development	The monitoring wells were developed on 12 January 2021 using a submersible electrical pump. Due to the hydrogeological conditions, groundwater inflow into the wells was relatively low, therefore the wells were pumped until they were effectively dry.

Aspect	Input
Groundwater Sampling	The monitoring wells were allowed to recharge for approximately three to four days after development. Groundwater samples were obtained on 15 January 2021. Prior to sampling, the monitoring wells were checked for the presence of Light Non-Aqueous Phase Liquids (LNAPLs) using an inter-phase probe electronic dip meter. The monitoring well head space was checked for VOCs using a calibrated PID unit. The samples were obtained using a peristaltic pump. During sampling, the following parameters were monitored using calibrated field instruments: • SWL using an electronic dip meter; and • pH, temperature, electrical conductivity (EC), dissolved oxygen (DO) and redox potential (Eh) using a YSI Multi-probe water quality meter. Steady state conditions were considered to have been achieved when the difference in the pH measurements was less than 0.2 units, the difference in conductivity was less than 10%, and when the SWL was not in drawdown. Groundwater samples were obtained directly from the single use PVC tubing and placed in the sample containers. Duplicate samples were obtained by alternate filling of sample containers. This technique was adopted to minimise disturbance of the samples and loss of volatile contaminants associated with mixing of liquids in secondary containers, etc. Groundwater removed from the wells during development and sampling was transported to JKE in jerry cans and stored in holding drums prior to collection by a licensed waste water contractor for off-site disposal. The field monitoring record and calibration data are attached in the appendices.
Sample Preservation	The samples were preserved with reference to the analytical requirements and placed in an insulated container with ice or ice bricks. On completion of the fieldwork, the samples were temporarily stored in a fridge at the JKE office, before being delivered in the insulated sample container to a NATA registered laboratory for analysis under standard COC procedures.

6.4 Laboratory Analysis

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

Table 6-3: Laboratory Details

Samples	Laboratory	Report Reference
All primary samples and field QA/QC samples including (intra-laboratory duplicates, trip blanks and trip spikes)	Envirolab Services Pty Ltd NSW, NATA Accreditation Number – 2901 (ISO/IEC 17025 compliance)	259409 and 259572

7 SITE ASSESMENT CRITERIA (SAC)

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

7.1 Soil

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

7.1.1 Human Health

- Health Investigation Levels (HILs) for a 'commercial/industrial' exposure scenario (HIL-D) and 'residential with minimal opportunities for soil access' exposure scenario (HIL-B);
- Health Screening Levels (HSLs) for a 'commercial/industrial' exposure scenario (HSL-D) and 'low-high density residential' exposure scenario (HSL-A & HSL-B). HSLs were calculated based on conservative assumptions including a 'sand' type and a depth interval of 0m to 1m;
- HSLs for direct contact presented in the CRC Care Technical Report No. 10 – Health screening levels for hydrocarbons in soil and groundwater Part 1: Technical development document (2011)[6]; and
- Asbestos was assessed on the basis of presence/absence. Asbestos HSLs were not adopted as detailed asbestos quantification was not undertaken.

7.1.2 Environment (Ecological – terrestrial ecosystems)

- Ecological Investigation Levels (EILs) and Ecological Screening Levels (ESLs) for a 'commercial/industrial' and for an 'urban residential and public open space' (URPOS) exposure scenario. These have only been applied to the top 2m of soil as outlined in NEPM (2013). The criterion for benzo(a)pyrene has been increased from the value presented in NEPM (2013) based on the Canadian Soil Quality Guidelines[7];
- ESLs were adopted based on a coarse soil type which is most conservative;
- 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)[8]. This method is considered to be adequate given the main objectives of this assessment.

[6] 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*

[7] 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)

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

7.1.3 Management Limits for Petroleum Hydrocarbons

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

7.2 Groundwater

Groundwater data were compared to relevant Tier 1 screening criteria in accordance with NEPM (2013), following an assessment of environmental values in accordance with the Guidelines for the Assessment and Management of Groundwater Contamination (2007)[9]. Environmental values for this investigation include aquatic ecosystems and human-health risks in non-use scenarios.

7.2.1 Human Health

- The NEPM (2013) HSLs were not considered as there is not 2m of soil across the site and the groundwater was recorded within sandstone bedrock. On this basis, JKE have undertaken a site-specific assessment (SSA) for the Tier 1 screening of human health risks posed by volatile contaminants in groundwater. The assessment included selection of alternative Tier 1 criteria that were considered suitably protective of human health. These criteria are based on drinking water guidelines and have been referred to as HSL-SSA. The criteria were based on the following (as shown in the attached report tables):
  - Australian Drinking Water Guidelines 2011 (updated 2018)[10] for BTEX compounds and selected VOCs;
  - World Health Organisation (WHO) document titled Petroleum Products in Drinking-water, Background document for the development of WHO Guidelines for Drinking Water Quality (2008)[11] for petroleum hydrocarbons;
  - USEPA Region 9 screening levels for naphthalene (threshold value for tap water); and
  - The use of the laboratory PQLs for other contaminants where there were no Australian guidelines.

7.2.2 Environment (Ecological - aquatic ecosystems)

Groundwater Investigation Levels (GILs) for 95% protection of freshwater species were adopted based on the Default Guideline Values in the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2018)[12]. The 99% trigger values were adopted where required to account for bioaccumulation. Low and moderate reliability trigger values were also adopted for some contaminants where high-reliability trigger values don't exist.

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

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

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

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

8 RESULTS

8.1 Summary of Data (QA/QC) Evaluation

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

8.2 Subsurface Conditions

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

Table 8-1: Summary of Subsurface Conditions

Profile	Description
Pavement	Concrete pavement was encountered at the surface in all boreholes.
Fill	Fill was encountered beneath the pavement in all boreholes and extended to depths of approximately 0.3mBGL to 0.6mBGL. The fill typically comprised sand, silty sand and gravelly silty sand with inclusions of igneous and sandstone gravel, concrete fragments and clay nodules.
Natural Soil	Residual soil comprising silty sandy clay was encountered below the fill in BH2 only. The residual soil profile typically extended to the top of the weathered sandstone bedrock.
Bedrock	Sandstone bedrock was encountered in all boreholes at depths of 0.3mBGL to 0.8mBGL.
Groundwater	Groundwater seepage was not encountered in the boreholes during drilling. All boreholes remained dry on completion of drilling and a short time after.

8.3 Field Screening

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

Table 8-2: Summary of Field Screening

Aspect	Details
PID Screening of Soil Samples for VOCs	PID soil sample headspace readings are presented in attached report tables and the COC documents attached in the appendices. The results ranged from 0.0ppm to 1.2ppm equivalent isobutylene. These results indicate that relatively low concentrations of PID detectable VOCs were present in some samples.
Groundwater Depth	A SWL was measured in MW2 at 4.81mBGL approximately three hours after completion of drilling, during development of this well. The remaining boreholes were dry during and a short time after completion of drilling. SWLs measured on the 15 January 2021 in the monitoring wells installed at the site ranged from 2.12mBGL to 2.35mBGL.
Groundwater Field Parameters	Field measurements recorded during sampling were as follows: - pH ranged from 6.04 to 6.05; - EC ranged from 606µS/cm to 682µS/cm; - Eh ranged from 52.1mV to 96.3mV; and

Aspect	Details
	- DO ranged from 4.0ppm to 4.2ppm.
LNAPLs petroleum hydrocarbons	Phase separated product (i.e. LNAPL) were not detected using the interphase probe during groundwater sampling.

8.4 Soil Laboratory Results

The soil laboratory results were assessed against the SAC presented in Section 7.1. All SAC are shown in summary report tables attached in the appendices. A summary of the results is presented below:

8.4.1 Human Health and Environmental (Ecological) Assessment

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

Analyte	N	Max. (mg/kg)	N> Human Health Criteria	N> Ecological Criteria	Comments
Arsenic	10	6	0	NSL	-
Cadmium	10	0.8	0	NSL	-
Chromium (total)	10	45	0	0	-
Copper	10	210	0	1	Copper concentration exceeded the adopted EIL in one fill sample collected from BH4.
Lead	10	340	0	0	-
Mercury	10	0.8	0	NSL	-
Nickel	10	63	0	2	Nickel concentrations exceeded the adopted EIL in two fill samples collected from BH4 and BH5.
Zinc	10	390	0	3	Zinc concentrations exceeded the adopted EIL in three fill samples collected from BH3 and BH4.
Total Phenol	5	<5	0	NSL	-
Total PAHs	10	20	0	NSL	-
Benzo(a)pyrene	10	1.7	NSL	0	-
Carcinogenic PAHs (as BaP TEQ)	10	2.6	0	NSL	-
Naphthalene	10	<PQL	0	NSL	-

Analyte	N	Max. (mg/kg)	N> Human Health Criteria	N> Ecological Criteria	Comments
DDT+DDE+DDD	5	<PQL	0	NSL	-
DDT	5	<PQL	NSL	0	-
Aldrin and dieldrin	5	7.2	0	NSL	-
Chlordane	5	<PQL	0	NSL	-
Heptachlor	5	<PQL	0	NSL	-
PCBs	5	<PQL	0	NSL	-
TRH F1	10	<PQL	0	0	-
TRH F2	10	<PQL	0	0	-
TRH F3	10	610	0	2	TRH F3 concentrations exceeded the adopted EIL in two fill samples collected from BH2 and BH4.
TRH F4	10	1,300	0	0	-
Benzene	10	<PQL	0	0	-
Toluene	10	<PQL	0	0	-
Ethylbenzene	10	<PQL	0	0	-
Xylenes	10	<PQL	0	0	-
Asbestos (in soil)	5	Detected	0	NA	Chrysotile asbestos was detected in two fill sample from BH3 and BH4. Identified asbestos occurrences were considered to be friable (fibrous asbestos/asbestos fines - FA/AF) in BH3 and bonded asbestos (ACM) in BH4.

Notes:

N: Total number (primary samples)

NSL: No set limit

NL: Not limiting

8.5 Groundwater Laboratory Results

The soil laboratory results were assessed against the SAC presented in Section 7.2. SAC are shown in the report tables attached in the appendices. A summary of the results is presented below:

Table 8-4: Summary of Groundwater Laboratory Results – Human Health and Environmental (Ecological)

Analyte	N	Max. (µg/L)	N> Human Health Criteria	N> Ecological Criteria	Comments
Arsenic	2	<PQL	0	0	-
Cadmium	2	0.3	0	1	The cadmium concentration exceeded the adopted GIL in MW2.
Chromium (total)	2	16	0	1	The chromium concentration exceeded the adopted GIL in MW3.
Copper	2	3			The copper concentration exceeded the adopted GIL in MW3.
Lead	2	<PQL	0	0	-
Mercury	2	<PQL	0	0	-
Nickel	2	2	0	0	-
Zinc	2	520	0	2	Zinc concentrations exceeded the adopted GIL in both MW2 and MW3.
Total PAHs	2	<PQL	0	0	-
Benzo(a)pyrene	2	<PQL	0	0	-
TRH F1	2	<PQL	0	0	-
TRH F2	2	270	2	0	TRH F2 concentrations exceeded the adopted site specific HSL-SSA criterion in both MW2 and MW3.
TRH F3	2	<PQL	NSL	0	-
TRH F4	2	<PQL	NSL	0	-
Benzene	2	1	0	0	A detectable benzene concentration below the SAC was identified in MW3.
Toluene	2	1	0	0	A detectable toluene concentration below the SAC was identified in MW3.
Ethylbenzene	2	<PQL	0	0	-
Total Xylenes	2	2	0	0	A detectable concentration of xylenes below SAC was identified in MW3
pH	2	6.7	0	0	-

Analyte	N	Max. (µg/L)	N> Human Health Criteria	N> Ecological Criteria	Comments
EC	2	600	0	0	-
VOCs	2	5	0	0	Detectable concentrations of cis-1,2-dichloroethene, trichloroethene (TCE), tetrachloroethene (PCE) and chloroform were identified in MW3. However, all results were below the adopted HSL-SSA criteria. All other VOC concentrations were below the laboratory PQL.

Notes:

N: Total number (primary samples)

NSL: No set limit

NL: Not limiting

9 HAZARDOUS MATERIALS ASSESSMENT

For the purposes of this assessment, hazardous materials were limited to asbestos, lead in paint, synthetic mineral fibre (SMF), PCBs and ozone depleting substances (OSD) which may be present within the site buildings. No previous Asbestos / Hazardous Materials Surveys and/or Management Plans were provided for review.

A walkover inspection of the site buildings was undertaken by JKE on 15 January 2021. The inspection was limited to safely accessible building areas and comprised visual assessment of the presence and condition of hazardous buildings materials. Inspection included tenanted/occupied building areas, back of house areas, stock storage areas, car parking areas and excluded some of the first and second floor areas within building at 206 Parramatta Road. Roof structures were inspected from a distance were possible as no safe access was available. Selected site photographs obtained during the inspection are attached in the appendices. Descriptions of the hazardous materials assessment undertaken is contained in the following sections.

9.1 Asbestos

In Australia, asbestos cement materials were first manufactured in the 1920s and were commonly used in the manufacture of residential building materials from the mid-1940s until the late 1980s. During the 1980s asbestos cement materials were phased out in favour of asbestos-free products. From 31 December 2003, the total ban on manufacture, use, reuse, import, transport, storage or sale of all forms of asbestos came into force. The site buildings are understood to have been present since at least 1930s, therefore the potential for asbestos containing building materials to be present is considered to be high.

Our inspection identified potential asbestos containing materials (PACMs), observed to be present as fibre cement sheet (FCS) ceiling panels on the ground floor of 206 Parramatta Road within the amenities area. FCS was also observed in other parts of the buildings on site. Identified PACMs were not labelled. In general, all inspected PACMs were non-friable and appeared to be in good or fair condition.

Due to the age of the buildings, there remains a potential that asbestos containing materials are present in areas of the buildings not inspected, covered up, or that were inaccessible.

9.2 Lead in Paint

Significantly deteriorated paint systems that are likely to impact on demolition/refurbishment practices or that would be considered a health or environmental hazard were not identified.

9.3 Synthetic Mineral Fibre (SMF)

During our inspection, SMF was observed to be present throughout the site as sarking insulation beneath the roof, around pipe/ductwork, within hot water systems and boiler units and as ceiling tiles. Observed SMF was considered to be mostly in a good or fair condition and in general presented a low risk as contact with site occupants is limited.

9.4 Polychlorinated Biphenyls (PCBs)

The use of PCBs in electrical equipment (i.e. transformers, lighting capacitors etc.) within Australia was phased out in the early to mid-1970s. Site buildings were constructed prior to the phase out of PCBs, therefore there is a potential for PCBs to be present within the buildings on site. However, our inspection did not identify any potential PCB containing equipment to be present.

9.5 Ozone Depleting Substances (ODS)

Some of the split air conditioning systems on site were found to contain R22 refrigerant gas. R22 is a hydro chlorofluorocarbon (HCFC) which is considered to be ozone depleting.

10 DISCUSSION

10.1 Contamination Sources/AEC and Potential for Site Contamination

Based on the scope of work undertaken for this assessment, JKE identified the following potential contamination sources/AEC:

- Imported fill material (entire site);
- Various historical commercial/industrial activities across the site including dry cleaner's, electroplating etc. (entire site);
- Hazardous building materials (entire site);
- Use of pesticides (entire site); and
- Current and historical off-site commercial/light industrial activities on neighbouring properties including "7-Eleven" service station (20m to the south-east), "Harold Park Repairs" mechanical workshop (20m to the west), "VG Group" car detailing (20m to the north-east), historical dry cleaner's (29 to the west) etc.

Considering the above, and based on a qualitative assessment of various lines of evidence as discussed throughout this report, JKE are of the opinion that there is a potential for site contamination. The preliminary soil and groundwater data collected for the assessment is discussed further in the following subsection, as part of the Tier 1 risk assessment.

10.2 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.

10.2.1 Soil

10.2.1.1 Asbestos

Chrysotile asbestos was detected in two fill sample from BH3 and BH4 (see Figure 3). AF/FA was indicated to be present in BH3 by the laboratory whilst bonded asbestos (as ACM) was indicated to be present in BH4. The presence of FA/AF occurrences in fill is considered to be a result of former building demolition/ refurbishment activities that took place historically at the site. These identified occurrences are not considered to pose an unacceptable risk to current site users given the site area remains sealed under concrete pavements or beneath building footprints, hence there is no complete SPR during current day-to-day use.

We are of the opinion that the risk of exposure to asbestos would increase during excavation works as part of the redevelopment and these risks will need to be managed/mitigated. Further characterisation and/or remediation associated with this occurrence will be required for any future proposed re-development on site.

10.2.1.2 Heavy metals

Copper, nickel and zinc concentrations exceeded the adopted ecological criteria in fill samples from BH3, BH4 and BH5 (see Figure 3). The source of heavy metals is considered to be associated with the fill material. These identified exceedances are not considered to currently present an unacceptable ecological risk as there were no accessible soils which were observed to be present anywhere on site, i.e. there is no complete SPR linkage. Further characterisation or remediation associated with these ecological exceedances may potentially be required as part of future site re-development.

10.2.1.3 Hydrocarbons

The concentrations of TRH F3 fraction exceeded the adopted ecological criteria (i.e. URPOS) in two fill samples from BH2 and BH4 (see Figure 3). It was noted that testing of the underlying deeper fill and natural samples in these locations confirmed non-detect TRH concentrations which indicated that the TRH has not migrated vertically. These identified exceedances are not considered to currently present an unacceptable ecological risk as there were no accessible soils which were observed to be present anywhere on site, i.e. there is no complete SPR linkage. Further characterisation or remediation associated with these ecological exceedances may potentially be required as part of future site re-development.

10.2.1.4 Pesticides and PCBs

Detectable concentrations of Aldrin and Dieldrin (OCPs) were identified in fill sample from BH4. All concentrations were identified to be below the adopted SAC. However, it should be noted that these detected concentrations may have implications with regards to waste management/disposal during site re-development.

10.2.2 Groundwater

10.2.2.1 Heavy metals

Cadmium, chromium, copper and zinc were detected in the groundwater samples above the ecological criteria in MW2 and MW3, as shown on Figure 3 attached in the appendices. Elevated concentrations of these metals are common in urban groundwater as a result of leaking water infrastructure and surface run-off. The occurrence of these metals in groundwater is unlikely to pose a risk that warrants remediation of groundwater. However, further characterisation with regards to these exceedances may potentially be required as part of future site re-development.

10.2.2.2 Hydrocarbons

TRH F2 concentrations exceeded the adopted HSL-SSA criterion in both MW2 and MW3. Further characterisation and/or management associated with these exceedances may potentially be required. The source of the TRHs in groundwater has not been established.

It is noted that detectable concentrations of BTEX compounds were also identified in groundwater sample collected from MW3. All detect concentrations were below the adopted SAC for groundwater. However, the detect concentrations of BTEX may potentially be attributed to spills or leaks which have taken place on site or may potentially indicate migration of impacted groundwater from off-site sources (i.e. "7-Eleven" service station to the south-east). Further investigation is required to confirm the associated risks.

10.2.2.3 VOCs

It is noted that detectable concentrations of cis-1,2-dichloroethene, TCE, PCE and chloroform below the adopted HSL-SSA criteria were identified in groundwater sample collected from MW3. Identified concentrations of PCE and its breakdown products TCE and cis-1,2-dichloroethene are typically associated with dry cleaning processes which were identified to have historically taken place on site and on neighbouring properties in close proximity to the site.

Further groundwater characterisation and soil vapour investigation is required to assess the potential human health risks associated with the identified dry cleaner-related chemicals. A specific point source/location (e.g. leaking sewer infrastructure, area of historical spills etc) for these contaminants has not been confirmed.

10.3 Decision Statements

The decision statements are addressed below:

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

Yes, as noted in Section 10.1.

Are any results above the SAC?

Copper, nickel and zinc were detected above the adopted ecological SAC in fill at BH3, BH4 and BH5. TRH F3 was detected above the ecological SAC in fill at BH2 and BH4. Cadmium, chromium, copper and zinc were also identified above the ecological SAC for groundwater within MW2 and MW3. TRH F2 was also detected above the adopted HSL-SSA criteria in MW2 and MW3.

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

Potential risks have been identified as discussed in Section 10.1.

Is there a need for additional investigations and/or management with regards to contamination as part of the due diligence.

Due to the potential risks from groundwater and soil vapour, further investigation is recommended. As the site is currently paved, direct contact risks with groundwater or soil contamination are not of primary concern at this stage. However, additional detailed investigation would most likely be necessary during future redevelopment of the site.

10.4 Hazardous Materials

The site buildings are understood to have been present since at least 1930s. No previous Asbestos / Hazardous Materials Surveys and/or Management Plans were provided to JKE for review as part of this assessment.

Hazardous materials identified on site during JKE's inspection were limited to PACMs, SMF and R22 refrigerant gases.

PACMs were observed to be present as FCS ceiling panels on the ground floor of 206 Parramatta Road within the amenities area. FCS was also observed in other parts of the buildings on site. In general, all inspected PACMs were non-friable and appeared to be in good or fair condition.

If a workplace was built before 31 December 2003 or if asbestos has been identified at the workplace, an up to date asbestos register must be kept on premises and made available by a person conducting a business or undertaking (PCBU) to anyone likely to be exposed to asbestos.

SMF was observed to be present throughout the site as sarking insulation beneath the roof, around pipe / ductwork, within hot water systems and boiler units and as ceiling tiles. The presence of the SMF within the site buildings is not considered to be of significant concern as contact with site occupants is limited.

R22 refrigerant gas was identified for some of the air conditioning systems at the site. R22 is a hydro chlorofluorocarbon (HCFC) and is currently being phased out.

11 CONCLUSIONS AND RECOMMENDATIONS

The assessment included a review of historical information, soil sampling from five boreholes and groundwater sampling from two monitoring wells installed onsite. Parts of the site are currently used as commercial retail tenancies (i.e. "Energy Shop Australia" and "Olde English Tiles") and as music tutoring premises including car parking to the east. The site has historically been used for various commercial/industrial activities including dry cleaners and electroplating. Commercial/industrial activities were also identified for the neighbouring properties including service station, dry cleaners and mechanical workshops etc.

This assessment identified asbestos in soil, along with some heavy metals and hydrocarbons that exceeded the ecological-based SAC. Hydrocarbons in the form of volatile TRH and chlorinated VOCs were also identified in groundwater, with the TRH concentrations exceeding the human health-based SAC. Risks from asbestos and the ecological risks associated with heavy metals and TRHs in soil were assessed to be low in the context of the existing land use/site layout as there is currently no complete exposure pathway. A potential pathway exists in relation to exposure to vapours from volatile contaminants in soil and/or groundwater. This warrants further investigation for due diligence purposes. It is also anticipated that further detailed investigation will be necessary prior to any site redevelopment.

JKE recommends the following:

- A detailed hazardous materials assessment should be undertaken to confirm the presence and extent of all hazardous building materials present on site. A Hazardous Materials Register and Management Plan should be produced for all properties comprising the site following this assessment, in order to comply with currently endorsed regulations, codes and guidelines;
- Should refurbishment or demolition works be proposed, a destructive hazardous building materials survey should be undertaken prior to any demolition works taking place. Any proposed demolition works are to be complete with regards to the hazardous building materials report and all relevant codes, guidelines and standards. Clearance certificates are to be issued following removal of any hazardous building materials;
- Undertake a due diligence soil vapour investigation to determine the potential human health risks associated with vapour intrusion;
- Complete Detailed Site Investigation (DSI) as required for any future proposed development on site;
- Complete an ASS assessment as required for any future proposed development on site;
- Asbestos control measures will be required to be implemented for any works across the site which require penetration of the concrete slab/pavement. Control measures including preparation of a work specific Asbestos Management Plan (AMP) and engaging a specialist (i.e. licensed asbestos assessor) to assist with its implementation, air monitoring for potential asbestos fibres during the works and use of appropriate personal protective equipment are recommended.

At this stage, JKE consider that there is no requirement to notify the NSW EPA Guidelines on the Duty to Report Contamination under Section 60 of the CLM Act 1997 (2015)[13]. This should be reassessed as further investigations/assessments occur.

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

11.1 Indicative Capital Expenditure Forecast

Capital expenditure forecast for the site foreseeable at this stage is summarised in the following table:

Table 11-1: Capital Expenditure Forecast

Action Item / Comments	$$$ Short term #	$$$ As part of re-development*
Allow for preparation of hazardous materials register & management plan for the site in accordance with the regulations.	$6,000 - $8,000	NA
Allow for a destructive hazardous building materials survey to be carried out prior to any demolition works as part of re-development.	NA	$6,000 - $8,000
Undertake a soil vapour investigation to determine the potential human health risks associated with vapour intrusion.	$15,000 - $30,000	$15,000 - $30,000^
Allow to complete a DSI as required for any future proposed re-development on site.	NA	$30,000 - $50,000^
Allow for asbestos control measures to be implemented for any future proposed re-development across the site.	NA	$20,000 - $40,000
Allow to complete an ASS Assessment for any future proposed re-development on site.	NA	$5,000 - $7,000

Notes:

#: Essential capital expenditure forecast in the short term (i.e. within 1 year of purchase).

*: Foreseeable capital expenditure forecast in relation to potential re-development.

^: Depending on the timing, if soil vapour investigation is not completed as stand-alone a short time after purchase then it should be completed as part of the DSI prior to re-development. Presented budget for the DSI excludes soil vapour investigation. If, however DSI and soil vapour investigation are both undertaken concurrently then the two presented budgets should be added.

All budgets are exclusive of GST and are based on our knowledge at the time of preparation. Actual costs may vary depending on the exact scope of work and timing.

12 LIMITATIONS

The report limitations are outlined below:

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

Important Information About This Report

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

The Report is based on a Unique Set of Project Specific Factors
This report has been prepared in response to specific project requirements as stated in the JKE proposal document which may have been limited by instructions from the client. This report should be reviewed, and if necessary, revised if any of the following occur:

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

JKE will not accept any responsibility whatsoever for situations where one or more of the above factors have changed since completion of the investigation. If the subject site is sold, ownership of the investigation report should be transferred by JKE to the new site owners who will be informed of the conditions and limitations under which the investigation was undertaken. No person should apply an investigation 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 investigation 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 investigations 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 investigation 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.

Investigation Limitations
Although information provided by a site investigation can reduce exposure to the risk of the presence of contamination, no environmental site investigation can eliminate the risk. Even a rigorous professional investigation 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 Investigations by Design Professionals

Costly problems can occur when other design professionals develop plans based on misinterpretation of an investigation 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 Investigation Report

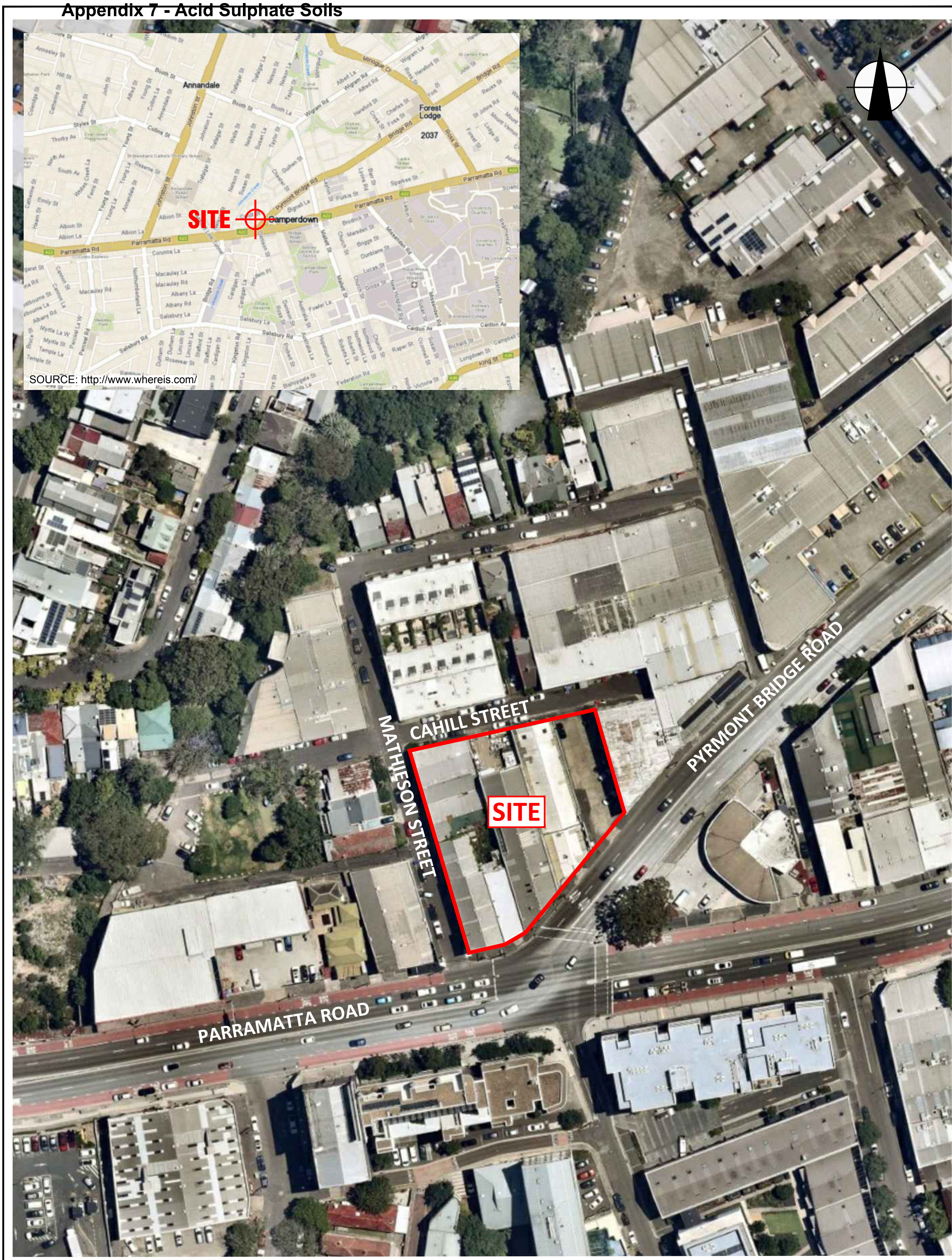
Borehole and test pit logs are prepared by environmental scientists, engineers or geologists based upon interpretation of field conditions and laboratory evaluation of field samples. Logs are normally provided in our reports and these should not be re-drawn for inclusion in site remediation or other 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 investigation. 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 investigation. 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 investigation 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 investigation 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 investigation, and you are encouraged to read them closely. Your consultant will be pleased to give full and frank answers to any questions.

Appendix A: Report Figures



AERIAL IMAGE SOURCE: MAPS.AU.NEARMAP.COM

Title: **SITE LOCATION PLAN**

Location: 122-128 & 130 PYRMONT BRIDGE ROAD AND 206 PARRAMATTA ROAD, ANNADALE, NSW

Project No: E33770PA

Figure No: 1

JKEnvironments

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

PLOT DATE: 25/01/2021 4:04:04 PM DWG FILE: Z:\5 EIS\5C EIS JOBS\33000'S\E33770PA ANNANDALE\CAD\E33770PA.DWG

LEGEND

(red line)	APPROXIMATE SITE BOUNDARY
(orange dashed line)	APPROXIMATE COMPRISING PROPERTY BOUNDARIES
BH(Fill Depth)	BOREHOLE LOCATION, NUMBER AND DEPTH OF FILL (m)
BH/MW(Fill Depth)	BOREHOLE AND GROUNDWATER MONITORING WELL LOCATION, NUMBER AND DEPTH OF FILL (m)

AERIAL IMAGE SOURCE: MAPS.AU.NEARMAP.COM

0 4 8 12 16 20
SCALE 1:400 @A3 METRES

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

Title: **SAMPLE LOCATION PLAN**

Location: 122-128 & 130 PYRMONT BRIDGE ROAD AND 206 PARRAMATTA ROAD, ANNADALE, NSW

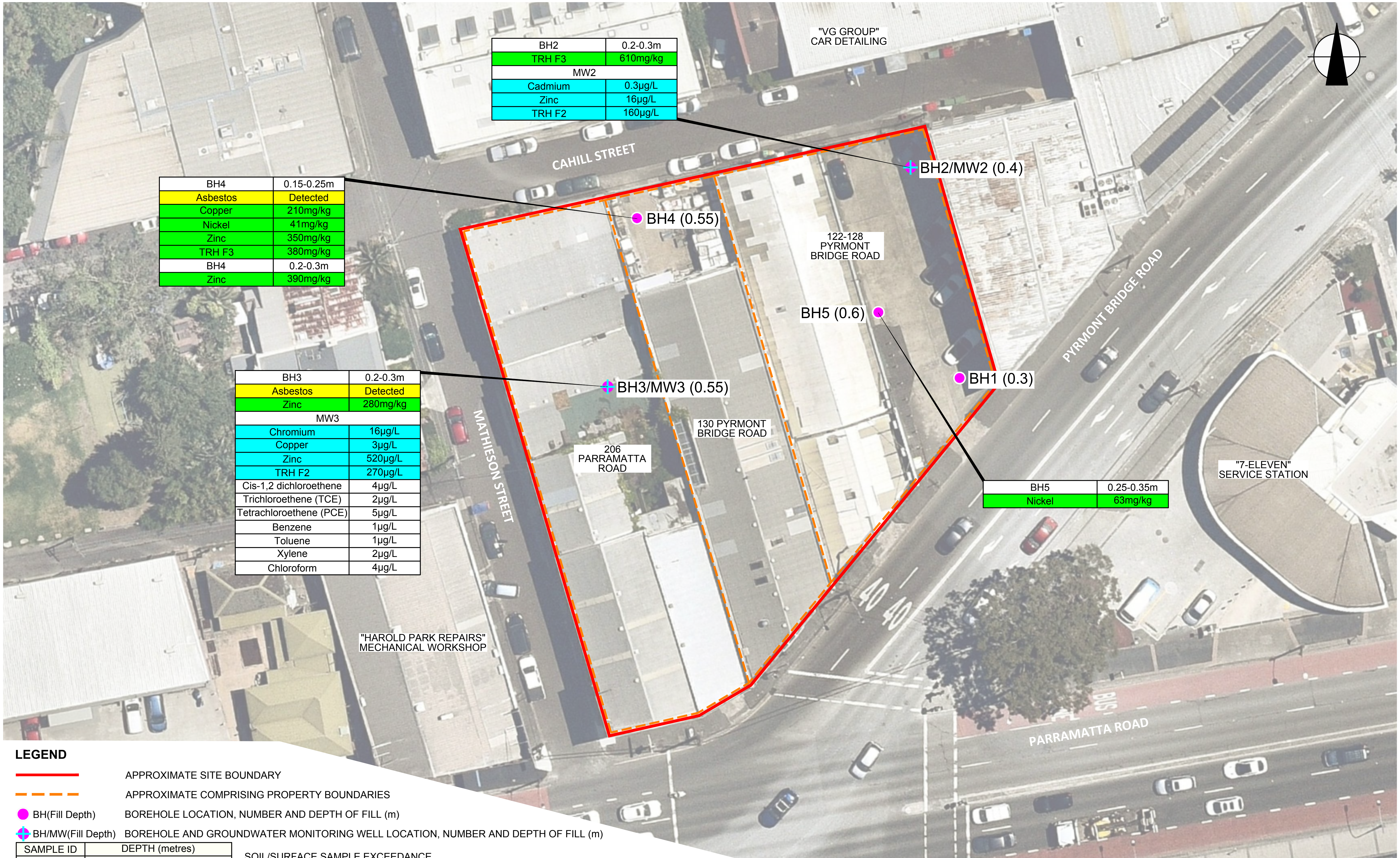
Project No: E33770PA

Figure No: 2

JKEnvironments

PLOT DATE: 25/01/2021 4:37:42 PM DWG FILE: Z:\5 EIS\5C EIS JOBS\33000'S\E33770PA ANNANDALE\CAD\E33770PA.DWG

Appendix 7 - Acid Sulphate Soils



BH2	0.2-0.3m
TRH F3	610mg/kg
MW2	
Cadmium	0.3µg/L
Zinc	16µg/L
TRH F2	160µg/L

BH4	0.15-0.25m
Asbestos	Detected
Copper	210mg/kg
Nickel	41mg/kg
Zinc	350mg/kg
TRH F3	380mg/kg
BH4	0.2-0.3m
Zinc	390mg/kg

BH3	0.2-0.3m
Asbestos	Detected
Zinc	280mg/kg
MW3	
Chromium	16µg/L
Copper	3µg/L
Zinc	520µg/L
TRH F2	270µg/L
Cis-1,2 dichloroethene	4µg/L
Trichloroethene (TCE)	2µg/L
Tetrachloroethene (PCE)	5µg/L
Benzene	1µg/L
Toluene	1µg/L
Xylene	2µg/L
Chloroform	4µg/L

BH5	0.25-0.35m
Nickel	63mg/kg

LEGEND

APPROXIMATE SITE BOUNDARY

APPROXIMATE COMPRISING PROPERTY BOUNDARIES

BH(Fill Depth) BOREHOLE LOCATION, NUMBER AND DEPTH OF FILL (m)

BH/MW(Fill Depth) BOREHOLE AND GROUNDWATER MONITORING WELL LOCATION, NUMBER AND DEPTH OF FILL (m)

SAMPLE ID	DEPTH (metres)
CHEMICAL	CONCENTRATION

SOIL/SURFACE SAMPLE EXCEEDANCE

SAMPLE ID	-
CHEMICAL	CONCENTRATION (µg/L)

GROUNDWATER SAMPLE EXCEEDANCE

SOIL/SURFACE CONTAMINATION ABOVE INVESTIGATION LEVELS FOR HUMAN HEALTH RISK

SOIL CONTAMINATION ABOVE INVESTIGATION LEVELS FOR ECOLOGICAL RISK

GROUNDWATER CONTAMINATION ABOVE INVESTIGATION LEVELS

AERIAL IMAGE SOURCE: MAPS.AU.NEARMAP.COM

0 4 8 12 16 20
SCALE 1:400 @A3 METRES

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

Title: **CONTAMINATION LOCATION PLAN**

Location: 122-128 & 130 PYRMONT BRIDGE ROAD AND 206 PARRAMATTA ROAD, ANNADALE, NSW

Project No: E33770PA

Figure No: 3

JKEnvironments

PLOT DATE: 27/01/2021 12:01:46 PM DWG FILE: Z:\5 EIS\5C EIS JOBS\33000'S\E33770PA ANNANDALE\CAD\E33770PA.DWG

Appendix B: Site Information and Site History

Selected Site Photographs

Appendix H: Field Work Documents

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PID FIELD CALIBRATION FORM

Client:	DEXUS
Project:	Proposed Mixed Use Development
Location:	122-128 & 130 Pyrmont Bridge Road; 206 Parramatta Road, ANNANDALE, NSW
Job Number:	E33770PA

PID

Make: Mini Rae 2000	Model: PID	Unit: Yellow	Date of last factory calibration: 19.8.20
Date of calibration: 11.01.21		Name of Calibrator: AVB	
Calibration gas: Iso-butylene		Calibration Gas Concentration: 100.0 ppm	
Measured reading: 100 ppm		Error in measured reading: ± 0 ppm	
Measured reading Acceptable (Yes/No):			

PID

Make:	Model:	Unit:	Date of last factory calibration:
Date of calibration:		Name of Calibrator:	
Calibration gas: Iso-butylene		Calibration Gas Concentration: 100.0 ppm	
Measured reading: ppm		Error in measured reading: ± ppm	
Measured reading Acceptable (Yes/No):			

PID

Make:	Model:	Unit:	Date of last factory calibration:
Date of calibration:		Name of Calibrator:	
Calibration gas: Iso-butylene		Calibration Gas Concentration: 100.0 ppm	
Measured reading: ppm		Error in measured reading: ± ppm	
Measured reading Acceptable (Yes/No):			

PID

Make:	Model:	Unit:	Date of last factory calibration:
Date of calibration:		Name of Calibrator:	
Calibration gas: Iso-butylene		Calibration Gas Concentration: 100.0 ppm	
Measured reading: ppm		Error in measured reading: ± ppm	
Measured reading Acceptable (Yes/No):			

PID

Make:	Model:	Unit:	Date of last factory calibration:
Date of calibration:		Name of Calibrator:	
Calibration gas: Iso-butylene		Calibration Gas Concentration: 100.0 ppm	
Measured reading: ppm		Error in measured reading: ± ppm	
Measured reading Acceptable (Yes/No):			

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WATER QUALITY METER CALIBRATION FORM

Client:	DEXUS		
Project:	Proposed Mixed Use Development		
Location:	122-128 & 130 Pyrmont Bridge Road; 206 Parramatta Road, ANNANDALE, NSW		
Job Number:	E33770PA		
DISSOLVED OXYGEN			
Make: YSI 5		Model: Professional Plus	
Date of calibration: 11.01.21		Name of Calibrator: AVB	
Span value: 70% to 130%			
Measured value: 99%			
Measured reading Acceptable (Yes/No):			
pH			
Make: YSI 5		Model: Professional Plus	
Date of calibration: 11.01.21		Name of Calibrator: AVB	
Buffer 1: Theoretical pH = 7.01± 0.01		Expiry date: Dec 2021	Lot No: 355904
Buffer 2: Theoretical pH = 4.01± 0.01		Expiry date: Nov 2021	Lot No: 354762
Measured reading of Buffer 1: 7.01			
Measured reading of Buffer 2: 4.00			
Slope: —		Measured reading Acceptable (Yes/No):	
EC			
Make: YSI 5		Model: Professional Plus	
Date: 11.01.21	Name of Calibrator: AVB		Temperature: 26.6 °C
Calibration solution: Conductivity Std		Expiry date: Jul 22	Lot No: 338233
Theoretical conductivity at temperature (see solution container): 1440 µS/cm			
Measured conductivity: 1441 µS/cm		Measured reading Acceptable (Yes/No):	
REDOX			
Make: YSI 5		Model: Professional Plus	
Date of calibration: 11.01.21		Name of Calibrator: AVB	
Calibration solution: ORP Test		Expiry date: 04/2025	Lot No: 5235
Theoretical redox value: 240mV			
Measured redox reading: 240.1 mV		Measured reading Acceptable (Yes/No):	

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Client:	DEXUS	**Job No.:**	E33770PA
Project:	Proposed Mixed Use Development	**Well No.:**	MW2
Location:	122-128 & 130 Pyrmont Bridge Road; 206 Parramatta Road, ANNANDALE, NSW	**Depth (m):**	5,36

WELL FINISH DETAILS

	Gatic Cover ☑	Standpipe ☐	Other (describe) ☐

WELL DEVELOPMENT DETAILS

Method:	Development Pump	**SWL – Before (m):**	4.81 m BGL
Date:	12.01.21	**Time – Before:**	4:50 pm
Undertaken By:	AVB	**SWL – After (m):**	NA
Total Vol. Removed:		**Time – After:**	
PID Reading (ppm):	0.0		

Comments:

DEVELOPMENT MEASUREMENTS

Volume Removed (L)	Temp (°C)	DO (mg/L)	EC (µS/cm)	pH	Eh (mV)
1.8	28.4	10	2017	7.26	111.3
	Pumped	DRY			

Comments: Odours (YES / NO), NAPL/PSH (YES / NO), Sheen (YES / NO), Steady State Achieved (YES / NO)

YSI Used: 3

Tested By:	AVB	**Remarks:** - Steady state conditions - Difference in the pH less than 0.2 units, difference in the conductiveity less than 10% and SWL stable/not in drawdown - Minimum 3 monitoring well volumes purged, unless well purged until it is effectively dry
Date Tested:	12.01.21	
Checked By:	AVB	
Date:	12.01.21	

JKEnvironments

Client:	DEXUS	**Job No.:**	E33770PA
Project:	Proposed Mixed Use Development	**Well No.:**	MW/3
Location:	122-128 & 130 Pyrmont Bridge Road; 206 Parramatta Road, ANNANDALE, NSW	**Depth (m):**	3.37

WELL FINISH DETAILS

	Gatic Cover ☑	Standpipe ☐	Other (describe) ☐

WELL DEVELOPMENT DETAILS

Method:	Development Pump	**SWL – Before (m):**	DRY
Date:	12.01.21	**Time – Before:**	NA
Undertaken By:	AVB	**SWL – After (m):**	NA
Total Vol. Removed:	N/A	**Time – After:**	NA
PID Reading (ppm):	0.7		

Comments:

DEVELOPMENT MEASUREMENTS

Volume Removed (L)	Temp (°C)	DO (mg/L)	EC (µS/cm)	pH	Eh (mV)
	DRY				

Comments:Odours (YES / NO), NAPL/PSH (YES / NO), Sheen (YES / NO), Steady State Achieved (YES / NO)

YSI Used:

Tested By:	AVB	**Remarks:**
Date Tested:	12.01.21	- Steady state conditions - Difference in the pH less than 0.2 units, difference in the conductiveity less than 10% and SWL stable/not in drawdown
Checked By:	AVB	- Minimum 3 monitoring well volumes purged, unless well purged until it is effectively dry
Date:	12.01.21	

Appendix 7 - Acid Sulphate Soils

JKEnvironments

Client:	DEXUS	**Job No.:**	E33770PA
Project:	Proposed Mixed Use Development	**Well No.:**	MW2
Location:	122-128 & 130 Pyrmont Bridge Road; 206 Parramatta Road, ANNANDALE, NSW	**Depth (m):**	5.36

WELL FINISH

✓	Gatic Cover		Standpipe		Other (describe)

WELL PURGE DETAILS:

Method:	Peri Pump	**SWL – Before:**	2.12
Date:	15/1/21	**Time – Before:**	12:20
Undertaken By:	MP	**Total Vol Removed:**	
Pump Program No:		**PID (ppm):**	7.8

PURGING / SAMPLING MEASUREMENTS

Time (min)	SWL (m)	Vol (L)	Notes	Temp (°C)	DO (mg/L)	EC (µS/cm)	pH	Eh (mV)
3	2.32	1		23.5	3.0	654	6.95	94.4
5	2.61	2		23.4	3.3	642	6.71	89.4
4	2.96	3		23.5	3.9	632	6.44	79.0
4	3.24	4		23.0	4.0	629	6.33	71.8
5	3.[illegible]8	5		23.8	3.9	627	6.24	64.1
4	3.7	6		23.7	4.0	621	6.19	61.0
4	3.98	7		23.8	3.9	614	6.12	56.5
4	4.30	8		23.7	3.9	608	6.08	52.5
4	4.65	9		23.7	4.0	606	6.05	52.1

Comments: Odours (YES / NO), NAPL/PSH (YES / NO) Sheen (YES / NO) Steady State Achieved (YES / NO)

Sampling Containers Used: 2 x glass amber, 4 x BTEX vials, 1 x HNO3 plastic, 0 x H2SO4 plastic, 1 x unpreserved plastic

YSI used: 4

Tested By: Matthew Paton		**Remarks:**
Date Tested:	15/1/21	- Steady state conditions
Checked By:	AVB	- difference in the pH less than 0.2 units, difference in conductivity less than 10%
Date:	18/01/21	10% and SWL stable/not in drawdown

JKEnvironments

Client:	DEXUS	**Job No.:**	E33770PA
Project:	Proposed Mixed Use Development	**Well No.:**	MW3
Location:	122-128 & 130 Pyrmont Bridge Road; 206 Parramatta Road, ANNANDALE, NSW	**Depth (m):**	3.38

WELL FINISH

x	**Gatic Cover**		**Standpipe**		**Other (describe)**

WELL PURGE DETAILS:

Method:	Peri Pump	**SWL – Before:**	2.35
Date:	15/1/21	**Time – Before:**	1145
Undertaken By:	MP	**Total Vol Removed:**	
Pump Program No:		**PID (ppm):**	4.2

PURGING / SAMPLING MEASUREMENTS

Time (min)	SWL (m)	Vol (L)	Notes	Temp (°C)	DO (mg/L)	EC (μS/cm)	pH	Eh (mV)
3	2.49	1		22.2	4.0	699	6.97	116.0
4	2.62	2		21.9	4.1	668	6.80	103.4
3	2.40	3		21.8	4.2	682	6.64	96.3

Comments: Odours (YES / NO), NAPL/PSH (YES / NO) Sheen (YES / NO) Steady State Achieved (YES / NO)

Sampling Containers Used: 2 x glass amber 4 x BTEX vials, 1 x HNO3 plastic 0 x H2SO4 plastic, 1 x unpreserved plastic

YSI used: 4

Tested By: Matthew Paton	**Remarks:**
Date Tested: 15/1/21	- Steady state conditions
Checked By: AVB	- difference in the pH less than 0.2 units, difference in conductivity less than 10%
Date: 18/01/21	10% and SWL stable/not in drawdown

Appendix I: Guidelines and Reference Documents

Acid Sulfate Soils Management Advisory Committee (ASSMAC), (1998). Acid Sulfate Soils Manual

Australian and New Zealand Environment Conservation Council (ANZECC), (2000). Australian and New Zealand Guidelines for Fresh and Marine Water Quality

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)

National Health and Medical Research Council (NHMRC), (2018). National Water Quality Management Strategy, Australian Drinking Water Guidelines 2011

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

NSW EPA, (1995). Contaminated Sites Sampling Design Guidelines

NSW EPA, (2014). Waste Classification Guidelines - Part 1: Classifying Waste

NSW EPA, (2015). Guidelines on the Duty to Report Contamination under Section 60 of the CLM Act 1997

NSW EPA, (2017). Guidelines for the NSW Site Auditor Scheme, 3rd Edition

NSW EPA, (2020). Consultants Reporting on Contaminated Land, Contaminated Land Guidelines

National Environment Protection Council (NEPC), (2013). National Environmental Protection (Assessment of Site Contamination) Measure 1999 as amended (2013)

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

Protection of the Environment Operations Act 1997 (NSW)

State Environmental Planning Policy No.55 – Remediation of Land 1998 (NSW)

World Health Organisation (WHO), (2008). Petroleum Products in Drinking-water, Background document for the development of WHO Guidelines for Drinking Water Quality

Western Australia Department of Health, (2009). Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia